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Efficacy of Digital Literacy Programme in Promoting Access to Electronic Information Resources by Public Primary School Teachers, Kakamega County, Kenya

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ABSTRACT

Going by the observation made by advocates of digital learning, digital technologies can increase the effectiveness of teachers. If digital technologies are made good use of, they can lead to increased access to data for learners, teaching materials, mentorship opportunities, and professional development. Successful incorporation of modern technologies into the classroom can be achieved if teachers work collaboratively to create modern learning environments and embrace technology in teaching. For this to be realised, a different set of teachers' skills is essential to ensure frequent use of technology while encouraging a new approach where technology is made use of. The researcher carried out an investigation of the efficacy of DLP to uncover the underlying issues that could be hindering access to electronic information resources by public primary school teachers in Kenya's Kakamega County. The objectives were to ascertain digital literacy skills possessed by public primary school teachers, establish availability and status of the necessary infrastructure for ICT in public primary schools, establish the relationship between teacher competence and access to and use of electronic information resources, and identify challenges faced by teachers in their endeavor to make use of useful electronic information resources. This research adopted descriptive approach because the intention was to describe the existing conditions with respect to variables which are, digital literacy, ICT infrastructure and teachers' competence that affect access to electronic information resources. Proper data analysis was enabled by the researcher applying Statistical Package for Social Sciences (SPSS). Analysis of open-ended questions, which formed part of the qualitative data, was done by use of conceptual content before being presented in prose. Pie charts, tables, percentages and bar graphs were used in presentation of quantitative data. Since previous studies have shown that primary school teachers obtain low scores in integration of digital technologies in the classroom, the researcher sought to identify unique challenges that schools could be facing that require homegrown solutions. From the results of the study, digital literacy, ICT infrastructure and teacher competence have significant effect on online academic resources being used by public primary school teachers in the County of Kakamega. From the findings, the study concluded that managements of public primary school teachers in Kakamega County should ensure computer teachers are trained on a regular basis to acquire the needed knowledge and skills. There is an advocacy to managements of public primary school teachers in Kakamega County to ensure availability of the required ICT infrastructure to facilitate access to electronic information resources. Further, teachers should undertake professional development trainings to enhance their ICT knowledge and skills.

Key Words: *Digital Literacy Programmes, Access to Electronic Information*

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1.0 Introduction

Advancement 21st Century developments in technology have led to remarkable changes in the daily life with education systems not left aside. This has led to emphasis in teaching students appropriate and required skills. As a result of this and so as to close the technology gap, curriculums offered by academic institutions have hence been restructured. In the developing countries, education is one of the key components being used for economic enhancement and poverty alleviation (UNDP, 2005; UNESCO, 2005). There is immeasurable use of Information and Communication Technologies (ICTs) to meet a growing demand for education especially by governments that are struggling while at the same time experiencing a serious shortage of teachers (UNESCO, 2006).

Social evils affecting a nation can be addressed through education and training which are often seen as solutions for economic growth and prosperity and therefore able to raise incomes and create employment for people. If at all education has to achieve such expectations of this ever-changing and increased complex world, it must be appropriate while at the same time impart appropriate attitudes and values for citizens to take up responsibilities (Swarts & Wachira, 2010). The education and skills sphere is gradually being infiltrated by technology. New required skills at the workplace have cropped out due to new digital technologies that are being used increasingly. To be parallel with new developments and advancements, skills refreshment and continuous knowledge addition by people is important.

According to Bhattacharya and Sharma (2007), e-learning entails delivering information materials electronically. This includes electronic forms of learning like open distance and online learning. This involves integrating modern technology into the classrooms (Voogt & Knezek, 2008). Schools, colleges and universities have put focus on e-learning mainly to hasten learning (Olatokun & Opesade, 2008). Teachers have adopted it as just pedagogy because they know the benefits that computer-assisted learning can have in primary schools (Mioduser, Nachmias, Lahav & Oren, 2000). To realise maximum benefits of digital literacy, many developed and developing nations have incorporated digital learning in their education systems. Proper ICT application can lead to effective classroom outcomes (Hennessy, Harrison, & Wamakote, 2010).

The concept of common computer access was adopted in 1980s and 1990s in USA and Canada among other countries. The intention was not only making technology low-cost but also available to all the people. Funding of tele centers globally was being done by development agencies mainly (Fillip & Foote, 2007). Tele centers in rural areas were found especially where public schools, libraries and hospitals were. They trained people who educated others how to use computers using a few computers with internet links.

Countries that have adopted digital technology in schools include Denmark, Portugal, Finland and Sweden (OECD, 2016). Practice-based teaching is highly employed using mobile-based tools such as portable devices. Electronic collaborative devices are also becoming common. By adopting this practice, there is a remarkable decrease in use of computer laboratories

(Hennessy, Harrison & Wamakote, 2010). Studies indicate preference in use of technology among children of between 5 to 15 years of age in the UK, (Devaux, *et al.*, 2017).

In Africa, the level of digital literacy is increasing day by day. That is an indication that there are new developments unfolding. Most African countries have prioritized formulation of ICT policies in schools but with different abilities to implement (Farrell & Isaacs, 2007). Ghana, Botswana, Cameroon and Mauritius, among other African countries, are experiencing economic stability. These countries have prioritised ICT use in learning institutions.

Access to digital technologies is hindered by several factors, some of which are social in nature. These include beliefs in religion, ethnic composition, education level, physical movement and social customs (Mutula, 2004; Becta, 2001; and Kozma *et al*., 2004). Tella, Tella, Toyobo, Adika and Adeyinka (2007) investigated uses of technologies by teachers in Nigeria. They established that teachers believe that technology is useful because it enhances learning. Their suggestion was that competence policies that encourage collaboration amongst learners and teachers should be put in place. Further, pedagogy that influences teaching and learning based on technology should be emphasized.

The process of integration of technology in learning institutions in East Africa has been slow over the years although there is tremendous improvement (Liverpool, 2002). Computers are being provided to learning institutions for learning and management tasks. Students can now network using computers in spite of inadequate infrastructure. It is only Tanzania in the East African Region where Technology is taught in public primary schools as a separate subject. What has influenced incorporation of technology in schools in Tanzania because of Kiswahili software. The subject is being taught in a few schools with technology facilities. On the contrary, in Kenya and Uganda, Computer Studies is taught only in secondary schools.

Access to computers vary depending on subjects selected by the learners. In Uganda and Kenya, there is more access to computers by students taking Computer Studies. Hence, schools and students access technology facilities on a varying extent. A study by Ndidde *et al.* (2009) confirmed this. It showed differences in use of technology by learners because of various factors such as varying computer access, different proficiency in technological skills and regulations put in place by an institution.

According to the MoE, 2006, the Government of Kenya aimed to ensure that pupils possess the required skills needed in today's world, giving rise to a brand name "DigiSchool", another name of Digital Literacy Programme (DLP), whose objectives are to: Include ICT in teaching and learning process; encourage learning process by providing public primary schools with the right ICT infrastructure; improve ICT skills and teachers' and education managers' capacity among other stakeholders; improve acquisition of the 21st Century skills by encouraging the development and approval of appropriate digital content; promote teaching and learning in primary schools through universal access to ICT tools; and, integrate in the Kenyan education system sustainable and affordable digital programme.

The DLP was to be rolled out in primary schools across the country in phases (Morara *et al.*; 2020). The programme was set to be rolled out in classes one and two first before being rolled out in the other classes. The programme implementation process involved different stakeholders who were required to offer their proficiency. However, implementation of the programme has faced many challenges if complaints from schools throughout the country is anything to go by.

During a Kenya Primary School Headteachers Association (KEPSHA) meeting that took place on 6th December, 2017 in Mombasa, a report by the Ag. CEO ICT Authority indicated that DLP devices had been supplied to more than 89.2% public primary schools, over 91,000 teachers had attended training on how to utilise the devices, and more than 91% of schools had been connected to power awaiting the DLP to be implemented. However, Gakuu, Kidomo, Bowa, Ndiritu, Mwangi &s Gikonyo (2011), in their report indicated that the Government of Kenya (GoK) seems not to be acting according to the plan. In as much as Computer Studies is part of the curriculum in secondary schools, there is no vital infrastructure in primary schools. The focus in Kenya has mainly been on secondary school and university levels over the past years. Efforts to introduce technology in Kenya, according to Sessional Paper No.14 of 2012, have been hindered by insufficient ICT resources, lack of funding, few teachers who are competent in ICT and interactive digital learning resources whose development costs are high.

1.1 Statement of the Problem

Kenya as a country is going through transformation in the education sector due to curriculum change from the examination-oriented to the Competency Based Curriculum (CBC). Vision 2030 envisages digital learning under the initiative of the DLP that requires implementation in primary schools. Despite the significance of digital technology, incorporation of digital technologies in classrooms in Kenyan primary schools is yet to be realized. Implementation of the DLP is yet to bear fruits due to numerous efforts being made. Previous studies have shown that primary schools score low in integration of digital technologies because schools have unique challenges that require domestic solutions. This standpoint was supported by both Nyaga (2018) who conducted an assessment of teachers' readiness in the execution of the DLP and a study by Mahinda (2018) on factors influencing implementation of the DLP by public primary schools. This study sought to highlight the gaps by assessing the efficacy of the DLP in promoting access to electronic information resources by teachers in public primary schools in Kakamega County. Should the underlying issues not addressed adequately by the GoK and other education stakeholders, such as teachers and curriculum developers, then it might take long to achieve the dream of the DLP. Therefore, achievement of the Vision 2030 that envisages use of technologies during this ever-changing period may just remain to be a pipe dream.

1.2 Objectives of the Study

The researcher focused on assessing the efficacy of DLP in promoting access to electronic information resources by Kakamega County's public primary school teachers in an effort to be at the same pace with current developments of the 21st Century.

The following were the objectives:

(i) To determine the level of digital literacy among public primary school teachers in Kakamega County.

(ii) To establish availability and status of ICT infrastructure in public primary school teachers in Kakamega County.

(iii) To establish how teacher's competence affects access to and use of electronic information resources by public primary school teachers in Kakamega County.

(iv) To identify the challenges encountered by the teachers in accessing useful electronic information resources in in public primary school teachers in Kakamega County.

2.0 Literature Review

2.1 Access to Electronic Information Resources

It is evident that there is uneven access to high quality education across the globe. It is argued that gaps between people can be reduced by education. Digital technologies can enable many people to access high quality education thereby reducing the difference between people. The United Nations Millennium Development Goals lays down a framework towards realisation of universal primary education. However, it is unlikely that this goal will be achieved going by the progress (UNESCO, 2011). There are some initiatives aimed at allowing unprivileged children from remote areas to access high-quality instructions digitally thus improving educational equity. For example, in the Maldives, 1,200 islands have been brought together by a broadband initiative enabling them to have online training. For the first time in their lives, many students have access to modern technologies (UNICEF, 2007).

Similarly, in the USA, many rural can now offer courses that would otherwise not be offered if it were not for technology thereby enabling distance learning (Hannum, Irvin, Banks, & Farmer, 2009). While no outright relationship between access to technology and what a student achieves has been observed in some studies, others have shown that digital learning technologies can improve student achievements (Pedro, 2012). Successful implementation of digital learning programmes is dependent on access to technology. Access to ICT resources depends on their availability. Access to ICT resources enables learners to acquire desirable quality and technical competence on their academic achievements. A report by UNESCO (2002) suggests that having ICT as a primary educational skill is now recognized as part of basic learning, together with reading, writing and numeracy. ICTs are used largely in developing countries to promote access to education. However, ICT is not accessible to the marginalized and vulnerable groups. A study by Ezeoba (2007) found that primary and secondary schools did not have ICT resources, hence, pupils could not access ICT materials leading to low exposure to technology among the learners.

2.2 Digital Literacy among Teachers

Students of today are conversant with digital technologies because they are familiar with creation, accessing and sharing of digital information (Fillip & Foote, 2007). According to Tondeur, Keer, Braak, and Valcke, (2007), if one is digitally literate, they should also know how to critically analyse and integrate digital information in addition to knowing how to search and manage the same. Gilster (1997) opined that for one to be digitally literate, they should be able to assemble different sources of information, in addition to knowing how to find information from the web. Digital literacy is not just about knowing how to use technology alone since it encompasses mastery of ideas. Digital literacy was defined by the European Framework for Digital Literacy (EFDL), which was an outcome of the DigEuLit project, as follows:

Digital literacy entails attitude, awareness, and correct use of digital facilities and tools by people in identifying, managing, accessing, assimilating, and communicating with others contextually so as to enable reflection upon the process and aid constructive social action (Martin, 2006, p.155).

Initially, the focus was on the development of ICT infrastructure without much focus on the need to make teachers to effectively use their digital technology skills. There was advancement in use of digital technologies in most schools in European countries and America by the end of the 20th Century (UNESCO, 2011). Variations in beliefs on the value of technology use in

schools started coming up in the 21st Century (Tondeur, Van Braak & Valcke, 2007). A research by Tondeur *et al*. that was conducted in Flanders, Belgium, found that most elementary school teachers presented a great interest in their personal growth rather than combining their digital skills while teaching. There was a big different between a planned and applied curriculum in terms of use of digital technologies.

It was evident that both practicing and newly graduate teachers had little understanding of digital literacies according to studies done by several Australian researchers (Hammond & Macken-Horarik, 2000; Makin & McNaught, 2001). It is a good indication that challenges and expectations in the learning sphere especially in this 21st Century may not be addressed sufficiently by both today's and tomorrow's teachers. A study by Henderson (2003) focused on the connection between recognition of students' digital skills, the pedagogical methods applied by teachers and accessibility to digital technologies while at home and in school and a remarkable difference was noted. If teachers did not consider technological skills possessed by students, then it could be difficult to close the digital divide. He emphasized the need for teachers to be aware of the knowledge on digital technologies brought to school by the students because of their diversity. Srivastava and Dey (2018) examined technology challenges faced by teachers. The findings showed different perceptions of classroom digital systems setups and challenges in using technology such as lack of technical support, adequate resources and sufficient time. Garcia-Perez, Rebollo-Catalan and Garcia-Perez (2016) observed digital literacy skills exhibited by teachers in using digital tools and social networks. However, their digital literacy was found to be far less developed in daily teaching practice.

2.3 ICT Infrastructure in Schools

ICT Sector Strategy Paper by Batchelor & Nocrish (2005) highlights components of ICT. They comprise hardware, software, networks, media for collection, storage, processing, transmission, and presentation of information. A conducive environment for e-learning is necessitated by the presence of ICT infrastructure in a school. Application of technology in communication and education has become an indispensable tool in the contemporary world (Olakulehin, 2007). There are increased options, participation, access to education and achievement for all students as a result of ICTs. Learning can be enhanced by the availability of ICT infrastructure, thus making education less dependent on different teacher quality. Technology can make education accessible even at home thus enhancing learning (Swarts & Wachira, 2010).

Kremer and Holla (2008), postulated the necessity to assimilate into the curriculum ICT tools and tailor pedagogy according to the social setting in order to achieve qualitative improvements in learning. In order to meet the need or target of a country especially where reforms in education are taking place, ICT materials should be integrated properly into a school's curriculum. Tilya (2007) asserted that students who suffer from learning disabilities can benefit greatly from increased availability of ICT infrastructure since teachers can prepare suitable tasks based on an individual's needs.

Idoko and Ademu (2010) pointed out ICT infrastructure as a deterrent to technology use in learning. Over the years, technology has transformed literacy instruction and education both in theory and practice, thereby enabling children of information age to communicate, investigate, compute and access information. Ezeoba (2007), conducted a research on ICT availability on 100 nursery school teachers in Onitsha in Nigeria. Research findings demonstrated that media availability average was less than 20%. The study revealed that teachers used books mostly for instructional delivery. It is evident that not only the availability of ICT resources contributes to

effective learning but also technological training needs of teachers should be identified to enable them possess the necessary ICT skills.

A study by the International Institute for Communication and Development (IICD) showed that about 60% of its participants stated that the availability of ICT infrastructure directly and positively affected teaching as well as learning while 80% felt that exposure to ICT in education made them more aware and empowered. Conclusively, integration of ICT can impact positively on how student learn and perform in class. Most countries in Africa have poor infrastructure. The situation plays a barrier to successful incorporation of digital technologies in most schools. Governments should invest adequately by increasing resource allocation for digital technologies in African countries for there to be a positive change (Kessy *et al.*, 2006; Ford, 2007). Educational ICT is arguably costly for majority of schools in developing countries such as Kenya to acquire ICT tools like computer hardware and software, set up communication infrastructure, and maintain them. This has limited effective use of technologies in the classroom by most schools, thus inhibiting their adoption (Kessy *et al.*, 2006; Ford, 2007).

2.4 Teachers' Competence in Using Digital Technologies

The role of teachers has become increasingly demanding because nowadays it is necessary to develop their digital literacy in order to successfully use new methods in the classroom in addition to improving existing knowledge and skills. Voogt and Roblin (2010) put that teachers should be supported especially in epoch where technology is used on a daily basis. Teachers also need strong support in developing digital literacy because they do not consider themselves competent in using technologies to teach (Thijs *et al*., 2014). Teachers play an essential role when it comes to determining how technology should be used. Technology use is affected by teachers' beliefs, confidence and competence. These further relates to digital technologies used by teachers not only in specific subjects but also when it comes to establishment of academic capabilities, values, aspirations as well as thoughts that influence digital technology use by schools.

How teachers are trained and even their professional development must be different for there to be a positive impact on student learning. Many teachers still lack proficiency with technology despite the shift. These variances play barriers to using digital technologies effectively (Thijs *et al*., 2014). Teachers should investment significantly in learning in order to shift gear from the traditional role of merely passing knowledge to providing students with guidance on how to apply the information. To effectively use technology in instruction, professional development of teachers is paramount. Trained manpower is crucial for successful implementation of any technology (Tilya, 2007). Hennessy *et al.* (2010) found that teachers were unreceptive towards application of e-learning mainly because of lack of skills. Henderson (2003) agreed that resistance to change is as a result of the perception by teachers that e-learning materials were not secure hence lack of confidence in them. Kiptalam (2010) did not agree that teachers are incompetent. He noted that teachers and students were IT literate. An overloaded curriculum leading to lack of time was the major factor, according to Kozma, McGhee & Zalles (2004), as opposed to teacher competence.

Educator familiarity with technology is also key when it comes to putting in place effective learning initiatives because some teachers lack familiarity with digital technologies while others may have received extensive training in the same. Therefore, the success of any digital learning initiative can be increased by training and providing help that teachers need (Greaves, Hayes, Wilson, & Peterson, 2010). According to UNESCO (2014), it is easy to integrate technology in all levels of education when a champion exists. If adequately trained and

supported, digital learning initiatives can be championed by school heads. Schools that integrate technology into teaching ensure that school heads are trained in the best practices and that there is teacher buy-in (Greaves *et al*., 2010). They come up with or adopt strategies that require all teachers to use digital technologies when at work. They also create time for all the teachers to learn and incorporate technology in teaching (UNESCO, 2004; Greaves *et al.*, 2010).

Teachers should be explained to how digital technologies can help them meet their curricular goals while at the same time providing specialised and pedagogical training practices that are best and related to any digital learning initiative on a continuous basis. Professional development is more useful when teachers are trained continuously throughout a teacher's career (UNESCO, 2004). In a study by Lagarto and Lopes (2018), ICT and digital competences are poorly applied in teaching because teachers use ICT just for transmission of the content without caring about students' learning process. They concluded that it is necessary for schools to adapt to modern demands by ensuring constant teacher training in ICT and digital education.

3.0 Research Methodology

To get answers to questions of how, who, when, what, and where, descriptive research design is usually vital. However, it cannot certainly provide answers to why. In describing "what exists", the variables which are digital literacy, ICT infrastructure and teachers' can influence access to electronic information resources. To describe the phenomena, this study used descriptive research design. Digital literacy skills, ICT infrastructure and teachers' competence are the independent variables. Access to electronic information resources is the independent variable. Kakamega, a unique county exhibiting both urban and rural setups as well as a large population, is where this study was carried out. According to the Kenya National Bureau of Statistics (KNBS) 2019 Kenya Population and Housing Census, Kakamega was number 4 with a population of 1,867,579 people after Nairobi, Kiambu and Nakuru counties respectively.

Kakamega County Governor, Hon. Wycliffe Oparanya, scored highly in surveys done in 2019 by both Infotrak Research and Consulting Company based in Kenya and the All-Africa Advisors Survey, a UK based research group. Among the parameters used in ranking the best performing governors was infrastructure development. Good road network and school infrastructure such as availability of classrooms and electricity connectivity are vital in promoting access to electronic information resources. Mugenda and Mugenda (2013) give the definition of population as shared observable characteristics in a set of objects, cases or individuals. Public primary school headteachers and teachers in charge of technology in Kakamega County were the target population. There are 851 registered public primary schools in Kakamega County based to the report of the Teachers Service Commission (TSC, 2019).

Considering that every public primary school has at least a teacher in charge of technology and a headteacher, the target population is 851 technology teachers and 851 headteachers, making it 1,702. A representative 10% to 30% sample of the population targeted is adequate, according to Kerlinger (1986). A sample size of between 10% and 30% is statistically substantial for a significantly small population (Mugenda and Mugenda, 2003). Going by the above statements, a 10% sample was deemed sufficient. A sample for this study was 10% of 851 which is 85 schools.

Distinct questionnaires, one for teachers in charge of technology and another one for head teachers were prepared. The reasons for using questionnaire are because the cost can be low even when the area is large, large samples can be made use of leading to more dependable and reliable results, well thought out answers are given by respondents because they have adequate

time, and, a questionnaire is free from bias because respondents answer in their own words (Kothari, 2004:100-101). Questionnaires for teachers in charge of technology and headteachers were delivered by hand by both the researcher and a research assistant who was trained. Qualitative and quantitative data was generated using both structured and unstructured questions. Clarifications on the questions were made to ensure a good response rate. Questionnaires were collected after three days upon delivery to the respondents. The data that was gathered methodically was organized in a manner that facilitated the analysis. Responses obtained from open-ended questions from questionnaires were assigned numbers after being categorized. After assigning codes, the researcher applied SPSS in the data analysis. Conceptual content analysis was vital in presentation of open-ended questions that generated qualitative data which was presented in prose. Quantitative variables were displayed in a summarized manner where tables, percentages, bar graphs and pie charts were used.

4.0 Data Analysis Results

4.1 Digital Literacy and Access to Electronic Information Resources

The first specific objective was to establish the level of digital literacy among public primary school teachers in Kakamega County. Respondents were requested to point out digital literacy skills that they possessed and how they acquired knowledge and/or training in ICT. The question was meant to establish whether teachers possessed digital literacy skills that would enable them access electronic information resources. They were further requested to rate the digital literacy skills they possessed. Table 4.2 shows the results. It is evident that respondents knew how to go about analyzing information. This is buttressed by a mean of 3.789 (std. dv = 0.876). In addition, as shown by a mean of 3.631 (std. dv = 0.904), they had skills in searching information. Further, the respondents agreed that they have skills in identifying information. This is shown by a mean of 3.596 (std. dv = 0.937). The respondents also indicated that they had skills in integrating information as evidenced by a mean of 3.568 (std. dv = 0.879). Further, the respondents indicated possessing skills in creating information, as supported by a mean of 3.526 (std. dv = 0.840). The respondents also agreed to knowing how to share information as evidenced by a mean of 3.543 (std. dv = 0.878).

Table 1: Digital Literacy and Access to Electronic Information Resources

	Mean	**Std. Deviation**
Creating information	3.526	0.840
Searching information	3.631	0.904
Identifying information	3.596	0.937
Analyzing information	3.789	0.876
Integrating Information	3.568	0.879
Sharing Information	3.543	0.878
Aggregate	**3.638**	**0.873**

Further, respondents were requested to provide information on how they acquired knowledge in information communication and technology. From the results, most of the respondents had enrolled themselves to institutions where people are taught computer application packages. In addition, the respondents revealed that ICT was part of their curriculum during their training at the college. Some respondents revealed trained by the Government when the DLP was rolled out. Since majority of teachers acquired training in ICT by sponsoring themselves, this could be attributed to the fact that ICT has become part of life and teachers do not want to be left behind. Generally, it is evident that teachers possess digital literacy skills and thus incorporating digital technologies in teaching and learning cannot be hindered by the mere fact that teachers lack the required skills.

4.2 ICT Infrastructure and Access to Electronic Information Resources

The study's second specific sought to determine ICT infrastructure status and availability and establish whether it affects access to electronic information resources by public primary school teachers in Kakamega County. In order to establish whether teachers could access information resources in electronic form, the researcher sought to establish if ICT infrastructure was available in the schools. The respondents were requested to indicate whether their school had a computer room. Going by responses, 79% agreed that theirs school had computer rooms while 21% indicated their schools did not have computer rooms. This implies that most of the public primary schools have computer rooms. The researcher wanted to find out if electricity was available and requested respondents to indicate whether their school had electricity or not. 96% of those who responded agreed that there was electricity in the schools while 4% indicated their schools did not have electricity. This implies that most of the public primary schools have electricity connectivity. Most schools are connected to electricity because of the Government programme to ensure that electricity is supplied to every school so as to facilitate implementation of DLP.

The respondents were requested to provide information on the internet connectivity in their schools. The results where 52% were in agreement indicating that their schools had internet connectivity while 48% indicated that there was no internet in the schools. This implies that access to internet by public primary schools is moderate. Lack of internet connectivity in schools could be a barrier for teachers who may want to search and share electronic information with the learners. To establish whether there were adequate computers for teachers in the schools, respondents were requested to provide information about the same. The results indicated that 61% of the schools lacked adequate number of computers for teachers while 39% had adequate computers for teachers. This implies that most public primary schools in Kakamega County do not have adequate computers for the teachers.

Respondents also provided information by indicating if there were enough tablets and/or computers for pupils in the schools they were teaching in. From the results, it was established that almost all schools lacked adequate tablets for pupils. This implied that public primary schools in Kakamega lack adequate tablets for pupils, which could be as a result of a surge in the population of children who attend to school. Headteachers were asked to indicate the percentage of the equipment in their schools that was working and how the equipment is serviced. Majority of them stated that most equipment is working, only that it is not serviced and the software updated regularly as required. Most headteachers had deviced their own ways of servicing the equipment that was delivered by the GoK to ensure they remain in working condition. In some schools, the equipment is not serviced at all due to lack of resources. For teachers to incorporate digital teaching and learning, up to date software and regularly serviced equipment are fundamental.

4.3 Teacher's Competence and Access to and use of Electronic Information Resources

Thirdly, the research also sought to establish the influence of teacher's competence and how it affects access to and use of electronic information resources among public primary school teachers in Kakamega County. To make use of digital tools at their disposal, teachers should have the competence in handling the same. The researcher sought to establish digital competencies that the targeted teachers have. Various statements on teacher's competence and how they access to and use of electronic information resources were provided for respondents to indicate their level of agreement to. A-five point Likert Scale was used; with 1 being

extremely poor, 2 being poor; 3 being average; 4 being good; and 5 being excellent. The results were as presented in Table 2.

Findings indicated that they were good in producing word documents. This was supported by a mean of 3.899 (std. dv = 0.708). In addition, as shown by a mean of 3.728 (std. dv = 0.925), they indicated that they were good in communicating with others through email. Further, the respondents indicated that they were good in using excel for making spreadsheets, as supported by a mean of 3.738 (std. dv = 0.809). Respondents also agreed to having knowledge of creating databases as shown by a mean of 3.642 (std. dv = 0.821). They further indicated being able to make presentation using PowerPoint as supported by a mean of 3.610 (std. dv = 0.981). To add on that, they indicated that they had good knowledge in uploading and downloading documents, as supported by a mean of 3.523 (std. dv = 0.891).

Table 2: Teacher's Competence

	Mean	**Std. Deviation**
Produce a word document	3.899	0.708
Communicate with other through email	3.728	0.925
Create a database	3.642	0.821
Use excel for making spreadsheet	3.738	0.809
Make presentation using power point	3.610	0.981
Upload or download document	3.523	0.891
Aggregate	**3.642**	**0.865**

In addition, the researcher wanted to know whether workshops and/or trainings during holidays or at any other time on digital technologies were there for teachers. From the results, the respondents indicated that there were no workshops and/or trainings during holidays or at any other time for teachers on digital technologies. Headteachers were asked to indicate their level of agreement to statements regarding digital literacy skills possessed by the teachers in their schools; where SA = Strongly Agree; A = Agree; D = Disagree; and, SD = Strongly Disagree. Table 4.5 below shows their responses.

Table 3: Headteachers' Rating of Teachers Competence

Statement	**SA**	**A**	**D**	**SD**
In this school, most teachers have basic computer knowledge	90%	9%	1%	0%
Most teachers in this school have digital literacy skills	86%	10%	4%	0%

From the results, 90% headteachers indicated that most teachers in their schools had basic computer knowledge. Further, 86% of the respondents indicated that teachers in their schools had digital literacy skills. Only 1% and 4% of the respondents indicated that teachers in their schools had minimal computer knowledge and most teachers had digital literacy skills respectively. To compound that, most teachers are computer literate and possess digital literacy skills and thus are able to make use of online information resources and impart knowledge to the learners.

4.4 Access to Electronic Information Resources

Information on various statements relating to access to electronic information resources was also sought from the respondents. Respondents were asked to provide information on whether they could easily make use of online information resources. The results were that 88% agreed that online information resources were easily accessible while 12% indicated that they had

difficulties accessing electronic information resources. This implies that most public primary school teachers in Kakamega County can easily access online information resources.

The respondents who indicated that online information was not easily accessible were further required to give reasons. The results indicated that lack of electricity and computer illiteracy were not the reasons why teachers could not access online information resources. From the results, the key issues included lack of electricity and internet and obsolete equipment. From the above findings, teachers in schools that lack appropriate ICT infrastructure, especially the internet, find it difficult to access electronic learning materials while at school as compared to those with the necessary infrastructure to support application and use of technology in teaching and learning.

The respondents were requested to indicate how frequent they accessed and utilized learning materials in electronic form. From the results, most respondents indicated they utilized materials in electronic form more often. Among the key reasons given were that access to online education materials depends on the availability of ICT infrastructure. In addition, electronic information resources supplement what is in the books and enhance teachers' knowledge. With technology being used in almost every aspect of life, online information resources should be utilized by the teachers because that is where the most current information can be found. The researcher also sought to find out why some respondents did not use materials in electronic form all the time. Based on the results, 64.5% of the respondents cited inaccessibility as the reason, as a result of lack of the internet, electricity and ICT support staff. By ensuring that every school has internet connectivity, it is easier for schools to have local area networks where information can easily be shared or accessed by all the teachers in a school.

5.0 Conclusions and Recommendations

5.1 Conclusions

There are three main conclusions in this study. To begin with, regarding the finding that teachers in public primary schools in Kakamega County have digital literacy skills because they can create, search and analyse information, among performing other tasks such as creating databases, digital literacy has a significant effect on access to electronic information resources. Findings revealed that the teachers are digital literate and hence the digital competencies they possess enable them to create, search, and analyse information before sharing it with the learners.

In addition, the study concludes that there is considerable effort to put up ICT infrastructure, which has a significant effect on access to electronic information resources by public primary school teachers in Kakamega County. Because of ICT infrastructure in most public primary schools in Kakamega County, teachers are able to access online information resources. Findings revealed that computer rooms, computer hardware and software, power supply and internet connectivity influence access to information in digital form by public primary school teachers in Kakamega County. Lack of computer rooms, enough computers, electricity and the internet dramatically affect access to information in electronic form.

Further, the study concludes that teacher competence, portrayed by their ability and possession of ICT skills, has a significant effect on them being able to access and use information resources in electronic form. Findings showed that access to electronic information resources by public primary school teachers in Kakamega County is influenced by the training that teachers undergo, their knowledge and skills in ICT and professional development.

5.2 Recommendations

It was established by this study that teachers possess digital literacy skills, which influence their access to information in electronic form. The study recommends that the management of Kakamega County's public primary schools should ensure teachers are trained on regular basis to acquire needed ICT knowledge and skills. Digital literacy skills are the cornerstones of optimum interaction with digital technologies. In addition, the study found that there is established ICT infrastructure, which has a significant effect on access to electronic information resources by public primary school teachers in Kakamega County. In schools where there was no ICT infrastructure such as electricity and the internet, teachers have difficulties in accessing academic resources in electronic form. The study recommends to the Government of Kenya to ensure availability of the required ICT infrastructure to enable teachers to access electronic information resources, so that the knowledge they acquire is passed to the learners.

Further, the study established that teacher competence considerably affects access to information in electronic form by public primary school teachers in Kakamega County. Findings revealed that most schools lacked enough computer teachers and that there were no workshops or seminars for teachers to be trained on emerging digital technologies. The study recommends to Kakamega County's public primary schools management to ensure periodic teacher training to enhance their ICT knowledge and skills and professional development, so that they are at par with the ever-changing world by embracing technology in their activities at school. To address challenges that hinder effective incorporation of ICT by teachers in their daily work, the Government should ensure that all public primary schools have computer classrooms with adequate computers for both teachers and pupils, are supplied with electricity and connected to the internet and that computers are installed with the up to date software and are serviced on a regular basis, so that they are in good working condition for optimum performance and functioning. In addition, schools should have ICT support staffs.

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