

**ASSESSING E-LEARNING READINESS OF PRIMARY SCHOOL
TEACHERS IN KENYA FOR THE USE OF TABLETS FOR TEACHING:
A CASE OF KALAWA PRIMARY SCHOOL**

Submitted by

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DEDICATION

This project is dedicated to my husband, son, and daughter who gave me the strength and courage to carry on though at times the going seemed very tough. You have been great pillars in my life and I wouldn't have come this far without your emotional, physical, and psychological support. My mentor, Mary Ndichu, for being there to offer moral support. You all brought out the best in me to prove that there is always a way when strong will prevail.

ABSTRACT

ICT has in recent years acted as a pillar for quality, effectiveness and success in the education sector. This study report examines e-learning readiness with use of tablets in primary schools and the implications of its adoption. The Government of Kenya is in the process of integrating ICT into the education curriculum in public primary schools countrywide through a government initiative causing the country to be an e-society as envisioned in Kenya Vision 2030. This programme will thrive only when teachers are ready to implement the change and pass what they learn through their training to the students. Most often, evaluators tend to blame teachers for the failure of ICT integration in education thus teachers end up being resistant. Effective use of tablets by teachers, teacher training on use of tablets, motivation to use tablets, integration of curriculum in the tablets, sustainability of tablet use, usefulness of tablets and ease of use of tablets were the variables used to measure e-learning readiness of teachers. This study incorporated inductive approach that seeks to move from a specific set to the broader set. Data was collected using questionnaires and FGDs. Data analysis was done using descriptive statistics, correlation, regression, Kruskal Wallis test and one way chi-square test. Findings show that all the independent variables employed in this study have a strong significance to e-learning readiness though some have a higher significance than others. The study concludes that some more factors may be incorporated to help achieve higher levels of e-learning readiness in the future.

Keywords: E-Learning, Readiness, Teachers, Technology, Education, Tablets, ICT, Integration.

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ABBREVIATIONS

ICT – Information Communication Technology

FPE – Free Primary Education

KICD – Kenya Institute of Curriculum Development

GOK – Government of Kenya

LDC – Less Developed Countries

UNESCO – United Nations Educational, Scientific and Cultural Organization

CFSK - Computers for Schools- Kenya

PTA - Parent-Teacher Associations

DLP – Digital Literacy Programme

JISC – Joint Information Systems Committee

CIPP – Context, Input, Process, Product

TAM – Technology Acceptance Model

FGD – Focus Group Discussion

ANOVA – Analysis of Variance

CSR – Corporate Social Responsibility

DEFINITIONS

E-readiness – This explains the attempt to assess how ready a society or economy is to use ICT and be impacted by it. E-readiness verifies that the infrastructure is acceptable for the use of ICT and accessibility of ICT devices by the target population. It is also vital to ensure that ICT use complies with the legal and regulatory policies put in place.

E-learning- This is the study that explains how learning is influenced by the use of the internet. Learning outcomes are improved by creating, using and managing current and future technological resources.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Kenya is among many countries in Africa and the world at large to integrate information and communication technology (ICT) and e-learning into its economy. This is expressed in the long-term national planning strategy document, (Kinuthia, 2009), that insists that learning institutions, both primary and tertiary levels, should provide ICT training to its pupils/ students in order to meet future ICT skills and improve the knowledge base. According to (Ndung'u, Thugge, & Otieno, 2011), school curriculum development should include ICT related studies which should be formal and examinable. (Kinyanjui, M, 2014).

The Kenyan education sector is in the process of a major change since constant innovations are coming up thus causing pedagogy (discipline that deals with the theory and practice of education - how best to teach) to constantly improve as well in order to cope with the change. Integration of ICT in education has led to improved access, equity and quality of education. The Millennium Development Goals of Kenya Vision 2030, (Ndung'u et al., 2011), and the Kenya's ICT policy all express the need for ICT incorporation in the education sector. However, the above documents show the importance of e-learning but they do not provide any guidelines on how to implement the concept. The greatest and easiest way to implement integration is to involve teachers in every step of the way. Teachers form the main bearers of the programmes and their input will make or break the programme. The readiness of teachers to appreciate the new technology is important as they need to show their preparedness to embrace the new technology to be used in teaching and learning activities, (Hennessy, Harrison, & Wamakote, 2010).

The content of the curriculum is a clear indication of e-learning readiness. The Korean government launched the Digital Textbook programme in 2010, (Kim & Jung, 2010), in order to eradicate the use of paper-based textbooks and support ICT innovations in education and any other future endeavors. The speed of technology adoption is pegged on government policies that play a great role in funding and security measures regarding information available. Korea were in a position to develop national standards for e-learning before they went into infusion, an example being the introduction of the Korea Educational Metadata, (Redempta & Elizabeth, 2012).

In January 2003, Kenya introduced the Free Primary Education (FPE), (Tooley, Dixon, & Stanfield, 2008), which has brought challenges with infrastructure and funding. The focus of learning to pass exams will not hold so much weight if a lot of emphasis is not placed on teacher-centered pedagogical methods. If this is effected, learners will be more engaged in class and there will be increase in academic achievements. This will also increase their ability to read clearly, understand, internalize and apply curriculum content. This may become a constant challenge to the teacher whose interest is to see the academic progress of the learners. As a result of this, the government of Kenya decided to introduce the Digital Literacy Programme in 2013, which is a program aimed at incorporating the use of digital technologies in learning using tablets. The decision was borne out of the vision and context that technology now defines our world and there is need to prepare our young people for today's realities. Kenya Institute of Curriculum Development (KICD) was tasked with the role of coming up with a curriculum to integrate into the tablets which will be uploaded as an important resource for m-learning.

This further led to the development of e-Limu, which is an award-winning Android application for upper-primary students in the Kenyan education system to learn & revise (e-Limu.org). This application presents a more student-centered approach to learning by using a user-friendly tablet technology and aims to pull out interest in a child and sustain engagement with learning. This has been achieved by using animations, games, songs, quizzes and practical exercises to capture learner attention and concentration. This is an encouragement to teachers who will engage with a more motivated group of learners as opposed to the previous traditional teaching/ learning methods which were deemed quite boring.

This study will focus on Kalawa Primary School, Kitui County, which was selected by MMC Africa (a law firm in Westlands, Nairobi County), to receive tablets as part of their corporate social responsibility (CSR).

1.2 Statement of the Problem

ICT has been seen as a positive catalyst by many policy makers in sub-Saharan African countries and this has improved educational outcomes tremendously. Studies are underway to illustrate

whether ICT increases the rate of learners ability,(Adomi & Kpangban, 2010); (Mtebe & Raisamo, 2014); (Tinio, 2003), proper access to information(Rubagiza, Were, & Sutherland, 2011), or ensures that learners are properly trained for a global competitive workforce (Beetham & Sharpe, 2013). The worry is growing that Kenyan primary school teachers, especially in public schools, who are vitally important to the success of the project, do not seem to be quick enough to begin using ICT in their classrooms. There is still some resistance. This is because most of them felt unequipped with ICT skills. However, MMC Africa offered training for teachers in the school that acted as a critical component for the successful implementation of the ICT Integration in the project, equipping them with knowledge and skills on ICTs.

ICT in education innovations have grown rapidly in recent years especially in developing countries. According to(Ifinedo, 2005), factors that affect e-readiness gather around physical infrastructure of a country, technology usage, the legal and regulatory guidelines, the human resource and the business climate of a country . For e-learning effectiveness in learning institutions, network connectivity, effective power supplies, digital equipment, proper storage media and trained human resources need to be properly ensured. (Redempta & Elizabeth, 2012); (Mulwa, Kyalo, Bowa, & Mboroki, 2011).

(Ngololo, Howie, & Plomp, 2012) reiterates that ICT implementation in most sub-Saharan African schools is still at the infant stage more specifically in the rural areas who mostly use it for management. (Kagwiria & Amukowa, 2013) suggests that policy makers must appreciate that technology is very important in learning institutions and most importantly in teaching and learning activities.

All this show that there are efforts that have been made to improve ICT integration in the education sector, (Buabeng-Andoh, 2012).

1.3 Objectives of the Study

This study was guided by the following objectives:

1. Study the relationship between effectiveness of tablets and e-learning readiness
2. Assess the effect of teacher training with regard to e-learning readiness and if they are motivated to use the new teaching methods

3. Evaluate whether tablets will incorporate the full curriculum, provide assessments and a variety of teaching approaches
4. Assess whether the use of tablets will have a permanent effect on teachers and the education sector at large and how well teachers utilize the new knowledge acquired
5. Verify whether a teacher believes using ICT will boost their teaching performance in class and free them from cognitive effort

1.4 Research Hypothesis

H1– Establish whether the programme will achieve its benefits and whether it has achieved the purpose to which it is provided.

H2 – Evaluate the knowledge, skills and attitudes acquired during and after the program and verify whether teachers have been impacted by them.

H3 – Establish whether teachers are more motivated with the introduction of the programme and how they value the training they received.

H4 – Verify whether the programme fits well into teaching/ learning, in curriculum delivery, during assessment and if there are a variety of approaches to use during teaching.

H5 – Establish whether there is a lasting effect of ICT deployment on teachers and how well they will utilize and maintain the deployment for teaching and learning purposes.

H6 – Understand the extent to which a teacher believes involvement of ICT will enhance their performance in class and its impact to the pupils

H7– We seek to understand the extent to which a teacher appreciates the use of ICT to free them from so much mental effort.

1.5 Significance of the Study

The tablet has in the recent past been seen as a potential way to change how teachers teach, (Shelly, Cashman, Gunter, & Gunter, 2007). It will be used to support educational reforms as a teaching support tool in learning institutions. It is also important to evaluate the extent to which ICT through the use of tablets improves teacher/ learner productivity academically, (Blumenfeld, Kempler, & Krajcik, 2006); (Gillies & Boyle, 2010). It should be viewed as a tool for extending capacity of humans to perceive, understand and communicate, (Gillies & Boyle, 2010). ICT has over time been seen as a potential for improving quality of teaching and learning. Mobile device penetration is gaining popularity in the education sector because of portability, low cost and availability, (Piper, Jepkemei, Kwayumba, & Kibukho, 2015).

According to (Lehner & Nosekabel, 2002), the use of mobile devices should not replace traditional teaching methods that rely on teachers but should support teachers and learners in engaging in modern activities that facilitate teaching and learning. This research will have a great positive impact on the government, schools involved, policy makers and other stakeholders.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section discusses the implementation of ICT in education in Kenya and compares with other countries across the globe in general and East Africa in particular. We also seek to incorporate a theoretical framework that will guide through our research. There are areas where ICT integration is a necessity. For example in teaching/ learning, curriculum development, ICT-based assessment and a blend of ICT-based teaching/ learning methods with traditional methods. (Andrews et al., 2007) recommends a well co-ordinate curriculum, appropriate performance standards and proper assessment tools as part of best practices in reforms of learning institutions.

2.2 E-learning Integration in Education

2.2.1 Hong Kong

The Hong Kong government injected HK\$5 billion into a five-year IT strategic plan for their learning institutions between 1998 and 2003 which provided a solid foundation for ICT integration ensuring that the institutions had internet connections and that teachers in all the learning institutions in Hong Kong received 18 hours of basic IT training (BIT), with 75% of them receiving a further 30 hours of intermediate IT training (IIT); and 25% receiving an extra 30 hours of IT training,(So & Swatman, 2006).

2.2.2 Cyprus

Cyprus Ministry of Education & Culture (MOEC) launched in 2008, a web-based learning platform, DIAS, that provided schools with easy access to educational tools and their subsequent content. The teachers have the capability to develop and deliver content that satisfies learners' individual needs and encourage participation and delivery of content. Teachers are encouraged to try out new teaching methodologies so that all students are motivated to use the tools provided in the platform for their own knowledge, (Hew & Brush, 2007).

2.2.3 Uganda

An ICT policy framework was adopted in 2003 by the government of Uganda that showed the need for improvement in literacy levels and human resource capacity building. Previously, ICT integration in education was not guided by any framework. Schools followed their own initiatives funded on agreements between the school and their donor(s). Different schools led their own initiatives mainly funded on bilateral terms between the school and their donor(s). For a proper guided framework, ICT had to be integrated into the curriculum and provide access to teachers

and their pupils at all levels, (Farrell, 2007b). According to (Akpan-Obong, Thomas, Samake, Niwe, & Mbarika, 2009; Farrell, 2007b), introduction of computer awareness programmes at primary teacher-training institutional levels is important in order to assist the newly qualified teachers to get properly equipped to implement the skills they have acquired.

2.2.4 Tanzania

Tanzania published a national ICT policy in 2003 with the sole objective of developing and applying ICT in education and training with direct bearing to primary and secondary education, (Hare, 2007). The main aim was to incorporate ICT at all levels of education to improve quality of education including distance learning and teaching experience, (Wamakote, Ang'ondi, & Onguko, 2010). Tanzania included an ICT curriculum for primary and secondary schools in the framework that was developed.

2.2.5 Rwanda

The government of Rwanda adopted a national ICT policy in 2000 that aimed at transforming the country into an ICT literate nation and improving the human resource capacity to meet the ever-changing needs of the growing economy. The policy elaborates plans related to the integration of ICT into the education system. This has seen Rwanda record a significant rise in the use of ICT in schools, (Farrell, 2007a).

2.2.6 Kenya

In January 2006, a national ICT policy was adopted,(Waema, 2005); (Kariuki, 2009)based on four guiding principles:

- i) Infrastructure development
- ii) Human resource development – Promoting ICT based curriculum and ensuring that teachers acquire required skills.
- iii) Stakeholder participation
- iv) Appropriate policy and regulatory framework

The government of Kenya has committed a lot to ensure the project becomes a success by having 60,000 teachers trained for ICT across all the 47 counties, ensuring that the digital content has been established by the Kenya Institute for Curriculum Development (formerly Kenya Institute of Education), electricity is installed in all public schools and ensuring that all schools will be connected to the national grid. A team from the ICT Authority of Kenya has been dispatched to inspect the schools ahead of the rollout by ensuring that the classrooms are secure, device storage

facilities are available and there are appropriate desks have been put in place. A total of 22,000 schools countrywide will be privileged to be part of the program. A pilot phase will target 11,000 schools by June 2016 while the remaining batch will roll out by June 2017.

(Kiptalam & Rodrigues, 2010) identify that there is a challenge with internet connection to schools. To this effect, Safaricom Limited has joined the bandwagon and will provide free internet connectivity to all the schools that will be supplied with the laptops/ tablets.

2.3 ICT and Pedagogy

According to (Leach & Moon, 2000);(Dladla & Moon, 2002), ICT has the potential of changing how teacher development processes take place and enabling quicker access academic resources. They suggest that ICT offers understanding of new professional knowledge, new practices in teaching, facilitation of social participation structures and enabling teachers to reflect on the whole teaching and learning process.

On the other hand, the researcher argues that these tools can only be effective to teachers if they have a change of mind and begin to embrace the introduction and use of technology in general and the tools in particular. Teachers' confidence was also seen as another factor to consider being able to achieve success. It is also argued that ICT can make pedagogy more efficient since it has the capacity to extend and transform the process from both the teaching and learning perspectives.

Some positive effects of ICT integration include positive pupils' response in class, ICT compatibility in teaching methods, ease in teaching, and access to information and update resources and being able to achieve more in a short time. (Rajasingham, 2011), (Wright, Stanford, & Beedle, 2007), (King, Melia, & Dunham, 2007), (Adedokun-Shittu & Shittu, 2014), and (Lao & Gonzales, 2005)also identified the above outcomes with regard to positive effects of ICT in education.

2.4 Empirical Literature

2.4.1 Effective Use of Tablets by Teachers and E-learning Readiness

For e-learning readiness to be effective in the education sector, qualified teachers have to drive the introduction and proper use of technology in the learning institutions. However, many African countries lack trained teachers who have ICT knowledge and skills to effectively introduce technology into schools. According to (Mentz & Mentz, 2003), many pupils leave school before sitting in front of a computer. The figures might have reduced in the recent past because penetration

of ICT in education is increasingly becoming rampant. Other challenges that influence effective use of tablets are lack of funding to pay salaries of the skilled teachers and the rapid growth of pupils' population since the introduction of free universal primary education which was guided by the Millennium Development Goals. For effectiveness in using tablets to be achieved, the need to acquire more qualified and competent staff needs to be met, (Hennessy et al., 2010).

2.4.2 Teacher Training on Use of Tablets and E-learning Readiness

Introducing ICT into teacher training has been a great challenge in Africa and other less developed countries. According to (Ertmer & Ottenbreit-Leftwich, 2010), readiness of teachers is affected by physical, cultural and educational factors. One issue that stands out in educational factors is the level of a teacher's own education and literacy levels. This plays a major role in professional development of the teachers. The attitude of teachers and personalized training in the use of ICT will highly determine the level of maturity in learning technology as highlighted by (Tella, Tella, Toyobo, Adika, & Adewuyi, 2007). Availability of learning resources, properly developed curriculum and other learning tools also facilitate ICT use in the training of teachers, (Littlejohn, 2004).

2.4.3 Motivation to Use Tablets and E-Learning Readiness

Motivation to use tablets or lack of it has been seen as a drive to e-learning readiness. Some factors that derail teachers' readiness include appropriate teachers' expertise and lack of required knowledge to evaluate the use and role of ICT in teaching (or technophobia in teachers and teacher trainers). On the other hand, there are qualified IT professionals who are willing to work with teachers on ICT-related matters but because of 'brain drain', these experts choose to work elsewhere where they are certain of better paying jobs,(Minishi-Majanja, 2007); (Alemneh & Hastings, 2006). Another challenge that affects motivation of teachers is lack of time to learn and use technology. When teachers are motivated, they will invest most of their time teaching in order to get a higher return on investment. Lack of time and absence of skills are the most significant barriers to motivation of teachers to use tablets, (Bingimlas, 2009).

2.4.4 Integration of Curriculum in the Tablets and E-learning Readiness

Integration of curriculum into the tablets has also been seen as a major concern. There seems to be a lack of any policy that guides the use of computers in schools, (R. Kozma, McGhee, Quellmalz, & Zalles, 2004),and that explains why curriculum integration is moving at a snail pace, (Bingimlas, 2009).Less developed countries technologically faced other challenges like lack of computer

hardware, software and reliable internet connectivity and this in some way affected how integration of curriculum would be achieved. Consequently, some of the computers provided for use did not match the requirements of the curriculum thus they would have no value to learners. Once proper integration is done and appropriate infrastructure is laid down, teachers will be in the forefront to implement e-learning in the learning institutions by compensating with their commitment, (R. Kozma et al., 2004).

2.4.5 Sustainability of Tablet Use and E-learning Readiness

Sustainability can be viewed on a wide spectrum as it incorporates among other things budget planning and stakeholder involvement. A lot of resources need to be set aside to support the use of ICT devices in learning institutions. Stakeholders need to come up with specific budgets that estimates the available resources and how to maintain them thus facilitating the sustainability of the program e.g. representatives from the school and the government, (Corn et al., 2010). Innovations are new every day and stakeholders also need to assess how and when they will be incorporated in the education sector and how to sustain them as well, (Condie & Munro, 2007).

2.4.6 Usefulness of Tablets and E-learning Readiness

Tablets have in the recent past proved that they are very useful in all sectors of economy and the education sector in particular with a growing desire to enhance creation, dissemination and sharing of ICT content. Since this is expected to improve the quality of teaching and learning, teachers are tasked to be the curriculum implementers in their respective classes and be in a position to pass the knowledge they have on ICT to the learners. This will in the end improve the standards of education in the country, (Y. Park, 2011). According to (S. Y. Park, Nam, & Cha, 2012), effectiveness is achieved when perceived usefulness of tablet use is combined with other factors like behavioral intention, attitude, perceived ease of use and self-efficacy of e-learning. Though it is argued that use of computers by young children is not proper, several results show that the impact is positive since the children portray intelligence, structural knowledge, problem solving skills and proper language skills, (Vernadakis, Avgerinos, Tsitskari, & Zachopoulou, 2005).

2.4.7 Ease of Use of Tablets and E-learning Readiness

Once teachers have full confidence of using the tablets, they will find it very easy to use them for teaching purposes and for their personal gain as well. Perceived ease of use is enhanced by perceived mobility and viewing experience, (E. Park & del Pobil, 2013). Teachers will eventually gauge if the use of tablets has improved their teaching skills and their efficiency as well. They

would also be better placed to verify whether the use of tablets has made it possible to access teaching contents thus improving students' performance (Park et al, 2011). Ease of use of tablets has increased functionality of the devices compared to other previous technologies since they are able to support extensive teaching and learning, (Clarke & Svanaes, 2014).

2.5 Considerations for readiness

According to (Chapnick, 2000), measuring the e-learning readiness of an organization has to consider psychological readiness, sociological readiness, environmental readiness, technological skill (aptitude) readiness, equipment readiness and content readiness in equal measure.

All this apply to e-learning readiness since the teachers have to be psychologically prepared for the transition, their social being needs to be prepared as well, the environment in which they are in needs to be conducive for proper use of tablets, they need to have hands on skills with regard to technology, the tablets should be readily available with proper content uploaded.

2.6 Theoretical Literature

(KASHORDA & Waema, 2011) indicate that learning institutions that are in the early stages of ICT integration have no specific model or framework to use to measure their e-learning readiness. We seek to incorporate a framework that will guide through the integration of ICT in the education sector in Kenya and may flow to other East African countries and to the whole of Africa as a whole. In this case, we will look at the CIPP evaluation model, Kirkpatrick evaluation model, ICT Assessment model and Technology Acceptance Model and borrow some of their variables for our conceptual framework. The justification of choosing these models is because they are rich in content regarding the teacher factor in implementing ICT in education. The researcher will borrow a lot from the models.

2.6.1 The CIPP Evaluation Model

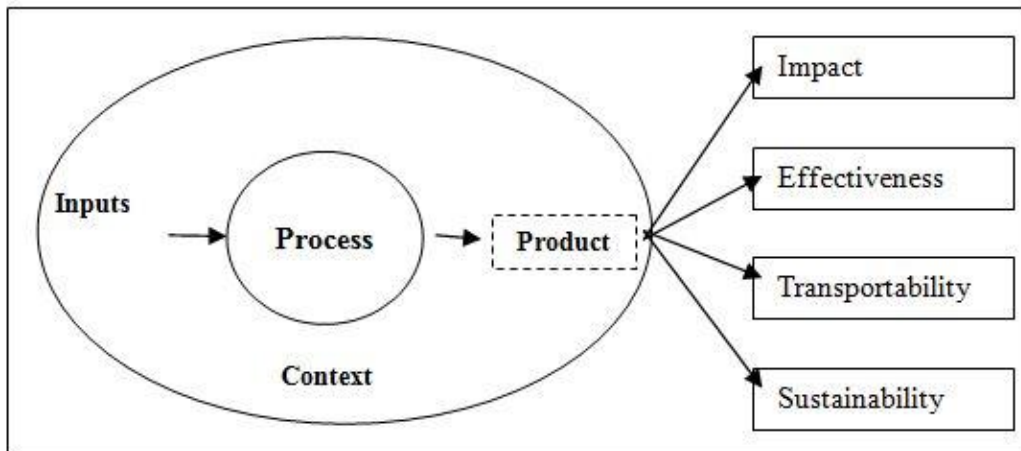


Figure 1. CIPP Evaluation Model(Adedokun-Shittu & Shittu, 2013)

This framework captures the context, inputs, process and product as dependent variables and impact, effectiveness, transportability and sustainability as the independent variables. **Impact** checks if the introduction of ICT facilities in teaching and learning has a direct impact on the teachers and pupils, **effectiveness** checks whether the programme achieves benefits anticipated and that it improves teaching and learning outcomes, **transportability** measures the changes in teaching and learning that have been felt since the introduction of ICT while **sustainability** assesses whether ICT deployment will have a lasting effect on teaching and learning.

2.6.2 Kirkpatrick Evaluation Model

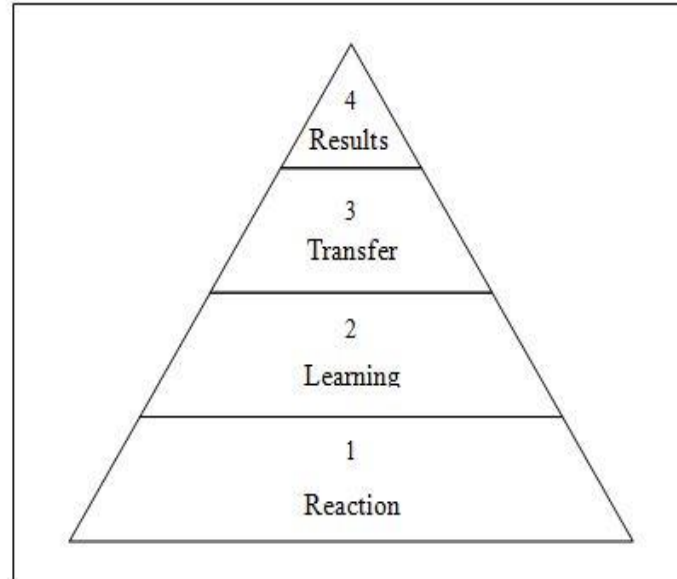


Figure 2. Kirkpatrick's model of evaluation(Adedokun-Shittu & Shittu, 2013)

This model measures the reaction, learning, transfer and results that help to determine a program's effectiveness. This model was originally developed for assessing training programs but is lately being used to assess the impact of technology during integration and implementation of ICT,(Owston, 2008). **Reaction level** checks whether objectives of the program have been met, **learning level** measures the extent to which knowledge, skills and attitudes acquired have been retained, **transfer level** checks whether knowledge acquired has been transferred to the working environment and **result level** checks whether the programme has improved the quality of work, if there is increased production, whether is a decrease of maintenance costs and if the is a higher return on investment.

2.6.3 The ICT Impact Assessment Model

This model comprises of themes generated from the two models above and narrows down to positive effects, challenges, incentives and integration. It is cyclic in nature showing that there is very strong cohesion between the variables meaning that the process can start from any of the four variables, (Adedokun-Shittu & Shittu, 2013). **Positive effect** checks on the benefits of the program, students' response, comfort/ compatibility with teaching and learning, **integration** in teaching and learning, in curriculum, in assessment and a blend of approaches, **incentives** refer to what is given

to teachers in form of motivation, adequacy, access and training, and *challenges* referring to problems faced, constraints and technical challenges.

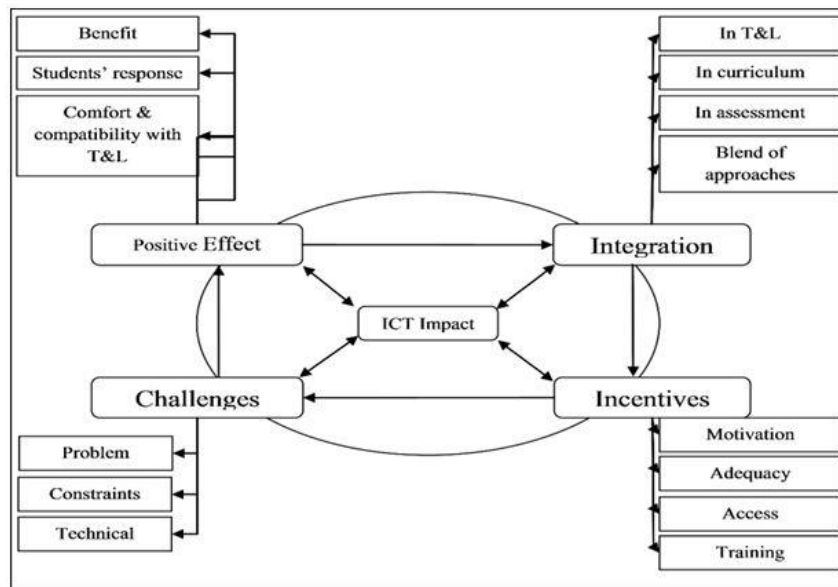


Figure 3: ICT impact assessment model (Adedokun-Shittu & Shittu, 2013)

2.6.4 Technology Acceptance Model (TAM)

This model explains and predicts user behavior of ICT use (Legris, Ingham, & Colletette, 2003). It provides emphasis on how external variables influence belief, attitude and the intention to use ICT facilities. The use of any system depends highly on the user's attitude, usefulness of the system and how easy it is to use the system. To some extent, teachers believe that using e-learning will boost their overall performance in class and help them use lesser of their mental effort.

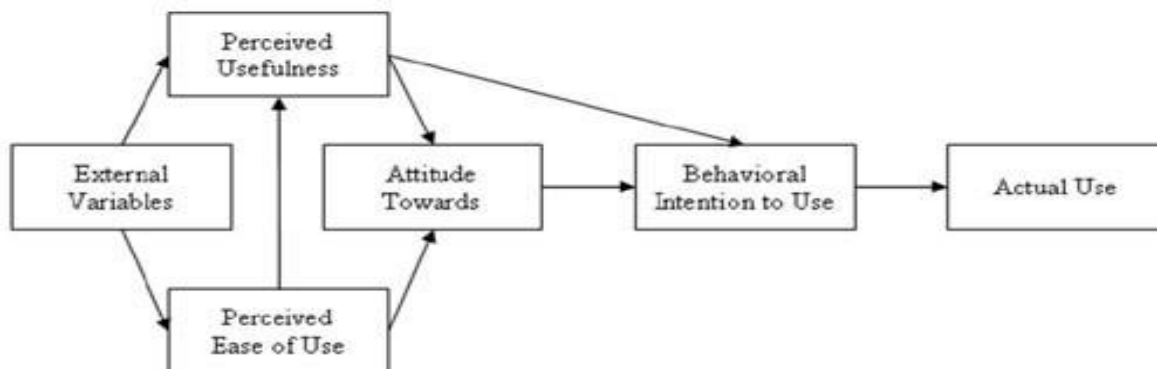


Figure 4. Original technology acceptance model (TAM)

2.6.5 Conceptual Framework

Having analyzed the above frameworks, the researcher decided to blend them picking on the strongest points that arose from the other frameworks. ICT impact affects all areas of integration thus we seek to assess if the introduction of ICT facilities in teaching and learning will have a direct effect to teachers and whether they have been able to come up with new teaching methods and approaches as a result of the same. Below is the blended framework:

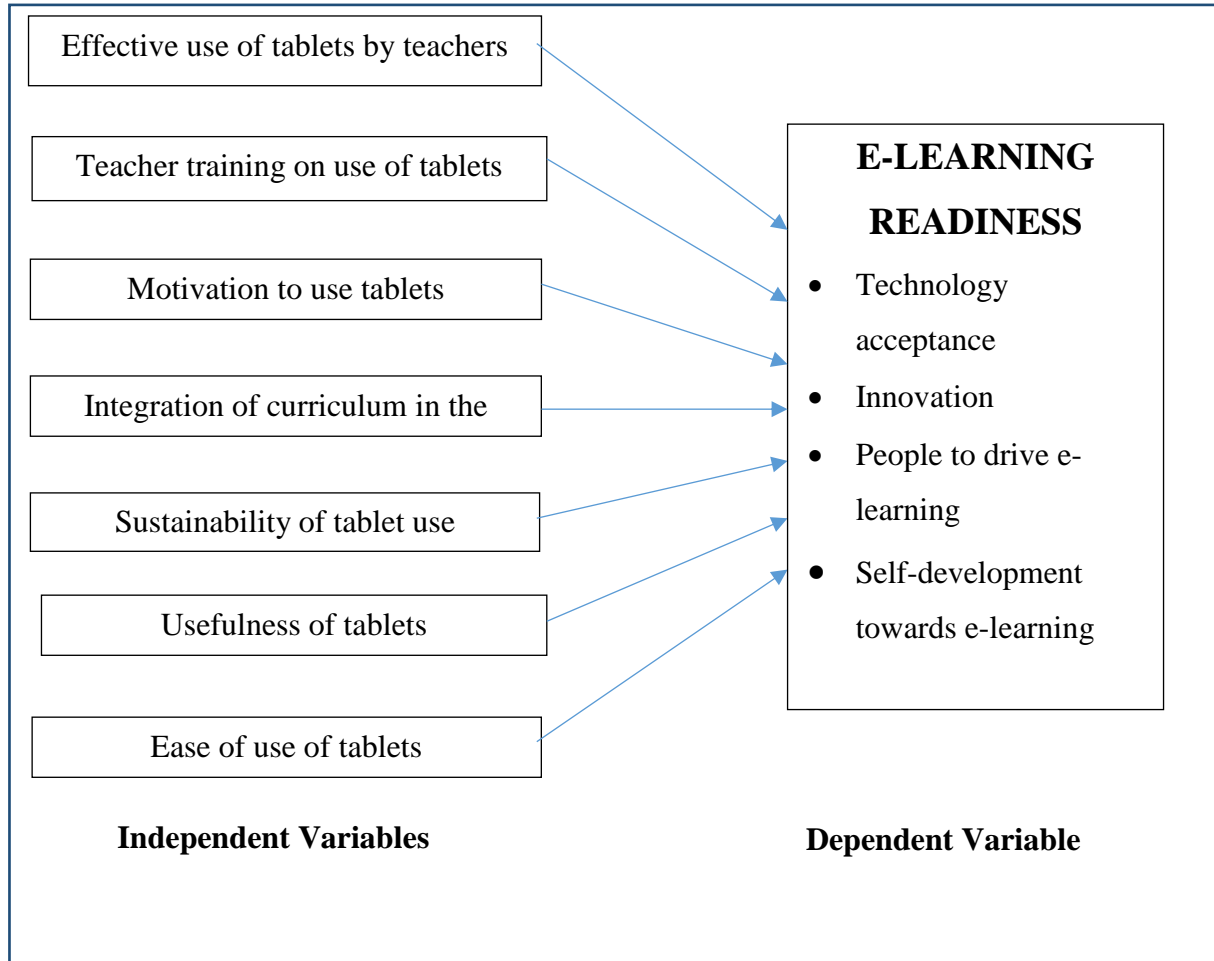


Figure 5: Conceptual framework

- i) **Effective use of tablets by teachers** – Establish whether the programme will achieve its benefits and whether it has achieved the purpose to which it is provided.
- ii) **Teacher training on use of tablets** – Evaluate the knowledge, skills and attitudes acquired during and after the program and verify whether teachers have been impacted by them.

- iii) **Motivation to use tablets** – Establish whether teachers are more motivated with the introduction of the programme and how they value the training they received.
- iv) **Integration of curriculum in the tablets** – Verify whether the programme fits well into teaching/ learning, in curriculum delivery, during assessment and if there are a variety of approaches to use during teaching.
- v) **Sustainability of tablet use** – Establish whether there is a lasting effect of ICT deployment on teachers and how well they will utilize and maintain the deployment for teaching and learning purposes.
- vi) **Usefulness of tablets** – Understand the extent to which a teacher believes involvement of ICT will enhance their performance in class and its impact to the pupils
- vii) **Ease of use of tablets** – We seek to understand the extent to which a teacher appreciates the use of ICT to free them from so much mental effort.

2.7 Conclusion

According to (Wankel & Blessinger, 2012), technology in learning institutions should be used for educational purposes with clear course objectives that will help achieve the expected teaching outcomes. (R. B. Kozma, 2005) suggests that introduction of technology should be well coordinated with the curriculum, pedagogy, ICT based assessments, human resource (teachers) development and school restructuring in terms of infrastructure. (Crowther, Keller, & Waddoups, 2004) reiterates that teachers hold the key to unlocking the potential of students and enhancing achievement not technology. Effective technology integration also relies heavily on efficient teacher training to ensure that their knowledge and attitudes are in line with the implementation. Proper curriculum development is critical for successful integration of technology. Teachers make up for the key personnel to enhance knowledge production, modification and application and therefore they must be properly trained to effect the same. Educational policies must realize this and effect them appropriately. (Liverpool, 2002) states that ICT already dominates the education sector in first world countries, but its penetration is slugging in the less developed countries. Developing countries need to benefit from technological advancements meaning that teachers need to be educated to match the advancements and have the ability to use ICT effectively and creatively. Once this is done, teachers will comfortably pass on the skills and ideas to learners. Unfortunately, teachers in developing countries are still struggling with little or no ICT skills but this can improve if appropriate policy measures are put in place.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This section describes practices and procedures for conducting and replicating this research. The sole purpose of this study is to understand more about the introduction of tablets in Kenyan public primary schools and interpret the findings based upon the fact that the details will reflect the reality on the ground regarding the project. In this topic, we will expound more on the relevant research philosophy for this study, research design, strategy, research methodologies, population sample, data collection, data analysis and operationalization of the research variables. We seek to use a small sample for our study which will be more appropriate compared to a large sample. The study will check the effect of tablet use for a period of two (2) academic terms.

3.2 Research Philosophy

This is a belief about the way data about a phenomenon should be gathered, analyzed and used. There are three types of research philosophies:

- i) Positivist research – where the study is independent of the human actors
- ii) Pragmatism research –where the study deals with specific situations instead of on ideas and theories
- iii) Interpretivist research –where the study is dependent of the human actors. They run the research. The teachers perceptions about the program are influenced by the experiences they have had.

For this study, we shall consider using interpretivist research since our human actors, the primary school teachers, will be working hand in hand with the government for the success of this program.

3.3 Research Design

Research design indicates the methods and procedures for collecting & analyzing the needed information in a study. It involves describing the research approach, population; sampling size and technique, project schedule, data collection instruments, and data analysis methods. This study is a form of a survey that seeks to understand the impact that the use of tablets will have on Kenya's education system and the country's economy as a whole. We intend to walk with the programme's flag bearers to see what results will come out of the programme at the end of the day. Constant follow-up will be made so that the entire progress can be monitored and results identified. One of the major results that we expect to project is student performance in class. As a whole, the programme should impact the teachers to be able to produce better results which will be reflected

by the results of the pupils at the end of the term or year. We intend to circulate questionnaires that will aid in data collection. These questionnaires will be issued to Kalawa Primary School teachers who will be required to fill out the details contained therein according to their knowledge.

3.3.1 Research Approach

This project seeks to evaluate the e-learning readiness of teachers in Kenyan public primary schools. There are two broad categories of research approach:

- i) Deductive—This involves the development of a theory subjected to a rigorous test and the researcher is independent of what is being observed. Its purpose is to test the validity of the explanations provided. It involves moving from general observations to specific observations. It can be used for large samples but the researcher picks a sample of sufficient numerical size.
- ii) Inductive—This involves identifying the general principles, structures and/ or processes underlying a specific observed phenomenon. Its purpose is to develop explanations to the phenomenon. It involves moving from specific observations of a study to broader generalizations and theories of the same. Smaller samples are appropriate for this approach.

For this study, the researcher will use inductive approach where we seek to move from specific observations of Kalawa Primary School, Kitui County to the broader observations. Similarly, we have the teachers who are the key human resource for the project who have to work hand in hand for the success of the project.

A questionnaire with 50 questions was given to Class Four teachers of Kalawa Primary School. All the questions were measured on a five-point Likert scale with 5 indicating “strongly agree” and 1 indicating “strongly disagree”.

3.3.2 Sampling

This research generally targets primary school teachers in Kenya and specifically, Class Four teachers in Kalawa Primary School who are nine (9) in number. We seek to analyze their readiness for ICT integration through the use of tablets. They form the key human resource target for the programme to run effectively. Class Four pupils were selected to be the first lot to benefit from the programme and this was done by a legal firm, MMC Africa, as part of their corporate social responsibility. The sampling technique is purposive since we specifically aim to target the teachers. Data collected will be qualitative since the study seeks to explain a reality in place.

3.3.3 Data Collection

Data will be collected using fixed-format questionnaires, face-to-face interviews and focus group discussions (FDGs). We chose this type of instruments as they will give us all the answers we need from the teachers. Since the tablets are a new concept in the system, some instruments would not be effective. Questionnaires will include all questions that we need answers for, we will hold interviews with the teachers so that we can gauge their reaction to the programme on face value and also have an FGD with them.

3.3.4 Validity Measures

Validity measures show the degree to which data instruments succeed in getting the details that it was designed to achieve. For this study, the measure is to ensure that the correct data has been collected. Scrutiny from lecturers and supervisors will be effected.

3.3.5 Reliability Measures

Reliability measures show the degree to which a measurement instrument can be relied upon to relay consistent results if procedures are repeated over and over again. Pilot pre-test will be used.

3.3.6 Data Analysis

Once data collection is done, analysis will be done using a number of tests. Some of the tests include Kruskal Wallis, regression, correlation, factor analysis among others. Kruskal Wallis test is an example of a non-parametric test that estimates variables that do not follow normal distribution. The others are tests that compare relationships between different variables. Descriptive statistics will also be used and this helps the researcher to describe many pieces of data with few indices i.e., tables, graphs and charts. We will also be able to measure the mean and standard deviation. SPSS (Statistical Package for Social Science) analytical tool will be used to perform analysis on all data collected.

3.3.6.1 Conceptual Framework Analysis

This analysis is done during a study to investigate the relationship that exists among variables. The researcher is better placed to determine the contribution made by each independent variable on the dependent variable. This study adopted a Linear Regression Analysis and a multiple regression equation as follow:

$$ER_i = \beta_0 + \beta_1 EUT_i + \beta_2 TT_i + \beta_3 MUT_i + \beta_4 ICT_i + \beta_5 STU_i + \beta_6 UT_i + \beta_7 ET_i + \varepsilon_i$$

Where:

ER : denotes the E-learning Readiness

EUT : denotes Effective Use of Tablets by Teachers

TT : denotes Teacher Training on Use of Tablets

MUT : denotes Motivation to Use Tablets

ICT : denotes Integration of Curriculum in the Tablets

STU : denotes Sustainability of Tablet Use

UT : denotes Usefulness of Tablets

ET : denotes Ease of Use of Tablets

β_0 : is a constant, the value of ER when all values are 0

β_1 : denotes the regression coefficient of Effective Use of Tablets

β_2 : denotes the regression coefficient of Teacher Training on Use of Tablets

β_3 : denotes the regression coefficient of Motivation to Use Tablets

β_4 : denotes the regression coefficient of Integration of Curriculum in the Tablets

β_5 : denotes the regression coefficient of Sustainability of Tablet Use

β_6 : denotes the regression coefficient of Usefulness of Tablets

β_7 : denotes regression coefficient of Ease of Use of Tablets

ε_i : Error time assumed to be a white noise.

For this study, independent variables were: Effective Use of Tablets, Teacher Training on Use of Tablets, Motivation to Use Tablets, Integration of Curriculum in the Tablets, Sustainability of Tablet Use, Usefulness of Tablets, and Ease of Use of Tablets. The dependent variable was E-learning Readiness.

Table 3.1: Operationalization of the Research Variables

Construct	Explanation	Operational Definitions
Effective use of tablets by teachers	This variable tries to establish whether the programme will achieve its benefits and whether it has achieved the purpose to which it is provided	There is greater comfort in both teaching and learning with the introduction of new methods as opposed to the previous traditional methods. Access to information and up to date resources has been subsequently improved. Interaction between teachers / learners and teachers/ teachers has also been enhanced. Pupils class attendance will improve as they look forward to using the tablets on a day-to-day basis
Teacher training on use of tablets	This variable evaluates the knowledge; skills and attitudes acquired during and after the program and verify whether teachers have been impacted by them.	A major one is overreliance on ICT as teachers tend to become lazy since the tablets will do most of the work. Other challenges include inadequate facilities, limited access to ICT facilities in terms of working hours, lack of technical staff and inefficient power supply all which derail the intervention of ICT in e-learning.
Motivation to use tablets	This variable establishes whether teachers are more motivated with the introduction of the programme and how they value the training they received	ICT is new to teachers therefore it is advisable to come up with ways to make them appreciate the innovation and be willing to work for the good of the programme.

Integration of curriculum in the tablets	ICT needs to be integrated into the curriculum and blend ICT-based teaching and learning methods with the traditional teaching and learning methods	A number of best practices in the school curricula need to be incorporated for integration to be effective. This includes coordinated curricula, performance standards and a variety of assessment tools.
Sustainability of tablet use	This variable seeks to establish whether there is a lasting effect of ICT deployment on teachers and how well they will utilize and maintain the deployment for teaching and learning purposes	With proper use of tablets, ICT deployment in e-learning will be effective and the teachers will be better placed to implement their use for teaching purposes. This will also cause the program to grow and be very effective in the education sector.
Usefulness of tablets	This variable seeks to understand the extent to which a teacher believes involvement of ICT will enhance their performance in class and its impact to the pupils	It is believed that the use of tablets will tremendously improve performance in schools as they will be viewed as very important tools.
Ease of Use of tablets	This variable seeks to understand the extent to which a teacher appreciates the use of ICT to free them from so much mental effort	Teachers believe that using tablets will reduce the amount of mental effort they require for teaching purposes since the tablets will be better placed to do most of the tasks.

3.4 Project Schedule

This research will spread across two (2) academic terms which should be approximately six (6) months will give us a perspective of the positive effect of the programme to the teachers and to teaching/ learning and possible challenges that might have been experienced for that period of time.

Table 3.2: Project Schedule

No.	Task	Resource	Duration (days)	Start	Finish	Status
1.0	Consultations and picking of project titles					
1.1	Settle on project title	Researcher	5	25/4/2016	29/4/2016	Done
1.2	Identify project supervisor	Researcher	2	5/5/2016	6/5/2016	Done
1.3	Register project title	Researcher/ Co-coordinator	1	10/5/2016	10/5/2016	Done
1.4	Liaise with supervisor on viability of the project and way forward	Researcher/ Supervisor	10	16/5/2016	27/5/2016	Done
2.0	Preparing the proposal					
2.1	Chapter 1	Researcher/ Lecturer	5	8/2/2016	12/2/2016	Done previously
2.2	Chapter 2	Researcher & Lecturer	10	15/2/2016	26/2/2016	Done previously
2.3	Chapter 3	Researcher & Lecturer	2	7/3/2016	11/3/2016	Done previously
3.0	Milestone 1 Presentation	Researcher/ Panel	1	1/7/2016	1/7/2016	Done
4.0	Working towards milestone two					

4.1	Data collection	Researcher + 3 others	3	6/7/2016	8/7/2016	Done
4.2	Data analysis	Researcher	40	11/7/2016	2/9/2016	Done
5.0	Milestone two presentations	Researcher/ Panel	1	08/09/16	08/09/16	Done
6.0	Working towards milestone three					
6.1	Findings, conclusions and recommendations	Researcher	20	12/09/16	07/10/16	Done
7.0	Milestone three presentations	Researcher/ Panel	1	18/10/16	18/10/16	Done

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results of analysis, findings and discussions with reference to the research topic and study objectives. The results are shown in summary tables and analysis charts. Kruskal Wallis test and tests of correlation and regression have been employed to answer the research objectives. The data used in this study was primarily obtained from Kalawa Primary School. This chapter first presents the general information of the respondents.

4.2 Reliability Analysis

Reliability analysis for this study was done using Cronbach's Alpha. This test measures the internal consistency and reliability of any research tool used in a study. For the study to be effective, alpha values have to be >0.6 . Cronbach's Alpha for this study was 0.944 thus this study is effective. The table below shows the results.

Table 4.1: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.900	.944	50

Table 4.2: Reliability Test Results

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
There are fears and concerns from both the pupils and their parents regarding the use of tablets	202.11	231.861	-.677	.907
The use of tablets has had a direct impact on teachers	199.11	210.861	.662	.896
Program has achieved intended and unintended results through methods used for teaching	199.33	212.750	.648	.896
Teachers have acquired other executive functioning skills e.g. being technology savvy	199.00	205.750	.720	.894
The use of tablets enabled the teachers to showcase other skills and strengths e.g. being creative	199.00	208.500	.821	.894
There are sufficient buildings for the conduct of computer-based exams	201.11	208.111	.365	.899

Free internet connectivity has been installed in the school	202.11	223.111	-.134	.903
I had prior knowledge of tablets	199.78	216.444	.096	.904
The knowledge acquired has been transferred to the classrooms	198.78	212.444	.672	.896
Teachers have had an on-the-spot access to knowledge with regard to the use of tablets	199.22	210.444	.730	.895
I have acquired new skills and strengths with the use of tablets	198.89	209.111	.824	.894
Training acquired has improved my effectiveness and efficiency in teaching	198.89	209.111	.824	.894
The use of tablets has made teachers eager to teach since it is more fun	198.78	212.694	.652	.896
Due to intervention of the tablets, I have improved my knowledge, increased my skills and had a positive attitude	199.11	208.861	.797	.894
Using tablets made lesson preparation much easier	199.00	208.500	.821	.894
I have a flexible day as compared to previous teaching methods	199.00	208.500	.821	.894

The use of audio-visuals e.g. images, sound etc. has made learners more engaged in class	198.78	212.694	.652	.896
I have embraced the use of tablets as compared to traditional teaching methods	199.11	210.611	.679	.895
Access to the internet has helped me update myself professionally	200.00	212.750	.194	.903
The use of tablets in academics has improved pupils' performance	199.11	208.861	.797	.894
Tablets capture the curriculum effectively	200.44	216.278	.152	.902
ICT is integrated in the curriculum and provides ICT based assessments	200.11	224.611	-.144	.907
There is a blend of ICT-based teaching with the traditional teaching methods	199.44	214.778	.654	.897
The pupils can read, pronounce, understand and solve mathematical problems much better with the use of tablets compared to earlier methods of teaching	199.11	210.861	.662	.896
Tablets have enabled improvements in the curriculum which could not have been achieved cost-effectively in other ways	198.89	209.111	.824	.894

The use of tablets will have a lasting effect on the teachers as they will strive to utilize and maintain the knowledge acquired	199.00	208.500	.821	.894
Use of tablets should be permanent in the education sector	198.89	212.111	.612	.896
There is provision of a well-designed supportive software in the tablets	200.33	210.000	.438	.897
Tablets must be "cost-effective" in both time and money as perceived by teachers	199.22	212.444	.589	.896
Tablets are sufficiently easy to use by teachers	199.33	212.750	.648	.896
Children need traditional social interactions and communication with others through real play with functional objects	199.22	217.444	.243	.899
From my point of view, the program is relevant with regard to its objectives, perceived values and user satisfaction	199.00	214.500	.421	.898
Use of tablets has improved the quality of the teaching process	199.22	211.194	.677	.896
Children take more time using tablets rather than playing	199.89	229.361	-.300	.909

I have managed to come up with new teaching approaches e.g. practical and demonstrations	199.11	210.111	.713	.895
The use of tablets has increased over-reliance of ICT by the pupils	199.78	221.194	-.025	.903
I now have confidence using the tablets	198.89	214.361	.455	.898
The teachers prefer using the tablets instead of the traditional face-to-face methods	199.67	219.500	.050	.902
I can use tablets at home because of availability of electricity	200.56	199.528	.649	.893
We have adequate facilities and enough access to the tablets in terms of working hours	199.78	217.444	.082	.904
Technical issues revolve around hardware, software and internet services	199.33	219.500	.121	.900
The school is connected to an effective power supply thus teaching can go for longer than before	199.22	207.194	.667	.895
Teachers are getting comfortable with technology and are no longer technophobic (they do not fear technology)	199.44	216.028	.161	.901

Teachers' attitude towards use of tablets is positive	198.89	212.111	.612	.896
Previous introduction of new teaching methods have been successful and ran smoothly	199.11	211.861	.596	.896
There are technical staff who can facilitate e-learning in the school and appropriate storage facilities for the tablets	199.89	204.611	.642	.894
Training in the use of tablets made teachers more ready to use the new method of teaching	199.11	208.861	.797	.894
Presence of e-learning vendors has made it easier to access e-learning software	200.11	203.361	.465	.897
I am ready for more information in technology and individual development	198.78	212.444	.672	.896
There is a budget to implement and enhance e-learning in the school	200.22	223.444	-.098	.912

4.2.1 Response Rate

The researcher set out to reach 9 respondents (teachers of Kalawa Primary School) and all of them filled the questionnaires and returned them. This translates to 100% response rate.

4.3 Correlation Analysis

The researcher conducted some tests in order to check whether linear regression would be appropriate to use for the study. The researcher conducted a test of Multicollinearity using the Pearson Correlation test and the results are presented in table 4.3 below.

Table 4.3: E-learning Readiness and Determinants Correlation

		Effective Use of Tablets by Teachers	Teacher Training on Use of Tablets	Motivation to Use Tablets	Integration of Curriculum in Tablets	Sustainability of tablet Use	Usefulness of Tablets	Ease of Use of Tablets
Effective Use of Tablets by Teachers	Pearson Correlation	1						
Teacher Training on Use of Tablets	Pearson Correlation	.870**	1					
Motivation to Use Tablets	Pearson Correlation	.450	.611	1				
Integration of Curriculum in Tablets	Pearson Correlation	.397	.385	.770*	1			
Sustainability of tablet Use	Pearson Correlation	.477	.493	.856**	.490	1		
Usefulness of Tablets	Pearson Correlation	-.032	-.107	.510	.253	.763*	1	
Ease of Use of Tablets	Pearson Correlation	.365	.529	.712*	.353	.721*	.589	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The results of analysis show that there is positive correlation between the following: effective use of tablets by teachers and teacher training on use of tablets ($r = -0.870$, $p = 0.002$), effective use of tablets by teachers and motivation to use tablets ($r = 0.450$, $p = 0.224$), effective use of tablets by teachers and integration of curriculum in tablets ($r = 0.397$, $p = 0.290$), effective use of tablets by teachers and sustainability of tablet use ($r = 0.477$, $p = 0.194$), effective use of tablets and ease of use ($r = 0.365$, $p = 0.334$), teacher training and motivation to use tablets ($r = 0.611$, $p = 0.081$), teachers training and integration of curriculum in the tablets ($r = 0.385$, $p = 0.306$), teacher training and sustainability of tablet use ($r = 0.493$, $p = 0.177$), teacher training and ease of use of tablets ($r = 0.529$, $p = 0.143$), motivation to use tablets and integration of curriculum in tablets ($r = 0.770$, $p = 0.015$), motivation to use tablets and sustainability of tablet use ($r = 0.856$, $p = 0.003$), motivation to use tablets and usefulness of tablets ($r = 0.510$, $p = 0.160$), motivation to use tablets and ease of use ($r = 0.712$, $p = 0.031$), integration of curriculum in tablets and sustainability of tablet use ($r = 0.490$, $p = 0.181$), integration of curriculum in tablets and usefulness of tablets ($r = 0.253$, $p = 0.511$), integration of curriculum in tablets and ease of use ($r = 0.353$, $p = 0.352$), sustainability of tablet use and usefulness of tablets ($r = 0.763$, $p = 0.017$), sustainability of tablet use and ease of use of tablets ($r = 0.721$, $p = 0.028$), usefulness of tablets and ease of use of tablets ($r = 0.589$, $p = 0.095$). However, results show a negative correlation between effective use of tablets by teachers and usefulness of teachers ($r = -0.032$, $p = 0.935$) and teacher training on use of tablets and usefulness of tablets ($r = -0.107$, $p = 0.784$) meaning that other factors can be considered that have not been included in this study not forgetting the error term. Some of the variables have a correlation coefficient of >0.8 thus there is some extent of multicollinearity.

4.4 Descriptive Statistics

4.4.1 Mean and Standard Deviation

The results of mean are shown in table 4.4 below. The means are very high same to the standard deviation showing that all the independent variables have very high influence on the dependent variable.

Table 4.4: Mean and Standard Deviation Results

	N	Minimum	Maximum	Mean	Std. Deviation
Effective Use of Tablets by Teachers	9	3	4	3.30	.367
Teacher Training on Use of Tablets	9	4	5	4.44	.445
Motivation to Use Tablets	9	4	5	4.44	.424
Integration of Curriculum in the Tablets	9	3	5	3.96	.422
Sustainability of Tablet Use	9	4	5	4.20	.387
Usefulness of Tablets	9	4	5	4.19	.282
Ease of Use of Tablets	9	4	5	3.98	.358
E-learning Readiness	9	4	5	4.11	.502
Valid N (listwise)	9				

4.5 Kruskal Wallis Test Statistics

The researcher also performed Kruskal Wallis test on the data collected and all the variables yielded varied Chi-square results at 1 degree of freedom. Effective use of tablets yielded a Chi-square measure of 1.846, teacher training on use of tablets yielded 3.068, motivation to use tablets yielded 0.015, integration of curriculum in the tablets yielded 0.554, sustainability of tablet use yielded 0.381, perceived usefulness of tablets yielded 0.073 and perceived ease of use yielded 1.011. The level of significance for effective use of tablets by teachers was 0.174, teacher training on use of tablets was 0.080, motivation to use tablets was 0.901, integration of curriculum in the tablets was 0.457, sustainability of tablet use was 0.537, usefulness of tablets was 0.786 and ease of use of tablets was 0.315. For the variable to be effective, the level of significance should be >0.05 . In this study, all the variables have their level of significance being greater than 0.05. The results of the test are shown in table 4.5 below:

Table 4.5 Kruskal Wallis Test Results

	Effective Use of Tablets by Teachers	Teacher Training on Use of Tablets	Motivation to Use Tablets	Integration of Curriculum in the Tablets	Sustainability of Tablet Use	Usefulness of Tablets	Ease of Use of Tablets
Chi-Square	1.846	3.068	.015	.554	.381	.073	1.011
df	1	1	1	1	1	1	1
Asymp. Sig.	.174	.080	.901	.457	.537	.786	.315

a. Kruskal Wallis Test

b. Grouping Variable: E-learning Readiness

4.6 Regression Analysis Results

The study employed regression test to estimate the impact that the independent variables have of the dependent variable. Multiple regression analysis yielded results as shown in table 4.6.

R^2 is a term that shows how efficient a term is in predicting the other. The higher the R^2 value, the better it is for the variables to predict one another.

This study yielded an R square of 98.9% meaning that all the independent variables are strong determinants of the dependent variable, e-learning readiness.

Table 4.6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.994 ^a	.989	.911	.149	.989	12.748	7	1	.212

a. Predictors: (Constant), Ease of Use of Tablets, Integration of Curriculum in the Tablets, Effective Use of Tablets by Teachers, Usefulness of Tablets, Motivation to Use Tablets, Sustainability of Tablet Use, Teacher Training on Use of Tablets

4.6.1 ANOVA Results

Table 4.7: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.992	7	.285	12.748	.212 ^b
Residual	.022	1	.022		
Total	2.014	8			

a. Dependent Variable: E-learning Readiness

b. Predictors: (Constant), Ease of Use of Tablets, Integration of Curriculum in the Tablets, Effective Use of Tablets by Teachers, Usefulness of Tablets, Motivation to Use Tablets, Sustainability of Tablet Use, Teacher Training on Use of Tablets

4.6.2 Regression Coefficients

Regression coefficients yielded for this study are shown in table 4.8 below. Column 1] unstandardized regression coefficients for the model equation.

Table 4.8: Coefficients Table

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.400	2.398		-.167	.871
Effective Use of Tablets by Teachers	-.545	.916	-.399	-.595	.556
Teacher Training on Use of Tablets	1.074	.958	.952	1.122	.264
Motivation to Use Tablets	.129	1.304	.109	.099	.925
Integration of Curriculum in the Tablets	-.913	.624	-.767	-1.463	.153
Sustainability of Tablet Use	.358	1.071	.276	.334	.737
Usefulness of Tablets	.526	.903	.296	.583	.560
Ease of Use of Tablets	.218	.377	.156	.578	.569

a. Dependent Variable: E-learning Readiness

$$ER_i = \beta_0 + \beta_1 EUT_i + \beta_2 TT_i + \beta_3 MUT_i + \beta_4 ICT_i + \beta_5 STU_i + \beta_6 UT_i + \beta_7 ET_i + \varepsilon_i$$

The coefficients show that effective use of tablets and e-learning readiness were statistically insignificant and would be affected by other factors not included in this study. Teacher training on use of tablets and e-learning readiness and significant yielding 1.074 and a t value of 1.122. Motivation to use tablets and e-learning readiness are statistically significant yielding 0.129 and a t value of 0.099. Integration of curriculum in the tablets and e-learning readiness are statistically insignificant and others factors nor included in this study may affect the variable. Sustainability of tablet use and e-learning readiness are significant yielding 0.358 and a t value of 0.334. Usefulness of tablets and e-learning readiness are significant yielding 0.526 and a t value of 0.583. Ease of use of tablets and e-learning readiness are statistically significant yielding 0.218 and a t value of 0.578. However, the significance levels of the variables are all >0.05 thus they can still be used to measure e-learning readiness with other factors being considered that have not been included in this study not forgetting the error term.

4.6.2 Regression Coefficients

Regression coefficients yielded for this study are shown in table 4.8 below. Column 'B' shows unstandardized regression coefficients for the model equation.

Table 4.8: Coefficients Table

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.400	2.398		-.167	.895
Effective Use of Tablets by Teachers	-.545	.916	-.399	-.595	.658
Teacher Training on Use of Tablets	1.074	.958	.952	1.122	.463
Motivation to Use Tablets	.129	1.304	.109	.099	.937
Integration of Curriculum in the Tablets	-.913	.624	-.767	-1.463	.382
Sustainability of Tablet Use	.358	1.071	.276	.334	.795

Usefulness of Tablets	.526	.903	.296	.583	.664
Ease of Use of Tablets	.218	.377	.156	.578	.666

a. Dependent Variable: E-learning Readiness

$$ER_i = \beta_0 + \beta_1 EUT_i + \beta_2 TT_i + \beta_3 MUT_i + \beta_4 ICT_i + \beta_5 STU_i + \beta_6 UT_i + \beta_7 ET_i + \varepsilon_i$$

The coefficients show that effective use of tablets and e-learning readiness were statistically insignificant and would be affected by other factors not included in this study. Teacher training on use of tablets and e-learning readiness and significant yielding 1.074 and a t value of 1.122. Motivation to use tablets and e-learning readiness are statistically significant yielding 0.129 and a t value of 0.099. Integration of curriculum in the tablets and e-learning readiness are statistically insignificant and others factors nor included in this study may affect the variable. Sustainability of tablet use and e-learning readiness are significant yielding 0.358 and a t value of 0.334. Usefulness of tablets and e-learning readiness are significant yielding 0.526 and a t value of 0.583. Ease of use of tablets and e-learning readiness are statistically significant yielding 0.218 and a t value of 0.578. However, the significance levels of the variables are all >0.05 thus they can still be used to measure e-learning readiness with other factors being considered that have not been included in this study not forgetting the error term.

4.7 Results of Hypothesis

The study tested the following hypothesis:

H1 – Establish whether the programme will achieve its benefits and whether it has achieved the purpose to which it is provided.

H2 – Evaluate the knowledge, skills and attitudes acquired during and after the program and verify whether teachers have been impacted by them.

H3 – Establish whether teachers are more motivated with the introduction of the programme and how they value the training they received.

H4 – Verify whether the programme fits well into teaching/ learning, in curriculum delivery, during assessment and if there are a variety of approaches to use during teaching.

H5 – Establish whether there is a lasting effect of ICT deployment on teachers and how well they will utilize and maintain the deployment for teaching and learning purposes.

H6 – Understand the extent to which a teacher believes involvement of ICT will enhance their performance in class and its impact to the pupils

H7– We seek to understand the extent to which a teacher appreciates the use of ICT to free them from so much mental effort.

Table 4.9: Hypothesis Test Summary

	Variables	Test	Sig.	Decision
H1	Effective use of tablets by teachers	One-Sample Chi-Square Test	0.981	Retain the hypothesis
H2	Teacher training on use of tablets	One-Sample Chi-Square Test	0.801	Retain the hypothesis
H3	Motivation to use tablets	One-Sample Chi-Square Test	0.963	Retain the hypothesis
H4	Integration of curriculum in the tablets	One-Sample Chi-Square Test	0.963	Retain the hypothesis
H5	Sustainability of tablet use	One-Sample Chi-Square Test	0.981	Retain the hypothesis
H6	Usefulness of tablets	One-Sample Chi-Square Test	0.368	Retain the hypothesis
H7	Ease of use of tablets	One-Sample Chi-Square Test	0.817	Retain the hypothesis

Asymptotic significances are displayed. The significance level is 0.05

All the variables were retained since they positively and significantly affect e-learning readiness. The results show that all the variables yielded a level of significance of >0.05 . This shows that all the independent variables tested have a significant impact on the dependent variable, e-learning readiness.

4.8 Fitted Model

The fitted model will remain as it was in the previous chapter as all the variables remain intact.

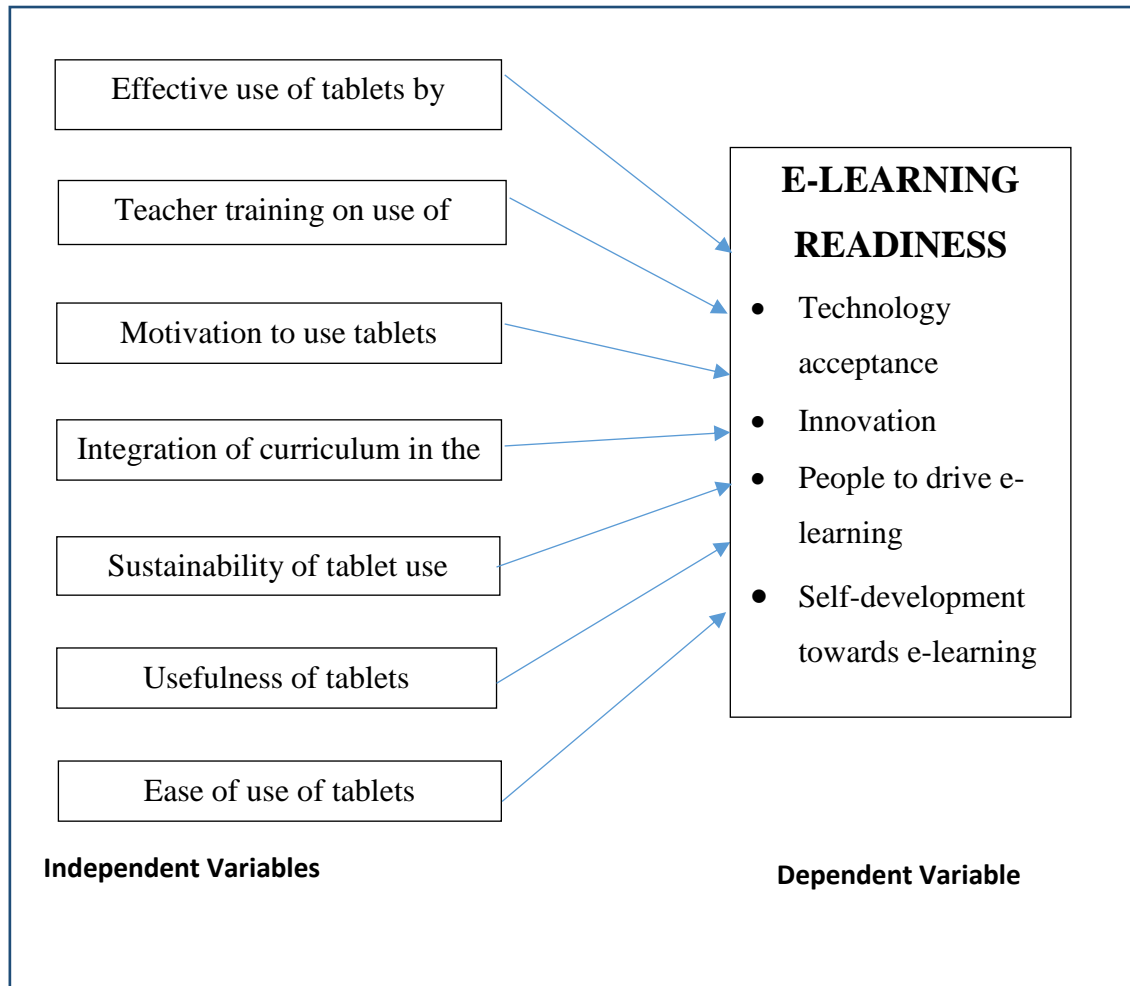


Figure 6: Fitted Model

4.9 Summary of Findings

This study aimed at investigating the effect of effective use of tablets by teachers, teacher training on use of tablets, motivation to use tablets, integration of curriculum in the tablets, sustainability of tablet use, usefulness of tablets and ease of use of tablets and how all these independent variables will affect the dependent variable, e-learning readiness. The independent variables were perceived by the researcher and supported by previous theoretical literature, to have higher effects to the dependent variable. Data collected was analyzed using SPSS version 20.

The study established that e-learning readiness was highly influenced by all the variables included. This means that, to achieve more e-learning readiness, and then we have to increase on all the independent variables at the same time. The computed R^2 yielded 0.989 (98.9%) which shows that there is a strong and positive correlation between the independent variables and dependent variable, e-learning readiness. The other 1.1% (100% - 98.9%) indicates that e-learning readiness is affected by other factors that are not included in this study which includes the error term.

Other tests used in this study were Kruskal Wallis test and One Sample Chi-Square. Kruskal Wallis showed that all the variables yielded chi-square results whose significance levels were >0.05 . This further explains that the variables are significant to e-learning readiness. One Sample Chi-Square was used to test the hypothesis of the study and showed that all the variables were significant thus they were all retained in the model.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter shows the findings, conclusions and recommendations for further study on the same based on the findings of this research report.

5.2 Conclusion

From the findings of this study, it is possible to tell the variable with the highest influence of e-learning readiness up to the least: effective use of tablets by teachers, sustainability of tablet use, motivation to use tablets, integration of curriculum in the tablets, ease of use of tablets, teacher training on use of tablets and usefulness of tablets. All the variables were strongly significant. In this case, the objectives of this study were achieved. This study was guided by the objectives listed below and their conclusions were as follows:

- i) Study the relationship between effectiveness of tablets and e-learning readiness—Effective use of tablets was found to have 0.981 level of significance. This shows that the variable had a strong significance to e-learning readiness.
- ii) Assess the effect of teacher training with regard to e-learning readiness and if they are motivated to use the new teaching methods – Teacher training had a significance of 0.801 while motivation to use tablets had a significance level of 0.963. The two variables were the ones used to come up with this objective are both significant and their relationship to e-learning readiness is equally strong.
- iii) Evaluate whether tablets will incorporate the full curriculum, provide assessments and a variety of teaching approaches—Integration of curriculum in the tablets was the variable that was used to test this objective. It yielded 0.963 significance thus showing that the variable is very significant to e-learning readiness.
- iv) Assess whether the use of tablets will have a permanent effect on teachers and the education sector at large and how well teachers utilize the new knowledge acquired – Sustainability of tablet use was the variable use to test this objective. It yielded 0.981 significance level showing that the objective is very significant to e-learning readiness.

Verify whether a teacher believes using ICT will boost their teaching performance in class and free them from cognitive effort – Usefulness of tablets and ease of use of tablets were the variables that were used to measure this objective. They yielded 0.368 and 0.817 levels of significance respectively both showing that the variables have strong significance to e-learning readiness though ease of use of tablets has a higher value than usefulness of tablets.

5.3 Recommendation

This study involved a small number of respondents. Future studies may incorporate a bigger number of respondents to establish whether the findings would be similar. Similar, a comparison between different sets of users in different schools may yield different results. All the variables were significant to e-learning readiness though some had more weight than others.

Subsequently, this study was used on teachers who are already using the tablets, future studies may try to compare with those that have not used the tablets for teaching.

5.4 Limitations of the Study

Due to constant evolution of technology, findings may vary from time to time. For example, a teacher may feel that the tablets should not replace traditional teaching methods due to resistance to change but later realize that it is indeed a good thing to incorporate the tablets into teaching. Therefore, researchers have to constantly collect data to verify if the previous findings still hold or whether there are changes. The concept of using tablets in public primary schools is still new therefore with time changes may be experienced. The sample size taken was also considered small compared to the number of primary school teachers we have in Kenya.

REFERENCES

- Adedokun-Shittu, N. A., & Shittu, A. J. K. (2013). ICT impact assessment model: An extension of the CIPP and the Kirkpatrick models. *International HETL Review*, 3(12), 1-26.
- Adedokun-Shittu, N. A., & Shittu, A. J. K. (2014). Evaluating the Impact of Technology Integration in Teaching and Learning. *Malaysian Online Journal of Educational Technology*, 2(1), 23-29.
- Adomi, E. E., & Kpangban, E. (2010). Application of ICTs in Nigerian secondary schools. *Library Philosophy and Practice (e-journal)*, 345.
- Akpan-Obong, P., Thomas, C. A., Samake, K. D., Niwe, M., & Mbarika, V. W. (2009). An African pioneer comes of age: Evolution of information and communication technologies in Uganda. *Journal of Information, Information Technology, and Organizations*, 4, 147-171.
- Alemneh, D. G., & Hastings, S. K. (2006). Developing the ICT infrastructure for Africa: Overview of barriers to harnessing the full power of the Internet. *Journal of Education for Library and Information Science*, 4-16.
- Andrews, R., Freeman, A., Hou, D., McGuinn, N., Robinson, A., & Zhu, J. (2007). The effectiveness of information and communication technology on the learning of written English for 5-to 16-year-olds. *British Journal of Educational Technology*, 38(2), 325-336.
- Beetham, H., & Sharpe, R. (2013). An introduction to rethinking pedagogy. *Rethinking pedagogy for a digital age: Designing for 21st century learning*, 41-61.
- Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science & Technology Education*, 5(3), 235-245.
- Blumenfeld, P. C., Kempner, T. M., & Krajcik, J. S. (2006). *Motivation and cognitive engagement in learning environments*: na.
- Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the

- literature. *International Journal of Education and Development using Information and Communication Technology*, 8(1), 136.
- Chapnick, S. (2000). Are you ready for e-learning. Retrieved on Dec, 19, 2004.
- Clarke, B., & Svanaes, S. (2014). An updated literature review on the use of tablets in education. *Tablets for Schools. UK: Family Kids & Youth*.
- Condie, R., & Munro, B. (2007). The impact of ICT in schools: Landscape review.
- Corn, J. O., Oliver, K., Hess, C. E., Halstead, E. O., Argueta, R., Patel, R. K., . . . Huff, J. D. (2010). A Computer for every student and teacher: Lessons learned about planning and implementing a successful 1: 1 learning initiative in schools. *Educational Technology*, 50(6), 11.
- Crowther, M. S., Keller, C. C., & Waddoups, G. L. (2004). Improving the quality and effectiveness of computer-mediated instruction through usability evaluations. *British Journal of Educational Technology*, 35(3), 289-303.
- Dladla, N., & Moon, B. (2002). *Challenging the assumptions about teacher education and training in Sub-Saharan Africa: a new role for open learning and ICT*. Paper presented at the Pan-Commonwealth Forum on Open Learning from <http://www.open.ac.uk/deep/why/PanCommonwealth.doc>.
- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of research on Technology in Education*, 42(3), 255-284.
- Farrell, G. (2007a). ICT in Education in Rwanda. *Survey of ICT and Education in Africa: Rwanda Country Report*.
- Farrell, G. (2007b). ICT in Education in Uganda. *Survey of ICT and education in Africa: A summary report, based on, 53*.
- Gillies, R. M., & Boyle, M. (2010). Teachers' reflections on cooperative learning: Issues of implementation. *Teaching and teacher Education*, 26(4), 933-940.
- Hare, H. (2007). ICT in Education in Tanzania. *Survey of ICT and education in Africa, 53*.
- Hennessy, S., Harrison, D., & Wamakote, L. (2010). Teacher factors influencing classroom use of ICT in Sub-Saharan Africa. *Itupale online journal of African studies*, 2(1), 39-54.

- Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development*, 55(3), 223-252.
- Ifinedo, P. (2005). Measuring Africa's e-readiness in the global networked economy: A nine-country data analysis. *International Journal of Education and Development using ICT*, 1(1).
- Kagwiria, K. J., & Amukowa, W. (2013). Teacher's Productivity in Promoting Quality Education in Public Primary Schools in Kenya. *Academic Journal of Interdisciplinary Studies*, 2(2), 365.
- Kariuki, G. (2009). Growth and improvement of information communication technology in Kenya. *International Journal of Education and Development using ICT*, 5(2).
- KASHORDA, M., & Waema, T. (2011). *ICT indicators in higher education: Towards an e-readiness assessment model*. Paper presented at the Proceeding and reporte of the 4th UnontuNet Alliance annual conference.
- Kim, J. H.-Y., & Jung, H.-Y. (2010). South Korean digital textbook project. *Computers in the Schools*, 27(3-4), 247-265.
- King, K. P., Melia, F. J., & Dunham, M. D. (2007). Guiding Our Way: Needs and Motivations of teachers inOnline Learning Modeling Responsive Course Design *Integrating Information & Communications Technologies Into the Classroom* (pp. 307-326): IGI Global.
- Kinuthia, W. (2009). Educational development in Kenya and the role of information and communication technology. *International Journal of Education and Development using ICT*, 5(2).
- Kiptalam, G. K., & Rodrigues, A. J. (2010). Internet utilization: A case of connected rural and urban secondary schools in Kenya. *International journal of computing and ICT research*, 4(1), 49-63.
- Kozma, R., McGhee, R., Quellmalz, E., & Zalles, D. (2004). Closing the digital divide: Evaluation of the World Links program. *International Journal of Educational Development*, 24(4), 361-381.

- Kozma, R. B. (2005). National policies that connect ICT-based education reform to economic and social development. *Human Technology: An interdisciplinary journal on humans in ICT environments*, 1(2), 117-156.
- Lao, T., & Gonzales, C. (2005). Understanding online learning through a qualitative description of professors and students' experiences. *Journal of Technology and Teacher Education*, 13(3), 459.
- Leach, J., & Moon, B. (2000). Pedagogy, information and communications technology and teachers' professional knowledge. *Curriculum journal*, 11(3), 385-404.
- Legris, P., Ingham, J., & Collette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & management*, 40(3), 191-204.
- Lehner, F., & Nosekabel, H. (2002). *The role of mobile devices in E-Learning first experiences with a wireless E-Learning environment*. Paper presented at the Wireless and Mobile Technologies in Education, 2002. Proceedings. IEEE International Workshop on.
- Littlejohn, A. (2004). The Effectiveness of Resources, Tools and Support Services used by Practitioners in Designing and Delivering e-Learning Activities: Final Report. JISC. *Joint Information Systems Committee*.
- Liverpool, L. (2002). Information and communication technology in teacher education. *Teacher Education in Nigeria: Past Present and Future-Proceedings of the First Teachers' Summit*.
- Mentz, E., & Mentz, K. (2003). Managing technology integration into schools: A South African perspective. *Journal of educational administration*, 41(2), 186-200.
- Minishi-Majanja, M. K. (2007). *Integration of ICTs in library and information science education in sub-Saharan Africa*. Paper presented at the World Library and Information Congress: 73rd IFLA General Conference and Council. Retrieved from <http://www.ifla.org/IV/ifla73/index.htm>.
- Mtebe, J. S., & Raisamo, R. (2014). Investigating perceived barriers to the use of Open Educational Resources in higher education in Tanzania. *The International Review of Research in Open and Distributed Learning*, 15(2).

- Mulwa, A., Kyalo, N., Bowa, O., & Mboroki, G. (2011). INFLUENCE OF ICT INFRASTRUCTURE ON READINESS TO ADOPT E-LEARNING IN SECONDARY SCHOOLS IN KITUI DISTRICT, KENYA. *Journal of Continuing, Open and Distance Education*, 23.
- Ndung'u, N., Thugge, K., & Otieno, O. (2011). Unlocking the Future Potential for Kenya: The Vision 2030: Citeseer.
- Ngololo, E. N., Howie, S. J., & Plomp, T. (2012). An evaluation of the implementation of the National ICT Policy for Education in Namibian rural science classrooms. *African Journal of Research in Mathematics, Science and Technology Education*, 16(1), 4-17.
- Owston, R. (2008). Models and methods for evaluation. *Handbook of research on educational communications and technology*, 605-617.
- Park, E., & del Pobil, A. P. (2013). Technology acceptance model for the use of tablet PCs. *Wireless personal communications*, 73(4), 1561-1572.
- Park, S. Y., Nam, M. W., & Cha, S. B. (2012). University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model. *British Journal of Educational Technology*, 43(4), 592-605.
- Park, Y. (2011). A pedagogical framework for mobile learning: Categorizing educational applications of mobile technologies into four types. *The International Review of Research in Open and Distributed Learning*, 12(2), 78-102.
- Piper, B., Jepkemei, E., Kwayumba, D., & Kibukho, K. (2015). *Kenya's ICT Policy in Practice: The Effectiveness of Tablets and E-readers in Improving Student Outcomes*. Paper presented at the FIRE: Forum for International Research in Education.
- Rajasingham, L. (2011). Will mobile learning bring a paradigm shift in higher education? *Education Research International*, 2011.
- Redempta, K., & Elizabeth, M. (2012). An e-learning approach to secondary school education: e-readiness implications in Kenya. *Journal of Education and Practice [Online]*, 3(16).

- Rubagiza, J., Were, E., & Sutherland, R. (2011). Introducing ICT into schools in Rwanda: Educational challenges and opportunities. *International Journal of Educational Development*, 31(1), 37-43.
- Shelly, G., Cashman, T. J., Gunter, G., & Gunter, R. (2007). *Teachers discovering computers: Integrating technology and digital media in the classroom*: Cengage Learning.
- So, T., & Swatman, P. M. (2006). *e-Learning readiness of Hong Kong teachers*. Paper presented at the Hong Kong IT in Education Conference.
- Tella, A., Tella, A., Toyobo, O. M., Adika, L. O., & Adewuyi, A. A. (2007). An assessment of secondary school teachers uses of ICT's: Implications for further development of ICT's use in Nigerian secondary schools. *TOJET: The Turkish Online Journal of Educational Technology*, 6(3).
- Tinio, V. (2003). ICT in Education: e-Primers for the information economy, society and policy. *New York, NY: United Nations Development Programme*.
- Tooley, J., Dixon, P., & Stanfield, J. (2008). Impact of free primary education in Kenya A case study of private schools in Kibera. *Educational Management Administration & Leadership*, 36(4), 449-469.
- Vernadakis, N., Avgerinos, A., Tsitskari, E., & Zachopoulou, E. (2005). The use of computer assisted instruction in preschool education: Making teaching meaningful. *Early Childhood Education Journal*, 33(2), 99-104.
- Waema, M. (2005). A brief history of the development of an ICT policy in Kenya. *At The Crossroads: ICT Policy Making In East Africa*, 25-43.
- Wamakote, L., Ang'ondi, E. K., & Onguko, B. (2010). East African governments investments in information and communication technologies for education: Matching policy to practice. *Itupale online journal of African studies*, 2, 25-38.
- Wankel, C., & Blessinger, P. (2012). *Increasing student engagement and retention using online learning activities: Wikis, blogs and webquests* (Vol. 6): Emerald Group Publishing.
- Wright, V. H., Stanford, R., & Beedle, J. (2007). Using a blended model to improve delivery of teacher education curriculum in global settings. *L. Tomei, Integrating Information and Communications Technologies into the classroom*, 51-61.

APPENDIX 1: SAMPLE QUESTIONNAIRE
KALAWA PRIMARY SCHOOL TEACHER QUESTIONNAIRE

Dear respondent,

We are conducting a research on the link between the teacher’s computer efficiency, attitudes and beliefs and their experience using tablets compared to traditional teaching methods.

The main aim of this study is to understand how the transition of the process has been. We will be able to know the benefits of the laptop project (Digital Literacy Programme) and challenges that have arisen and therefore be in a position to tackle the obstacles for the smooth running of the process. Data collected is meant for research only therefore all answers given remain very confidential. The questions require you to indicate your response(s) by marking a tick in the spaces provided alongside.

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Effective Use of Tablets by Teachers						
1	There are fears and concerns from both the pupils and their parents regarding the use of tablets					
2	The use of tablets has had a direct impact on teachers					
3	Program has achieved intended and unintended results through methods used for teaching					
4	Teachers have acquired other executive functioning skills e.g. being technology savvy					
5	The use of tablets enabled the teachers to showcase other skills and strengths e.g. being creative					
6	There are sufficient buildings for the conduct of computer-based exams					
7	Free internet connectivity has been installed in the school					
Teacher Training on Use of Tablets						
8	I had prior knowledge of tablets					
9	The knowledge acquired has been transferred to the classrooms					
10	Teachers have had an on-the-spot access to knowledge with regard to the use of tablets					

11	I have acquired new skills and strengths with the use of tablets					
12	Training acquired has improved my effectiveness and efficiency in teaching					
Motivation to Use Tablets						
13	The use of tablets has made teachers eager to teach since it is more fun					
14	Due to intervention of the tablets, I have improved my knowledge, increased my skills and had a positive attitude					
15	Using tablets made lesson preparation much easier					
16	I have a flexible day as compared to previous teaching methods					
17	The use of audio-visuals e.g. images, sound etc. has made learners more engaged in class					
18	I have embraced the use of tablets as compared to traditional teaching methods					
19	Access to the internet has helped me update myself professionally					
20	The use of tablets in academics has improved pupils' performance					
Integration of Curriculum in the Tablets						
21	Tablets capture the curriculum effectively					
22	ICT is integrated in the curriculum and provides ICT based assessments					
23	There is a blend of ICT-based teaching with the traditional teaching methods					

24	The pupils can read, pronounce, understand and solve mathematical problems much better with the use of tablets compared to earlier methods of teaching					
25	Tablets have enabled improvements in the curriculum which could not have been achieved cost-effectively in other ways					
Sustainability of Tablet Use						
26	The use of tablets will have a lasting effect on the teachers as they will strive to utilize and maintain the knowledge acquired					
27	Use of tablets should be permanent in the education sector					
28	There is provision of a well-designed supportive software in the tablets					
29	Tablets must be “cost-effective” in both time and money as perceived by teachers					
30	Tablets are sufficiently easy to use by teachers					
Perceived Usefulness of Tablets						
31	Children need traditional social interactions and communication with others through real play with functional objects					
32	From my point of view, the program is relevant with regard to its objectives, perceived values and user satisfaction					
33	Use of tablets has improved the quality of the teaching process					
34	Children take more time using tablets rather than playing					
35	I have managed to come up with new teaching approaches e.g. practical and demonstrations					

36	The use of tablets has increased over-reliance of ICT by the pupils					
Perceived Ease of Use						
37	I now have confidence using the tablets					
38	The teachers prefer using the tablets instead of the traditional face-to-face method					
39	I can use tablets at home because of availability of electricity					
40	We have adequate facilities and enough access to the tablets in terms of working hours					
41	Technical issues revolve around hardware, software and internet services					
42	The school is connected to an effective power supply thus teaching can go for longer than before					
E-learning Readiness						
43	Teachers are getting comfortable with technology and are no longer technophobic (they do not fear technology)					
44	Teachers' attitude towards use of tablets is positive					
45	Previous introduction of new teaching methods have been successful and ran smoothly					
46	There are technical staff who can facilitate e-learning in the school					
47	Training in the use of tablets made teachers more ready to use the new method of teaching					
48	Presence of e-learning vendors has made it easier to access e-learning software					
49	I am ready for more information in technology and individual development					
50	There is a budget to implement and enhance e-learning in the school					

Thank you for your time