

Influence of frequency of use of ICT on effective management of public secondary schools in Uasin-Gishu County, Kenya

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Abstract- With the introduction of Information and Communication Technologies in schools, major changes should be observed in the way education is managed, but there is still minimal evidence on the impact of these technologies in public secondary schools in Uasin-Gishu County. The objective of the study was to analyze how ICT frequency of use influence effective management of public secondary schools in Uasin-Gishu County. The study was based Open Systems Theory and The Technology Acceptance Model (TAM). The researcher adopted the correlational and cross sectional research designs. “The population for the study was 189 with 171 respondents being selected using stratified and simple random sampling method. Primary data was collected using structured questionnaire measured on liker type interval scales of 1-5 between April 2021 and August 2021. Reliability of the research instrument was tested against Cronbach’s alpha coefficient where an overall reliability score of 0.778 was achieved while validity was gauged using panel of experts, ensuring that the indicators of each variable were within the same construct and operationalizing the instrument as per the variables. Descriptive statistics comprising means and standard deviations were used to analyze the data while hypotheses were tested using multivariate linear regression model to generate relevant statistics.” The findings indicated that ICT frequency of use and effective school management had a moderate relationship ($R = 0.549$, $\beta_1 = 0.449$, $R^2 = 0.302$, $p < 0.05$) demonstrating that whenever school administrators’ frequently employ ICT facilities in their management functions there was a significant improvement on effective management of schools. On the basis of these findings, it was concluded that the Ministry of education should encourage frequent use of ICTs in school management by conducting training in the area of ICT. The study may be useful to stakeholders in the education sector in providing information on the state of ICT in public secondary schools in Kenya.

Index Terms- Public Schools, Frequency, Information and Communication Technology, School Management

I. INTRODUCTION

Background of the Study

The rapid growth in the global economy and technological advancement has pressurized the education institutions to use ICT not only for teaching and learning but also for managing school operations. Since ICT has become an essential part of everyday life, its integration in education is inevitable and cannot be avoided. However, it is important to note that Schools are open systems that interact with their environment, and the effective use and integration of technology is directly associated with the role of various socio-technical factors that may impact the integration of ICT in schools (Tay, Lim & Lim, 2013).

Today, all schools are already equipped with computers and connected to the internet, and 93.2% operate their own wireless network or information system (Wichova, 2020). The ICILS international comparison of computer and information literacy states that Czech schools (Frailon, Ainley, Schulz, Friedman, and Duckworth 2018).

Globally, the use of ICT innovation in school management can be dated back to the 1960s when the computerization of schools gained momentum (Mimbi & Bankole, 2016). Anderson, Potočnik and Zhou (2014) stipulated that secondary schools should embrace ICT use in school management. For example, In Malaysia, the University Science Malaysia (2009) “brought to light that successful diffusion of ICT was due to perceived administrative and technical support on the use of technology. In Spain, familiarity with computers and years of experience with ICT correlate positively with levels of institutional management (Selwood, Fung & Mahony, 2003).

In African countries, initially, the use of ICT in management of schools was low compared to other fields such as business and engineering, however, in recent times, school managers have embraced ICT in the education sector” (Mwadulo & Odoyo, 2020). Farrell and Isaacs (2007) observe that Rwanda is among few African countries to have embraced ICT policy more specially in the management of schools (Farrell & Klemperer, 2007). In South Africa many educational institutions have embraced ICT in management of their operations (Hennessy, Harrison & Wamakote, 2010).

Effectiveness in the use of ICT in school management can be influenced “by the frequency of use of ICT as shown in several studies. Afshari, Bakari, Luan, Afshari, Fooi and Samah (2012) indicated that frequency of use entails communicating with staff, and members of the wider school, initiating and sustaining collaborative activities with colleagues within and outside their school were the areas of greatest use, while financial matters, maintaining administrative records about students, using a program to analyze information for solving problems, and using technology to support levels of professional collaboration.”

Markauskaite (2006) did a study in Nairobi, Kenya that revealed that many school principals have low levels of competencies for effective use of ICT in school leadership. School principals not only need formal training, but also sustained and ongoing support from their colleagues to help them learn how best to integrate technology into their administrative duties (Amara, 2006). ICT administration and management applications are currently common in schools because of their capacity to facilitate administration from data storage to information management and decision-making activities (Ghavifekr, Afshari, Siraj&Sereg, 2013).”

In a study by Ngavana, Mutua and Koech (2018), the emphasis was on frequency of use of ICT equipment, and Singh and Muniandi (2012) looked at frequency of use of ICT applications for management. The conclusion in these studies was that frequency of ICT use can influence effective use in ICT management.

Like many other countries in the world, Kenya developed National ICT policy in 2006, giving priority to ICT. The ICTs in Education Sessional Paper one (MoE, 2010), explains that ICT can be leveraged to support and improve school management (MoE, 2010). In regard to educational institutions adoption of ICT the mandate was to improve school management. In the quest for integrating ICT in education, various policy documents spelt out the ICT policy in schools, namely; e-Government Strategy, National ICT Policy and Sessional Paper No. 1 of 2005” (MOE, 2006). ICT policy in this study was taken as a theoretical variable that the researcher used to explain a connection between Socio-Technical issues and the management of public secondary schools in Uasin-Gishu County in Kenya. A sound policy in place would ensure that the issues bedeviling the ICT usage in secondary schools in Uasing-Gishu County would be addressed adequately enabling schools to adopt technologies that are relevant to their business processes.

Statement of the Problem

The use of ICT in school management helps enhance effectiveness in three main areas of administration, that is, student administration, staff administration, and general administration. ICT assists in enhancing timeliness, accuracy, completeness and quality of school management. To achieve this, school administrators need to embrace the adoption of ICT for use in school management in order to register required management effectiveness. On the other hand, the government should ensure that a policy to address the socio-technical issues be in place to help address them and enable schools adopt technologies that will help them achieve their objectives. Schools’ ought to have relevant ICT hardware and software and related ICT skills for effective management of various business processes in schools. Past studies

in Kenya indicate that secondary school does not involve ICTs frequently in handling their day to day operations. This has led to challenges with respect to organization of information, computation and processing of paper work, organization communication, planning, monitoring, and management of instruction. This study sought to determine how ICT frequency of use influence effective management of public Secondary Schools in Uasin-Gishu County.

Hypothesis

There is no significant influence of frequency of use of ICT on effective management of public secondary schools in Uasin-Gishu County.

ICT use in Management of Public Secondary Schools

Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software. They are often spoken of in particular context like ICT in education (Noor-ul-Amin, 2013). Information and Communication Technology in education encompasses the utilization of ICT in carrying out management functions of (Sweeney, 2012). ICT applications in the field of education are regarded as an effective facilitator to creating, accessing, storing, manipulating and transmitting or share various forms of information, such as audio, visual and word formats. This is made possible by the proactive environment presented by ICT (Kawade& Kulkarni, 2012).

In a school context, ICT applications can be utilized for various functions including enhancing the teaching-learning process and the overall school administration purposes. School administrators utilize ICT to ease their mundane administrative task areas. School administrators use ICT in the registration of students, preparing school reports, announcements and letters for meetings, as well as staff and teachers’ employment. ICT is also employed in giving in-house training or presentations to teachers. Preparation of schemes of work, teaching plans and timetables also come forth as the functions that necessitate administrators to use ICT applications. Finally, school administrators utilize ICT application in handling financial work, keeping records, collecting data, processing documents and maintaining communication across the school and with the external environment alike (Mwalongo, 2011).

ICT in education improves teaching, learning, and administrative processes to qualify students for the modern-day era (Zhao, Pugh, Sheldon, & Byers, 2012). Efforts have been made to incorporate technology into education since the late 20th Century. For instance, low cost software, such as Logo, first became available in the 1980s (Papert, 1980). According to the World Bank, [ICTs] consist of hardware, software, networks and media for collection, storage, processing, transmission, and presentation of information (including voice, data, text and images).

Plomp, Anderson, Law & Quale (2009), in his contribution in the World Communication “and Information Report 1999-2000 states, that information and communication technologies (ICT) are diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. For the purpose of this study, ICT covers a range of

technologies, including computers, communication devices, and audio and video components (Powell&Rødseth, 2013). ICT also includes software, such as Excel Spreadsheet, Word processing, Image Creation, Data Show, Email, and Web tools; all help to improve the teaching approaches and content quality.

Osborne and Hennessy (2003) emphasize the role of the teacher; state that a significant role is played by the teacher as they create the conditions for effective ICT use. Therefore, ICT is considered a tool that creates and causes change in the practices and behaviours of both teachers and students. While some people view the use of ICT in education in negative ways (Trucano, 2008), ICT is perceived as a positive influence by many in the global education field.

ICT makes use of a combination of information and communication methods and, as a result, helps students to learn faster. The strength of ICT is that it makes use of text, images, motion and, sometimes, sound, to engage the learner and transform traditional teaching approaches (Selinger, 2010). Moreover, through networking, ICT uses information repeatedly, while also increasing the learner's chance to participate in real world events (Baumgartner, Denz, Oberhauser, & Hoffmann, 2011). For these reasons, ICT offers great advantages for students, and teachers; it also facilitates management processes, such as meetings and training sessions (World Bank, 2008)."

Nevertheless, ICT implementation in schools requires much effort for successful integration. Embedding ICT requires both behavioural and practical amendments which can be challenging for educators. While past research presented here appears to concentrate on the importance of ICT in school management," the neglected aspect is the ICT competencies of the user and how these relates to effective school management in selected public secondary schools. Though we appreciate the fact that much effort is required on the part of school managers, little is said about their attitude and its relationship with effective school management.

Effective implementation of an innovation is dependent to a considerable degree upon the active intervention of key personnel in change agent roles; their roles are crucial because school improvement programmes require time and effort for effective change (Miles, Saxl& Lieberman, 2000). Wango (2009) indicates that there is a considerable increase in knowledge and innovations which have had an impact on education. Wango (2009) elaborates that education policy makers will have to combine the knowledge of individual schools with an understanding of administrative and managerial factors and skills so as to influence the process of change."

School administration and management can use various software applications in their work. The enormous data generated in the course of managing schools can be efficiently and effectively handled by use of spreadsheets and database applications. A case in point is the Education Management Information System (EMIS). Information can easily be collected, stored, processed, analysed, and disseminated by such a system" (Ministry of Education, 2012).

Tayet *al* (2013) describes and analyses the conditions that support the seamless integration of information communication technology (ICT) into school management. The researcher points out the importance of two factors: technological infrastructures and human (school managers)' beliefs and practices. However, Tayet's argument relate to primary school and thus, leaves the gap

as to whether these factors can apply in the context of secondary schools.

Etudor-Eyo (2012) investigated the "use of ICT and communication effectiveness among secondary school administrators in AkwaIbom State, Nigeria. The study obtained data from 396 secondary school administrators through the Administrators' Use of ICT Questionnaire (AUIQ) and Administrators' Communication Questionnaire (ACQ). The findings were that the extent of administrators' use of ICT and the extent of administrators' effectiveness in communication are high; there is a significant positive relationship between administrators' use of ICT and administrators' effectiveness in communication; the effectiveness of secondary school administrators in communication is significantly predicted by the use of ICT." This study therefore provides the opportunity to transform the management practices in schools.

Frequency of Use of ICT and Effective Management of Public secondary schools

Afshari, Bakari, Luan, Afshari, Fooi&Samah (2010) studied the "extent to which Iranian secondary school principals used computers and secondly to explore the relationship between a number of variables related to the use of information and communications technology (ICT). The word processing was the most frequently utilized software among the principals and they used it to create documents and slides. The findings also revealed that that within the area of administrative uses, communicating with staff, and members of the wider school, initiating and sustaining collaborative activities with colleagues within and outside their school were the areas of greatest use, while financial matters, maintaining administrative records about students, using a program to analyze information for solving problems, using technology to support levels of professional collaboration, and using technology to engage new kinds of professional development were the least used areas. Therefore, the early assumption that the introduction of computers into schools for administrative purposes would spread to their use for instructional purposes was not supported by the data.

Kimosop and Chemwei (2016) examined the frequency of use of ICT equipment by secondary school heads and teachers in Nandi and UasinGishu counties, Kenya. The study employed a descriptive survey research design. A total of 63 schools with functional ICTs were purposively selected and, in each school, one class teacher, 2 subject teachers and 2 heads of department were selected using stratified random sampling to give a total of 315 teachers. All head teachers from each of the 63 schools were selected through purposive sampling. From the study findings, the most utilized ICTs in schools were the printer, photocopier and computer while the curriculum management activity that highly utilized the use of ICT was the preparation of and the analysis of exams. This implies that ICTs in schools were mostly used as gadgets for typing and producing exam materials. Little seems to have been done in the utilization of ICTs for curriculum delivery and the management of data that could be utilized for informing decision making.

Lipesa (2018) studied the effectiveness of ICT integration in enabling the e-leadership of public secondary schools in Busia County, Kenya. A cross-sectional survey design was adopted. Systematic random sampling technique of 14 public secondary

schools was employed, while the school leaders, including 14 principals, 42 teachers and 14 support staff were sampled using Stratified Random Sampling. Questionnaires was employed in gathering quantitative data. The study established that there was a marked difference between the ways in which support staff and teachers were integrating ICT in their administrative roles, integrating ICT in the leadership of public secondary schools was deemed to improve access to a motivating learning and teaching environment that provides a good interface between theory and practice, as well as improve efficiency.

Jumaet *al.*, (2016) found that frequency in the use of Institutional management systems databases help to avoid the redundancy or duplication of data thereby enhancing data coordination with departments. Manual handling of huge data is very difficult and causes delayed information collection and compilation. This affects decision-making process for quality education, but with the use of ICT, well-organized and analyzed data is readily available to foster effective and quick decision-making.

Biegon (2017) examined the extent of ICT integration in school management and the perceptions of teachers on its usefulness in Westlands, Nairobi. It focused also on the level of foundation skills and training of school managers on ICT usage for management. The samples size was 114 teachers and 10 principals from the 10 schools. The study found that ICT was not extensively used in management of the schools. The study further established that secondary schools in Westlands mostly concentrated on using ICT in teaching and learning and not management. This shows that there is still a lot to be done on the integration of ICT in school management. The study concluded that ICT was not highly upheld in public secondary school management.

Mutisya (2017) studied the extent to which Information and Communication Technology has been integrated in the management of public secondary schools in Kitui County, Kenya. This study used sample size table as proposed by Krejcie and Morgan (1970) and Peter (2005) whereby 58 principals, 58 senior teachers and 266 assistant teachers from schools that have functional ICT infrastructure were selected. All 16 Sub-county Directors of Education and one County Director of Education were selected for the study. The study found that among those who used ICT, majority of the principals” used ICT for managing internal exams to a great extent. On internet use the study established that; majority of principals used internet for school management less frequently. In fact, some of the principals had no active emails. It was also noted that some of the principals and senior teachers respectively had never used internet.

II. REVIEW OF RELATED LITERATURE

Theoretical Framework

This study was supported by the Open Systems Theory and The Technology Acceptance Model (TAM).

Open Systems Theory

The “theory was developed by a biologist Ludwig Von Bertalanffy in 1937 in Chicago. The theory views an organization as an integrated system of interdependent and interrelated structures and functions. In the open systems theory, the school is

viewed as an open social-technical system composed of four major inter-dependent subsystems namely; structure, technology, task and people. These subsystems interact with the external environment in such a way that bringing change in one would lead to changes in all the others (Waweru, 2008).

The incorporation of ICT into the day-to-day functions of educational institutions has a marked impact on every aspect of management structure and dynamics. It means the study on ICT introduction in the schools would not have been exhaustive if the social and technical aspects were not considered in their entirety explaining the reason for the adoption of the socio-technical approach in the study based on the open systems theory as espoused by Kast and Rosenzweig (1985).

According to Owen &Valesky (2011), the organization is structured, equipped and staffed appropriately to accomplish its mission. The organization must have technological resources and people who contribute to the task achievement. The four internal organization factors; task, structure, technology and people are variables that are highly interactive, each tending to shape and mold the others. Significant change in one factor will result in some adaptation on the part of the other factors. A technological change, such as introduction of computers in a high school will require personnel with new technical skills. It may lead to change in the structure as a new department may be created. Technology is usually developed outside the school system. The school may either adapt it smoothly and easily, or it may resist technological changes (Muriko, Njuguna, &Njihia, 2015).

The Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a theoretical model that explicates the manner in which users accept and embrace novel technology and was coined by Fred Davis in 1989. TAM postulates that actual technology usage is shaped by behavioral intent. TAM proposes that perceived usefulness of new technology determines the attitude of a user towards the innovation. On the other hand, perceived ease of use influences the users to utilize technology. Generally, TAM assumes that once perceived usefulness and perceived ease of use interact and the intention to act is developed, an individual is boundlessly able to act. However, this comes out as the major limitation of TAM since in reality individuals face constraints including time, limited ability, as well as organizational and environmental restraints (Davis, Foxall&Pallister, 2002). This brings forth the importance of perceived usefulness and perceived ease of use in integration of ICT into secondary schools.

According to Crawford (1997), Schools should encourage teachers to develop their ICT skills. It is advisable to reserve some ICT resources for staff only. The staff ICT room should be equipped with the suitable hardware, software and ICT learning resources to train staff on ICT skills. If teachers can see that what is done can be done more thoroughly and effectively using ICT, then they will spend more time developing their ICT skills. Schools should hire ICT technician to assist teachers in familiarizing with both the theory and applications of computers

According to Daily Nation (August 31, 2012: pVII), Kenya Education Management Institute (KEMI) has been at the forefront of building the capacity of education administrators/managers on ICT integration under the Economic Stimulus Program. KEMI director Dr. WanjiruKariuki has expressed the organizations

commitment to bridging the digital divide in the education sector. In its ICT strategy the MOE has outlined a training program for the entire MOE, its agencies and institutional managers in the area of Education Management Information System (EMIS). The teaching staff force of about 240,000 teachers will be trained in ICT literacy and integration (ROK, 2006).

Conceptual Framework

The conceptual framework shows that Frequency of ICT use is looked at from the point of frequency of using computer applications such as word processing, spreadsheets, and presentations for school management, as well as frequency of use of ICT equipment.

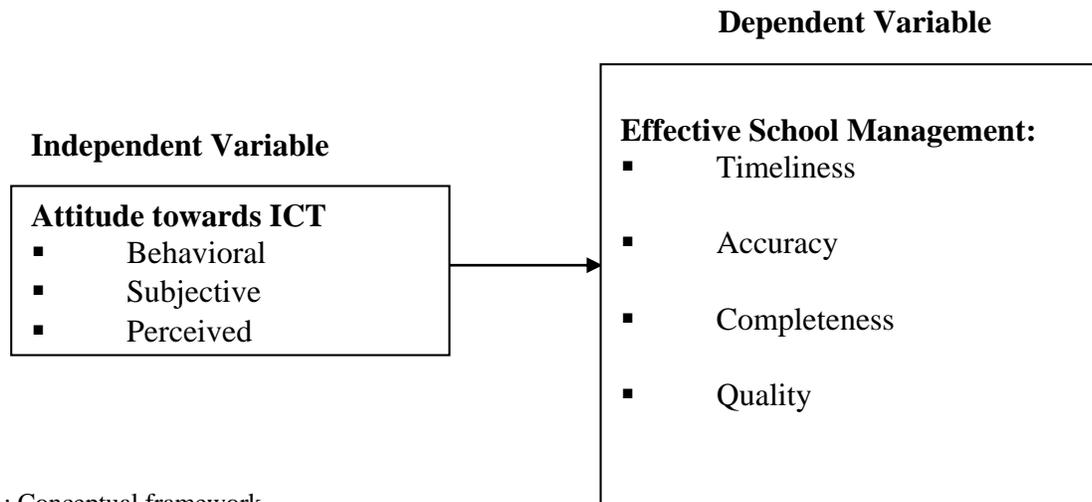


Figure 1: Conceptual framework
Source: Author, (2022)

III. METHODOLOGY

Research Methodology

The study used a convergent mixed research design. A convergent mixed research design is a type of design in which qualitative and quantitative data are collected in parallel, analyzed separately, and then merged (Creswell, 2014). This design was chosen because both qualitative and quantitative data was collected, analyzed and interpreted. This design helped gain insight in generalizing a situation without utilizing the whole population. It is suitable in determining reasons or causes for the current status under study (Marshall & Rossman, 2014). The study was carried out in Uasin Gishu County located in Rift Valley region of Kenya 330km North West of Nairobi. The County has 166 secondary schools. The county was selected as a representative of other counties because it is believed that it will give a wider view of the problem under the study. The population of the study was 189 with a sample of 171 respondents being picked. Stratified sampling technique was used to stratify schools based on sub counties while purposive sampling method utilized to pick respondents. Data was collected using a questionnaire designed based on study objectives. Instrument validity was gauged using a panel of experts who are knowledgeable in the study area while internal consistency of was tested against Cronbach’s alpha where a reliability score of 0.778 > than 0.7 was obtained. Both descriptive and inferential statistics were used in the data analysis. Primarily, descriptive statistics encapsulated measures of distribution and central tendencies while inferential statistics constituted correlation and regression analysis that helped determine the relationship between the study constructs.

For the purpose of communicative effectiveness the study findings were presented in tables.

IV. RESULTS

Discussion of Findings

ICT frequency of Use and Effective Management of Public secondary schools

The objective was to determine how ICT Frequency of use influence Effective Management of Public secondary schools in Uasin-Gishu County.

H₀: *There is no significant influence in Frequency of use of ICT on Effective Management of Public Secondary Schools in Uasin-Gishu County.*

Table 1: Model Summary for Regression Analysis for ICT Frequency of Use and Effective Management of Public secondary schools

Variable	No. of Observations	Beta	Standard Error	t-Statistic	p-value
Constant	171	6.845	1.585	4.319	
Frequency of Use	171	.449	.118	8.989	.000

R = .549
R² = .302
F = 80.796

Durbin

Watson=2.

201

* $p < 0.05$

Predictors: (Constant), Frequency of Use

Dependent Variable: School Management

Source: Research Data (2021)

The results in table 4.12 indicates the regression analysis for Frequency of use, the value for Durbin-Watson ($D=2.201$) is also within the established range of 1-3 indicating the absence of autocorrelation in the sample. The correlation in the relationship between Frequency of use and Effective Management of Public secondary schools was also found to be positive and significant ($R = 0.549, p < 0.05$). This indicates a significant relationship between Frequency of use and Effective Management of Public secondary schools signifying that whenever Public secondary schools in Uasin-Gishu County ensured that there was frequent use of ICT there was a positive and significant improvement on Effective Management.

The regression results further indicated that Frequency of use significantly predicted Effective Management of Public School ($\beta_1 = .449, t = 8.989; p < 0.05$), which means a unit increase in Frequency of use produced a 0.449 deviation in Effective Management of Public secondary schools in Uasin-Gishu County. The R squared value indicated that Frequency of use explained 30.2 percent of the variance in Effective Management of Public Secondary Schools ($R^2 = 0.302, F = 80.796; p < 0.05$). This reveals that a higher proportion of disparity in Effective Management (69.8%) is explained by other aspects not captured in the second model. Therefore, the hypothesis that there is a significant relationship between Frequency of use and Effective Management of Public secondary schools in Uasin-Gishu County is therefore supported.

The results again demonstrate that Effective Management in Public Secondary Schools may not be attributable to Frequency of use only but could be explained further by the ability of the Schools in the County to integrate frequency of use, attitude, access to ICT facilities and their technical competencies to effectively achieve good management.

Afshari, *et al* (2010), supported the findings of the current study where they established that most school administrators frequently use ICTs in maintaining administrative records about students. Similarly, Kimosop&Chemwei (2016), Jumwa (2016) and Mutisya (2017) further supports the findings of this study that frequency of ICT use in Schools can help the sSchool administrators achieve their objectives. However, Biegon (2017) indication that School administrators rarely used ICTs for planning school activities contrasted the current results. The study outcomes however are in contrary with those of Lipesa (2018) which established that most school administrators such as school administrators and bursars had not integrated ICT in handling financial work, and where this was done it was not frequently done.

V. SUMMARY AND CONCLUSION

Summary and Conclusion

The objective sought to determine frequency of use of ICT affect the effective utilization of ICT in management of public secondary schools in Uasin-Gishu County. The study established that a minority of the school administrators' often used ICT in their management activities. This is justified by a weak relationship between frequency of ICT use and effective management of Schools in the County. The results however indicated a positive and significant relationship between ICT frequency of use and effective school management indicating that whenever there was an increase in ICT usage there was likely to be effective management of school in Uasin-Gishu County.

Based on this the study concluded that failure to utilize ICT facilities frequently due to unavailability of the same in most schools has led to a negative impact on the achievement of effective management in Uasin-Gishu County. On the conclusion that minority of the school administrators' utilizes ICT facilities frequently in their management functions, the Ministry of Education should consider revising policies related to monitoring the frequency of ICT by school administrators for management purposes. The policy should be crafted in such a way that school administrators are encouraged to use ICT equipment and software for school management as frequently as possible.

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