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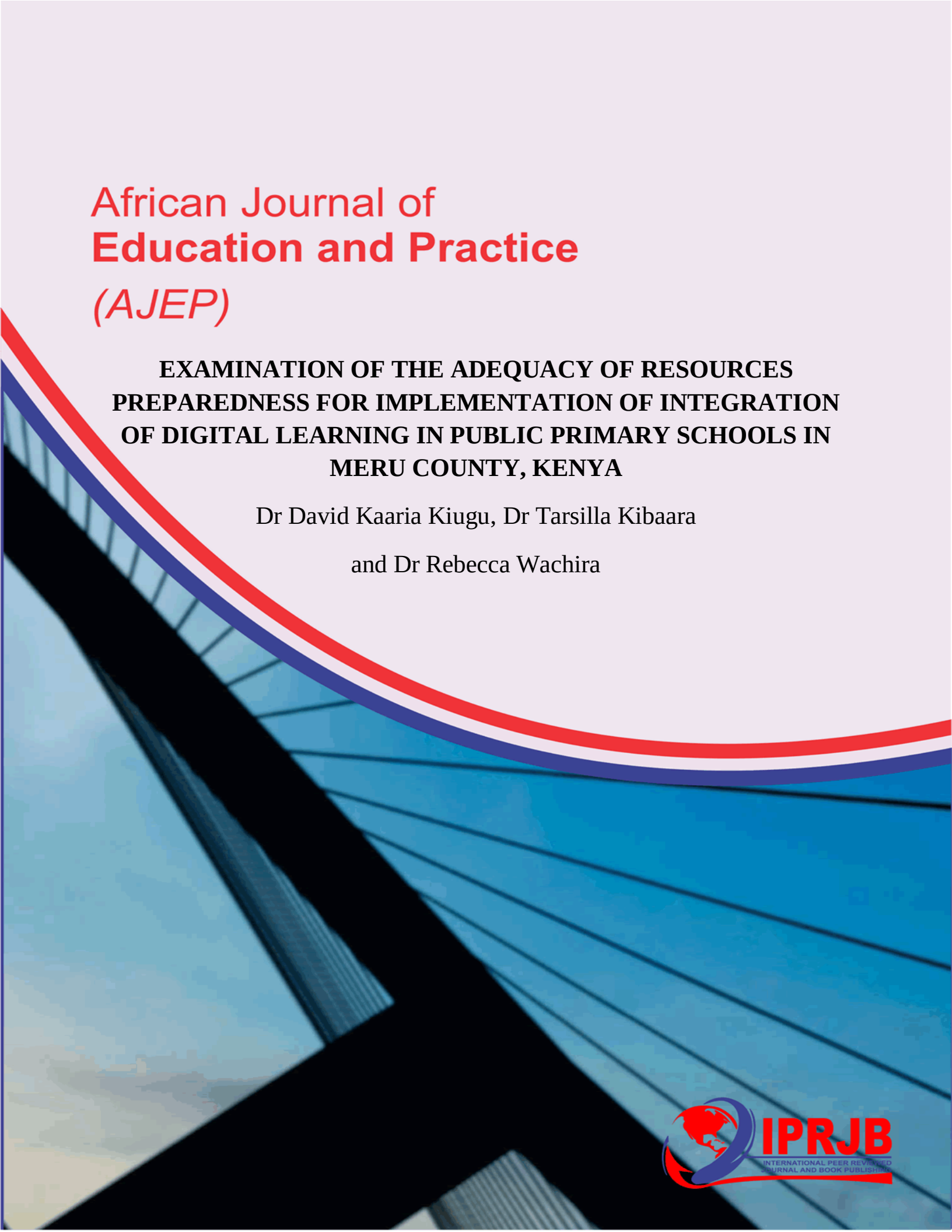

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EXAMINATION OF THE ADEQUACY OF RESOURCES PREPAREDNESS FOR IMPLEMENTATION OF INTEGRATION OF DIGITAL LEARNING IN PUBLIC PRIMARY SCHOOLS IN MERU COUNTY, KENYA

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Abstract

Purpose: Digital learning integration (DLI) in schools has positive implications for the education systems. DLI programme was rolled out in Meru County alongside other 46 counties in Kenya in 2016 after several postponements. However, DLI programme adoption is attributed to preparation challenges. This study examined the adequacy of resources on implementation of DLI programme in public primary schools in Meru County.

Methodology: The study was guided by Roger's diffusion of innovation theory and Boum's project management cycle. The study used descriptive survey design and adopted mixed method approach. The study targeted 710 public primary schools in 9 sub-counties. Data was provided by 710 head teachers, 7032 teachers, 2004 Parent Teachers Association (PTA) executive members, and 25,720 grade 3 DLI programme pioneer pupils. A 10% sample of schools was considered sufficient which was obtained using simple random sampling technique. As a result, 71 head teachers and 703 teachers were obtained. Purposive judgmental sampling technique was used to get 201 PTA members. Further, Sloven's formula was used to get a sample size of 396 pupils that formed Focus Group Discussion (FGD) each consisting of 8 learners, and 9 SCDEs were purposively sampled. Questionnaires were used to collect data from head teachers, teachers and PTA while interview schedules and FGDs were used to get data from SCDEs and from learners respectively. Observational schedule was also used to provide guide for focusing observation and recording data. The research tools were pre-tested for validity and reliability. The quantitative data was analyzed using IBM SPSS Statistics for Windows version 22. The data was analyzed, interpreted and reported using percentages, measures of central tendency. Univariate regression analysis was used to test hypothesis. Qualitative data was analyzed according to themes based on study objective and reported in narratives.

Findings: Through computation of Pearson product moment correlation coefficients confirmed that there is significant positive correlation (r = 0.825) between variable adequacy of digital learning resources against DLI at 0.05 level of significance. Resources such as tablets, internet connectivity, computer laboratory and electricity were noted to be inadequate. Learners who were introduced to DLI appreciated and were always eager to learn using the available digital technology resources. In addition, there was no monitoring or evaluation of the digital programme after roll out by quality assurance and standards officers as per the policy guidelines. The study concluded that preparations for digital programme were inadequate. The findings will be useful to educationists, parents, teachers, and policy makers.

Unique contribution to theory, practice and policy: The study recommended that MoE should go back to the drawing board and come up with proactive measures on provision of digital learning resources. Adequate resources such as tablets, desks, computer laboratories, network connectivity and electricity among others should be availed to all schools. Tablets available are too few to be distributed to pupils during this period of COVID-19 pandemic leading to resource wastage. MoE should own the innovation and facilitate its full adoption by coming up with apt monitoring and control systems. Political objectives should not be allowed to overshadow policy structures such as planning, management and administrative processes.

Key words: *Digital learning resources, digital learning integration, schools' resource preparedness, implementation, examination*

1.0 INTRODUCTION

Digital learning integration means access and incorporation of digital resources such as laptops, tablets and other digital tools and facilitated by digital technology as an instructional media for learning (Roblyer & Doering, 2014). The digital technologies support students learning and increase student success (Kozma, 2012; Bandung & Langi, 2011; Bitter & Legacy, 2009). The decision to start using digital technology in schools relies on the policies of individual countries' preparations and adequacy of resources (Keiyoro, et al., 2011). The digital technology provides the mechanism that delivers content by providing tools that facilitate how students receive content (Lee, et al., 2015; Sang, et al., 2011). In addition, within the learning environments, teachers become facilitators and students become constructors of knowledge (Almalki & Neville, 2012).The adoption, organization, planning preparations and management of DLI in the classroom is complex and involves link between policy and politics, coalition of education public officials, parents, teachers and practically all aspects of school management and administration (Bebell & O'Dwyer, 2010**).** Impediment such as provision of digital learning resources reduced the effectiveness of DLI in the classroom (Ghavifekr, et al., 2012; Bebell & O'Dwyer, 2010). Appropriate policies are essential to enabling concrete and adequate preparations and eventual successful digital learning integration programmes. Therefore, preparations to ensure DLI as a tool for enhancing students' learning and as a catalyst for improving access to quality education are a necessity. Resources are necessary tools that can bring about effective learning outcomes (Rebecca & Marshal, 2012). Institutions can realize their goals when facilitation resources are enough and available in good time. Availability of learners' digital equipment when measured using indicators such as student-computer ratio or access to the internet can be used to gauge the level of preparedness for digital learning to be rolled out (Li & Walsh, 2010).

Most developed countries are endowed with resources for digital learning. For instance, in Singapore the ratio of student to computer in 2015 was 2:1 in class one and 1:1 in class two and three (Lee, et al., 2015). Further, the success of digital learning in Singapore emanated from good management practices, adequate preparations, and provision of the required resources and effective partnership with stakeholders. Countries such as Malaysia proactively prepared digital learning resources making it possible for teachers to integrate digital learning that supports and enhances the actual teaching and learning process (Ghavifekr & Sufean, 2011).The government committed resources and sought support from parents and government departments in the education system and provided enough funds to start and maintain digital learning programme in schools (Ghavifekr & Sufean, 2011). However, schools that had scarce digital learning resources experienced hardships while trying to implement digital learning integration in the classroom. For example, a study carried out by Rebecca and Marshall (2012) in India showed that electricity fluctuations and inadequate digital learning equipment in public primary schools was a major stumbling block to digital learning integration in the country. Similar impediments were also experienced in Keerom-Papua in Indonesia where availability of electricity was limited and low network connectivity (Bandung & Langi, 2011). Thus, in those countries where digital learning resources were inadequate DLI had challenges. This indicates a gap between resources preparedness and digital learning integration.

Nigeria initiated a One Laptop per Child (OLPC) programme for the 24 million public primary school pupils in 2006 without policy foundation and adequate preparations, notwithstanding political commitment taken at presidential level. Only one million laptops were purchased and the program collapsed leading to a lot of resource wastage and conduit to siphon public funds (Hennessy, et al., 2010). East Africa countries have appreciated the importance of digital technology and have embarked on DLI programmes into the pre-existing education framework. In Uganda for example, the need to have computer literate population, the creation of an enabling environment for digital learning became inevitable (Markon, 2013 However, most of the computers used in schools in Uganda were donated by U.S. and Great Britain. Without availing digital learning integration resources by various stakeholders in education and after assessing the necessary conditions and parameters of each school, digital learning integration cannot be successful. The study identified a gap in preparedness on the adequacy of digital learning resources to enable successful DLI.

Kenya DLI strategy in the policy documents seek to facilitate development of digital content, power supply to schools, training of teachers and supply of tablets to learners (Nyambura, 2015). Policy framework for digital learning integration in Kenya was formulated in the form of session paper No 14 of 2012 where the government through MoE promised to enhance DLI (Gikundi, 2016). Digital learning in Kenya is viewed as a key enabler for Vision 2030 and the education system is undergoing reform so that it is aligned to the Government's DLI initiative (Nyambane & Nzuki, 2014). The Government of Kenya (GoK) is committed to ensuring that all the children are given opportunities to develop digital skills and attributes that could enable them become successful learners and responsible citizens (Kenya, Education Management Institute, 2011). The GoK embarked on digital learning curriculum development through Kenya Institute of Curriculum Development (KICD) in 2013. However, adequate digital learning resources preparations measures are essential before embarking on project preparations. A policy guideline

on digital learning integration in Kenya had put into account provision of adequate infrastructure to facilitate DLI (Hennessy, et al., 2010). Strategies of equipping schools with relevant and up-to-date digital learning resources were essential in any learning institution (Sang, et al., 2011). Lack of resources prohibits the adoption and use of digital learning integration (Li & Walsh, 2010). Primary schools in Kenya lack adequate resources for DLI (Kindombo, et al., 2012). For example, Musa Gitau primary school with s405 students had 20 computers with no network connectivity, and Githunguri with 800 pupils had 14 computers without connectivity (Kindombo, et al., 2012). Lack of enabling resources, including classrooms, electricity, internet connectivity and computers posed a hurdle to the integration of digital learning education curriculum (Mugo, 2016; Keiyoro, et al, 2011). With, insufficient digital learning integration resources, the acquisition and use of 21st century skills that involve inquiry based learning was not likely to be achieved sooner rather than later. Making DLI possible and easier through resource mobilization before rolling out the digital programme was identified as a research gap.

Statement of the Problem

Adequate preparations such as provision of adequate digital learning resources before embarking on DLI programme in schools are critical in order to satisfy the requirements of the pupils and the country at large. DLI has been found to be very useful in teaching and learning process (Bitter & Legacy, 2009; Bandung & Langi, 2011). However, the conception, adoption and eventual integration of DLI depend on preparedness of individual schools and institutions (Keiyoro, et al., 2011). Adequate resource preparedness on digital learning made the programme very successful in several countries such as Malaysia (Ghavifekr & Sufean, 2011), China (Li & Walsh, 2010), UK (O'Hara, 2011) and Israel (Blau & Hameiri, 2016). Notwithstanding the above, some countries such as India embarked on DLI programmes without adequate preparations on provision of adequate resources, hence impediments (Rebecca & Marshall, 2012). Thus, preparedness determined the success of DLI. The GoK rolled out DLI programme in PPS in the 47 counties in 2016. It allocated Kenya shillings 17.58 billion for preparations through deployment of digital learning devices and infrastructure development among other areas in DLI in public primary schools in 2015/2016 budget (Kenya Information Communication Technology Authority, 2016). It was expected that with such huge budgetary allocation, adequate resources would be supplied in preparations for a successful DLI programme. However, teachers and stakeholders had raised issues through the media since adequate digital learning resources had not been distributed to all schools (Sossion, 2017). Further, there were complaints that money disbursed was too little and that digital equipments were lacking (Onyango, 2018). Budget for the digital programme was thwarted by members of parliament by reducing the budget by nearly 6.4 billion for the financial year 2018/2019 and that 4,951 PPS had not received tablets by July 2018 (Otieno, 2018) yet the programme was on course. Despite the government commitment to digital learning integration programme implementation, the process in PPS in Meru County seemed very slow with the problem directed to preparedness gap with respect to adequacy of digital learning resources. This study identified digital resources preparedness for DLI before the programme roll out in PPS in Meru County as a problem that needed to be looked into. Further, previous studies majority of which were carried out in secondary schools have not addressed how the gap affected DLI in PPS in Meru County. If the problem is not addressed, digital learning integration program is likely to be unsuccessful hence

leading to resource wastage, inadequate learning outcomes, inequitable access to digital learning resources, diminished public benefit and fail to alleviate basic educational disparities. The future of education lies in embracing DLI, online learning and other forms of digital learning that depended wholly or partially on digital technology. It is on the basis of this research gap that the study was conducted to examine preparedness for DLI programme with respect to adequacy of digital learning infrastructure in PPS in Meru County.

1.1 Purpose of the Study

The aim of the study was to analyze the extent of readiness of public primary schools in Meru County for digital learning integration programme. This was meant to validate the specific preparations with regards to planning, adequacy of digital learning resources allocated to schools, and the theory to which the study was underpinned. The study aimed at contributing to the world of knowledge resulting from the study findings. Further, the use of digital tools in accessing education is the main option during this period of corona virus pandemic (COVID-19).

Theoretical Review +Theoretical Framework

The study was anchored on Rogers Diffusion of Innovation theory (RDI) by Everett Rogers (2003) and on Warren Boum's Project Cycle (1992). Rogers (2003) RDI theory provides a general way of understanding innovation and how it spreads within and across institutions with respect to the human application and progress with the aim of improving and expanding individual capabilities, outcome and learning.

Everett Rogers is considered as the founding father of diffusion theory and how innovations are adopted, spread, and used. The process of individual's acquisition of knowledge to the final stage of adoption requires time and resource preparations for the innovation adoption. Therefore, time and preparations were essential before the adoption of DLI (Rogers, 2003).

Hardware and software and other related digital learning integration tools should be user-friendly and advantageous compared to other innovations to avoid complexity which is an obstacle to innovation adoption. Availability of digital learning resources is of necessity for faster digital learning integration. The digital learning integration enables students to generate knowledge and practice and acquire new skills since the digital technologies are interwoven into curricula. Therefore, the innovation offers a relative advantage (Nkula & Krauss, 2014).

The Rogers Diffusion of Innovations Theory shows clearly that teachers' increased access to digital technology resources, training to meet technological and pedagogical needs, access to technical support to deal with technology challenges, are key stakeholders in education were critical to DLI preparations and adoption. For effective use of the digital technology in the teaching process, teachers' digital knowledge and pedagogical skills were key prerequisite. The variable resource availability was critical to the study. The RDI theory was useful to this study on digital learning integration preparedness in PPS.

Thus, diffusion of innovation was useful in answering questions regarding the nature of preparations done in advance before introducing DLI to PPS. That is, the kind and number of digital resources purchased in advance in preparation for digital learning of their children was inevitable.

The RDI theory failure to reach 100% perfection due to weaknesses such as preparations, cost, lack of support resources, and failure to make immediate impact, which makes the theory to be criticized. In addition, the theory structure provides a one-way information flow. It moves from the opinion leaders downwards to the locals and not vice versa. The person controlling the change controls the direction of outcome of the innovation adoption. The theory does not quite give a clear prediction of how the innovation will be successfully be integrated or implemented (D merez, et al, 2011; Kamau, 2014).The theory does not talk about the management of the innovation on or before integration in a complex environment such as schools which requires a participatory approach.

Warren Boum's Project Cycle

Warren Boum (1992) project management cycle is primarily an instrument aiming to achieve a certain goal by planning, controlling and scheduling within the boundaries of an organization (Prokaoiadon, 2011). A project is an endeavor that requires adequate and collaborative preparations within a clearly specified time, cost, and supportive environment (Prokaoiadon, 2011). Project management cycle is based on thorough planning including start and end dates, resources availed, clear budgets, schedules of activities and dynamic leadership. Project management cycle ensures proper planning for resources, participation and ownership by all stakeholders, agreements, and commitments that ensure sustainability for investment.

Projects have phases that require preparations for implementation to achieve the desired results (project life cycle). The life of the project is divided into four phases: project formation (conceptualization), project build-up (planning), main program phase (execution), and phase-out (termination) (Boum, 1992). The policy phase at conceptualization enters the planning phase to influence action in the project but its importance diminishes as the project progresses. The first phase also requires identification and understanding of the problem to be addressed by the project by carrying out needs assessment and baseline survey. A design is developed containing what will be done, time frame of doing the tasks and persons responsible for the task (Boum, 1992). This stage forms the basis for evaluation, establishes a contract and sets out the duties and responsibilities of each of the involved parties. At this stage, it is ensured that everything is ready before the roll out of the project.

The study analyzed the state of preparedness of PPS for digital learning integration project with respect to provision of learning resources for digital learning integration project. Therefore the stage was relevant. If the project was well planned, then it must be technically feasible, workable, politically sustainable, and socially acceptable (Kennedy & Nevcombe, 2011). In project appraisal stage, reviewing of all the aspects of the project are done to give information of whether the project should proceed or not. The benefits and gaps are identified, and the core problems come out clearly. The study sought to examine the infrastructural and digital learning tools prepared before the rolling out the DLI program. Schools required adequate digital learning resources to reduce the level of risks and wastage thereby enhancing the likelihood of project success.

Negotiation takes place throughout between team leaders and the financiers of the project (Kidombo, et al., 2012). Head teachers and MoE officials were team leaders in digital learning

integration project and therefore they were expected to be always being in touch with the government. This is because various management processes and techniques are required to monitor the project, control quality, time, costs, and scope of the project through strategic planning, capital budgeting, project management, internal communications, change management, quality management, and time management (Kidombo, et al., 2012). The last stage was implementation after evaluating that all work was done as was planned. The project team leaders are in charge of the supervision and allow other stakeholders also to supervise the project. In this stage, the activities involved are: Production of training manuals, provision of resources, production of curriculum materials for the learners, orientation of key project personnel, construction of laboratories and storage rooms, hiring technical staff, cost management, quality control, and many others. At various stages of project development and implementation, evaluation studies are undertaken to provide direction to the project. Evaluation attempts to determine the relevance, effectiveness, efficiency, and effects of project activities in light of the objective of the project. It is learning and action oriented process for improving activities. Such an activity that ensures largely that input leads to output and those activities are implemented as was planned (Kidombo, et al., 2012).

Project Management theories have been criticized for not being scientific models but instead they are of something an art. This shows that theory and practice are different. Thus the project management is hands on through practice and mobilization of resources for implementation (Lalonde, et al., 2010). The project can easily fail if human factors such as conflict between actors, political issues, power relations, policy interpretations, management styles, and communication problems are encountered (Lalonde, et al., 2010). The theory should be used to enrich ones understanding of the project from different angles hence the theory weakness did not affect the study.

Schools' Preparedness on Digital Learning Resources

A resource is a valuable possession that helps the teacher to organize and effectively utilize the classroom and school environment to maximize learners' engagement rates and eventually improve the learning outcomes (Rebecca & Marshall, 2012). Digital learning technology resources are support tools that help teachers teach well and students learn better. Computer laboratories, electricity supply, websites, software, online, DVDs, CDS, teachers, and many others are the essential digital learning resources before digital learning integration was undertaken (Tinio, 2017). The infrastructure and digital learning materials are the fundamental resources for effective digital learning integration, content delivery and uplifting the standards of learning (Orodho, et al., 2013). In addition, availability of digital learning resources promotes good preparations, lesson flow, clarity and momentum (Li & Walsh, 2010). Similarly, availability of digital learning integration resources enhances discussions, collaboration, project work and many others (Orodho, et al., 2013).

Successful DLI is influenced by availability of technology equipment and access to the available infrastructure facilities. Countries such as New Zealand planned to be spending over $410 million every year on schools digital learning resource allocation and updating (Johnson, et al., 2009). In the U.S. the necessary infrastructure and digital learning tools were put in place before embarking on digital learning integration in the classroom (Nut, 2010). Teachers therefore

effectively used the tools and techniques to achieve their goals. As a result, learners had a chance for practical work that enabled them to make their own conclusions from their findings (Sang, et al., 2011). The government of Saudi Arabia committed herself to improve digital technology resources required for digital learning integration in primary schools although the cost was high for the supply and maintenance. However, inadequacy of digital learning resources undermined the connection between the availability of digital learning resources and digital learning integration (Gafar & Neville, 2012). Thus, embarking on DLI programme before first preparing the resources is a waste of time and energy because there is no meaningful learning that can take place without resources. Therefore, availing adequate digital learning resources to schools before rolling out the programme is an important undertaking for successful DLI programme. Preparedness of schools with respect to procuring adequate digital learning resources which affects reliable DLI was found to be a gap that this study addressed accordingly.

Many African countries have embarked on huge investments in digital learning infrastructural developments in preparation for digital learning integration. A variety of devices are increasingly being used to spread and display teaching and learning content in electronic and digital formats though not without challenges. Inadequacy of resources was found to impede teachers' effectiveness on digital learning integration as well as focusing on the individual learner in Africa (Buabeng & Andoh , 2012; Naikar, 2010). In Ghana for example, lack of sufficient and relevant materials required for the implementation of digital learning programs in PPS and PSS constrained teachers during DLI hence rendering the process ineffective and eventually affecting the attainment of good academic results (Yaw Skyi, 2012). Paramount among the teacher's responses were power fluctuations, lack of suitable computer peripherals such as printers and scanners, while a number of teachers also decried the lack of adequate time allocated in the timetable for the practical sessions. Due to the lack of computers and other devices necessary to implement digital learning, there was the likelihood that teachers may end up compromising students learning concepts that they cannot easily understand and identify with. Such a scenario was likely to defeat the whole idea of introducing digital learning in the curriculum at lower levels of education (Yaw Skyi, 2012). Similarly, digital learning integration in South Africa had not picked up at the desired pace due to inadequacy of digital learning tools. Further, impediments range from inadequate resources such as: Interactive Whiteboard (IWB), laboratories, insufficient computers, standard classrooms, limited hardware and software (Naiker, 2010). Workable policies, coordinated management and leadership teams provide the necessary digital learning integration tools and infrastructure. Policies should point out the management strategies that would ensure that resources are provided before the roll out of the program. The studies above reveal that digital learning resources and other resources significantly determined the success of DLI in a school. Based on this gap the study was set out to examine the adequacy of digital learning resources in public primary schools in Meru County.

East Africa equally faces digital learning integration barriers resulting from inadequate resources (Markon, 2013; Orodho, et al., 2013). Uganda for instance, experienced lack of classrooms and desks in many public primary schools and inadequate digital learning integration tools among others. However, the Ministry of Education is determined to have computer labs and computer curriculum in the schools (Markon, 2013). The students to computer ratio range from 40:1 to 160:1 in primary schools (Hennessy, 2010). Though the country had policy guidelines the

introduction of DLI could have been gradual since some schools lacked necessary infrastructure. Similarly, schools in Rwanda had barriers such as insufficient digital resources and poor infrastructure leading to poor teaching and learning outcomes (Orodho, et al., 2013). The issue of digital learning resources has not been addressed appropriately in many East Africa countries in the digital learning integration process. However, the adequacy of DLI resources remained a mirage. The policies are good, but why there was no systematic planning and eventual supply of adequate digital learning resources was a concern to the study. The digital learning integration policy guidelines emphasize availing of appropriate digital learning resources in public schools in Kenya (Hennessy, 2010). Though, the curriculum is reformed and aligned to Vision 2030, only 2% of PSS in the country have the necessary digital learning resources (Murrira, 2013). Limited electricity supply in rural areas, persistent power disruptions, inadequate digital learning resources such as computers and digital technology, and lack of trained teachers discouraged an institution from embarking on digital learning integration programs (Muriira, 2013). Digital learning inequalities exist in secondary schools in Kenya with rural schools experiencing inadequate resources, facilities and manpower. That was as a result of poor planning in advance by management which led to DLI impediments (Sanja & Rabah, 2013). Availability and access to digital learning tools and infrastructure was a factor influencing digital learning integration application in Githunguri and Musa Gitau primary schools (Kidombo, et al., 2012). Internet connectivity is neither readily available nor cheap in rural areas and these calls for proper planning and management (Laronde, 2012). Seamless digital learning integration cannot be achieved if resources were not availed. Digital learning integration in schools is a complex process that requires coordination and interplay between several stakeholders who will harmonize policy, leadership and management. Digital learning integration leadership means championing and providing the prerequisite resources to enable sufficient and efficient programme in the classroom.

The local situation was not different. The computer to student ratio in PSS in Tigania West sub-county acquired through public-private partnership approach was inadequate (Gikundi, 2016). Further, the study indicated that majority of the schools could not effectively use computers for teaching and learning since (70%) could not access the internet (Gikundi, 2016). However, schools that had internet were connected through various channels such as gateway or sometimes referred to as access point, Wi-Fi, modems and satellite dish. Similarly, only 10% of the public primary schools in North Imenti had received digital learning tools (Mwiti, 2014). However, the study did not investigate planning, procurement and allocation of the resources for the programme. Digital learning integration program requires resources to enable teachers employ the new teaching and learning methods and increase in computers in schools enabled them to achieve baseline targets (Kwamboka, 2015). Additionally, provision of digital learning integration resources to schools through planning and offering appropriate leadership and management strategies influenced the adoption of the technology by secondary school teachers in Buuri sub-county (Kwamboka, 2015). Failing to provide the digital learning resources and at the same time introducing the program in the curriculum can be a serious shortcoming on the side of policy, planning, and management. Availability of digital learning resources such as sufficient computers, internet connectivity, laboratories and many others significantly enhance the quality of digital learning integration (Keiyoro, et al., 2011). The studies reviewed reaffirmed

the importance of having adequate digital learning resources in schools before embarking on the programme. However, there is a gap on resource preparedness to guarantee desirable DLI. Inadequate digital learning integration resources eventually lead to unfulfilled expectations. The study found preparations to provide digital learning resources as a research need. Therefore, the study analyzed the availability of digital learning resources, their appropriateness and their working conditions in Meru County public primary schools as the county embarks on digital learning integration programme.

National Policy on Digital Learning Integration

A successful digital learning integration in schools requires quality preparations based on good workable policies. A policy is a principal of action adopted in response to a problem that requires attention (Birkland, 2015; Singh, 2016). In order to achieve the goal, every school, institution, teacher, learner and stakeholders should be equipped with appropriate DLI resources, competencies and policies. Major challenges in education policies in China were that they emanated from theories and discussions which had no empirical evidence (Schulte 2015). The guiding policy principles led to digital infrastructure development in education which made Malaysia to reduce the digital divide in various parts of the country in both primary and secondary schools (Chan & Fong-Moe, 2015). ICT policy in Tanzania is guided by the country's vision 2025. The policy on ICT offers new opportunities to enhance education and to improve quality of education in all areas by deploying a broad-based national strategy to address Tanzania's development agenda (Kweka & Ndibalema, 2018). The Kenya Institute of Curriculum Development (KICD) is mandated to initiate and conduct research to curriculum policies in all education levels except university (KICD, 2016).

2.0 RESEARCH METHODOLOGY

This study was largely descriptive in nature. Descriptive survey studies have important role in educational research because they increase the knowledge of what happens in schools (Creswell, 2014). The design was the best since it enabled the study to explain, describe, predict, and recommend with accuracy surrounding the problem. Both quantitative and qualitative research approaches were adopted. In this study, preparedness of public primary schools in Meru County on DLI was investigated. The study variable was digital learning resources preparedness in DLI programme. Underlying issues and concerns on the construct from the viewpoints of SCDEs, head teachers, teachers, pupils, and parents were investigated and appropriate recommendations were made to MoE, and other concerned stakeholders. The study targeted 710 public primary schools in nine sub-counties from which respondents comprising of 668 head teachers, 7,032 classroom teachers, 2004 PTA executive members representing parents, 26,720 pupils in grade 3, and 9 SCDEs were drawn. The respondents were rich in information. The sample size is an important feature of any empirical study in which the goal is to make conclusions about a population from a sample (Potts & Fugard, 2015). Where the population is large, 10% to 20% of the population is a good representation (Orodho, 2010; Emmel, 2013). The study accessed 9 SCDEs obtained through non probability sampling technique, 71 public primary schools through probability sampling. Since the schools were too many 10% yielded 71 public primary schools. As a result, head teachers, teachers, grade 3 learners and executive PTA members from the sampled schools were considered. SCDE were purposively sampled while 8 pupils from DLI

pioneer grade in the sampled schools were randomly sampled to form focus group discussion (FGD). Purposive judgmental sampling technique was used in selecting the PTA respondents. Ten percent of the teachers' proportions (703) from the sub-counties were in the sample. Sloven's formula, $n = N/1+Ne^2$ was used to get the sample size of the pupils. The sample size had a total of 1380 respondents consisting of 9 sub-county Directors of Education, 71 head teachers, 703 teachers, 201 PTA, and 396 pupils. The study considered data collection tools that met specific study objectives in addition to systematic collection of primary data. The choice of data collection instruments determined the accuracy of the findings that contributed significantly to the overall research (Wilson, 2010). The literature review aided in identifying specific questions. Questionnaires, interview guide, FGD and observational schedule were used. Pre-testing of data collection tools was done before they were administered to ascertain their reliability and validity. Reliability test results show Spearman-Brown coefficients were above the required 0.8. The open-ended questions, interviews, observational schedules, and FGD were reviewed by experts in the same field at KeMU University and validated to verify the correctness, credibility and dependability.

Data collection and Analysis

The collected data was sorted out to identify the fully completed and incomplete responses and organized first before analyzing. The quantitative data was presented using descriptive statistics (percentages), inferential statistics (testing of statistical hypothesis). Inferences were made to look for patterns, determine if there was a relationship between an intervention and an outcome variable as well as strength of that relationship. Univariate regression analysis was carried out to test hypothesis. This helped the study to reject or fail to reject the null hypotheses. Qualitative data was transcribed by typing the text from the written essays into word processing files. The codes were reduced removing the overlaps which were finally collapsed into 4 fully developed ordinary themes after reaching saturation point where no more themes emerged. Data obtained through observational schedule was organized in a frequency distribution table and percentages worked out.

RESULTS AND DISCUSSIONS

The variable on digital learning resources was measured using four indicators: adequacy of digital learning resources, workability of the digital learning resources, and management of resources and learners application of resources in the classroom. Views were collected from 45 head teachers and 496 teachers on the adequacy of digital learning resources. Data obtained is shown in Table 1.

Table 1: ***Head Teachers' and Teachers' Responses on the Adequacy of Digital Learning Resources***

Statement (Head teachers N = 45)	Strongly agree A (%)	Agree B (%)	Combined (A+B) %	Neutral C (%)	Disagree D (%)	Strongly disagree E (%)	Combined (D+E) %

The school had adequate digital learning resources	3 (7%)	2 (4%)	5 (11%)	0 (0%)	5 (12%)	35 (78%)	40 (89%)
PTA ensured each pupil had a tablet	5 (12%)	2 (4%)	7 (16%)	0 (0%)	9 (20%)	29 (64%)	38 (84%)
MoE provided head teachers with laptops	3 (7%)	3 (7%)	6 (13%)	0 (0%)	14 (31%)	15 (33%)	39 (87%)
Teachers N = 496							
Digital learning resources are available and enough	33 (7%)	10 (2%)	43 (9%)	1 (0%)	50 (10%)	402 (81%)	452 (91%)
All digital learning resources are in good condition	325 (66%)	90 (18%)	415 (84%)	0 (0%)	70 (14%)	11 (2%)	81 (16%)
Each teacher has a laptop	21 (4%)	35 (9%)	56 (11%)	38 (8%)	161 (32%)	241 (49%)	402 (81%)
There are adequate reference materials supplied	23 (5%)	40 (8%)	63 (13%)	0 (0%)	38 (8%)	395 (79%)	433 (87%)
Digital learning rooms are adequate	93 (19%)	102 (20%)	195 (39%)	6 (1%)	123 (25%)	172 (34%)	295 (59%)
Solar power back ups are available	1 (0%)	3 (1%)	4 (1%)	2 (5%)	64 (13%)	403 (81%)	467 (94%)
School has safe storage room for DLI materials	321 (65%)	47 (9%)	368 (74%)	53(11 %)	54 (11%)	21 (4%)	75 (15%)
Digital learning tools are often serviced	15 (3%)	20 (4%)	35 (7%)	38 (8%)	61 (12%)	362 (73%)	423 (85%)

Table 1 shows that out of the 45 sampled schools, 89% (40) did not have adequate digital learning resources, while only 5 (11%) schools had adequate digital learning resources. Majority of the head teachers 38 (84%) disagreed with the statement that PTA had ensured that each child had a tablet before DLI programme was rolled out. Only 7 (16%) agreed. MoE did not provide head teachers with laptops in about 39 (87%) of the schools. However, 6 (13%) of the head

teachers accepted that they were provided with laptops and 4 (9%) agreed that teachers had laptops. Response from teachers indicates that digital learning materials were not enough for each learner according to 452 (91%) teachers. However, 43 (8%) teachers indicated that the digital learning materials were adequate. In most of the PPS, digital learning resources supplied were in good condition according to 415 (84%) teachers and about 81 (16%) felt that the DLI resources were not in good working condition. Schools did not have adequate digital reference materials according to 87% (433) of the teachers whereas 13% (63) of the teachers indicated that the reference materials were adequate. Most teachers 81% (402) reported that there were no individual laptops for each teacher supplied by MoE. Only 11% (56) of the teachers were affirmative. Learners did not have adequate desks according to 59% (295) of the teachers while 39% (195) agreed that the desks were adequate. Most of the schools did not have solar power backup according to 94% (467) of the teachers, but about 1% (4) of the teachers reported that their schools have solar panels which act as alternative power source when electricity from the national grid fails. Majority of the schools have a strong room for keeping digital materials according to 368 (74%) teachers.

The findings indicate that schools did not have adequate digital learning resources. Among the responsibilities of the head teachers was ensuring that learners access adequate resources if any meaningful learning was to take place. Teaching and learning resources provide adequate challenging and engaging activities in a school which eventually lead to quality learning outcomes (Kidombo, et al., 2012). In addition the resources aid teachers to teach better and optimize learning. The findings indicate that digital learning resources were insufficient. In many schools, teachers were grappling with lack of necessary DLI infrastructure to fully embrace the programme. Digital learning integration is quite demanding and requires one to have tools like laptops, projectors, tablets good internet connectivity, electricity and spacious rooms in addition to the desks. Lack or inadequate resources could lead to teachers developing negative attitude or ineffective teaching and learning hence low quality output. The findings concur with those of Orodho, et al. (2013) who revealed that inadequacy of digital tools and other learning resources negatively affected teacher effectiveness and attainment of good grades. The findings indicated that introduction and adoption of innovation in public primary schools required huge infrastructural and digital equipment investments. The study noted that with huge digital learning resource limitations, the indication is that comprehensive preparations to avail adequate resources were not carried out and that partly contributed to the programme failure. The impression is further reinforced by Muriira (2013) study which indicated that limited electricity supply in rural areas, persistent power disruptions, inadequate digital tools such as tablets, and lack of DLI trained teachers among others discouraged schools from embarking on DLI. The observation done on selected public primary schools revealed that a number of digital learning resources were in good condition. However, some essential digital learning resources like tablets, internet connectivity, laboratories, electricity, reference materials, were lacking or inadequate. Tablets, electricity and internet connectivity were the main digital technical tools behind the DLI programme. The findings revealed that preparations to avail adequate digital learning resources were inadequate because there were failures in determining which resources were most essential and prioritize them accordingly. Further, the study noted that various administrative levels from school to MoE headquarters did not provide leadership and management strategies of better

digital learning preparations. Without adequate digital learning resources DLI programme could not effectively take off in majority of the schools while in others the learning is not effective. The findings are supported by Gafar and Neville (2012); Naiker (2010); Buabeng and Andoh (2012) who found out that inadequacy of digital learning resources impeded teachers' effectiveness in the classroom.

MoE being the only supplier of digital resources were not prepared since they did not supply enough. Teachers too did not get laptops or guide books or reference materials. A situation where learners share desks and tablets could not be expected to provide teaching and learning environment that was conducive. Schools cannot effectively make use of technology if they do not have the digital tools which enhance learning. Therefore, schools were not prepared to develop meaningful and effective use of the innovation. The study is supported by Markon (2013) who found that it was a waste of time to start a program without adequate resources. Similarly, Li and Walsh (2010) and Orodho (2014) concur with the study findings. Their studies indicate that preparation of digital learning resources before rolling out the DLI program is fundamental for effective classroom delivery. All the SCDE admitted that resources for digital learning integration were inadequate and in some schools lacking. Tablets were supplied for grade one (class one) only yet grades two and three were also supposed to have integrated teaching and learning digital programme. SCDE A shared *"the initial communication from MoE was that each child from grade1-3 would get a laptop (OLPC) which later changed to one tablet per child (OTPC) and that also did not happen. Currently the ratio is one tablet per three children (1:3) and teachers were using their own money to access internet which made the innovation to be abandoned since it was not advantageous to teachers and learners".* SCDE C added "*resources such as desks, electricity and electrical installations were a challenge in many public primary schools in the county".* SCDE D lamented *"DLI programme was a huge project that required thorough preparations, monitoring and evaluation before the programme roll out. The inadequate preparations were made worse by political pressure to effect comprehensive and rapid changes".*

The study noted that political influence and pressure without adequate preparation or provision of relevant infrastructure and resource development contributed greatly to the program ineffectiveness. Despite considerable political pressure to adopt DLI in teaching and learning process most schools expressed frustration due to inadequate or lack of digital resources hence abandoned the programme. The study concurred with that of Hennessy, et al (2010) in Nigeria where the introduction of OLPC project in the public primary school after presidential directive before digital and human resources were prepared collapsed. The FGD revealed that in most of the public primary schools tablets were satisfactorily enough for one grade only though not in the ratio 1:1. Therefore, it was not possible for the three classes to use tablets at the same time unless when combined so as to share one tablet among three or four learners (1:3 or 1:4). Pupil 05 from school 29 reported *"we were sharing tablets and desks and at times there was frequent electricity failure and low internet connectivity".* Pupil 06 from school 17 said *"we have limited access to the technology because our school does not have a computer laboratory. Our class was converted to a computer room and colleagues were constantly interfering with power sockets".*

Head teachers and teachers were asked if digital learning integration tools were tested to confirm their workability as part of the preparations for the program. The findings from the 45 head teachers and 496 teachers are as shown in Table 2.

Table 2: Data from Head Teachers and Teachers Response on Workability of Digital Learning Resources

Statement	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree	Weighted Mean	Standard Error
All tablets were in good working condition (N = 45)	35 (78%)	6 (13%)	0 (0%)	1 (2%)	3 (7%)	1.04	0.044
All digital learning tools were in good working condition (N = 496)	401 (81%)	50 (10%)	0 (0%)	13 (3%)	32 (6%)	1.09	0.013

Head teachers and teachers were both in agreement that the digital learning tools supplied to schools were in good working condition. The means for head teachers and teachers were 1.04 and 1.09 while the SEs was 0.044 and 0.013 respectively. Thus, both head teachers and teachers were in agreement that digital learning tools were in good condition. The findings revealed that tablets were tested by the supplier on delivery. The workability of the tablets was confirmed by 89% (40) of head teachers while 4% (2) of the head teachers refuted the assertion. Teachers, about 84% (415) confirmed that digital materials supplied were in good working condition. Only 81 (16%) of the teachers dissented. The findings from SCDE indicate that tablets and other digital learning integration materials were tested on delivery. SCDE B reported *"a contractor from Jomo Kenyatta University College of agriculture and technology had a technician who ensured that testing was done in most schools. Further, the digital tools were brought directly from the source to schools by-passing SCDE".* SCDE F remarked *"I relied on the CSOs who are the MOE field officers at zonal level to get information on the resources supplied".* Other SCDEs got the information about testing of the DLI infrastructure from the head teachers during term meetings. The study revealed that most schools had digital learning integration resources tested and found to be in good condition. The study concurred with that of Bizimama and Orodho (2014) who found out that incompatible software and faulty gadgets made DLI inaccessible.

Overseeing the way resources were being used to maximize learning output required sound management practices. DLI program required digital learning resource management planning and preparations. The study sought information from PTA on how digital learning integration project preparations were managed. Data obtained is shown in Table 3.

Table 3: ***Resource Management for Digital Learning before Program Roll out***

Statement (N = 43)	Strongly agree (A %)	Agree (B %)	Combined (A+B) %	Neutral C (%)	Disagree D (%)	Strongly disagree E (%)	Combined (D+E) %
Parents provided resources for the construction of computer lab	2 (5%)	2 (5%)	4 (9%)	0 (0%)	9 (21%)	30 (70%)	39 (91%)
Parents organized for the construction of computer store	16 (37%)	12 (28%)	28 (65%)	0 (0%)	8 (19%)	7 (16%)	15 (35%)
Parents ensured that all digital tools were ready before roll out	1 (2%)	1 (2%)	2 (5%)	0 (0%)	20 (47%)	21 (48%)	41 (95%)
Parents were involved in management of DLI programme	1 (2%)	1 (2%)	2 (5%)	0 (0%)	24 (56%)	17 (39%)	41 (95%)
Parents' have trust in DLI in that it won't spoil their children	9 (21%)	6 (14%)	15 (35%)	0 (0%)	19 (46%)	9 (21%)	28 (65%)
PTA planned and provided the required DLI resources	1 (2%)	0 (0%)	1 (2%)	0 (0%)	23 (53%)	21 (45%)	44 (98%)

Table 3 reveals that about 91% (31) of the parents did not provide resources for the construction of computer laboratory and only 9% (4) of the parents confirmed that they participated. However, 65% (28) of the parents confirmed organizing for the building of the strong room for the safe keeping of digital learning resources and 35% (15) did not participate. Further, 95% (41) of the parents were not involved in availing digital learning resources before the program was rolled out but about 2 (5%) said that they were involved. Similarly, 41 (95%) parents said that they were not involved in provision of digital learning resources but 2 (5%) said that they were

involved. Nearly 98% (44) of the parents were not involved in planning and provision of digital learning resources but about 2% (1) confirmed their involvement.

The findings indicate that parents were not involved in the management of digital resources from procurement, allocation to monitoring and evaluation. Involvement of key stakeholders such as PTA is important since it builds transparency, accountability and success of the project. The findings revealed that failure to involve parents in program management showed that there were deficiencies in preparations for the program roll out. SCDEs were also interrogated during interview on availability of resources and their role in management. SCDEs A and C revealed that schools were given ksh 60,000 to prepare the storage facility. SCDE A remarked *"SCDEs did not have any role to play in the management of digital learning integration resources nor were they afforded an opportunity to influence on how the DLI resources were to be managed to ensure continuity and their effective use".* SCDE D stated *"there were no structures, clear systems, and processes on how the resources were to be managed, replaced or maintained. Further, there was no management plan on how the program was to be maintained and improved to enhance teaching and learning".* SCDE F revealed "*from the minutes I have received from PTA and meetings I chair, I have not come across an agenda on how to improve infrastructure and resources on digital learning integration to promote dissemination of knowledge and skills. In addition, the government reduced the amount to be disbursed to MoE to procure tablets for the schools that had not received".* SCDE B reported *"some schools appointed a teacher to be in-charge of the digital resources".* The study found out that management of digital resources was lacking; something that made gainful access to digital learning resources impossible by the learners. On the contrary a study by Li and Walsh (2010) found out that resources were well managed in China at 96% accessibility of digital resources by the learners. SCDEs interview further revealed that there are no assessment structures put in place to monitor DLI application. However, they registered their dissatisfaction on DLI program preparation since it is not working as they expected. SCDE F shared *"Each school has its own unique challenges ranging from provision of digital learning resources, DLI trained teachers and infrastructure which made schools not to uniformly embark on DLI application. There was need to plug funding gaps and boost DLI. Schools faced financial limitations and DLI program faced financial cutback in 2018/2019 financial year".* SCDE B narrated *"pupils were not introduced to tablets in most public primary schools. Further, schools faced logistical challenges on how to share the tablets meant for grade one with grade two and three without laboratory".* SCDE A revealed *"some schools introduced digital learning integration to learners just to cover themselves in case learners were asked whether the program was on course. Thus, learners were not effectively and sufficiently using tablets to come up with meaningful learning".* SCDE C remarked *"DLI program failed since the government stopped the issuance of tablets to grade one pupils and grades two and three had not all received their tablets. MoE should ensure that relevant and right proportions of DLI learning and teaching materials are available in schools. In some schools tablets were safe in the stores incase officers come checking, added the officers".* SCDE H reported *"teachers were still teaching using traditional methods whereas they were supposed to integrate digital technology which was capable of making the instruction more engaging to the learners".*

The few schools that had introduced DLI, learners appreciated and enjoyed using them for learning or playing games. Pupils 04 and 07 from school 17revealed *"we appreciated the use of tablets in learning and playing games. It was interesting to interact with the tablets and watch cartoons".* Pupil 03 in school 34 shared *"we were introduced to tablets once. Our teacher was transferred to another school".* Pupil 05 from school 21 revealed *"We use tablets to play games. We use them when class 6 teachers find time once or twice a month".* Pupil 02 from school 11 reported: *"We are able to open, close, watch cartoons and games but its only once a week".* Pupil 01, from school 06 said *"we have never seen the tablets. We hear our neighboring schools have them. We appeal to the government to supply our school with tablets*". Lack of unity and coalition among stakeholders made the pupils not to effectively access the technology in schools and there was no monitoring or assessment of the progress. Further, the study confirmed that there was no mark of active adoption and continued development of the innovation in schools due to inadequacy of digital learning resources. Availability and access to digital learning resources was a factor that greatly influenced DLI in schools (Kidombo, et al., 2012; Sanja & Rabah, 2013)

PTA (43) as school managers were requested to give information on how the schools applied the digital resources in the classroom. Table 4 shows the results.

Table 4: ***PTA Data on Application of Digital Learning Resources***

Statement N = 43	Strongly Agree A (%)	Agree B (%)	Combined (A+B) %	Neutral C (%)	Disagree D (%)	Strongly disagree E (%)	Combined (D+E) %
Teachers use laptops as a tool for teaching in class	5 (12%)	10 (23%)	15 (35%)	4 (9%)	8 (19%)	16 (37%)	24 (56%)
Teachers use software from KICD in their subject area	5 (12%)	3 (7%)	8 (19%)	0 (0%)	19 (44%)	16 (37%)	35 (81%)
Teachers use VCD/CD ROM for education purpose	10 (23%)	10 (23%)	20 (46%)	0 (0%)	13 (30%)	10 (23%)	23 (53%)
Teachers assist pupils to play games using tablets	23 (53%)	7 (17%)	30 (70%)	5 (12%)	6 (14%)	2 (5%)	8 (19%)
Teachers show pupils how to do assignments using	11 (26%)	5 (11%)	16 (37%)	4 (9%)	10 (23%)	13 (30%)	23 (53%)

tablets							
Pupils appreciate the use of tablets in class	30 (70%)	5 (11%)	35 (81%)	3 (7%)	2 (5%)	3 (7%)	5 (12%)
Teachers appreciate the use of tablets in class since they aid in time management	7 (16%)	5 (12%)	12 (28%)	9 (21%)	12 (28%)	10 (23%)	22 (51%)

The findings indicated that teachers were using laptops for demonstration in class according to 15 (35%) PTA and 15 (35%) were of the contrary opinion. On the use of software from KICD in their subject area, teachers were not using the digital technology according to 35 (81%) PTA while 8 (19%) confirmed that teachers used software from KICD. Teachers' used VCD/CD ROM for teaching and learning according to 20 (46%) PTA while 46 (53%) were of the contrary opinion. Teachers assist pupils to use tablets to play games and do assignments according to 30 (70%) and 16 (37%) PTA executive members respectively whereas 8 (19%) and 23 (53%) had contrary opinion. Pupils and teachers appreciate the use of tablets in the classroom according to 35 (81%) and 122 (28%) PTA respectively while 5 (12%) and 22 (51%) respectively could not see it. The findings indicate that the application of digital learning resources in learning and teaching was minimal according to parents. In majority of the schools the software was not in use meaning that DLI did not take place in those schools. In schools where learners used the tablets teachers did not appreciate because the digital technology did not aid in time management but the learners appreciated. Learners accessed tablets to play games more that doing the assignments. The findings revealed that digital learning resources were inefficiently underused. Thus, preparedness to avail adequate resources that could have ensured optimal application of digital learning was lacking. Schools were not equipped to meet the learner's needs due to shoddy preparation. Learners could not be able to optimize the few available resources. Therefore, the incomplete investment was wastage because the expectations were not met. The study concurred with that of Keiyoro, et al., (2011) who found out that it was almost impossible to start a program without adequate resources since it was likely to backfire. Further, COVID-19 Pandemic exposed and confirmed the myriad challenges facing the public primary school DLI programme. MoE turned to virtual learning knowing very well that there were inadequate digital learning resources on the ground. Pupils are not using the tablets during this period.

The study established the relationship between adequacy of digital learning resources (independent) and digital learning integration (dependent) using Pearson product moment correlation as shown in Table 5a.

Table 5: Correlation between Adequacy of digital learning resources and (DLI)

Variables correlated	r - value	Sig. (2 – tailed)	N
Adequacy of digital learning resources against DLI	0.825	0.000	496

Data from Table 5 confirmed that there was positive significant correlation between variables at alpha = 0.05 level of statistical confidence hence Ho was rejected. Adequacy of digital learning resources preparedness is related to digital learning integration. Thus, without adequate digital learning resources, maximizing learners' engagement rates to improve learning outcomes is not possible. Orodho (2014) and Rebecca and Marshall (2012) supported the findings by revealing that resources are fundamental for effective learning.

CONCLUSIONS AND RECOMMENDATIONS

Despite the government initiatives to have DLI in public primary schools, the financial subsidies are inadequate to enable they acquisition of adequate, equitably distributed and appropriate digital teaching and learning infrastructure. The resources supplied by MoE were inadequate and in some schools lacking. In general there is limited digital infrastructural development including internet connectivity which was inevitable for the program. The study noted that insufficient DLI resources compromised the classroom application and effectiveness of content delivery when using the innovation. All public primary schools should have computer laboratories where learners can be going for their digital lessons. Alternatively each learner should have his/her tablet (OCPT) as was initially designed. Malfunctioning tablets should be replaced and power connectivity to the national grid done to all schools. Other areas that require attention include replacement of broken tablets, dealing with power fluctuations or replacement of lost digital gadgets of which if not addressed can create gaps in teaching and learning process. Tablets should also be increased annually by MoE proportional to the exponential growth of the pupils' enrolment. In addition, development of DLI infrastructure by MoE should put into consideration the construction of more classrooms with desks and of appropriate sizes to ease congestion in some schools and ensure that the learning environment was conducive and appropriate for the adoption of the innovation. Schools should be assisted by MoE to undertake installations, wiring and furniture which limit the range of classroom activities. During COVID-19, parents, teachers and pupils had to adjust to the new teaching and learning methods. Online learning became the main option of accessing education during that period yet the critical learning resources are scanty both in school and at home. The pandemic exposed weakness and challenged MoE on provision of DLI resources to schools and that we are nowhere from close to achieving country's DLI and virtual learning. The runaway corruption that has plagued the education sector must be tamed; leaders must do what they are legally and ethically are supposed to do hence the need for parliament to come up with legislative measures which can be entrenched in the policy to curb the resource wastage.

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