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DETERMINANTS OF SUCCESSFUL IMPLEMENTATION OF DIGITAL LITERACY PROJECT IN PUBLIC PRIMARY SCHOOLS IN BARINGO COUNTY, KENYA

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Abstract

Purpose: The study aimed at finding out the determinants of successful implementation of digital literacy project in public primary schools in Baringo County in Kenya. The specific objectives of the study were to determine the effect of school leadership, information communication technology teacher competence, and teacher workload and information communication technology infrastructure. The study was founded on Technology Acceptance Theory, Resource Based Theory, Upper Echelons Theory and the Technology, Organization and Environment Model theories. This study adopted a descriptive survey research design.

Methodology: The study targeted 612 stakeholders in the implementation of the Digital Literacy Project in public schools including the Ministry of education Science and Technology representative who is the Sub county Directors, the TSC Sub County Directors, curriculum support officers in the County, the Kenya Institute of Special Education Sub County coordinators, the Kenya Primary Schools Head Teachers Association Sub County coordinators, the Kenya National Union of Teachers Sub County coordinators and the head teachers of the public primary schools in Baringo county. Yamane formula was used to determine a sample size of 150 respondents. Structured questionnaire presented in likert scale were used in collecting primary data. Descriptive statistics such as percentages, mean and frequency was used to analyze the collected data. The study also used inferential statistics such as correlation and regression.

Results: The study found that school leader of technology encourage use of technology in teaching and learning and help teachers establish goals to implementation of technology in achieving their instructional strategies and that school leader's interest; their commitment and championing implementation of ICT programs in schools

positively influenced the whole process. The study concluded that school leadership had the greatest influence on implementation of digital literacy project in public primary schools in Baringo County in Kenya in Kenya followed by ICT infrastructure, then teachers ICT competence while teachers' workload had the least influence on the implementation of digital literacy project in public primary schools in Baringo County in Kenya.

Contribution to policy and practice: The study recommends that the school leaders should increase their compliance with the various policies so as to ensure more effective integration of learning and teaching in primary schools and that school administration and stakeholders in education needs to be more supportive towards implementation of ICT programs.

Key Words: *School Leadership, Information Communication Technology, Teacher Competence, Teacher Workload, Information Communication Technology Infrastructure And Implementation of Digital Literacy Project*

1.0 INTRODUCTION

A number of transformations have been experienced in the education sector as a result of introduction of technology in schools. Most education systems around the world are introducing technology as part of day to day operations. Therefore, there is a growing need for introduction of ICT in the education programmes. The same has been to ensure that learning is smooth, teaching is efficient and administration of schools is also efficient and effective (Buabeng, 2012).

The UNESCO ICT Competency Framework for Teachers (2011) also recognizes the importance of ICT in education and highlights that it ensures that the students are fully capacitated in the 21st century. Despite its importance, its introduction in schools is subject to a number of factors. Laaria (2013) argued that to be successful in introducing ICT in schools, very basic factors such as having a good infrastructure such as electricity, buildings, as well as purchases of both hard and soft wares is mandatory. There is also a need to have professional teachers with the competence required to handle IT related challenges. Furthermore, the school leadership should have the commitment and support to make the same a success. In Africa, the continent still lags behind in matter of ICT in the education sector and a number of reasons have been presented as argued by Chuttur (2009). Among them is lack of both physical and technological capacity in the continent as well as regional and international gaps in interconnectivity. This is to mean that whichever internet Africa uses is routed somewhere in America or Europe which is costly forth end user as compared to other regions in the world.

Global Perspective of Digital Literacy Project

With the advent of new technology globally, most countries have adopted digital literacy project with an aim of enhancing the skills of the students participating. This makes the teaching programs nowadays to evolve from teacher centered to student centered (Kainth & Kaur, 2010). Among the major activities for adoption of ICT in education is

transacting curricular as well as for authentic tasks by the students. In short, in developed economies, ICT cannot be separated from delivery of quality education through its role in internet. File servers, storage of data as well as broadcasting among other uses. India has also been recognized as an advent and champion of digital literacy project. The government has come up with a scheme to equip all the students properly with ICT skills by coming up with a framework for adoption of the same in schools. Apart from schools using ICT to for administration purposes, it is also used for learning and teaching purposes. In administration, technology is used to monitor student's attendance, tracking their performance, registration of the students online for exams as well as sharing of information with the education officials and parents (Chuttur, 2009). In South America, Peru has not been left behind as the government has also initiated frameworks for implementation of digital literacy project in schools by ordering the procurement of over 600,000 laptops for consumption by children in rural primary schools in the country and for future use. The program however faces challenges of not just teacher computer literacy, but also difficulties in infrastructure such as electricity and modern buildings (Warschauer, 2010).

Regional Perspective of Digital Literacy Project

Hennesy *et al* (2010) argued that ICT integration in Sub Saharan Africa depends on the availability of resources, that is, physical resources such as hardware, electricity and modern buildings as well as human resources such as teacher competence, IT expertise and experience as well as knowledge. Some African countries such as Sierra Leone which is recovering from the civil wars that plunged the country in poverty in the 90s as well as a small landlocked and poverty stricken Swaziland have a huge challenge in adoption of ICT projects for schools due to the same problems of most African countries in the name of lack of resources, both physical and human capacity (Mangesi, 2007). In comparison to other African countries, the penetration of ICT in Zambian education system has also remained low and slow. In most cases, the country uses refurbished computers or second hand IT related accessories. Despite the challenge, the country has moved a step ahead in ensuring that computer is a mandatory subject in schools which can be argued to have changed the scenario (Isaacs, 2007).

Local Perspective of Digital Literacy Project

Over the past years, the Kenyan government has been keen in ICTs usage for enhancing the learning and teaching effectiveness in system of education. Due to dynamics in technology, it becomes more affordable and available such as electronic books, digital video recorders and interactive white books. Different categories have been used by researchers to classify factors influencing successful implementation of ICT integration in teaching and learning, this are extrinsic factors cited access, time, resources, support and training while intrinsic cited attitude, beliefs, practices and resistance (Stephen, 2014). Mingaine (2013) argued that despite a positive start to adoption of digital literacy project in Kenya, challenges still exists. Among the secondary schools in Kenya for instance, some of the biggest problems to adoption of digital literacy project has been

related to high infrastructural costs, high electricity bills, lack of support from the school heads as well as lack of capacity. Of similar sentiments is Stephen (2014) who argued that the spirit and enthusiasm for adoption of digital literacy project in Kenya is high in both the teachers and learners. However, the process is not smooth as obstacles still exists of which among those he cited were inadequacy of capacity, poor development of IT related infrastructure and poor development of the necessary software.

1.1 Statement of the Problem

While digitization seems appealing to many government institutions, those among them which undertake digitization face many organizational and management challenges. Digitization in Kenya education system is enhanced through developing capacity of education managers, primary school teachers to enable them use wide range of ICT tools in teaching-learning process and management of schools, Appropriate ICT infrastructure, Credible digital content and change strategy (Ministry of Information and Communication Technology, 2015). Digital Literacy
Project is a flagship project of Kenyan Government that is part of Vision 2030 social pillar aimed at making Kenya knowledge based economy. Statistics reveal that roughly only 10% of public schools with computers in Kenya are able to exchange materials via LAN (ICTed Survey, 2016).

Statistics reveal that ICT penetration rate in the education system in Kenya remains well below the 50% global threshold (Aker & Mbiti, 2015). Since the adoption of the digital literacy project, the results have shown poor performance in terms of implementation. Challenges have been encountered, and to date, there has been no improvement, hence a need to conduct this study. Digitization in Kenya has generally progressed slowly than in other countries in Africa and the rest of the world. There is very little published literature that identified the issues impeding egovernment efforts in Kenya (Malela, 2012). With the recent slow pace of projects associated with digital literacy, it is of importance to carry out a study to focus on the same. The study was also motivated by knowledge gaps on findings of the study in relation to infrastructural facilities, the level of teacher training, administrative support and schools ICT policies are factors that hinder ICT implementation Muriithi (2017), Statistics reveal that roughly only 10% of public schools with computers in Kenya are able to exchange materials via LAN (ICTed Survey, 2016).These studies present contextual knowledge gaps since none of the study had answered the question determinants of successful implementation of Digital Literacy Project in Baringo County, Kenya.

1.2 Research objectives

i. To assess the influence of school leadership on successful implementation of digital literacy project in public primary schools in Baringo County in Kenya

ii. To analyze the influence of teacher's ICT competence on successful implementation of digital literacy project in public primary schools in Baringo County in Kenya

iii. To establish the influence of teacher workload on successful implementation of digital literacy project in public primary schools in Baringo County in Kenya

iv. To assess the influence of ICT infrastructure on successful implementation of digital literacy project in public primary schools in Baringo County in Kenya

2.0 LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Technology Acceptance Theory

In the year 1989, Fred Davis proposed the Technology Acceptance theory. It argues that for technology to be accepted, it depends on how useful it can be and how easy it can be used. So for the teachers to facilitate implementation of the project, they must understand the usefulness it has and how easy it is to use. The theory links effective integration of technology to perceived usefulness and ease of use. Ease of use is a factor of competence. Hence, it can be noted that the theory links to staff competence. If the teachers are incompetent, they will be unwilling to adopt ICT technology. The theory can also link to teacher workload and adoption of the digital literacy project in the sense that, if there is a feeling that adoption of the project will improve their workload, then the reception will be good.

2.1.2 Resource Based Theory

In the year 1959, Penrose came up with the theory that firm resources were major determinants of competitive edge and performance of firms in competition. The argument was resources, physical or human capital, when especially unique, can help a firm perform better than its competitors (Hitt *et al*, 2013). Barney (2001) expounded the type of resources to both physical and capabilities. According to Barney (2001), implementation of any firm strategy heavily relied on the blend between the two sets of resources. When a firm has the required infrastructure and competent employees to ensure the infrastructure works, then implementation of its intended strategy or projects becomes a success. Hitt (2003) similarly supported this argument. In this study, the theory provides an understanding on the independent variable of presence of ICT infrastructure. The theory argues that presence of physical and human capability can affect implementation of programmes in an organization and ultimately affect the overall performance of the programme.

2.1.3 Upper Echelons Theory

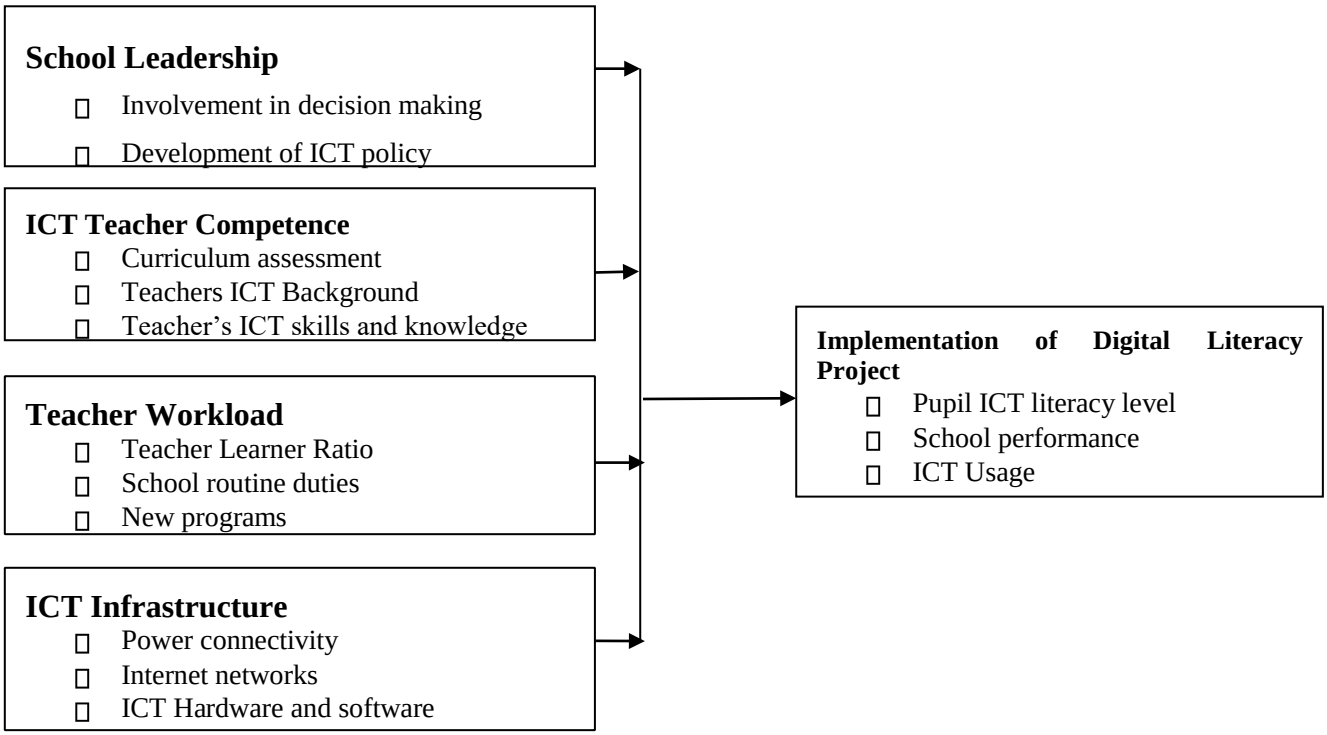
The theory has roots in the behavioral theory by March and Simon (1958). The theory argues that the choices the managers make in affirm are critical since it may sometimes reflect their idiosyncrasies which in that case, may affect a firm in the opposite direction. The theory has been adopted to study the role of top management in implementation of firm's ideas (Eisenhardt & Schoonhoven, 1990). To spearhead a firm's agenda accordingly, the top management team plays a critical role in the whole process. Through their decision making, behavior, leadership and support, a firm can achieve its intended ideas. In the context of implementing digital literacy project in schools in Kenya, the

Upper Echelons theory is important in highlighting the role of the head teachers in the project.

2.1.4 Technology, Organization and Environment (TOE) Model

Oliveira and Martins (2011) proposed the theory to explain the role of a number of factors ranging from external factors, the technological factors and internal factors in implementation of a new technology by a firm. When these factors are considered, then it would be easy to implement a new technology. In terms of internal factors, the theory presented factors such as institutional structures and policy are critical. On the other hand, factors which are from the environment of operation and the firm cannot control such as the ministry policy, teachers workload and government regulations can also affect. Furthermore, the cost of implementing the project is a huge determinant of its success.

2.2 Conceptual framework



Independent variables **Dependent variable**

Figure 1: Conceptual Framework

2.3 School Leadership

Based on the Upper Echelons theory, leadership is important in implementation of any project. Same to digital literacy project in schools, the guidance and support of the top leadership, from the parents and teachers association members to the head teacher, is important. It is argued that the school leaders play a significant role in directing and

managing the process which facilitates adoption (Armstrong, 2012). Leaders will remove barriers on implementation of firm policies, they make employees interested, led by example through their attitudes, show commitment and champion for adherence to ways of implementing new policies and projects (Armstrong, 2012) and therefore, their role cannot be ignored. In the school setup, it is argued that leaders who are incapable of using technology are not fit to be good leaders in championing for its implementation (Armstrong, 2012). Kairo (2013) argued that it was important for the school leaders to participate in development of a school policy for ICT, which is achievable, economically sustainable and which will ensure equal access to ICT by all learners. Furthermore, the policy should be comprehensive enough to touch on how the ICT resources would be stored, ethical guidelines on copyrights, authorized access to sensitive systems, access to adult-only sites and the health risks which the students can face tampering with the systems.

2.4 Teacher's ICT Competence

UNESCO (2016) report indicated the importance of teacher competence if there is a chance that implementation of digital literacy project is to be a success. According to Bordbar (2010), definition of computer competence is being in a position to handle a number of computer applications. It is very useful in implementation of digital literacy project. It has been argued before that when teachers don't have the skills and knowledge about ICT, they develop a negative attitude towards it that makes the process of implementation of digital literacy project difficult. Focusing on integration of ICT in schools in Europe, Costa and Peralta (2007) indicated that the ICT usage in teaching in Italy was highly dependent on the teacher technical skills. In Portugal, there was a varied need for the competence that would aid in computer teaching. Generally, it was established that experienced teachers as those new to the field, were the ones that stressed the need to have ICT integration while the old teachers had a negative attitude towards it.

2.5 Teacher Workload

Increased teacher workload reduces chances of embracing ICT use in teaching and learning and also attending ICT training. Mulhim (2014) posited that lack of time is a problem for teachers all over world and affect technology implementation. Workload could include preparing, supervising and marking examinations, Schools programs like games and competition, syllabus coverage etc. In schools there could be proper technology leadership, ICT Competent teachers, available ICT material and resources but teachers may not apply ICT in learning and teaching due to workload problem. According to Abuhmaid (2011), for the teachers to fully embrace new technology and commit to it, it is important to lessen their work load. Otherwise with their current workload, it is hard to implement new initiatives even new technology. With overload, it is hard for the teachers to learn and practice new concepts.

2.6 ICT Infrastructure

ICT infrastructure refers to various significant components that would make ICT systems work properly and the same would range from among other components, networks, satellites dishes, hard ware and software components as well as IT experts (Warschauer, 2010). Accessibility to ICT resources influences the level of ICT integration. Such access can be measured by ICTs equipment available such as Computers, tablets, projectors, broadband connectivity devices, digital content and ability to use by teachers and learners. Decision to adopt a new technology in schools will depend on various infrastructures one of which is the availability of electricity power in public primary schools due to the fact that computers require electricity power for their functionality (Makinia, 2014). Warschauer (2010) argued that among the most important ICT infrastructural components for successful ICT integration in schools in the rural areas is availability of electricity.

Empirical Review School Leadership

Wong and Li (2008) while focusing on schools in Hong Kong and Singapore used a descriptive approach as well as structural equation modeling to establish what factors were critical in implementing digital literacy project. Also using qualitative approach, it was established that among the critical factors was the support of the school heads by creating high performance expectations. Similarly, Afshari *et al* (2009) focused on institutions in Tehran Iran and established how a leadership practice from the top leadership was linked to ICT integration in those schools. The study adopted qualitative and quantitative approaches to find out the relationship. It was revealed that top management leadership was a key factor in ICT integration in the institutions. Locally, Kidombo, Gakuo and Kindachu (2011) established that for the adoption of digital literacy projects in secondary schools in Kenya to be successful, the school managers need to have competence in ICT and be able to come up with effective ICT policies.

2.7 Teacher's ICT Competence

Ghavifekr *et al* (2015) determined the extent of adoption of ICT in schools in Malaysia by focusing on collecting the opinion of teachers in Kuala Lumpur. It was established that the projects have been a success mainly because of the presence of well-established infrastructure, teacher training and preparedness. In Machakos county of Kenya, Michael (2016) investigated what determined teacher participation in implementation of digital literacy project. Using a survey design primary data and inferential methods of analysis, it was revealed that the level of competence in the teachers played a significant role in the extent of adoption of digital literacy project. In another county in Kenya, Mingaine (2013) focused on ICT integration in secondary schools in Meru and sought to interrogate the challenges experienced in making the process a success. A survey was conducted on secondary schools randomly selected to participate in the study and from them, primary data was collected. The findings placed importance on teacher competence, infrastructure availability and good will as the determinants of success of the projects.

2.8 Teacher Workload

A study in Australia by Samarawickrema and Stacey (2007) interrogated what factors were critical for use of learning management systems in schools. The study conducted a case study and picked teachers from different schools. The findings indicated that teacher workload was a big determinant since increased workload discouraged the teachers. Neyland (2011) focused on schools in Sydney and established the factors that influenced integration of online learning in the schools. The study used qualitative data from interviews and revealed that the already overcrowded curriculum was a big hindrance to adoption of the system. In Jordan, Abuhmaid (2011) looked at the effectiveness of ICT training courses in their education system and among those sampled were teachers and principals. Using open ended questionnaires and interviews, the study revealed that overload was a big hindrance to the program.

2.9 ICT Infrastructure

Stephen (2014) conducted a study in Kenya's western side of Kimilili Sub County to find out whether the schools were prepared in adopting the digital literacy project. The study focused on a group of public schools and the respondents were TAC tutors and teachers. Among the unpreparedness indicators was lack of adequacy in teacher training, electricity availability and limited infrastructure. In Rift valley, Kajiado North Sub County, Muriithi (2017) similarly interrogated the critical factors for success in implementation of digital literacy projects. The study adopted a descriptive design and through random sampling, teachers were selected to participate in the study. Lack of adequate infrastructure was among the cited issues for the failure of the project. In Nairobi, Grace (2012) focused on schools in Westland's Sub County and interrogated what factors affected success in implementing the digital literacy project. The study acknowledged the efforts of the government in availing infrastructure. However, it was argued that inadequacy of the infrastructural facilities was still a major problem.

2.10 Critique of the existing Literature relevant to the study

The studies that were reviewed in this study such as by Wong and Li (2008) in Hong Kong and Singapore, Ghavifekr *et al* (2015) in Malaysia, Abuhmaid (2011) in Jordan, and Samarawickrema and Stacey (2007) in Australia cannot be used to generalize the findings in Kenya. This is because those countries are way developed and their economies are not similar to that of Kenya. Therefore there is a contextual gap hence a need to conduct this study to fill this gap. Similarly, the studies by Neyland (2011) in Sydney and Michael (2016) in Machakos Sub County focused on public secondary and not public primary as this study. The study by Mingaine
(2013), Kidombo, Gakuo and Kindachu (2011) and Stephen (2014) similarly focused on secondary schools. Therefore this study seeks to compare its findings with these studies and is hence relevant.

2.11 Research Gaps

The review of literature guided the study in critiquing which helped to identify research gaps which encouraged the current study to focus on the determinants of successful

implementation of digital literacy project in public primary schools in Baringo County in Kenya. From the literature review, it is clear that there are few studies on the influence of ICT teacher competence, ICT infrastructure, and school leadership and teacher workload on successful implementation of digital literacy project in public primary schools in Baringo County in Kenya. Of the studies that have made attempts to focus on the theme, the context is not the same as that of the current study thus presenting contextual knowledge gaps. Studies for instance Wong and Li (2008) was based in Hong Kong and Singapore, Ghavifekr *et al* (2015) focused on Malaysia, Abuhmaid (2011) interrogated schools in Jordan, Samarawickrema and Stacey (2007) interrogated institutions in Australia and Neyland (2011) investigated high schools in Sydney. These studies presented contextual differences where the findings from those studies cannot be generalized to Baringo County Kenya. Other studies for instance Michael (2016) which focused on Machakos Sub County focused on public secondary and not public primary as this study. The study by Mingaine (2013), Kidombo, Gakuo and Kindachu (2011) and Stephen (2014) similarly focused on secondary schools.

3.0 RESEARCH METHODOLOGY

The study adopted a descriptive survey approach and targeted 612 stakeholders in Digital Literacy Program implementation in public schools comprising of Sub county Directors, TSC
Sub County Directors, curriculum support officers, Kenya Institute of Special Education Sub County coordinators (6), Kenya Primary Schools Head Teachers Association Sub County coordinators, KNUT Sub County coordinators and 533 head teachers. The study adopted Yamane (1967) sampling formula to derive a sample of 150 respondents. The study used likert scaled questionnaires in collecting data. Inferential and descriptive statistics was used to analyse data. Results of the analysis were presented by use of tables and figures. The study used the following regression model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Implementation of Digital Literacy Project, X_1 = School Leadership, X_2= Teachers ICT competence, X_3 = Teachers' Workload, X_4 = ICT Infrastructure, ε = Error term, β_0 = the constant term and $\beta_i i$= 1….4 are beta coefficients

4.0 RESULTS

The study administered 150 questionnaires where 114 questionnaires were filled and returned. This represented a response rate of 76%. This was sufficient for analysis as advocated by Hussey and Collis (2009) who asserts that a response rate of a minimal value of 50% is good for analysis.

4.1 Descriptive statistics

School Leadership

The study sought to establish how school leadership influence successful implementation of digital literacy project in public primary schools in Baringo County in Kenya. Respondents were requested to indicate their agreement levels with statements on School Leadership. Their responses were as illustrated in Table 1. From the findings, the respondents agreed that school leader of technology encourage use of technology in teaching and learning and help teachers establish goals to implementation of technology in achieving their instructional strategies as shown by a mean of 4.333, that school leader's interest; their commitment and championing implementation of ICT programs in schools positively influenced the whole process as shown by a mean of 3.983 and that the successful implementation of ICT in schools depends on the effective of school heads to manage change as shown by a mean of 3.930. These findings are in line with Kairo (2013) who argued that it was important for the school leaders to participate in development of a school policy for ICT, which is achievable, economically sustainable and which will ensure equal access to ICT by all learners. The respondents moderately agreed that school leader who are uncomfortable in using technology are not capable of leading their schools in implementing ICT as shown by a mean of 3.211 and that the school leaders plays important roles in managing and directing positive actions that acts as facilitators of usage and adoption of technology as shown by a mean of 2.500. These findings correlate with Armstrong (2012) who noted that in the school setup, it is argued that leaders who are incapable of using technology are not fit to be good leaders in championing for its implementation. Further on respondents explanation on the extent to which school leadership affect effectiveness implementation of DLP in Baringo County, they indicated the school leaders being able to understand the elements and characteristics of long range planning for the use of current and emerging technology makes the implementation of the DLP easier. The respondents also indicated that school leaders establish and maintain learning environments compatible with student-centered approaches to teaching and learning with ICT and encourage, give support and make teachers adopt to the use of computers in their instruction process leads to quicker implementation of ICT integration through provision of good training manuals. On the same the respondents indicated that school leaders can give financial support to teachers who need training in ICT for the ICT implementation to run smoothly and ensure that the ICT program is supportive of the curriculum for primary school and influencing the extent to which integration of ICT can become firmly fixed in educational institutions and the role of leadership in championing ICT.

Table 1: School Leadership

Statement	Mean	Std. Dev.
The successful implementation of ICT in schools depends on the effective of school heads to manage change	3.930	0.648
The school leaders plays a vital role in directing and managing positive actions that facilitates adoption and use of technology	2.500	1.236
School leader's interest; their commitment and championing implementation of ICT programs in schools positively influenced the whole process	3.983	0.809
School leader of technology encourage use of technology in teaching and learning and help teachers establish goals to implementation of technology in achieving their instructional strategies.	4.333	0.674
School leader who are uncomfortable in using technology are not capable of leading their schools in implementing ICT	3.211	1.060

ICT Teacher Competence

The study further sought to establish how teacher's ICT competence influences successful implementation of DLP in public primary schools in Baringo County in Kenya. The study requested respondents to indicate their agreement levels with statements on ICT Teacher Competence. The results are as presented in table 2. As per the findings, the respondents agreed that lack of innovativeness and Technical skills of teachers in ICT affect usage of ICT in teaching and learning processes as shown by a mean of 4.313, that qualified teachers with skills on ICT should be recruited and in-service courses design to train the ones already in profession as illustrated by a mean of 4.184 and that attitude of teachers affects integration of ICT as illustrated by a mean of 4.053. Respondents however moderately agreed that teacher's perception about ICT affects its effectiveness in implementation as shown by average mean of 3.290 and that professional development training programs for teachers to enhance their competence as illustrated by a mean of 2.798. These findings are similar to Peralta and Costa (2007) indicated that the usage of ICT in teaching in Italy was highly dependent on the teacher technical skills. In Portugal, there was a varied need for the competence that would aid in computer teaching. Generally, it was established that experienced teachers as those new to the field, were the ones that stressed the need to have ICT integration while the old teachers had a negative attitude towards it. Further on how the ICT Teacher Competence affect implementation of ICT integration in teaching and learning in their school, the respondents indicated that competent ICT teacher ensures that there is maintenance of ICT tools. This enhances safe working environment, reduction of production costs and improved product quality, reactive maintenance and safety incidents.

Table 2: ICT Teacher Competence

Statement	Mean	Std. Dev.
Professional development training programs for teachers to enhance their competence	2.798	0.668
Lack of innovativeness and Technical skills of teachers in ICT affect usage of ICT in learning and teaching processes	4.313	0.605
Teacher's attitude has an effect on the ICT integration	4.053	0.714
Teacher's perception about ICT affects its effectiveness in implementation	3.290	0.975
Qualified teachers with ICT skills should be employed and in-service courses design to train the ones already in profession	4.184	0.646

Teacher's Workload

The study further sought to establish whether teacher's workload influence successful implementation of DLP in public primary schools in Baringo County in Kenya. The study requested respondents to indicate their agreement levels with statements on Teacher's Workload. The results are as presented in table 3. The results in Table3 indicates that the respondents agreed that workload reduces the teachers' ability to cope with the pressure from ICT training as shown by an average of 4.342, that workload problem reduces the teacher's ability to use ICT resources and material in teaching and learning as shown by an average of 3.983 and that busy work day reduces the availability of teachers as shown by an average of 3.798. However, the respondents moderately agreed that overcrowded curriculum hinders the teachers ability to train about ICT use as shown by an average of 2.684 and that preparing, supervising and marking examinations reduces the time for teachers to learn about ICT use as shown by an average of 2.649. These findings are in line with Mulhim (2014) who posited that lack of time is a problem for teachers all over world and affect technology implementation. n schools there could be proper technology leadership, ICT Competent teachers, available ICT material and resources but teachers may not use ICT in learning and teaching because of workload problem. On the respondents' thoughts on whether they think teachers in their school have overcrowded workload; they indicated that the teachers' workload is not very overcrowded. The respondents pointed out the school administration have collaborated with the PTA to employ more teachers on PTA terms as they wait for TSC to allocate them teachers. This has reduced the work load on the TSC teachers hence making integrations of ICT less challenging.

Table 3: Teacher Workload

Statement	Mean	Std. Dev.
Workload reduces the teachers ability to cope with the pressure from ICT training	4.342	0.785
Workload problem reduces the teacher's ability to use ICT resources and material in learning and teaching	3.983	0.809
Busy work day reduces the availability of teachers	3.798	0.833
Overcrowded curriculum hinders the teachers ability to train about ICT use	2.684	1.100
Preparing, supervising and marking examinations reduces the time for teachers to learn about ICT use	2.649	0.479

ICT Infrastructure

The study further sought to assess whether ICT infrastructure influences successful implementation of DLP in public primary schools in Baringo County in Kenya. The study requested respondents to indicate their agreement levels with statements on ICT infrastructure. The results are as presented in table 4. As per the findings, the respondents agreed that availability of internet affects ICT integration as shown by an average of 4.342, that hardware and software availability affects ICT integration as shown by an average of 4.333 and that technical and financial support affects ICT integration as shown by an average of 3.983. Further the respondents agreed that availability of space such as laboratory and storage affects ICT integration as shown by an average of 3.632 and moderately agreed that electricity connectivity improves the integration of ICT as shown by an average of 2.868. These findings concurs with Warschauer (2010) who argued that among the most important ICT infrastructural components for successful ICT integration in schools in the rural areas is availability of electricity. Further on the respondents thought on whether they think infrastructural facilities in their school are adequate for ICT integration, most of the respondents indicated that they have only one computer lab which is not well equipped for ICT integration. However, other respondents indicated that they improvised computer labs by restructuring one of the classrooms. However, limited number of computers has made ICT integration in most schools in Baringo County a nightmare as per most of the respondents.

Table 4: Descriptive statistics on ICT Infrastructure

Statement	Mean	Std. Dev.
Electricity connectivity improves the integration of ICT	2.868	0.770
Availability of space such as laboratory and storage affects ICT integration	3.632	0.989
Availability of internet affects ICT integration	4.342	0.785
Technical and financial support affects ICT integration	3.983	0.809
Hardware and software availability affects ICT integration	4.333	0.674

Table 5: Descriptive Statistics on Implementation of Digital Literacy Project

Statement	Mean	Std. Dev.
There is increased of Frequency of usage of digital devices in the school	4.079	0.680
The school performance have improved since implementation of digital literacy project	4.088	0.472
There is increased pupil enrollment since implementation of digital literacy project	3.483	0.641

Implementation of DLP

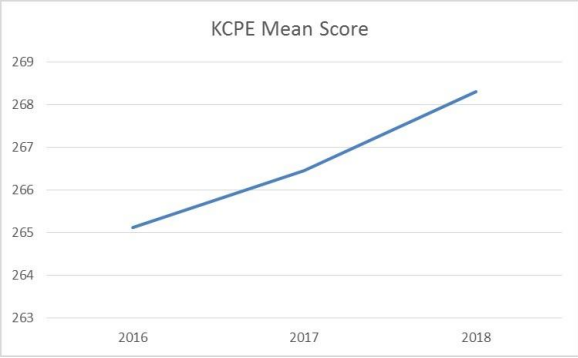
The study sought to establish the level of implementation of DLP in the county. The study requested respondents to indicate their agreement levels with statements on implementation of Digital Literacy Project. The results are as presented in table 5. The results shows that respondents agreed that the school performance have improved since implementation of digital literacy project as shown by a mean of 4.088 and that there is increased of Frequency of usage of digital devices in the school as shown by a mean of 4.079 but moderately agreed that there is increased pupil enrolment since implementation of digital literacy project as shown by a mean of 3.483.

Further the researcher collected secondary data on Baringo county KCPE performance and enrollment for 2016, 2017 and 2018. The Table and Figures below shows the findings.

Table 6: KCPE Performance and Enrollment for Baringo County

Year	2016	2017	2018
KCPE Mean Score	265.12	266.46	268.31
School enrolment	157780	186,997	193,488

From the findings, the study shows that Baringo County recorded a Mean score of 268.31 with an enrollment of 157780 in 2016, mean of 266.46 and enrollment of 186,997 in 2017 as well as mean of 265.12 and enrollment of 193,488. This shows that since the inception of the digital literacy project the mean score and enrollment has been increasing.



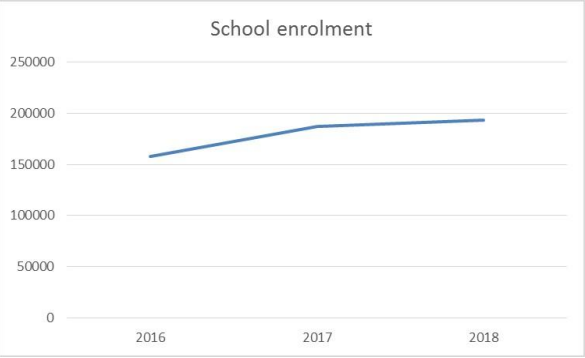


Figure 2: Trend Analysis for KCPE and Enrollement

From the trend analysis in Figure 2, the results shows that since inception of the digital literacy project the mean score and enrollment has been increasing from 2016 to 2018.

4.2 Inferential Statistics

Correlation Analysis

Correlation analysis establishes the degree of association between study variables (Ward, 2013). The correlation results shows a positive and significant relationship between school's leadership and implementation of DLP in public primary schools r=0.714, a positive relationship between implementation of digital literacy project in public primary schools and teachers ICT competence r=0.611, a positive relationship between implementation of digital literacy project in public primary schools and teachers' workload, r=0.522 and a positive relationship between implementation of digital literacy project in public primary schools and ICT infrastructure, r= 0.672.

Table 7: Correlation Matrix

		Implementation of digital literacy project	School leadership	Teachers ICT competence	Teachers' workload	ICT infrastructure
Implementation of digital literacy project	Pearson Correlation	1				
	Sig. (2-tailed)	.				
School leadership	Pearson Correlation	. 714	1			
	Sig. (2-tailed)	.023	.			
Teachers ICT competence	Pearson Correlation	.611	.513	1		
	Sig. (2-tailed)	.027	.026	.		
Teachers' workload	Pearson Correlation	.522	.423	.0.327	1	
	Sig. (2-tailed)	.028	.012	.018	.	
ICT infrastructure	Pearson Correlation	0.672	.533	.520	.431	1
	Sig. (2-tailed)	.042	.009	.002	.014	.
	Sig. (2-tailed)	.037	.009	.002	.014	.

Regression Analysis

The relationship between independent and dependent variables was assessed through a regression analysis. The regression analysis shows the extent to which independent variables influence dependent variable. The results as presented in table 8 shows that there is a statistical significance of independent variables in predicting the dependent variable since R square was 0.737. This implied that 73.7% variations in implementation

of digital literacy project in public primary schools in Baringo County in Kenya are explained by school leadership, teachers ICT competence, teachers' workload and ICT infrastructure.

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.859	0.737	0.727	0.796

From the ANOVA Table, p-value was 9.83E-31 and F-calculated was 76.405. Since p-value was less than 0.05 and the F-calculated was greater than F-critical (2.455), then the regression relationship was significant in determining how school leadership, teachers ICT competence, and teachers' workload and ICT infrastructure influenced implementation of digital literacy project in public primary schools in Baringo County in Kenya.

Table 9: ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	199.121	4	49.780	76.405	9.83E-31
	Residual	71.017	109	0.652		
	Total	270.138	113			

The regression coefficient results has established that taking (school leadership, teachers ICT competence, teachers' workload in the school leadership leads to 0.812 and ICT infrastructure), implementation of digital literacy project in public primary schools in Baringo County in Kenya will be 1.267. The findings presented further shows that a unit increases in the implementation of DLP in public primary schools in Baringo County in Kenya. These findings correlate with Armstrong (2012) who noted that in the school setup, it is argued that leaders who are incapable `of using technology are not fit to be good leaders in championing for its implementation. Further it was found that if teachers ICT competence increases, there is a 0.712 increase in implementation of digital literacy project in public primary schools in Baringo County in Kenya. This variable was significant since calculated t statistic (2.561) is greater than table value (1.658) at 5% level of significance. These findings are similar to Costa and Peralta (2007) who indicated that ICT usage in teaching in Italy was highly dependent on the teacher technical skills. Further, the findings show that a unit increases in the scores of Teachers' workload would leads to 0.568 increases in the score of implementation of digital literacy project in public primary schools in Baringo County in Kenya. These findings are in line with Mulhim (2014) who posited that lack of time is a problem for teachers all over world and affect technology implementation. The results further indicate that a unit increases in ICT infrastructure lead to a 0.771 improvement in the implementation of digital literacy project in public primary schools in Baringo County in Kenya. These findings concurs with Warschauer (2010) who argued that among the most important ICT infrastructural components for successful ICT integration in schools in the rural areas is

availability of electricity. Overall, school leadership had the greatest influence on implementation of digital literacy project in public primary schools in Baringo County in Kenya followed by ICT infrastructure, then teachers ICT competence while teachers' workload had the least influence. However, all the variables were found to have a positive and significant influence on the implementation of DLP amongst primary schools in Baringo County.

Table 10: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.267	0.182		6.962	.001
School leadership	0.812	0.321	0.714	2.530	.014
Teachers ICT competence	0.712	0.278	0.611	2.561	.013
Teachers' workload	0.568	0.208	0.462	2.731	.007
ICT infrastructure	0.771	0.312	0.672	2.471	.016

The established model for the study was:

Implementation of digital literacy project = 1.267 + 0.812 (School leadership) + 0.712(Teachers ICT competence) + 0.568(Teachers' workload) + 0.771(ICT infrastructure)

5.0 CONCLUSIONS AND RECOMMENDATIONS 5.1 Conclusions

The findings of the study led to conclusions that school leadership have a significant influence on successful implementation of digital literacy project in public primary schools in Baringo County in Kenya. This is because there is encouraged technology usage by school leader in learning and teaching which help teachers in establishing goals on technology implementation in achieving their instructional strategies. It was also established that the interest of school leaders; their levels of commitment in championing ICT programs implementation positively influenced the entire process and that the ICT implementation success in schools depends largely on the effectiveness of school heads to manage change. The study further concluded that ICT teacher's competence positively and significantly influences implementation success of DLP in public primary schools in Baringo County in Kenya. The study found that inadequate innovativeness and technical skills of ICT teachers affect the usage of ICT in learning and teaching processes and attitude of the teacher has an effect on the ICT integration. It was also deduced that teacher's perception about ICT affects its effectiveness in implementation and that professional development training programs for teachers to enhance their competence. The study concluded that teacher workload influences successful implementation of digital literacy project in public primary schools in Baringo County positively and significantly. This was attributed to the fact that workload reduces the teachers' ability to handle the pressure and from ICT training, that workload problem reduces the teacher's ability to use ICT resources and material in learning and teaching and that busy work day reduces the availability of teachers. It was as well established that overcrowded curriculum hinders the teachers' ability to train about ICT use. Finally, the findings of

the study led to conclusion that ICT infrastructure significantly influences the implementation success of DLP in public primary schools in Baringo County in Kenya. It was clear that availability of internet, hardware and software affects ICT integration. The integration of ICT was revealed to have been affected by technical and financial support as well as availability of space such as laboratory and storage. Electricity connectivity on the same was established to have enhanced the integration of ICT.

5.2 Recommendations

The study has established that school leadership influences successful implementation of digital literacy project in public primary schools. Therefore the study recommends that the school leaders should increase their compliance with the various policies so as to ensure more effective integration of learning and teaching in primary schools. The school leaders should also improve on the level of staff skills development through organized workshops and seminars on integrations ICT. Further the study recommends that the school leadership should prioritize ICT infrastructure in their five years strategic plan to enable their schools to be well equipped with ICT infrastructure to facilitate ICT integration as the school were noted by the findings to be having inadequate ICT infrastructure. Education stakeholders and school administration needs to be more supportive towards implementation of ICT programs. This can be achieved through provision of all necessary material, conducive environment and financial injections for ICT implementation. Government must support ICT integration by sensitizing head teachers on the importance supporting ICT in education at school level as well as showing ICT leadership. The policy makers at the Ministry of Education and TSC should prioritize in-servicing of science teachers to improve their ICT skills as the study found that majority of the science teachers had low skills in ICT. The District Education Officer with Quality Assurance and Standards Department should continue with SMASE INSET on ICT integration every year. Teacher training colleges and universities also need to introduce ICT component in all science subjects.

The teachers and head-teachers needs also to be reinforced through training so as to increase their efficiency in promoting ICT implementation. The education stakeholders should organize for inset training which reinforces the ICT skills of the teachers and head-teachers. Provision of good training manual and provision of financial assistance to support teachers training in the ICT will encourage teachers to think out of the box and come up with mechanism that can enable ICT success in primary school education. The study recommends that there is a need to seek funding from the national and county government to improve physical and ICT infrastructural facilities so as to promote better ICT implementation in public primary school in the sub-county level. Additionally there is need for technical support in these schools to give teachers back up in repairing software and hardware that get damaged. Otherwise even with infrastructural facilities with computer not being in functional state, very little ICT education will take place. There is need for TSC to employ more teachers. This will reduce the teachers' lesson load, paving way for adequate time of planning, preparing, and executing ICT integrated lessons in class. The Ministry of Education should organize and sponsor teachers for

capacity building courses in ICT integration. This will equip the in-service teachers with appropriate skill and knowhow on how best integrate ICT in their subject area.

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