

Heads of Department Information Systems' Utilization on Communication Management of Public Secondary Schools in Nyamira County, Kenya

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Abstract: Communication remains and is a determining factor in the smooth running of institutions of learning. But on the other hand, its poor management in these institutions contributes to a great extent; to the provision of poor quality services, hence low quality education. This paper argues that the methods employed in the management of communication should take into consideration the paradigm shift in global communication trends. The purpose of this study was to establish the utilization of 'Information Systems' (IS) on communications in public secondary schools in Nyamira County. A survey design and mixed method approach were used in the study and a questionnaire was the main tool for collection of data. The target population was 400 Heads of Department of public secondary schools distributed in 5 sub-counties. Stratified random sampling technique was used to obtain a sample of 200 Heads of Department. Questionnaire was utilized to collect data. The data collected was analyzed using Analysis of Variance (ANOVA). The findings show that Website, SMS and e-mail were found to be the main channels of communication. They are utilized for sending and obtaining information, filing KRA returns, sending EMIS and for registering candidates for KNEC examinations. It is also established that utilization of SMS, website and e-mail is highest at the national schools compared to county and sub county ones, owing to better facilities, thereby, making communication effective and efficient leading to reduced costs.

Keywords: Information Systems, Management, Communication, Utilization.

I. INTRODUCTION

Communication which is a driver of curriculum implementation and supervision means to make known, to impact or to transmit information and it forms a bridge between principals, teachers and education officials; since principals must receive and give ideas, reports and instructions, explain problems and give demonstrations (Kirimi, 2013). Nduka (2014) noted that communication with employees is important even in small organizations in order to keep them informed about new products, customer wins, important appointments, and any new business opportunities.

Prudent management of communication is important in quality education provision. This means that the traditional methods of school management and administration are insufficient in enhancing quality in educational institutions (Okon, Akpan & Ukpong, 2011). New knowledge and skills are thus imperative in improving efficiency. Information Systems (IS) is thus a tool for use in the information and data gathering, and analysis in public secondary schools in the 21st century (Makera, Meremo, Role, and Role, 2013). IS refers to the telecommunications (telephone lines and wireless signals). It therefore means that they encompass; computers and enterprise software, middleware, storage and audio-visual systems that transmit, access, store and manipulate information (FOLDOC, 2013). For the purposes of this study IS refers

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to e-mail, computer software, SMS, e-learning and information management systems whereas, DVDs, internet, projectors, computers (laptop, mobile phones and Desk Tops) are infrastructures that enable IS to work.

E-mail and computer software were used in education in the United States of America, and the United Kingdom, mainly to process information on personnel, and to link local and central education administration offices (Castels, 1996 & Twining, 2002). Spectrum Community Secondary School in Britain, installed computer system that had administrators' APPLE Package consisting of attendance periods for students and teachers, and demographic aid for textbooks, and for monitoring, and this proved very useful (Simair, 2006). Computers and DVDs for instance, can be used in keeping students and various administration resources records (Maki, 2008 & Makera, Maremo, Role, E and Role, J, 2013).

In Kenya, various policies such as, the e-government, e-learning and teaching, and IS for educational management of information systems (EMIS), have been developed (Siele, 2006). GOK (2008) through Sessional paper No.1 of 2005 introduced 'Education Management Information Systems' (EMIS) policy in education which was to improve access to education and decision making leading to quality education. Similarly, Sessional paper No.10 of 2012, introduced 'Science, Technology and Innovation' (STI) policy whose aim was similar.

Equally, The Kenya National Examination Council (KNEC) has developed online registration of (KCSE) and (KCPE) candidates' policy and this compels school principals and head teachers to use internet for this service. Although, the government has introduced Information Systems policies, Oloo (2009) found out that 42.9% of the schools had computers, with national schools having better facilities than county and sub-county ones. Similarly, a study by Ocharo, *et al* (2015) observes that that most principals in schools have computers in their offices making easy it for IS utilization. Onderi and Makori (2013) opines that schools in this area have inadequate human and physical facilities, whereas, schools with adequate facilities perform better than those with inadequate ones in national examinations. According to Kaguri, Ibantu, and Thiaine (2014), it is because of careless financial and budgeting, poor financial reports and arbitrary auditing process. The studies by Makori and Onderi (2013) and Kaguri, Ibantu and Thiaine (2014) indicate inadequacy of facilities and inefficient financial management in public secondary schools. This, thus underscores the need for introduction of new skills in management, where IS may be the option for utilization in the management of public secondary schools in Nyamira County, Kenya.

Statement of the Problem:

The provision of quality education world over is pertinent to the achievement of Sustainable Development Goals (SDGs) and Vision 2030. One of the key pillars in the provision of this education is efficient communication network in public secondary schools. However, currently, the Heads of Department find it difficult to effectively manage communication using the conventional methods (Wangui & Miriti, 2014). Consequently, they need new ideas to re-invent communication to assist boost their administrative efficiency. It is on this basis that; Meziobi (2006) opined that 'Information Systems' (IS) may be a tool that can be employed to address these challenges in communication. Utilization of 'Information Systems' comes in hand to address these challenges because our country (Kenya), hinges the achievement of the Sustainable Development Goals (SDGs) and Vision 2030 on technology. Therefore, the present study seeks to establish the utilization of 'Information Systems' on management of communication in public secondary schools in Nyamira County, Kenya.

Significance of the study:

This study would be valuable to students and parents of Nyamira County as it would provide information on the utilization of IS on finance management, curriculum supervision and implementation; communication as it would a supplement to learning resources. The parents would benefit from the prudent management of finance resources, thus reducing wastage. Utilization of IS in school administration and management would drastically reduce resource wastage and bring about efficiency (Makera *et al*, 2013). The students would attain higher academic qualifications enabling them to join competitive courses in the universities. The principals would benefit from the information on utilization of information systems in monitoring implementation and supervision of school curriculum and its use in management of students, support staff and teachers, and efficient finance management. The ministry of education and policy makers

would benefit from data on how best schools could be run and may use this same information in rolling out policy on school administration using Information Systems (IS).

Conceptual framework:

Information systems such as e-mail, SMS, Website and IMS as independent variables, bring efficiency in school finance management, communication, curriculum implementation and supervision

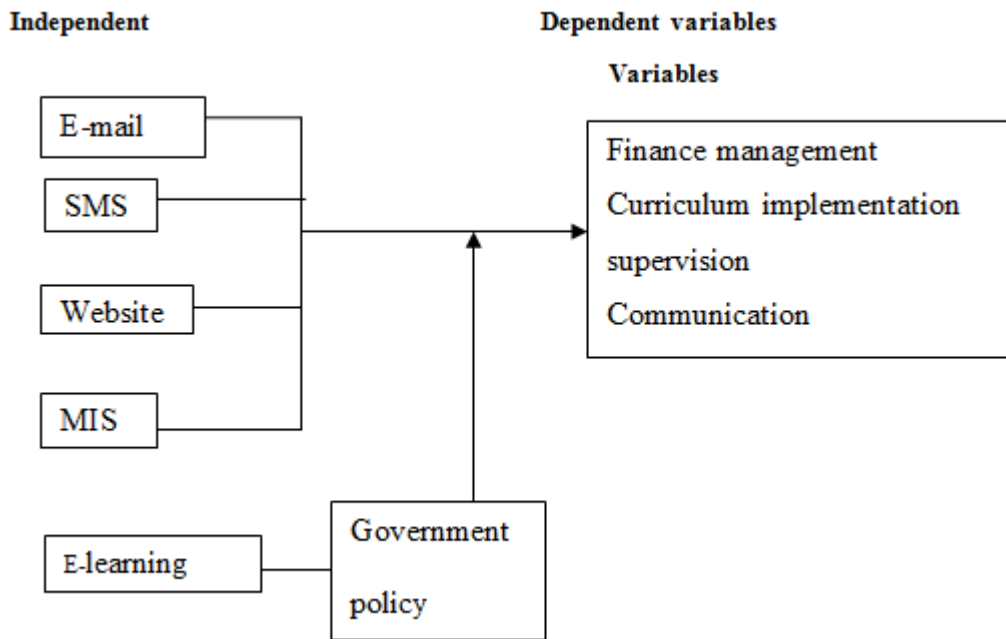


Figure 1.1: Conceptual Framework

This conceptual framework shows how the independent and dependent variables relate to each other in the study. The independent variables; e-mail, SMS, website, MIS and e-learning are expected to positively influence the dependent variables; finance management, curriculum implementation and supervision; and communication to bring efficiency and effectiveness in public secondary school management.

II. LITERATURE REVIEW

Institutions are made up of more than one department and therefore there should be a good and efficient communication network within to interconnect these departments so as to enable a smooth flow of information. King and Godwin (2002) argue that for institutions involved in learning, parents must take part in shaping their children behavior by always encouraging and motivating the children to develop positive attitude towards school, good classroom conduct and self-esteem and this can only be achieved through effective communication. Armstrong (2009) agrees with Ling and Godwin that effective communication is vital in running of institutional programmes. Any change in an organization such as contingent pay, working methods, technology, and services need to be known by employees; and therefore effective communication will help improve relationship at work, teamwork, decision making and problem solving techniques amongst the employees (Robinson and Judge, 2007). Lack of effective communication therefore will lead to poor quality education resulting in graduates who cannot deliver quality services. A study on the influence of communication channels on management practices in Kenyan Public Universities revealed that MMUST relies on HODs, Group representations, memos, notice boards, face to face and telephone to communicate (Namasaka, et al (2013). While, Mutua (2014) said that Newspapers, radio and Telephones are important channels for communication with customers, investors and the community during product launching because they reach a larger target market however, with increasing digitalization these channel are increasingly being rarely used.

Communication within an organization is very important and when it is effective, it enables constructive teamwork, since colleagues understand the way that communication is done and they feel recognized (Njiru, 2015). Nakpodia (2010) argued that communication within the school enhances discipline and maintains law and order. A study by Odhiambo (2005) found that Principals used school assemblies, staff meetings, HODs, memos, staff reports and consultations to communicate within the school, however, the channels are prone to distortion due language barriers and absenteeism on the part of the recipients thus they become inadequate in conveying messages to the recipients. Similarly, Kiriago (2013) found that when oral communication was used by students, administrators, HODs, teachers and support staff to communicate to their external target audience, there is a high tendency of people to forget too fast. However, it has been observed that technology such as internet has improved communication as it enables users to access news, search for information, plan and book vacations and even buy households from home (Kefalaki, 2012).

One of the common challenges of communication is failing to communicate the deliberations of meetings with staff in time leading to information failure or late communication (Mamuli, Mustosto, Namasaka and Odera, 2013). It is also noted that 'Top-down' communication affect organization cohesion as employees don't feel that their supervisor interact with them enough or communicate reliable information about the organization to them (Njuru, 2015). Effective communications within the institutions thus serve as a driving force behind successful activities hence there is need for every organization to embrace utilization of good channels of communication. Management information systems therefore provide information to administrators and the teachers for informed planning, policy making and evaluation (Madiha, 2014). It is such an important tool for management of schools as teachers and other members of staff can sign in online as they come and leave school. Management information systems are utilized on tracking students who have defaulted on fee payment (Benwari, 2014).

Information Systems, need structures which will enable them work. Kamile (2006) opined that the number of computers, computers connected to internet, their location; and software used in schools are part of the important facilities for utilization of 'Information Systems' in schools. Although Information Systems have proved so vital in public secondary school management, not all schools have utilized the technology. Aduwa-Ogiegbaen and Iyam (2005) argue that lack of appropriate software which was culturally suitable to Nigeria, was a stumbling block to technology adoption. This finding was different from that of Kamile(2006), that found that school principals' perceptions about IS, determined the level of their utilization. While, Mingaine (2013) argued that: in Kenya the challenges of IS implementation were due to limited qualified teachers and high cost of infrastructure. On the other hand, Shah (2014) opined that management information systems (MIS) utilization was impeded by administrators' lack of time, skills, and technical support. Kidombo, Gakuu and Nderito (n.d) study in selected schools in Kenya, concurred with shah that lack of skills in 'Information Systems', prevented school managers from utilizing the technology.

Short Message Service (SMS) is a household name common in almost all mobile phone users, and as reported by Queensland Government (2013), its' civil servants even use government network in their departmental offices to communicate to friends, family members, do online banking or pay bill, access breaking news and other online media site. Carke(2015) said that in New Zealand, most schools use SMS to capture achievement data and parents are given report using the stored information and standard templates in SMS. This SMS technology has had a wide application in Tanzanian education sector where rural schools uses mobile network to send Education Management Information System(EMIS) and other statistical data via SMS to Ministry of Education and Vocational Training(MoEVT).

Traxer and Dearden (n.d) say that these returns are used by ministry officials in sub-saharan Africa in allocating resources, however their transmission process currently used by letter-post, courier or by phone conversation is slow, expensive and error prone and most are stored and never used. SMS has been used in notifying students about changes in the timetables and sending bulk learning material resources in the rural areas in the United Kingdom (UK) (Nix, Russel and Keagan, n.d). Obrien (2015) observed that parents want curriculum description and instructional programs, calendar of events and meetings, information on students' safety (quality of teaching and educational program changes) communicated through e-mail, website, SMS and voice messaging.

Queensland, government officials use SMS from their departments for personal use in communicating to friends, family members, and, for online banking and paying bills; but in New Zealand most schools use it to capture achievement data of students which are then sent to parent from stored information and standard templates. In Tanzania the SMS is used to

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send EMIS to the MoEVT headquarters whereas in Nyamira North Sub-county the studies did not reveal SMS usage. The study also found that there was low level computer implementation prompting usage of SMS as it has a high acceptability, coverage, ownership among teachers and is socially inclusive (Traxer and Dearden, n.d).

Sunday and Oni (2012) found that Nigerian school administration used, e-mail to send and receive, bulk information to and from parents and other stakeholders and receive and send information on students, staff and materials to and from government and other agencies. Cynon (n,d) said that schools and colleges use the website to advertise for places and students and parents apply through the website. Whereas management information systems are used in the offices to store data on students and personnel (Shah, 2014),

Shih and Kin(2003) argued that currently distance learning is primarily limited to colleges and corporate training secondary and elementary schools have not adopted it due limitations of network infrastructure, experiences, manpower, effective policy and acceptance from the employees.

Zajicova(2007) said that e-learning encompasses computer learning, internet resources and educational websites offering worksheets and interactive exercises for children . Questions can be answered online, and can answer emergency questions at any time. E-learning courses will help teachers and offer new ideas to make their lessons more attractive for their students and thus make them more active during the lesson. A study by Kiilu (2012) in Kitui County, which examined E-readiness implications of e-adoption in Kenya, found that 10% of secondary schools offer computer studies which are an indicator of e-readiness. However, another study by Muluva and Kyalo(2013), on relationship between principals' teachers' and students' attitude towards e-learning adoption in curriculum implementation, using cross-sectional survey research design found that the students' attitude had significant influence on schools' readiness to adopt e-learning.

III. RESEARCH METHODOLOGY

Research design:

This study employed survey design. This is a design which involves a brief interview and collection of information or data in its original form. The design is able to collect views from a large population using a single questionnaire (Cresswell & Plano, 2011). This method was appropriate in this study to gather a lot of information on 'Information Systems' utilization using a questionnaire from the many sparsely populated schools within a short time. The researcher thereafter used 'Structured in-depth interview schedule' to collect more information on the utilization of information systems from two key informants (principals of the two national schools). A mixture of quantitative and qualitative mixed method approach (paradigm) was suitable for this study as opined by Cresswell and Plano (2007) that Mixed Method Design methodology provides a better understanding which either method cannot. The researcher thus, administered 217 HODs' questionnaires in 80 public secondary schools in Nyamira County, Kenya.

In Mixed methods approach, the researcher based the inquiry on the assumption that collecting diverse types of data, best provided an understanding of a research problem as it brought with it, abroad survey in order to generalize results to the population and then focused, in a second phase, the researcher concentrated on detailed qualitative structured interviews on the key informants to collect detailed views from participants an idea shared by (Creswell, 2003).

Sample size and sampling procedures:

The sample size was obtained using Proportionate Stratified Random Sampling method. Mwangi (2015) said that this method involves the division of a population into strata with members sharing similar characters and then obtaining a random sample from each stratum that is proportional to the stratum's size as relates to the population.

The sample size was obtained using Willen (2013)' table 3.1. The margin of error for this study- that is the deviation between the opinions of the respondents and the entire population was 5% and the confidence level 95%. The total number of respondents for the study was 217 who were distributed thus: 2 national schools each contributing 8 HODs making a total of 16, county schools number is 24, each contributing 3 HODs making a total of 72 HODs. The county and national schools sample HODs were selected by purposive sampling technique. This is a type of non-probability sampling method that relies on data collection from members who are conveniently available to participate in the study. It is

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advantageous because it is easy to sample respondents, data collection can be facilitated in a short duration of time and it is cost effective (Trochim, 2008).

The number of HODs who participated in the study was obtained from Willem’s table proportionately; where a population of 500 contributed a sample of 217 at 95% confidence level. Since 400 is not in the table, it was taken to be nearer 500 than 100, thus a sample of 217 HODs was taken for the study.

Table 1: Willem’s 2013 sample size selection and confidence levels table

Population	Confidence level=95% margin of error			Confidence level=99% Margin of error		
	5%	2.5%	1%	5%	2.5%	1%
100	80	94	99	87	96	99
500	217	377	475	285	421	485
1000	278	606	906	399	727	943
10 000	370	1332	4899	622	2098	6239
100 000	383	1513	8702	659	2585	14227
500 000	384	1532	9423	663	2640	16055
1000 000	384	1534	9512	663	2647	16317

Table 2: Sample size formula for schools and HODs

Sub county	Formula	Sample of HODS	Sample of schools
Nyamira South	$\frac{21 \times 129}{80}$	34	21
Nyamira North	$\frac{24 \times 129}{156}$	39	24
Manga	$\frac{12 \times 129}{80}$	19	12
Masaba North	$\frac{14 \times 129}{80}$	23	14
Borabu	$\frac{9 \times 129}{80}$	15	9
Total		129	80

Once the schools had been sampled and the number of HODs determined, the schools from which the sample of HODs was selected, were obtained by simple random sampling at each sub-county.

Instrumentation:

The study used three types of data collection instruments namely; the principals’ and HODs’ questionnaires, and an interview schedule. The questionnaires have the advantage of allowing for minimal contact between the researcher and the participants, using multiple avenues to administer such as: hand delivery, snail mail, e-mail and online; participants’ answers are readily recorded on prescribed forms. Therefore, the participants are independent in the process of responding to the items raised. In-depth interview schedule obtained detailed information on utilization of IS in, finance, curriculum implementation and supervision, and communication from principals of national schools. This is a one on one conversation and thus provides the researcher with the opportunity of getting clear information on misconceived ideas or information which the questionnaire cannot.

Data collection procedures

The researcher obtained a consent letter from the school of post-graduate studies, and then proceeded to the National Council of Science and Technology to obtain a research permit. The researcher then prepared the data collection instruments ready. The instruments were administered by the researcher himself during the data collection process. Some of the completed questionnaires were collected the same day and those that were unable to, were given one week after which the researcher went round to collect them.

The interview schedule was conducted after making arrangements with the interviewees to compromise on the convenient time. During the interview the data was voice recorded and transcribed later into meaningful data.

Methods of data analysis:

The data was collected using questionnaires and in-depth interview schedule. The questionnaires containing data from the respondents were coded and edited to ensure completeness and consistency. The items in the questionnaire were divided into; demographic, general and specific IS utilization. Demographic data was analyzed using descriptive statistics, while general and Specific IS utilization data in Objective one; two and three were analyzed using one-way Analysis of Variance (ANOVA). Objective four was analyzed using regression. ANOVA is a statistical test which analyzes variance and it is helpful in analyzing two or more population means which enables a researcher to draw conclusions on various results and predictions about two or more sets of data (Howell, 2010). This method was appropriate in the analysis of this research data, for it considered data from sub county, county and national schools from public secondary schools in Nyamira County which formed three independent groups.

Ethical considerations:

The principals and HODs were invited to participate voluntarily, with a clear understanding that they were under no obligation to do so and that there was no negative consequences for them if they did not assist in the research. They were also assured that all the responses given would be treated with confidentiality and anonymity.

All the HODs and principals involved in the researches were made fully aware of what they were being asked to do and any potential negative consequences of their participation was explained before the exercise began.

IV. RESULTS AND DISCUSSION

Information Systems Utilization on Communication by Heads of Department:

This information was sought in order to establish the type of IS and how they are utilized in public secondary schools in Nyamira County, Kenya. The study first determined the type of information systems using descriptive statistics. The second part of the study involved analysis of variance to determine significance of difference in IS utilization and then hypothesis testing. The data was further subjected to post hoc HSD analysis to identify the differences in levels of IS utilization between sub county, county and national public secondary schools.

Information System Utilization on Communication by Heads of Department:

The study sought to find out the type of ‘information systems’ utilized by principals of sub county, county and national public secondary schools from the questionnaire. Table 4.3 illustrates the findings while the answers to the question below are found in Table 4.4.

How are IS utilized on the management of communication between sub county, county and national public secondary schools in Nyamira county, Kenya? The results are illustrated in Table 4.5

Table 3. Information Systems Utilization on Communication by Heads of Department

Information Systems	No. of respondents	%	No of Non respondents	%
SMS	149	75.3	51	24.7
E-mail	28	14.2	172	85.8
Website	19	9.6	181	90.4

Illustrations in Table 4.3 show that HODs used SMS most at 149 (75.3 %) in relation with e-mail at 28 (14.2%) and website 19 (9.6%). SMS is important in calling for meetings as it is faster, cheaper and convenient and the information can be retraced for reference if needed. SMS is applicable in all forms of communication vertical, horizontal and diagonal communication. E-mails and websites were minimally utilized at (14.2%) and (9.6%) respectively. Therefore, the data has revealed that SMS, E-mail and Website are utilized on management of communication in sub county, county and national public secondary schools in Nyamira County, Kenya. These data were further subjected to hypothesis testing in inferential

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statistics to determine the type of IS utilized by HODs in the management of communication of public secondary schools. This was further investigated using the 3rd null hypothesis at $p < .05$ statistical significance levels;

H0: There is no significant difference in the utilization of IS on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.

Information Systems Utilization on Communication by Heads of Department

The study sought to find out the type of information systems utilized by HODs in managing the communication process in their schools. The investigation conducted involved general and specific information systems utilization.

Significance of Difference Analysis on Information Systems General Utilization on Communication

This analysis of significance of difference was done to determine the IS utilization on the management of finance in sub county, county and national public secondary schools. The results are illustrated in Table 4

Table 4 Significance of Difference Analysis on Information Systems General Utilization on Communication

		Sum of Squares	df	Mean Square	F	Sig.
Com- emails	Between Groups	42.630	2	21.315	12.102	.000
	Within Groups	341.695	194	1.761		
	Total	341.695				
Com- sms	Between Groups	72.452	2	36.226	27.231	.000
	Within Groups	259.412	195	1.330		
	Total	331.864	197			
com webs	Between Groups	4.842	2	2.421	7.391	.001
	Within Groups	63.866	195	.328		
	Total	68.707	197			

The data illustrated in table 4.29; show the analysis of variance conducted to test for significance of differences in IS utilization on communication in public secondary schools in Nyamira County. It was established that there is a statistical significant difference at $p < .000$ for e-mail and SMS utilization on communication; e-mail $F(2, 194) = 12.102$, and SMS, $F(2, 195) = 27.231$. Equally, there is a statistical significant difference at $p < .001$ level in website utilization on communication; website $F(2, 195) = 7.391$. Since $p < .000$ and $p < .001$ are less than $p < .05$, the null hypothesis is rejected: 'There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Therefore, the alternative hypothesis is accepted: 'There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Thus, the data has revealed that e-mail, SMS and website are utilized on the management of communication but their utilization vary significantly between sub county, county and national public secondary schools in Nyamira County, Kenya. This is supported by finding in Table 4.28 which show that HODs used SMS most at 149 (75.3 %) in relation with e-mail at 28 (14.2%) and website 19 (9.6%). The variation in the utilization stems from an equal and inadequate distribution of the IS equipments in schools, hence hindering adoption and eventual utilization. This however, has affected service delivery in these schools. Those schools that utilize 'Information Systems' have been found to offer impressive services and continue to post good results in Kenya National of Secondary Examination.

The F-values from the data show that there is low variability in utilization of e-mail, SMS and website ($F = 12.102, 27.231$ and 7.391 respectively). Therefore, e-mail, SMS and website utilization on communication vary among the schools to a small extent. The implication is that this information systems utilization has had a great effect in the improvement of the communication between and within educational institutions. Principals are able to communicate with their staff from the office thereby delivering important messages that need urgent action. However, some staff members may intentionally ignore the messages citing low battery of phone, being away or the children may have accidentally deleted the messages as some of the excuses for failing to read the message. Nevertheless, e-mail and SMS remain the quickest means of communication in any organization.

Significance of Difference Analysis of Information Systems Specific Utilization on Communication by Heads of Department:

This analysis of significance of difference of IS utilization on communication was done to determine specific IS utilization on the management of communication in sub county, county and national public secondary schools.

Table 5 Significance of Difference Analysis of Information Systems Specific Utilization on Communication

Variable	IS utilization	SSB	SSW	dfB	dfW	MSB	MSW	F	Sig
Used for communicating	E-mail	42.630	341.695	2	194	21.315	1.761	12.102	.000
	SMS	72.452	259.412	2	195	36.226	1.330	27.231	.000
	Website	4.842	63.866	2	195	2.421	.328	7.391	.000
Used for KNEC registration	Website	3.876	58.286	2	195	1.938	.299	6.484	.000
Used to obtain information	SMS	72.452	259.412	2	195	36.226	1.330	27.23	.000
	E-mail	3.876	24.286	2	195	1.938	.125	15.156	0.00
Used convening meetings	SMS	000	000	2	195	36.226	1.330	27.231	000
	E-mail	3.876	24.286	2	195	1.938	.125	15.561	0.000
Used for KRA returns	Website	3.876	58.286	2	195	1.938	.299	6.484	.002
Sending EMIS	E-mail	3.299	58.203	2	194	1.964	.300	6.547	.002

N= 200(sub county- 120, county-64, national-16) SSB-sum of squares between -sum of squares within, dfB-degrees of freedom between,dfw -degrees of freedom within, MSB-mean squares between, MSW-mean squares within, F- anova value, sig- significance

Table 5; shows the analysis of variance conducted to test for significance of differences in SMS, e-mail and website utilization on general communication, KNEC registration, obtaining information, convening meetings, filing KRA returns and sending EMIS between sub county, county and national public secondary schools in Nyamira County. The data in this table show that there is a statistical significant difference at $p < .000$ in e-mail utilization, e-mail, $F(2, 194) = 12.102$ on general communication, e-mail, $F(2, 194) = 15.156$ on obtaining information, e-mail, $F(2, 194) = 15.561$ on convening meetings and e-mail, $F(2, 194) = 6.547$, $p < .000$ on sending EMIS. Since $p < .000$ is less than $p < .05$, the null hypothesis is rejected: ‘There is no significant difference in IS utilization on management of communication in public secondary schools between sub county, county and national public secondary school in Nyamira County, Kenya.’ Therefore, the alternative hypothesis is accepted: ‘There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.’ Thus, the data shows that e-mail is utilized on general communication, obtaining information, convening meetings and sending EMIS but it varies significantly between sub county, county and national public secondary schools in Nyamira County, Kenya.

From the F-values ($F=6.683$), for e-mail utilization indicates that variation between sub county, county and national public secondary schools is to a small extent. Therefore, the schools have underscored the importance of utilization of information systems for efficient and effective service delivery. This in turn led to better performance in Kenya Certificate of Secondary Education.

Similarly, SMS utilization is significant at $p < .000$ level in mean scores of SMS, SMS, $F(2, 194) = 27.231$ on general communication, SMS, $F(2, 194) = 27.23$ on obtaining information and SMS, $F(2, 194) = 27.23$ on convening meetings. Since $p < .000$ is less than $p < .05$, the null hypothesis is rejected: ‘There is no significant difference in SMS, MIS, e-mail, e-learning and website utilization on management of communication between sub county, county and national public secondary school in Nyamira County, Kenya.’ Therefore, the alternative hypothesis is accepted: ‘There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.’ Therefore, the study has established that SMS is utilized on general, communication obtaining information and convening meetings in ;sub county, county and national public secondary schools in Nyamira County, Kenya.

The F-value of $F=27.231$ for the utilization of SMS on; general communication, obtaining information and convening meetings, indicate an average variation in utilization between sub county, county and national public secondary schools in Nyamira County, Kenya.

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Equally, there is a significant difference at $p < .000$ level in website utilization, website, $F(2, 195) = 7.391$ on general communication, website, $F(2, 195) = 6.484$ on KNEC registration and website, $F(2, 195) = 6.484$ on filing KRA returns. Since $p < .000$ is less than $p < .05$, the null hypothesis is rejected: ‘There is no significant difference in SMS, MIS, e-mail, e-learning and website utilization on management of communication between sub county, county and national public secondary school in Nyamira County, Kenya.’ Therefore, the alternative hypothesis is accepted: ‘There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.’ Therefore, website is utilized on general communication, KNEC registration and filing KRA returns in; sub county, county and national public secondary schools in Nyamira County, Kenya. The F-values of $F=7.391$ and 6.84 for utilization of website on general communication, KNEC registration and filing KRA returns in sub county, county and national public secondary schools varies only to a small extent. Filing of KRA returns and KNEC registration is a government policy, which must be effected and as such all schools must comply. This is the reason why there is a very small variation in IS utilization between sub county, county and national schools. The question how IS are utilized on the management of curriculum implementation and supervision in public secondary schools in Nyamira County, Kenya is answered. Equally, the 3rd null hypothesis was tested at $p < .05$ statistical significance levels.

Post Hoc Multiple Comparisons of Information Systems Specific Utilization on Communication by Heads of Department:

Post hoc multiple comparisons was done to establish where the differences in IS utilization occurs between sub county, county and national public secondary of Nyamira County. The results are illustrated in Table 4.3

Table 6 Post Hoc Multiple Comparisons of Information Systems Specific Utilization on Communication

Dependent Variable	(I) cat of school	(J) cat of school	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
com emails	1 Sub county	2 County	-0.949*	.210	.000	-1.45	-.45
		3 National	-0.949*	.328	.012	-1.72	-.17
	2 County	1 Sub county	0.949*	.210	.000	.45	1.45
		3 National	0.000	.349	1.000	-.83	.83
	3 National	1 Sub county	0.949*	.328	.012	.17	1.72
		2 County	0.000	.349	1.000	-.83	.83
com sms	1 Sub county	2 County	1.235*	.183	.000	.80	1.67
		3 National	1.235*	.285	.000	.56	1.91
	2 County	1 Sub county	-1.235*	.183	.000	-1.67	-.80
		3 National	0.000	.304	1.000	-.72	.72
	3 National	1 Sub county	-1.235*	.285	.000	-1.91	-.56
		2 County	0.000	.304	1.000	-.72	.72
com webs	1 Sub county	2 County	-0.319*	.091	.002	-.53	-.11
		3 National	-0.319	.141	.064	-.65	.01
	2 County	1 Sub county	0.319*	.091	.002	.11	.53
		3 National	0.000	.151	1.000	-.36	.36
	3 National	1 Sub county	0.319	.141	.064	-.01	.65
		2 County	0.000	.151	1.000	-.36	.36
con mt sms	1 Sub county	2 County	1.235*	.183	.000	.80	1.67
		3 National	1.235*	.285	.000	.56	1.91
	2 County	1 Sub county	-1.235*	.183	.000	-1.67	-.80
		3 National	0.000	.304	1.000	-.72	.72
	3 National	1 Sub county	-1.235*	.285	.000	-1.91	-.56
		2 County	0.000	.304	1.000	-.72	.72
con-mte-mail	1 Sub county	2 County	-0.286*	.056	.000	-.42	-.15
		3 National	-0.286*	.087	.004	-.49	-.08
	2 County	1 Sub county	0.286*	.056	.000	.15	.42
		3 National	0.000	.093	1.000	-.22	.22
	3 National	1 Sub county	0.286*	.087	.004	.08	.49
		2 County	0.000	.093	1.000	-.22	.22

*. The mean difference is significant at the 0.05 level.

Con mt-sms- SMS utilization in convening meetings, com mis-MIS utilization in communication, com emails-utilization of e-mails in communication.

Table 6 gives illustrations of differences in IS utilization between each category of schools. The data from the table indicates that there is a significant difference at $p < .000$ level in e-mail utilization on general communication with a mean difference of $-.949$ between; sub county and county; and at $p < .012$ level between sub county and national public secondary schools. Since $p < .000$ and $p < .012$ are less than $p < .05$, the null hypothesis is rejected: 'There is no significant difference IS utilization on management of communication between sub county; county and national public secondary schools in Nyamira County, Kenya.' Therefore, the alternative hypothesis is accepted: 'There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Therefore, e-mail utilization on general communication with a negative mean difference of $-.949$ between; sub county and county or national public secondary schools is low. The low utilization of e-mail at sub county schools is attributed to inadequate resources committed to the implementation of IS. This therefore, could lead to poor delivery of services leading to poor quality education.

Most county and national schools receive a lot of financial support from the government and parents hence have fairly adequate resource materials that they can commit in IS adoption. This argument is supported by the data in the table which shows that there is no significant difference at $p < 1.000$ level in e-mail utilization between county and national schools. Since $p < 1.000$ is greater than $p < .05$, the null hypothesis is not rejected: 'There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Thus, the findings show that there is no difference in utilization of e-mail on general communication between county and national public secondary schools.

In Kenya, most households own mobile phones that are used for messaging. Teachers therefore own mobile phones and are expected to utilize them for SMS; however, the data shows that there is a significant difference at $p < .000$ level in SMS utilization on general communication and convening meetings: with a mean difference of 1.235 between sub county and county; and sub county and national public secondary schools. Since $p < .000$ is less than $p < .05$, the null hypothesis is rejected: 'There is no significant difference in IS utilization on management of communication between sub county; county and national public secondary schools in Nyamira County, Kenya.' Therefore, the alternative hypothesis is accepted: 'There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Thus, SMS utilization on general communication and convening meetings with a positive mean difference of 1.235 is a higher in; sub county when compared to county and national public secondary schools. It is expected that county and national school heads of department could be using SMS to carry out general communication and convention of meetings but to the contrary. This is probably done to avoid cases of teachers who excuse themselves from having not received the message.

Although SMS utilization on general communication and convening meetings is higher in sub county schools, there is no significant difference at $p < 1.000$ level in SMS utilization on general communication and convening meetings between county and national public secondary schools. Therefore, since the $p < 1.000$ is greater than $p < .05$, the null hypothesis is not rejected: 'There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Thus, the findings show that there is no difference in utilization of SMS on general communication and convening meetings between county and national public secondary schools.

Websites are very useful for providing news or information and educational materials. In this study, website was found to have a significant difference at $p < .002$ levels in utilization on general communication with: a mean difference of $-.319$ between sub county and county; and sub county and national schools. Since $p < .000$ is less than $p < .05$, the null hypothesis is rejected: 'There is no significant difference in IS utilization on management of communication between sub county; county and national public secondary schools in Nyamira County, Kenya.' Therefore, the alternative hypothesis is accepted: 'There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Website utilization on general communication with a negative mean difference of $-.319$ indicates that it is the least utilized in sub county schools than county or national public secondary schools. This is because it requires internet and computers which are expensive to acquire at sub county schools due to inadequate financial resources.

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Contrastingly, there is no significant difference at $p < 1.000$ levels in website utilization on general communication between county and national public secondary schools. Therefore, since $p < 1.000$ is greater than $p < .05$, the null hypothesis is not rejected: ‘There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.’ Thus, the findings show that there is no difference in utilization of website on general communication between county and national public secondary schools.

Utilization of E-mail by schools in this study, show that there is a significant difference at $p < .000$ level ,on convening meetings with mean difference of $-.286$ between sub county and county; and sub county and national public secondary schools. Since $p < .000$ is less than $p < .05$, the null hypothesis is rejected: ‘There is no significant difference in IS utilization on management of communication between sub county; county and national public secondary schools in Nyamira County, Kenya.’ Therefore, the alternative hypothesis is accepted: ‘There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.’ The data of E-mail utilization on convening meetings has a negative mean difference. This thus, indicates that sub county schools utilize e-mail the least when compared to county and national public secondary schools.

However, the data show that there is no significant difference at $p < 1.000$ levels in E-mil utilization on convening meetings between county and national schools. Therefore, since the $p < 1.000$ is greater than $p < .05$, the null hypothesis is rejected: ‘There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.’ Thus, the data shows that the utilization of e-mail on convening meetings between sub county and national public secondary schools does not differ for similar reasons advanced above.

Table 7 Post Hoc Multiple Comparisons of Information Systems Specific Utilization on Communication Continued

Dependent Variable	(I) cat of school	(J) cat of school	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
obt-inf- sms	1 Sub county	2 County	1.235*	.183	.000	.80	1.67
		3 National	1.235*	.285	.000	.56	1.91
	2 County	1 Sub county	-1.235*	.183	.000	-1.67	-.80
		3 National	.000	.304	1.000	-.72	.72
	3 National	1 Sub county	-1.235*	.285	.000	-1.91	-.56
		2 County	.000	.304	1.000	-.72	.72
obt-inf email	1 Sub county	2 County	-.286*	.056	.000	-.42	-.15
		3 National	-.286*	.087	.004	-.49	-.08
	2 County	1 Sub county	.286*	.056	.000	.15	.42
		3 National	.000	.093	1.000	-.22	.22
	3 National	1 Sub county	.286*	.087	.004	.08	.49
		2 County	.000	.093	1.000	-.22	.22
snd-inf- sms	1 Sub county	2 County	.580*	.147	.000	.23	.93
		3 National	.580*	.229	.032	.04	1.12
	2 County	1 Sub county	-.580*	.147	.000	-.93	-.23
		3 National	.000	.244	1.000	-.58	.58
	3 National	1 Sub county	-.580*	.229	.032	-1.12	-.04
		2 County	.000	.244	1.000	-.58	.58
snd-inf-email	1 Sub county	2 County	-.218*	.051	.000	-.34	-.10
		3 National	-.218*	.080	.018	-.41	-.03
	2 County	1 Sub county	.218*	.051	.000	.10	.34
		3 National	.000	.085	1.000	-.20	.20
	3 National	1 Sub county	.218*	.080	.018	.03	.41
		2 County	.000	.085	1.000	-.20	.20

*. The mean difference is significant at the 0.05 level.

obt-inf-email-obtaining information using e-mail, obt-inf- sms-obtaining information using sms, snd-inf- sms- sending information using sms, snd-inf- email- sending information using e-mail, reg knec-web-registering in KNEC using website

Table 7, shows that there is a significant difference at $p < .000$ levels in utilization of SMS on obtaining general information with a mean difference of 1.235 and at $p < .000$; and $p < .032$ on sending information with a positive mean difference of .580 between sub county and county; and sub county and national public secondary schools respectively. Since $p < .000$ and $p < .032$ is less than $p < .05$, the null hypothesis is rejected: 'There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Therefore, the alternative hypothesis is accepted: 'There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Thus, SMS utilization on obtaining information with: a positive mean difference of 1.235 between sub county and county, and sub county and national; and a positive mean difference of .580 in SMS utilization on sending information between sub county and county; and sub county and national public secondary schools. It is therefore clear that SMS utilization is higher at sub county schools. It may be argued that HODs in sub county secondary schools communicate to their teachers using SMS and teachers too, use the same communication process whenever they are away. Contrary to this, HODs in county and national schools require written application for permission by teachers in order to be away.

As much as SMS utilization on obtaining information is higher in sub county schools when compared to county or national ones, data show that there is no significant difference at $p < 1.000$ level in utilization on obtaining and sending information between county and national schools. Since $p < 1.000$ is greater than $p < .05$, the null hypothesis is not rejected: 'There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Thus, utilization of SMS on obtaining and sending information between county and national public secondary schools does not differ.

Similarly, there is a significant difference at $p < .000$ and $p < .004$ levels in utilization of e-mail on obtaining general information with a negative mean difference of: -.286 between sub county and county; and sub county and national schools respectively. On the other hand, a significant difference occurs at $p < .000$ and $p < .018$ levels for e-mail utilization on sending information with a negative mean difference of: -.218 between sub county and county; and sub county and national public secondary schools respectively. Since $p < .000$, $p < .004$ and $p < .018$ are less than $p < .05$, the null hypothesis is rejected: 'There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Therefore, the alternative hypothesis is accepted: 'There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' E-mail utilization on obtaining and sending information has negative mean difference of -.286 and -.218 which means that sub county schools do not utilize it as much as county or national schools. The HODs in sub county schools are few: equally, the teachers are few. In some of the schools the principal's office and staffroom are located in the same roof making one on one communication easier and thus leading to less utilization of e-mail. For external communication, the schools still rely on sending and receiving information through the post office; a method that takes longer and more costly as well as being inefficient. This affects the way communication is done in sub county secondary schools given that some of them are located in remote areas where letters from the ministry headquarters or TSC would take a long time to reach. Since county and national schools utilize e-mail for sending and obtaining information, they could be more efficient and effective in communication between themselves and their headquarters. The HODs in these schools find it easier to disseminate bulk information through e-mail to their teachers thus minimizing unnecessary briefs which take a lot of learning time. Therefore there is quality education advanced through the utilization of information systems.

County and national schools have perfected the art of information systems utilization almost at equal level due to the competition to outdo each so as to emerge the best in national examinations. This is supported by the data from the table which shows that there was no significant difference in e-mail utilization at $p < 1.000$ level between county and national schools. Therefore, since $p < 1.000$ is greater than $p < .05$, the null hypothesis: 'There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in

Nyamira County, Kenya.’ Thus, the utilization of e-mail on obtaining and sending information between county and national public secondary schools does not differ.

Table 8 Post Hoc Multiple Comparisons of Information Systems Specific Utilization on Communication Continued

Dependent Variable	(I) cat of school	(J) cat of school	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
reg knec-web	1 Sub county	2 County	.286*	.087	.003	.08	.49
		3 National	.286	.135	.089	-.03	.60
	2 County	1 Sub county	-.286*	.087	.003	-.49	-.08
		3 National	.000	.144	1.000	-.34	.34
	3 National	1 Sub county	-.286	.135	.089	-.60	.03
		2 County	.000	.144	1.000	-.34	.34
snd-kra web	1 Sub county	2 County	.286*	.087	.003	.08	.49
		3 National	.286	.135	.089	-.03	.60
	2 County	1 Sub county	-.286*	.087	.003	-.49	-.08
		3 National	.000	.144	1.000	-.34	.34
	3 National	1 Sub county	-.286	.135	.089	-.60	.03
		2 County	.000	.144	1.000	-.34	.34
snd-emis-email	1 Sub county	2 County	.288*	.087	.003	.08	.49
		3 National	.288	.135	.087	-.03	.61
	2 County	1 Sub county	-.288*	.087	.003	-.49	-.08
		3 National	.000	.144	1.000	-.34	.34
	3 National	1 Sub county	-.288	.135	.087	-.61	.03
		2 County	.000	.144	1.000	-.34	.34

*. The mean difference is significant at the 0.05 level.

snd-kra web- sending kra returns using website, snd-emis-email- sending EMIS – using e-mail

The government requires that KCSE candidates, KRA returns and school EMIS are registered or filed online. The data in Table 8 show that there is a significant difference at $p < .003$ levels in utilization of website on KNEC registration and filing KRA returns with a positive mean difference of .286 between sub county and county; and sub county and national public secondary schools. Since $p < .003$ is less than $p < .05$, the null hypothesis is rejected: ‘There is no significant difference in scores IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.’ Therefore, the alternative hypothesis is accepted: ‘There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya. Website utilization on KNEC registration and filing of KRA returns has a positive mean difference of: .286 between sub county and county; and sub county and national public secondary schools. This shows that website utilization on KNEC registration and filing of KRA returns was higher at sub county schools by .286 compared to county and national public secondary schools. It is expected that county and national schools should utilize website more but it contrary. This contraction may be due to more exposure of HODs of sub county schools to Information Systems than their county and national school counterparts.

However, the data shows that there is no significant difference in website utilization at $p < 1.000$ between county and national schools. Therefore, since $p < 1.000$ is greater than $p < .05$, the null hypothesis is rejected: ‘There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.’ Thus, the website utilization on KNEC registration and filing of KRA returns between county and national public secondary schools does not differ.

Education Management Information Systems provide data and information about enrolment of students and the staffing status of secondary schools in Kenya. Utilization of e-mail on sending EMIS to the headquarters provides a fast and

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efficient mode of communication. The data from the table show that there is a significant difference at $p < .000$ levels in utilization of e-mail on sending EMIS to education headquarters with a mean score difference of .288 between Sub County and county; and sub county and national public secondary schools. Since $p < .000$ is less than $p < .05$, the null hypothesis is rejected: 'There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' Therefore, the alternative hypothesis is accepted: 'There is a significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' The study has thus established that e-mail is utilized on sending EMIS to education headquarters. The HODs have indicated that this aspect of e-mail is highly utilized at sub county schools by .288 mean units compared to county and national public secondary schools. Thus, this implies that the cost and time incurred in this process is greatly reduced therefore bringing better services in communication.

County and national schools, however do not differ in the utilization as the data indicates that there is no significant difference at $p < 1.000$ level in e-mail utilization on sending EMIS to education headquarters between county and national schools. Therefore, since $p < 1.000$ is greater than $p < .05$, the null hypothesis is rejected: 'There is no significant difference in IS utilization on management of communication between sub county, county and national public secondary schools in Nyamira County, Kenya.' These schools have embraced e-mail utilization on sending EMIS because of the adequate resources at their disposal that can be utilized to acquire IS equipment, which would enable them to utilize IS for communication and in the process improving service delivery.

This study established that SMS, website and E-mail are utilized by principals and HODs in the process of communication in the day to day running of the schools. However, the principals, in addition to SMS, website and e-mail, utilized MIS. It was established that SMS was mostly used in sending and obtaining information and for convening meetings. In addition to utilization on general school communication; e-mails used for sending EMIS to the Teachers Service Commission (TSC). These findings were contrary to the study of Mostosto, Namasaka and Odero (2013) that indicated Masinde Murilo University of Science and Technology (MMUST) relied on HODs verbal communication, group representations, memos, notice boards, face to face and telephones for its communication. Whereas the website has provided fast, efficient and effective means of candidate registration for KNEC, Odero and Oroko, (2013), argue that it reduces multiple registration and impersonation cases in KCSE examinations in Kenya.

Odhiambo (2005) argued that principals used school assemblies, staff meetings, HODs as information carriers, memos, staff reports and consultations to communicate within the schools. However, it was noted that these channels are prone to distortion due to language barrier and absenteeism on the part of the recipients. This gap can be bridged by IS utilization such as MIS, E-mail, website and SMS which provide efficient and effective means not prone to distortion.

The study found from both HODs and principals, that SMS was utilized in sending and receiving information, and for convening meetings but as reported by Clarke (2015), in Newzealand, most schools use SMS to send achievement data of student to parents. While in Tanzania, it is used to send Education Management Information Systems (EMIS) and statistical data to the Ministry of Education and vocational training (MoEVT) .These studies agree with the present findings to the extent that SMS has a wide application in the management of Education, hence its utilization in the management of public secondary schools in Nyamira county, could bring effective and efficient service delivery.

Utilization of website in management of public secondary schools in Nyamira County was found to affect KNEC KCSE registration and filing of KRA returns, obtaining information, covering meetings and sending EMIS to TSC. This study agrees on part to that carried out by Sunday and Oni (2012), in Nigeria which found that school administration used E-mail to send and receive bulk information to and from parents and other stakeholders. This information could be mainly on students, staff and materials from the government and other agencies.

Where there is efficient and effective communication, information is received and sent on time; thus facilitating decision making. This would mean that vital information is passed to the ministry of education, TSC and the youth in schools on time; enabling them to participate in national issues. This would ensure that the graduates are well informed about national activities to be able to participate in nation building.

V. CONCLUSION AND RECOMMENDATIONS

Information System Utilization on Communication:

This study established that SMS, website and E-mail are utilized by HODs in the process of general communication in the day to day running of the school. MIS was established to be the least utilized on general communication, while, SMS was fairly utilized on convening meetings and obtaining information. Website was fairly utilized on KNEC registration, while e-mail was least utilized on general communication; and obtaining information, sending EMIS; and sending information. It was observed that SMS, MIS and e-mail utilization were lower at sub county schools than county ones; but at the same level between sub county and national public secondary schools.

The utilization of SMS and e-mail on obtaining and sending information was lower at sub county schools than the county ones, while it was at the same level between the sub county schools and the national ones. Similarly website utilization on KNEC registration was lower at sub county schools than national ones but at the same level between sub county schools and county ones. Equally e-mail and website utilization on filing KRA returns, sending EMIS was lowest at sub county schools compared to both county and national ones.

E-mail was utilized on general communication, obtaining information, convening meetings and sending EMIS. SMS was utilized on general communication, obtaining information and convening meetings. While, website was utilized on general communication, KNEC registration and filing KRA returns.

It was also established that e-mail and website utilization on general communication and convening meetings, was lowest at sub county schools compared to both county and national ones. However, its utilization between county and national schools was at the same level.

While, SMS utilization on general communication, convening meetings; and obtaining and sending information, was highest at the sub county schools compared to both county and national ones, but it was at the same level between county and national schools.

E-mail utilization on obtaining and sending information was established to be lower at Sub County than at both county and national ones; whereas it is at the same level between county and national schools.

Website utilization on KNEC registration and filing of KRA returns was established to be higher at sub county schools than county and national ones, whereas, it is at the same level between county and national schools.

E-mail utilization on sending EMIS was established to be higher at sub county schools than county and national ones, whereas, it was the same between county and national schools.

The study found out that SMS, website and e-mail were utilized in day to day communication in the school. SMS and e-mail were utilized more at county schools for obtaining and sending information, while website was utilized more at national schools for registering KNEC candidates and filing KRA returns. E-mail was mostly utilized at national schools for sending EMIS to education headquarters. It is therefore evident that utilization of SMS, website and e-mail is highest at the national schools compared to county and sub county ones, owing to better facilities, thereby, making communication effective and efficient leading to reduced costs.

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