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The Integration of Information Communications Technology in Teaching and Learning in Public Secondary Schools in Turkana-Central Sub-County, Kenya

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Abstract
Technology is increasingly becoming a daily need. This study was conducted to assess the integration of ICT in teaching and learning in public secondary schools in Turkana Central Sub-County. It was to assess the following factors: teachers' knowledge and skills on ICT Availability of ICT facilities and administrative support on ICT in Turkana Central Sub-County. The study was informed by the Diffusion of Innovation (DOI) Theory and used Ex-post Facto design. Data collection instruments included questionnaires and interview schedule. The target population was 12 principals and 240 teachers. The sample size was 8 principals and 48 teachers from 8 schools. Simple random sampling was used for schools and teachers. Principals were sampled using census sampling. Quantitative data was analyzed using statistics package for social science (SPSS) software version 22. Descriptive statistics was used to derive means, percentages and frequencies. The hypotheses were tested using Pearson's Product Moment Correlation Coefficient. The study found that Pearson's r = 0.899, 0.916 and 0.913 for the relationship between teachers' knowledge and skills on ICT, ICT facilities and administrative support on ICT and ICT integration in Teaching and learning respectively. The findings revealed a strong relationship between teachers' knowledge and skills on ICT, ICT facilities and administrative support on ICT and ICT integration in teaching and learning. It was thus deduced that teachers' knowledge and skills, availability of ICT facilities and influence of administrative support significantly affected the integration of ICT in teaching and learning. Findings further revealed that videoconferencing equipment, were minimally used in implementation of ICT in schools. Additionally, computer networks were less available in schools. The study concludes that for effective integration of ICT in teaching and learning, teachers' knowledge and skills, availability of ICT facilities and influence of administrative support is very essential. The study recommends that the Ministry of Education (MOE) should equip all schools with necessary ICT facilities for ICT integration; school administration to take teachers for in-service trainings on ICT integration and teachers to regularly apply the knowledge acquired on trainings in their teaching and learning process.

Key Words: Integration, Information Communication Technology, Teaching and Learning, Public Secondary Schools, Turkana County, Kenya

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Introduction

Technology is increasingly becoming a daily need. Information and communication technology (ICT) has become an important source of innovation and improvement of efficiency for many sectors across the globe. ICT which stands for information communication technology has been defined variedly by various researchers. According to UNESCO (2002), information and communication technology (ICT) may be regarded as the combination of 'informants' technology' with other related technology, specifically communication technology. Information in this case includes: voice, data, text and images.

The use of ICT tools for teaching and learning falls into four major categories i.e. Constructing knowledge and problem solving through the internet, e-mail, CD-ROMs, databases and video conferencing; using process skills; Aiding explanation of concepts and communicating ideas. According to Enakrire and Ocholla (2017), ICT is the application of computers and other technologies to the acquisition, organization, storage, retrieval, and dissemination of information, in this context, ICT is the use of electronic devices such as computers, telephones, internet, and satellite system, to store, retrieve and disseminate information in the form of data, text and image. Information and Communication Technologies can be split into three components namely the technology part; information that the technology helps to deliver; and a communication process that the technology facilitates and serves as a medium for the information (Martin, 2017). Integration has a sense of completeness or wholeness by which all essential elements of a system are seamlessly combined together to make a whole (Khan & Alwi, 2018).

Teaching is imparting knowledge, attitudes and values (Reddy, 2017). Carey (2017) describes teaching as a unique professional, rational and humane activity in which one creatively and imaginatively uses himself and his knowledge to promote the learning and welfare of the learner. WHO (2011) summarizing teaching as 'interactions between teacher and learner under the teachers' responsibility in order to bring about expected changes in the learners' behaviour'. WHO (2011) further explains the purpose of teaching as to help learners to acquire, retain and use knowledge; understand, analyze, synthesize and evaluate; achieve skills and establish habits and develop attitudes. Learning is the transformative process of taking in information that when internalized and mixed with what we have experienced changes what we know and builds on what we do. It is based on input, process and reflection (Bingham & Conner, 2010).

In the education sector, particularly, the application of ICT has become a critical part of the learning process for students both outside and inside the classroom setting. Therefore, acquisition of ICT skills plays an important role in equipping learners with technological skills to enable them adapt to the world of technology. ICT can enhance teaching opportunities and outcomes for students, including students with intellectual disabilities (Butler, Sheppard-Jones, Whaley, Harrison & Osness, 2016). Students who integrate ICT in learning may easily understand complex topics and concepts. They are more likely to recall information and use it to solve problems in the classroom (Gardner & Belland, 2017). Integration of ICT in teaching enhances

students' knowledge, investigation and inquiry skills and creates curiosity and interest as information is available at multiple levels (CEO Forum on Education and Technology, 2001).

In Germany, ICT incorporation in pedagogy wasn't comprehensively embraced in schools as a result of insufficient trained teachers for ICT integration in the respective subjects with a technology connotation. To enable the merging of ICT to be fruitful, teachers should be vested with skills and knowledge and most significantly, must have positive attitudes (Singh & Muniandi, 2012). Marinas and Ditapat (2011) studied curriculum development in Philippines discovered that there is intensive training and orientation for supervisors and school teachers to make sure the curriculum enactment is performed productively. The researchers remarked that capacity development for teachers equip them with necessary professional expansion that equips them to tackle alterations successfully

Rastogi and Malhotra (2013) argued that, in order to gain positive outcomes of ICT in education, any education system of any country which is responsible for the implementation of the innovation should take cognizance of teacher development in ICT integration first so as to produce confident teachers in ICT incorporation in teaching students of 21st century digital age. The researcher consequently asserted that its only teachers who shape what go on in classroom. This underscores the need for teacher training in ICT integration in teaching so as to ensure appropriate blending of the traditional pedagogy to the ultra-modern ICT inputs.

Kenya promulgated a National ICT Policy in January 2006 whose main aim was to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services. In the policy, the government committed itself to improving the quality of teaching and learning through the use of ICT in schools, colleges, universities and other educational institutions (Ministry of Information and Communication [MIC], 2006). In order to achieve this, the government came up with several strategies. The Government of Kenya (GoK) undertook to facilitate public-private partnerships to mobilise resources in order to support e-learning initiatives through collaboration between the government and the private sector. Computer for Schools – Kenya (CFSK) whose mission is to provide Kenya's youth with access to modern technology through supply of computers to Kenyan public secondary schools (Reddick, 2010). Up to 2013 CFSK had sourced for 50,000 computers which were then distributed to about 3000 learning institutions. Through this project, a number of schools in every district received twenty computers at a subsidized cost. Moreover, through the Economic Stimulus Programme (ESP), the government has availed ICT facilities to one thousand and fifty (1050) schools in the country. Each school received eleven desktop computers, one laptop, printer, local area network facilities and an LCD projector.

Despite the government's substantial investment in ICT related teaching and learning resources, a few schools in Turkana Central Sub-County are integrating ICT in the teaching and learning in their various schools while other schools don't. Even to those few schools that over ICT training like teaching computer studies as a subject, only a handful of students end up choosing the subject to proceed with it to form four while others opt for other technical subjects. Some principals and teachers too use cyber cafe and other avenues in order to get assistance on ICT services such as KCSE registration of candidates, NEMIS registration of students among others (SCDE-Turkana Central, 2018). Computers in some schools have ended up being stacked in the

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stores and not being used thus pausing the need of wanting to know why this is happening at this point and time when the government is embracing technology in almost all its ministries (CDE-Turkana, 2019). A case on this is PAG secondary school which benefited from the Economic Stimulus Programme (ESP) that provided schools with 11 computers, a projector and a laptop but up to date students and teachers are not using the said facilities to facilitate the teaching and learning process. This problem has impacted negatively to the quality of education offered to the learners and also extended to the entire community lagging behind in terms of embracing technology.

Statement of the Problem

Access to information is at the core of instructional processes and academic achievement in educational institutions. Therefore, with the advent of ICTs, especially in the education sector, it is expected that teachers and students would more readily access quality information through online libraries to facilitate instructional processes. Moreover, during the period of Covid-19 when schools were closed down periodically, it was noted that ICTs can facilitate remote interaction between the learners and their teachers thus support continuous learning. Besides, ICT skills have become a necessary part of teaching-learning content in schools since the world is increasingly information-driven. Therefore, schools need, not only the appropriate ICT infrastructure, but also the requisite knowledge, attitudes and support to apply ICT for enhanced educational outcomes.

The introduction of ICT in Kenya's education system was a step towards the realization of Vision 2030 and national education aspirations through the impartation of ICT skills for the production of globally competitive market. Notwithstanding the endeavour made by the Kenya government and all key education stakeholders, it has been indicated that the incorporation of ICT in secondary schools teaching has remained quite low (Mwunda, 2014). Studies point to many factors for this low uptake of ICT in schools. For instance, Seifu (2020), in research on determinants of ICT integration in teaching-learning processes at Aksum University, found that inadequate administrative support and technical support, restrictive nature of curriculum, lack of sufficient time, shortage of electric power and concrete models to integrate technologies hinder using ICT in teaching-learning process. In a study in Kenya, (Kidombo, Gakuo & Kindachu, 2011) found that integration of ICT in curriculum delivery in secondary schools depends on schools' leadership, professional training of the teachers in ICT, school manager's level of ICT skills competence and presence of school ICT policy.

In their study, Kombo and Jepketer (2015) reported that despite the Kenya government's effort and willingness to promote ICT as an instructional tool, progress on ICT use had fallen short of expectation. They add that the Ministry of Education's strategic plan for 2008-2012 shows that slow integration of ICT in operations and programmes constitute major weaknesses in the part of the Ministry. The core problem is that Kenya lacks adequate connectivity and network infrastructure. Although a small number of schools have direct access to high-speed connectivity through an Internet service provider, generally there is limited penetration of the national physical telecommunication infrastructure into rural and low-income areas. Consequently, there is limited access to dedicated high-speed connectivity for e-mail and the Internet.

In Turkana Central Sub-County, it is observed that many schools have been provided with computers. Teachers have also benefited from some ICT training courtesy of the SMASSE

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programme. Yet, quality education and the performance level of learners in the Sub-County remains poor. This situation begs the question concerning the implementation of ICT in schools in Turkana Sub-County, Kenya. No studies have also been undertaken to assess the implementation of ICT in instructional processes in Turkana Sub-County. Therefore, this study was designed to assess selected factors affecting the integration of ICT in teaching and learning in secondary schools in Turkana Central Sub-County.

Research Questions

i. To what extent has ICT been implemented in secondary schools in Turkana Central Sub-county?
ii. What is the relationship between teachers' knowledge and skills on ICT and integration of ICT in teaching and learning?
iii. What is the relationship between presence of ICT facilities and integration of ICT in teaching and learning?
iv. What is the influence of administrative support on ICT integration in teaching and learning?

Research Hypothesis

$1H_{01}$: There is a relationship between Teachers' knowledge and skills on ICT and integration of ICT in teaching and learning.

$2H_{01}$: There is a relationship between ICT facilities and integration of ICT in teaching and learning.

$3H_{01}$: There is a relationship between administrative support on ICT and ICT integration in teaching and learning.

Significance of the Study

The study findings will inform the Ministry of Education on the status of ICT infrastructural capacity in schools in Turkana Central. It will provide data for the Board of Management in the various institutions to recruit teachers with ICT skills. It will also help learners to be competent in the use of ICT facilities and be conversant on how to use those ICT facilities in the learning process. These will enable the learners to gain a different dimension or approach of learning a part from the normal chalk board process of learning because learners are able to visualize the procedures of learning digitally. The study will contribute to policies that govern ICT training for teachers in order to equip them with skills and competency, introduce capacity building for both principals and teachers. All these will make the entire Turkana sub-county be at per with the rest of the places in the country in terms of technology and thus fitting into this dynamic world which is globalizing the need for technology.

Theoretical Framework

The study was based on Diffusion of Innovation (DOI) Theory by Rogers (1962). It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behaviour, or product. Adoption means that a person does something differently than what they had previously (i.e., purchase or use a new product, acquire and perform a new behaviour, etc.). The key to adoption is that the person must perceive the idea, behaviour, or product as new or innovative. It is through this that diffusion is

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possible. Adoption of a new idea, behaviour, or product (i.e., "innovation") does not happen simultaneously in a social system; rather it is a process whereby some people are more apt to adopt the innovation than others.

Rogers (1995) looks at the process of this theory as a mental process that an individual passes through before adopting or rejecting an innovation. Katz, Blumler and Gurevitch (1974) affirm that for a new idea to diffuse there must be awareness stage, interest stage, evaluation stage, trial and adoption stage. For proper understanding, Rogers amended these stages and came out with his own processes which are: knowledge, persuasion, decision, implementation and confirmation stage. *Knowledge* refers to exposure to the new idea, having understanding of it and how it works. According to Bittner and Wonka (2003), it is the media that presents information that makes us aware of the existence of an item. During this stage, the individual has not been inspired to find more information about the innovation. *Persuasion* is to do with one's attitude towards the innovation. In this stage, the individual is interested in the innovation and actively seeks information/details about the innovation (Rogers, 1995). *Decision* is the choice that an individual makes after thinking and talking about what is the best thing to do. *Implementation Stage* is the stage where a would-be adopter decides to give the new idea a trial. Eichholz and Rogers (1964) further assert that the individual employs the innovation to a varying degree depending on the situation. The individual then determines the usefulness of the innovation and may search for further information about it. *Confirmation Stage* is where an individual decides to accept or reject the innovation at this stage. The individual finalizes his decision to continue using the innovation and may use the innovation to its fullest potential.

The rate of adoption is the relative speed with which members of a social system adopt an innovation. It is usually measured by the length of time required for a certain percentage of the members of a social system to adopt an innovation (Rogers, 1962). The rates of adoption are determined by an adopters' category. In general, individual who first adopts an innovation requires a short adoption period (adoption process) than late adopters. Within the rate of adoption, there is a point an innovation reaches critical mass. This point in time, within curve that enough individuals have adopted an innovation in order that the continued adoption of the innovation is self-sustaining.

Conceptual Framework

Independent Variables

Availability of ICT facilities
- Computers / PC
- Computer lab
- Internet Access
- Stable Electricity Supply

Teachers' knowledge and Skills on ICT
Use of basic computer packages, e.g. Ms word, Ms excel, Power

Administrative Support on ICT
- Maintenance of Computers
- ICT policies

Dependent Variable

Integration of ICT in teaching and learning
- Use of computers in teaching and learning
- Use of projectors in teaching and learning
- Accessing internet for teaching and learning resources
- Use of ICT facilities to generate teaching aids to simplify abstract content

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Figure 1: Source: Researcher 2022

Review of Related Literature

ICT started to be regarded gradually not only as a skill worthy to acquire but also as a valuable tool for development of other skills. In the present world, ICT has become an essential component of a school curriculum, a support apparatus for providing teachers and students with improved teaching and learning methods in all the subjects. The content of the national curriculum statements in countries like the USA and the UK and Australia provide clear information from the change of the teaching of ICT alone to its combination as an important instrument in the school curricula (Graber, Woods, Killian, Richards & Rhoades, 2019). The integration of ICT in classroom is getting more important as it help student in enhancing their collaborative learning skills as well as developing transversal skills that stimulates social skills, problem solving, self-reliance, responsibility and the capacity for reflection and initiative. All these elements are core values that students need to achieve in an active teaching and learning environment (Ghavifekr *et al.*, 2014). Similarly, in Malaysia the government has implemented the integration of ICT in learning and teaching process in early 1970's. This is due to the importance of technology literate which produce critical thinking workforce to face and involve the country in the global economy (Hamidi, Meshkat, Rezaee & Jafari, 2011).

Integration of ICT in Teaching and Learning

Simin, Wan and Wan (2015) conducted a study on teachers' perceptions on effectiveness of ICT integration to support teaching and learning in public secondary schools in Kuala Lumpur, Malaysia. The employed survey design and questionnaire as a method of data collection. The target population was 101 teachers. The results indicated that ICT integration a great effectiveness for teachers and students. They then found out those teachers with well-equipped preparation with ICT tools and facilities were one of the main factors in the success of technology-based teaching and learning. They also found out that professional development, training programmes for teachers also played a key role in enhancing students' quality learning. This study differs with the current study in that it is done in a different country, the design used is different from the design used in the current study and also its focus is on teacher's perception but the current study is on how teachers integrate ICT in teaching and learning.

Sani (2014) in his study on effective integration of ICT in educational practices in Nigeria sought to examine the development and acquisition of functional skills for integration within the context of teacher education in Nigeria. The study used qualitative research and data was collected using existing studies, observation and interview. The sample used was 8 teacher educators from 4 colleges. The findings from the study was that most of educational practitioners in Nigeria at all levels of learning lacked the necessary skills and competence needed for use of ICT in their

practices, the interest of teachers and teacher education towards the use of ICT facilities provided was still below expectation and the pedagogical practices and curriculum design for teacher training in Nigeria was yet to be directed towards the production of integrating ICT in their professional practices. The current study differs from this in that the later was done in Nigeria, it was targeting college teachers, used qualitative design and qualitative instruments of data collection and also the sample population used was very small as compared to the current study.

ICT Facilities

Tsai, Chen and Lu (2015) conducted a study on the infrastructure and application of ICT in middle and primary schools in urban areas (city and county) and rural areas in China based on their demands for promoting ICT in education. The survey focused on 2,168 middle and primary schools, including 717 schools in cities (33.1%), 487 schools in counties (22.5%) and 964 schools located in rural areas (44.5%). Based on stepwise regression analysis, it was revealed that ICT infrastructure had different influences on its application for schools in urban and rural areas. Schools' proportion of ICT aided courses in counties, and utilization of multi-media classrooms in rural areas was more associated with the infrastructure. The conclusions were particularly useful for policy-makers in Asia. Moreover, the analysis model highlighted some areas where improvement plans was to be implemented to reduce the digital divide. However, ICT infrastructure was found to play an insignificant role in "utilization of multi-media classrooms" or "proportion of ICT aided courses" in city schools, and thus its role in city schools was to be reinterpreted. The current study differs from the study reviewed because it was done in china and also the target group was primary schools as compared to the current which targeted secondary schools.

Opira (2010) conducted a study on the effect of ICT on students' learning by taking the case of Gulu University. It sought to establish the relationship between ICT and students' learning particularly looking at the availability, accessibility and user-ability of the ICT resources in Gulu University. The study was prompted due to the persistent report that students in Gulu University are getting difficulties in their studies due to limited access and use of ICT resources. It was conducted through cross-sectional survey design; data was collected during the month of March 2009 using questionnaires, interview techniques from a sample of 275 respondents out of a parent population of 1173. In verifying the hypotheses, the researcher used Pearson correlation analysis method to find out whether students' learning was linearly correlated with ICT. The study established that the availability of ICT resources in the University is still very much wanting and very inadequate for the students to use. Because of the limited number of functional computers and the computer laboratory, accessibility is timetabled. It was found out that training was mainly limited to introduction to basic concepts of information technology, some application programs notably Ms office suit and internet; contextual training of students on how to use ICT in learning was not in practice.

The researcher concluded that availability, accessibility and user-ability of ICT resources significantly affect students learning in Gulu University. Based on the above, the researcher recommends that there is need for the University to invest more in computers and related technology. Access to ICT tools should not be limited only in labs and library but expanded

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through establishment of ICT resource centre. ICT training should not be limited to Ms Office suites but rather aim at training students with the contextual skills to use ICT for their learning.

Teachers' Knowledge and Skills on ICT

In the recent past, ICT has become one of the basic building blocks of modern society. Everybody is now required to have basic knowledge of ICT tools ranging from the mobile phone, internet, computers, digital cameras, etc. in order to fit in the society. To be effective in the 21st century, citizens and workers must be able to exhibit a range of functional and critical thinking skills such as information literacy, media literacy and ICT literacy (Anderson, 2010). Nangue (2011) further avers that in order to use ICT effectively for teaching, then teachers must possess basic ICT skills.

Ward and Parr (2010) conducted a study on the teacher's laptop as a hub for learning in the classrooms in New Zealand. The study wanted to find out the influence of introducing laptops for teachers on learning and teaching. The target population included principals, senior teachers, technology leaders, classroom teachers and students from three primary schools in New Zealand school. They used a sample size of 40 participants. A survey design was employed with qualitative technique used. Data was collected using observation and interviews. From the research, teachers needed to feel confident in their ability to facilitate student learning with technology in order to integrate technology into their classrooms. To achieve the goal, more professional development was required with a focus on increasing teachers' skills so that they are able to overcome apprehensions associated with using technology. Further, new teaching approaches and technical support should be offered by schools to allow them to retain control while facilitating learning with computers. The above study would be different from the current study in that the current study is carried out in Turkana- Kenya while the above had been done in New Zealand; the current study will use ex-post factor design while the later used survey design. The current design uses questionnaire as a data collection too whiles the later used observation.

Mulenga, Maria and Prieto (2018) conducted a study on teachers' ICT skills, attitudes, beliefs and the integration of ICT in the teaching of mathematics in Kabwe District. The data collected through the questionnaire was analysed quantitatively using the Statistical Package for Social Sciences (SPSS 25.0). In order to determine the ICT skills, beliefs, attitudes and information technologies operation level in Mathematics lessons by teachers in Kabwe District, descriptive statistics and multiple regression analysis were used. The study established that one key determinant in secondary schools of Kabwe District that has significantly impacted the integration of ICTs in mathematics lessons has been the lack of ICT skills by the mathematics teachers and the know-how of how to integrate ICTs in their lessons. While teachers need support to develop the necessary technological and pedagogical content knowledge that is uniquely associated with the effective use of technology in teaching mathematics, adequate support has frequently not been provided, so that unrealistic expectations have been made of teachers. The survey findings indicated that Internet, word processing, Presentation software and educational CDs are used by the teachers at least once in the teaching and learning of mathematics in a week while other ICT components are almost never integrated in the teaching and learning in a week. The data based on 92 teachers' demographic variables showed that at

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least one teacher on average had previously participated in professional development courses related to integration of ICT.

Administrative Support on ICT

Simin and Sani (2015) studied the role of the administrators in integrating ICT into schools, Malasya. The findings showed that teachers felt motivated to use ICT in teaching and learning, but a lack of support from higher management prevented them from using it (M = 2.08, SD = 0.82). At the same time, teachers were not given the freedom to design teaching as needed (M = 2.75, SD = 0.94). Teachers further argued that school administrators failed to provide adequate training and professional development (M = 2.86, SD = 0.81) on the use of ICT during teaching and learning for the teachers. Finally, teachers were also not given sufficient time to learn how to use ICT and adapt accordingly (M = 3.00, SD = 0.76). Thus, researchers concluded that the implementation of ICT in the early stages must be effective so that teachers and students can utilise ICT and get the support from the school authorities. Besides, administrators are responsible for encouraging teachers to use ICT and further convince them that the use of ICT brings benefits to the teaching and learning process. Vella (2017) specified that school leaders need to be critical, act as leaders, and support teachers' efforts to improve ICT integration in schools.

Research Design and Methodology

This study employed Ex-post facto design. This design was applicable to the study because it found out why ICT is experiencing challenges in its integration in most of the schools in Turkana central sub-county. The target population included 12 Principals and 240 teachers from 12 public schools in Turkana Central Sub-County (County Director of Education, 2020). The principals were targeted because they were providers of the ICT facilities and teachers targeted because they were the implementers of ICT integration in teaching and learning. Therefore, teachers were sampled based on the formula hence 48 teachers (0.2 * 240) were considered. Similarly, according to Creswell (2014), during sampling, the size of the sample does not matter in a sample, but the representativeness of the sample is key. Therefore, the author's idea was used in the study to select a sample of schools and principals from the target groups. In line with the above statement, the researcher used 8 schools and 8 Principals and the 48 teachers based on Mugenda and Mugenda's (2003) statement. Data collection was done using questionnaires and interview schedule. A questionnaire was preferred because it permitted collection of data from a large population (Ogula, 2011).

There was a questionnaire for teachers and another for students and both were closed ended. An interview schedule would enable the researcher to seek for an explanation of information which might not be clear as given in the questionnaire or to confirm data as provided in the questionnaire. The interview schedule was administered to the principals. Data collected was analyzed quantitatively. After all data was collected, the researcher conducted data cleaning to remove unfilled questionnaires and categorized data manually according to the questionnaire items and then coded the data. It was then entered into computer software (SPSS, version 22) for

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processing. Descriptive statistics such as mean, percentages and frequencies were used to analyze data. The questionnaire used was entirely quantitative. Anonymity of the respondents was guaranteed by requesting the respondents not to indicate their names on the questionnaires.

Results and Discussion

The research questions of this study sought to find out: To what extent had ICT been implemented in Secondary schools in Turkana central Sub County; what was the relationship between teachers' knowledge and skills on ICT and integration of ICT in teaching and learning; what was the relationship between ICT facilities and ICT integration in teaching and learning and what is the influence of administrative support on ICT integration in teaching and learning.

The study employed Ex-post facto research design. The target population was 240 teachers and 12 principals from the public secondary schools in Turkana Central Sub-County. Data was collected using questionnaires and interview guides. Descriptive statistics such as means, percentages and frequencies were used to analyze data and then presented in form of tables. ANOVA was used to test hypotheses.

The findings on implementation of ICT in teaching and learning in secondary schools in Turkana Central sub-county revealed that majority of teachers used computers in computing students' scores and preparing lesson notes. It further showed that the implementation part which required use of videoconferencing application packages, use of projectors and use of online classes in teaching and learning was very minimally used. On availability of ICT facilities, the findings showed that stability of electricity supply, printers and computers were the most available facilities. On the other hand, video conferencing equipment, established computer networks and computer laboratories were less available in most institutions. On teachers' knowledge and skills, the findings revealed that teachers were competent on use of internet to download information whereas less competent on use of Microsoft publisher. Regarding influence of administrative support, the findings showed that the school regularly maintains computers and has internet access, but does little in terms of taking teachers for in-service training on ICT and establishment of ICT friendly classrooms. On the effects of the above variables in the integration of ICT in the teaching and learning process in schools, the study revealed the following: teachers' knowledge and skills, availability of ICT facilities and influence of administrative support significantly influenced the integration of ICT in teaching and learning.

Conclusions and Recommendations

Based on the finding of the study, the researcher made the following conclusions: That for effective integration of ICT in teaching and learning, teachers' knowledge and skills, availability of ICT facilities and influence of administrative support is very essential. Although most teachers were willing to implement ICT integration in their pedagogical practices, lack of knowledge on videoconferencing applications, use of projectors and use of online classes was a great hindrance.

Moreover, videoconferencing equipment, established computer networks and computer laboratories facilities were not available in most of the institutions. As such, the school administration was key in ensuring that the challenges mentioned above were either addressed or minimized for effective and efficient teaching and learning process. From the finding and

conclusion of the study, the following recommendations to various education stakeholders were made: It was recommended that the ministry of education should equip all schools with recommended ICT facilities for smooth integration of ICT in teaching and learning such as video conferencing equipment, established computer networks and computer laboratories among others.

The administration of school is supposed to play a bigger role in taking teachers for in-service training on ICT integration and to offer support on ICT facilities that were less available in schools in order to better integration of ICT in teaching and learning. The study also recommended that teachers need to regularly apply whatever learnt from the in-service training in their teaching and learning process. They need also to be ready to learn and embrace ICT without fear of technology. From the study, what clearly comes out is that teachers lacked knowledge and skills on ICT in teaching and learning in Turkana central sub-county. Therefore based on this the study recommends further research to be done on why the number of ICT teachers in Turkana Central Sub-County is low.

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