

# **UNIVERSITY OF NAIROBI**



**SCHOOL OF COMPUTING AND INFORMATICS**

**MSc. INFORMATION TECHNOLOGY MANAGEMENT**

**INFLUENCE OF TABLET USE ON COGNITIVE AND CRITICAL  
THINKING SKILL ATTAINMENT OF LEARNERS IN KALAWA  
PRIMARY SCHOOL, KITUI COUNTY**

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Submitted in partial fulfillment of the requirements for the Degree of Master of Science in  
Information Technology Management of the University of Nairobi

## **DECLARATION**

This thesis is my original work and has not been presented for a degree in another University

Signature: ..... ..

Denis Yegon – P54/86149/2016

Date

This final project proposal has been submitted in partial fulfillment of the requirements of the Master of Science Degree in Information Technology Management of the University of Nairobi with my approval as the University Supervisor.

Signature: ..... ..

Prof. Robert O. Oboko

Date

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## **DEDICATION**

This work is in memory of my late grandmother Eunice Chepkirui Tabchelong' Maina who believed in the value of education and encouraged me to pursue a lifelong quest for learning and research.

## **ABSTRACT**

The use of e-learning is increasingly continuing to grow in the current education system due to the increase of technology influence on our day to day activities. A tablet PC-Based learning approaches are also gaining popularity, particularly during routine classes. Yet, there are few studies assessing the effect of tablet devices on learners' learning attainment. This study's primary objective was to know the influence of tablet use on cognitive and critical thinking skill attainment of learners in Kalawa primary school, Kitui county. The specific objectives were; to measure the effect of learner competence in tablet use on cognitive skill attainment; determine the effect of attitude towards tablet use on cognitive skill attainment; determine the extent to which access to tablet use influences cognitive skill attainment; determine the effect of the method of teaching with tablet on critical thinking skill attainment; and establish the effect of perceived benefits of tablet use on critical thinking skill attainment. The descriptive survey design was adopted during the study. Questionnaires was developed and used to collect the data. Collected data were analyzed by use of the descriptive test, test of correlation and tests of regression presented in tables. Results of correlation analysis indicated that learner competence in tablet use, attitude towards tablet use, access to tablet use, method of teaching with tablet and perceived benefits of tablet use had a strong and positive association with the overall learning attainment. Multiple regression analysis was used to test the hypothesis. The results of multiple regression confirmed that there was a strong relationship between; learner competence in tablet use for learning and cognitive skill attainment, attitude towards tablet use and cognitive skill attainment, access to tablet use and cognitive skill attainment, method of teaching with tablet and critical skill thinking attainment, and lastly perceived benefits of tablet use and critical thinking skill attainment. It can therefore be concluded that use of tablet for e-learning has a huge role in improving both learners' performance and the education quality. The study recommends that various stakeholders' should pay attention to instructors' suggestions and comments. This will provide ways of improving the programme.

**Keywords:** Tablet, E-learning, Cognitive skills, Critical Thinking Skills, Education, ICT.

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## **ABBREVIATIONS**

ICT – Information Communication Technology

UNESCO – United Nations Educational, Scientific and Cultural Organization

SPSS – Statistical Package for the Social Sciences

ANOVA – Analysis of Variance

ToTs – Trainer of Trainers

DLP – Digital Literacy Programme

PC – Personal Computer

# CHAPTER 1: INTRODUCTION

## 1.1 Background

For economic growth and development to take place in this world, quality education to humankind in aspects of acquiring skills and knowledge is needed (F.M. Mbithe, R. Maithya, S. K. Cheloti, 2016). With the intention of achieve genuine education that is necessitated in this 21<sup>st</sup> century, learners need to effectively engage themselves in the learning atmosphere and develop their 21<sup>st</sup> century skills including critical thinking skill, problem-solving, and cognitive skill. Along those lines, learners will be well equipped with needed knowledge and life skills that will support them be fruitful in their forthcoming professions (Lombardi, 2007).

Education sector of the developing countries is in the process of a major change to constantly improve the equity and quality of education in order to cope with the change education system. This is witnessed by the increasing growth in usage of e-learning in the current education system due to the increase of technology influence on our day to day activities. Increasingly activities in the classroom are now computer-based and capitalize on the comfort of digital technologies. In this 21<sup>st</sup> century, human kinds have become more closely connected and heavily dependent on digital machineries especially youths are becoming more inclined to the use of technology unlike the older generation since they perceive technologies as an important element in the building of their skills and knowledge (P. C. Ezenkwu, C. Aneke and K. L. Akpabio, 2015).

S. K.W Chu, (2017) stated that ICT skills will enable a learner to use digital technology or communication tool to access, analyze, evaluate and create bodies of information. Therefore, it has become vital for learners to use digital technologies to harness acquisition of knowledge and skills such as critical thinking in expanding their learning, interaction and knowledge creation prospects (Trilling and Fadel 2009). In the realization of this, both the Kenya Vision 2030 (Ndung'u et al, 2011), and Kenya's ICT policy express the necessity for ICT integration in the education sector as an enabler of 21<sup>st</sup> century skills to learners for the development and economic growth in the country.

Even though interest in e-learning is on a high level, its integration is limited by various challenges including inadequate support, skills, the attitude of the teachers and learners (N. k. Ochogo, 2014). Thus, a lot of support and adequate training has to be improved.

## **1.2 Statement of the problem**

There is need to improve the curriculum implementation in public schools at primary category. The use of the tablet is perceived as an important tool for this purpose starting with standard one learner in all primary level schools in Kenya. The government of Kenya has started the roll out the Digital Literacy Programme (DLP) countrywide with the aim of radically changing the current approach of coaching and learning in primary level schools by blending ICT in the country's schooling system. The components of the project included improvement of ICT set-up in the country, digital content development, teacher's capacity building and purchasing of ICT devices to aid learning. A total of 1.2 million digital devices have been distributed to majority of the public primary schools in the country. Despite all these, few studies have been done to assess the attainment or outcome of digital learning with introduction of tablet.

In addition to, a concern is really mounting to what magnitude has the digital devices already influenced to the primary school's pupils since the roll-out. The concern is growing that Kenyan primary school pupils, especially in public schools, who are vitally important to the success of the project, do not seem to have benefited of using ICT for learning since the roll-out of the programme. To guarantee quality delivery of the programme/digital devices, a study must be done to measure learning attainment or outcome on cognitive and the critical thinking skill of the primary school pupils in broadening their openings for knowledge creation and communication.

## **1.3 Objective of the study**

### **2.3.1 General objectives**

The overall research purpose is to assess the effect of e-learning on use of the tablet on learning attainment.

### **2.3.2 Specific objectives**

1. To assess the effect of learner competence in tablet use on cognitive skill attainment
2. To determine the effect of attitude towards tablet use on cognitive skill attainment.
3. To determine the extent to which access to tablet use influences cognitive skill attainment.

4. To determine the effect of the method of teaching with a tablet on critical thinking skill attainment
5. To establish the effect of perceived benefits of tablet use on critical thinking skill attainment.

#### **1.4 Research Hypothesis**

- i. **H1** – Learner competence in tablet use have a significant effect on cognitive skill attainment
- ii. **H2** - Attitude towards tablet use have a significant effect on cognitive skill attainment
- iii. **H3** - Access to tablet use have a significant effect on cognitive skill attainment
- iv. **H4** – Method of teaching with a tablet has a significant effect on critical thinking skill attainment
- v. **H5** - Perceived benefits of tablet use have a significant effect on critical thinking skill attainment

#### **1.5 Significance of the study**

With introduction of the tablet in the delivery of e-learning in primary schools, it will assist shift the e-learning programs of the country into one that is worldwide competitive (Pauline A. and Isaac A., 2015). This leads to better inventions, innovations and e-learning advances, thereby changing the face of learning in education systems. The utilization of e-learning systems entail development of critical thinking skills and knowledge-based (Gharib et al., 2016). However, to avoid mere information transfer and guarantee interactive methods, such systems should be carefully tracked.

This research is crucial because it helps to evaluate extent to which ICT by use of a tablet will improve learner's productivity academically. Also, the research study will help schools to identify the effective study methods and skills that could be used in the learning environment. This will allow learners to access high-quality education, access time-consultation facilities and fully automate learning procedures as well as improve their study mode in general. Furthermore, with this study, it may help the Ministry of Education in formulating institutional capacity building framework to empower ICT use in the education system. Therefore, Studies in this field often seek comprehend the technology role in an education system.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

This section starts by giving a brief overview of e-learning. It also discusses the implementation and effect of ICT in learning institutions. The study also, seek to incorporate a theoretical framework that will guide through our research.

### **2.2 E-learning**

Although there are many e-learning definitions, a common definition is a tool where knowledge is delivered by means of electronic media including computers, intranet, extranet, audio/video tape, among others (Oketch H, Njihia J, Wausi A. 2014). Some writers have made the following attempt to define e-learning; According to (Nancy Mogikoyo, M., P. Pokhariyal, G. and Josiah O, A. (2014) defines e-learning as an acquisition of education by means of the internet, network or standalone computer. E-learning has also been described as use of electronic devices and Internet technologies to provide a wide range of learning and performance-enhancing alternatives (Fabiola, et al). With many definitions on e-learning by diverse authors, we can conclude that the common thing in all definitions is that it is an electronic means of learning, training or education.

### **2.3 E-learning integration in the education system**

#### **Higher learning**

E-learning utilization is increasingly growing in the current education system due to the increase of technology influence on our day to day activities. The introduction of e-learning in higher learning should not totally replace the traditional way of means of delivery but it should actually be a compliment it. This view is supported (Kassahun, 2014) by blending online education with the traditional way of learning.

Universities in Zimbabwe have appreciated the integration of e-learning to its education system as part of their development in their country (Kituyi, G, Tusubiria I, (2013). From their study (Omwenga, at el, 2016) they observed that most universities in Kenya such as Kenyatta University, and Maseno University, have already adopted the use of e-learning. Students are now interested in e-learning since they have access to technologies like internet connectivity and mobile phones computers.

## **Primary school**

In realization of the Millennium Development Goals and the Vision 2030, the government of Kenya has rollout Digital Literacy Programme countrywide with support of various stakeholders like UNESCO. The programme aimed at changing schooling and acquisition of knowledge in primary schools. In support of this, an e-learning policy was adopted with the aim of creating e-enabled and knowledge-based society (Kituyi and Irine, 2013).

For the project to become a success, the Kenya government received KES 24.5 billion during the financial year 2013/2014 to support the project. During the financial year 2014/2015, Ksh.17.5 billion was injected into the project. By the end of the year 2014/2015 several achievements had been achieved including training of 150 teachers as lead trainers at the nationwide level, Training 2555 educators from all 47 Counties as coaches, training of 62,784 teachers nationally drawn from all public primary schools, developing digital content for standard 1 and 2 and A pilot conducted in 40 primary schools to ensure that the curriculum targets are met and that each primary school receives at least KES 60,000.00 to improve its infrastructure.

## **2.4 Impact of e-learning**

E-learning has materialized as a model of learning in schools due to the scientific and technological innovation, which the world at the moment is experiencing. E-learning is a flexible tool of learning that it allows learners to receive the same message from various sources in different forms in the long run (Khaled, 2013) and on the other hand, the promotion of cognitive skills and critical thinking skills is an educational objective because through these skills learners move from learning to think about what they learn and not what others have thought about. According to (O. Gunga and W. Ricketts, 2007) E-learning encourages a team-learning pedagogy that focuses primarily on fostering a learning atmosphere for group communication through cooperation and self-learning.

### **2.4.1 Educational impacts of e-learning**

It is anticipated that the most direct effect of e-learning will be on learners ' learning accomplishment in Africa and developing nations. This section reviews various research on e-learning impacts on education systems, learners and pedagogy.



#### **2.4.1.1 Impact of e-learning on learners, teachers and classroom**

ICT for instance, the use of the tablet has brought a very innovative learning environment for learners. It thus requires a distinct set of skills to be effective. Skills such as critical thinking are growing in importance as learners have increased the capacity of knowledge from a range of sources (New Media Consortium, 2007). Tablet use in education as an aid to teaching and learning in school has an impact on students' academic performance.

Many studies show that adopting e-learning at all levels of learning institutions can significantly boost teaching and learning processes in terms quality (Oketch, Njihia & Wausi, 2014). Similarly, (Tunmibi and Aregbesola, 2015) explain that the use of the tablet in a classroom has enhanced quality and accessibility of education in schools so that learners can access unlimited sources of information anytime and from anywhere. Finlayson, Helen et al., (2006) discusses that e-learning can inspire the technique pupils are educated and how they learn hence the processes are learner-driven but not teachers-driven. Sequentially, this would set up learners for enduring learning besides it will enhance the education quality.

E-learning has positively influenced learner's mind to learning, (Md Osman, Jamaludin and Fathil, 2016) with the utilization of a video that comprises of a screen flooding with multi-hued words and glimmering and moving pictures. Furthermore, this generates the highest cognitive effort and continued attention by the learners. These discoveries are like the investigation done by (Mohammadia, Ghorbanib and Hamidi, 2011) shows that the gain of using e-learning devices like the tablet is that they comprise of sounds, images, games and actions draw in the consideration of schoolchildren easily and affect the extent of their attention levels. Pupils playing some games vocally help them bolstering their expression and pronunciation ability therefore lowering the level of error and anxiety during their learning. Using the internet through a tablet, pupils also can strengthen their communicative competencies, and bolster the needed skills such as listening, talking, perusing and composing hence learners get more confident.

With the improved education quality by ICT utilization, it has expanded student inspiration and engagement by promoting fundamental abilities. According to (Adu, E.O. and Olatundun, S.A. 2013), ICT changes not only on what pupils should learn but it also plays a major role in how the pupils should learn. Another author, (Safiyeh, 2015) identified that using technology can motivate learners, and with motivation, learners can engage together hence they will achieve learning

objectives. This is because tablet aid learners succeed in getting to the content, interacting with the content and learning significantly from the e-learning experience.

According to (Finlayson, Helen et al., 2006), e-learning changes the mindset of learners with regard to technology, education and subject matter. Yanga and Yenb, (2016) pointed out that e-learning platform offers a vibrant and rich learning experience for learners whereby learners can strengthen their autonomous learning capability. In addition, e-learning has increased teacher-student interaction and forms a close relationship between the two in the e-learning environment. Tablet is a possibly amazing asset for offering informative chances to learners.

The integration of information and communication technologies has helped to re-energize teachers by enhancing teaching process. The utilization of the tablet is changing methods of educating and learning in schools by including components of spirit to learning environment. Similarly, (Finlayson, Helen et al., 2006) explained that teachers gain trust, confidence and recharged inspiration with the integration of e-learning. Over a number of years, information have been composed around course books. Teachers have taught students in a study hall through talks and learning exercises intended to merge and practice the substance. Research by (Mohammadia, Ghorbanib and Hamidi, 2011) report that e-learning furnishes instructors with reasonable and inventive thoughts and cause them to make their very own differed strategies. Currently, the pedagogy of teacher-centered classroom environment has changed to a more learner-centered environment, thus aiding more effective use of e-learning technologies in the institutions of learning. As shown by (Ahmad et al., 2014) e-learning enhances knowledge and teaching skills of the teachers. E-learning helps both teachers and learners to improve their skills, how to use technology in teaching and learning not limited to pedagogical skills. (Adu, E.O. and Olatundun, S.A., 2013), concluded that it is difficult and perhaps even so unfeasible to picture forthcoming learning conditions that are not upheld, somehow, by Information and Communication Advances. Therefore, e-learning plays an important to teachers on the teaching process.

Though tablet is seen as of great benefits, there are some of their weaknesses. A few schoolchildren have little knowledge and technical limitations about using a computer, so it is difficult to use the platforms (Mohammadia, Ghorbanib and Hamidi, 2011). Furthermore, since e-learning users need to be able to work with technologies such as touchpads, internet and software, they need to be acquainted with these matters because absence of technical expertise can be challenging to users.

### **2.4.2 Economic benefits of e-learning**

Brooking (2012) posits that foundations of modern economic growth as a result of technology and knowledge spillovers is essential to make sure personnel possess the required skills to satisfy the need of these 21<sup>st</sup> century jobs. E-learning initiatives provides a platform easy learning in the education sector that saves time and resources for all parties involved in a learning environment (Abu Alsonos, 2006). As said by (Yusuf and Al-Banawi, 2013), e-learning offers a lesser amount cost compared to the additional way of face-to-face teaching. (Babu and Sree Reddy, 2015). With effective e-learning use, it has led to increased productivity in the economic sector through which knowledge can be shared across the world. E-learning has attracted enrollment of pupils in schools (Bourlova, Tatiana, and Mark Bullen, 2005).

An improvement in the quality of education in both developed and developing countries has positively affected economic growth, which includes an increment in Gross domestic product and an expansion in pay for laborers.

### **2.4.3 Social impacts**

This section reviews various research on the influence of e-learning on and the rural-urban divide, gender, culture and, language.

According to (Abu Alsonos, 2006, interactions among students themselves is deep-rooted in a new model because of e-learning, where there is are effective interaction and collaboration between teachers and learners. A traditional face-to-face form of interaction has shifted towards the formation of communities of learners and also cooperative learning with the emergence of e-learning (Alsonos, 2006). Mohammadia, Ghorbanib and Hamidi (2011), reasoned that since e-learning is mainly the interaction with virtual environments, there has been a decrease in social relations among learners. This is because pupils interact largely with the devices, hence they find limited time to interact among themselves.

Almaqtri (2014) concluded that both genders of teachers and pupils do welcome e-learning in education sector. E-learning could perhaps play a significant role in narrowing the gap in access to quality education by girls and other underserved communities in developing countries. According to a publication of school the Continuing and Distance Education, (2012) though female understudies, particularly more youthful ones seemed to have a fairly uplifting disposition

towards ICT when all is said in done and the utilization of ICT as a device for learning specifically it is evidence that there are gender differences in ICT skills leading to inequality of education.

## **2.5 Empirical Review**

### **2.5.1 Learner Competence in Tablet Use and Cognitive Skill Attainment**

Learning systems in the 21<sup>st</sup> century is being affected by emergence of new hardware/software and innovative developments arising in technology day-to-day. ICT utilization, particularly tablet is becoming universal in the learning processes. Therefore, utilizing tablet successfully, running them and. To guarantee viable utilization of the ICT equipment/Programming introduced in the study halls, the educators and understudies need to experience in-service preparing on the utilization of a tablet. With tablet literacy, Pupils proficiently see new information and review recently learned data.

Holland (2004) stresses that pupils need to be upturned as individuals who can embrace technological innovations, ready to characterize and take care of issues, while additionally having the capacity to influence their lives, and settle on fitting decisions. Understudies who can settle on having high levels of tablet literacy play a key role in the education scheme reasonable choices about technology can be depicted as technologically proficient. Technology literacy can be defined as having the necessary skills for using, applying and changing the technology to enhance the learning process. Thus, pupils who possess the competencies of the 21<sup>st</sup> century are relied upon to have the option to utilize the tablet PC effectively and adequately. This is just attainable if students are tablet educated.

### **2.5.2 Attitude Towards Tablet Use and Cognitive Skill Attainment**

Attitude refers to positive or negative affective responses towards performing a certain behavior, but it also contains the beliefs held towards behavioral outcomes and the extent to which these are valued. Tablet uses a behavioral theoretical framework that includes cognitive role-modeling. Pupils begin by interacting with the tablet. A touch screen on the tablet is ideal for pupils for the reason that it keeps them engaged with the handy assignment. Whether it is solving a mathematical problem, drawing and accessing information.

Fleischer (2012) reviewed studies of various empirical research on tablet use in learning process. From the majority of his studies, he found that pupils were positive about tablet use and felt more

encouraged and involved in their learning process, and it was further believed that it improved the attention and processing speed of pupils. Furthermore, pupils feel confident about using the tablet for learning. Most pupils feel confident and competent using the internet and general tablet applications, use ICT for browsing the Internet in order to find learning resources. With a positive attitude towards tablet use, pupils will learn more and at a faster rate than when they use normal textbooks

### **2.5.3 Access to Tablet Use and Cognitive Skill Attainment**

The tablet has progressively been implemented in educational framework over the last ten years. With regard to access to the tablet, computing programs have already been implemented globally in several other developed nations such that learners and instructors have their own tablet devices for learning and teaching respectively.

Having access to and also being able to effectively use the equipment helps in the development of the required 21<sup>st</sup> century skills. In terms of cognitive contribution, there are studies on the impact of tablet whereby Pupils undertake a fresh mental challenge related to enhanced processing speed, attention, and storage of information.

Therefore, the tablet has great potential for aiding further development of cognitive skills, communication and other high-level skill among pupils.

### **2.5.4 Method of Teaching with Tablet and Critical Thinking Skill Attainment**

Learners need to be exposed to diverse that promote critical thinking skill in order to nurture the critical thinking skill development. In this 21<sup>st</sup> century, integration of digital technologies such as use of internet, mobile phones, and tablet in teaching, use of e-learning is increasingly being emphasized.

Tablet use to teach and learn is a useful technological resource for the classroom of the 21<sup>st</sup> century. Tablet has engaged learners in critical activities. With the use of audio-visuals e.g. images, sound, etc. has made learning more interactive. Learners understand how various topics relate to one another, they can take insightful notes, engage and collaborate with other learners, solve complex concepts down into simpler form and present their thoughts and ideas to others effectively and efficiently. Tool such google docs are excellent for learners when it comes as they share information and deliberate among themselves.

### **2.5.5 Perceived Benefits of Table Use and Critical Thinking Skill Attainment**

The introduction of a tablet technology of majority learners is a relatively new phenomenon. It is valued and perceived as an innovative feature trying to change to a learner-centered style as opposed to teacher-centered learning environment. Irrespective of the style of educational situation in which the academic platform is located, there is strong perceived trust in the capacity to model critical thinking abilities and the capacity to evaluate critical thinking abilities of learners.

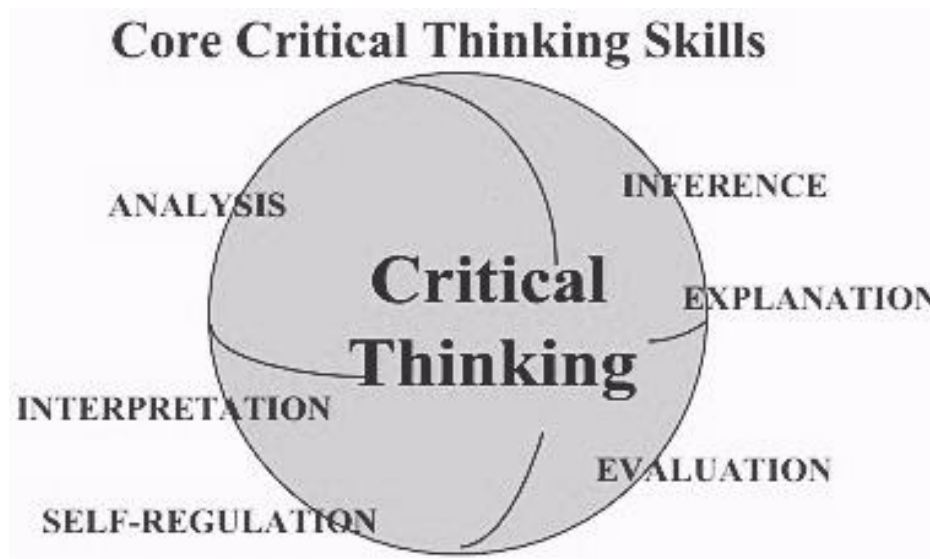
Learners anticipate that use of tablet can enhance the classroom-learning environment by increasing a teacher's effectiveness for sharing or exchanging information with them by maintaining a clear and continuous presentation of learning material. According to (Yengin and Lazarevic, 2018) learners have a favorable attitude towards tablet device dialog games and perceive the advantages of learning dialog games. The tablet device is suitable for school and facilitates learning for enabling social interaction.

Therefore, the tablet has been observed as “a game-changer” because learners will pay attention in class and potentially increase their knowledge of the material presented to them in class. Also, learners are more confident and find learning becomes more interactive.

### **2.6 Theoretical Review of Literature**

There has not been a specific model to ascertain the feasibility of ICT integration in learning institutions, which are still at the onset of integration of ICT (Kashorda & Waema, 2011). We seek to incorporate a framework that will guide through the effectiveness of e-learning on cognitive skills and critical thinking skills of primary school learners in the education sector in Kenya. In this case, we will look at the Dr. Peter A. Facione's Actionable Critical Thinking Skills Model, Model of Processing New & Known Information and The 3P model of student learning and borrow some of their variables to form our conceptual framework.

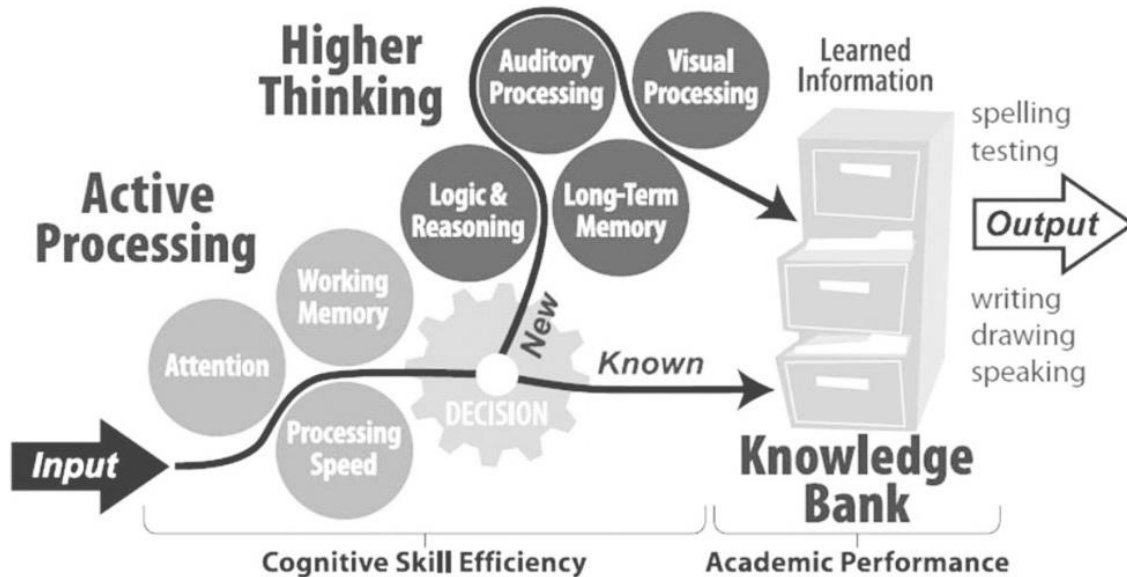
### 2.6.1 Dr. Peter A. Facione's Model



**Figure 1: Dr. Peter A. Facione's Actionable Critical Thinking Skills Model (2011)**

Dr. Peter A. Facione's developed a framework to measure the six fundamental critical thinking skills in determining a program's effectiveness that includes: Inference, Explanation, Evaluation, Self-Regulation, Interpretation, and Analysis. An **Inference** is being able to comprehend and perceive what components you will require so as to decide a precise end or theory from the data available to you. An **Explanation** is being able to repeat information as well as add clearness and viewpoint to the information, so it tends to be completely comprehended by anybody you are offering it to. An **Evaluation** is having the option to assess the credibility of an announcement or depiction of an individual's encounter, judgment or feeling so as to quantify the legitimacy of the data being exhibited. **Self-regulation** is being aware of your own thinking skills and the components you use to discover outcomes. In other words, being aware of your strengths, weaknesses and any potential biases that you may carry as you approach a problem. **Interpretation** is having the capacity to comprehend the data you receive and to transmit the significance of the data to others and **Analysis** is being able to interface snippets of information together so as to figure out what the proposed importance of the information was intended to speak to

## 2.6.2 The Model of Processing New & Known Information

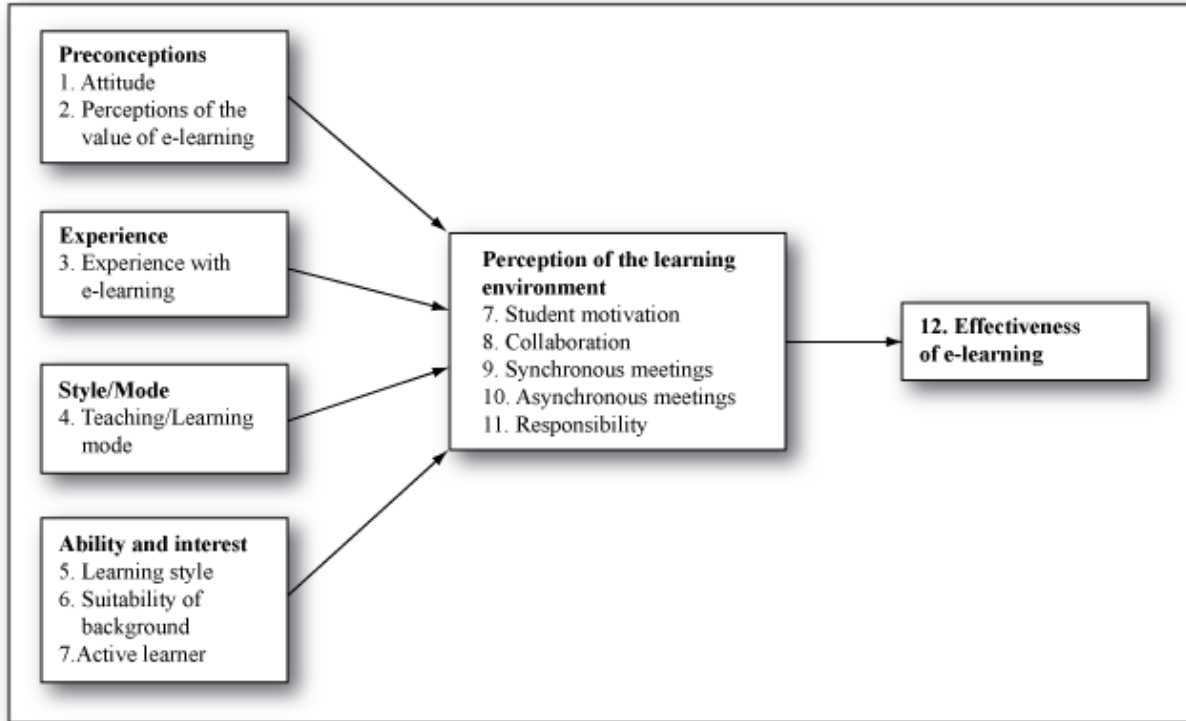


**Figure 2: Model of Processing New & Known Information**

The model developed by Dr. Ken Gibson's focuses on training the underlying cognitive skills efficiency that influences ease of learning, hence improving the academic performance of a learner. This framework consists of procedures that improve the brain abilities. This includes attention, working memory, processing speed, reasoning, and lastly processing (auditory and visual). Attention is the ability of a pupil to maintain focus will perform mental operation for a period of time. Learners are more attentive to the use of technology in education process, hence they develop more effective task given achieving their goal of learning (Haverila, 2009). Processing speed is the ability of a pupil to do cognitive tasks either simple or difficult. Working memory is the ability of a pupil to hold information, logic, and reasoning is the ability of a pupil to think and solve a problem. Auditory processing is the ability of a pupil to analyze, manipulate, store and recall sounds. The visual processing ability of a pupil to analyze, synthesize, store and recall visual images.



### 2.6.3 The 3P model of student learning



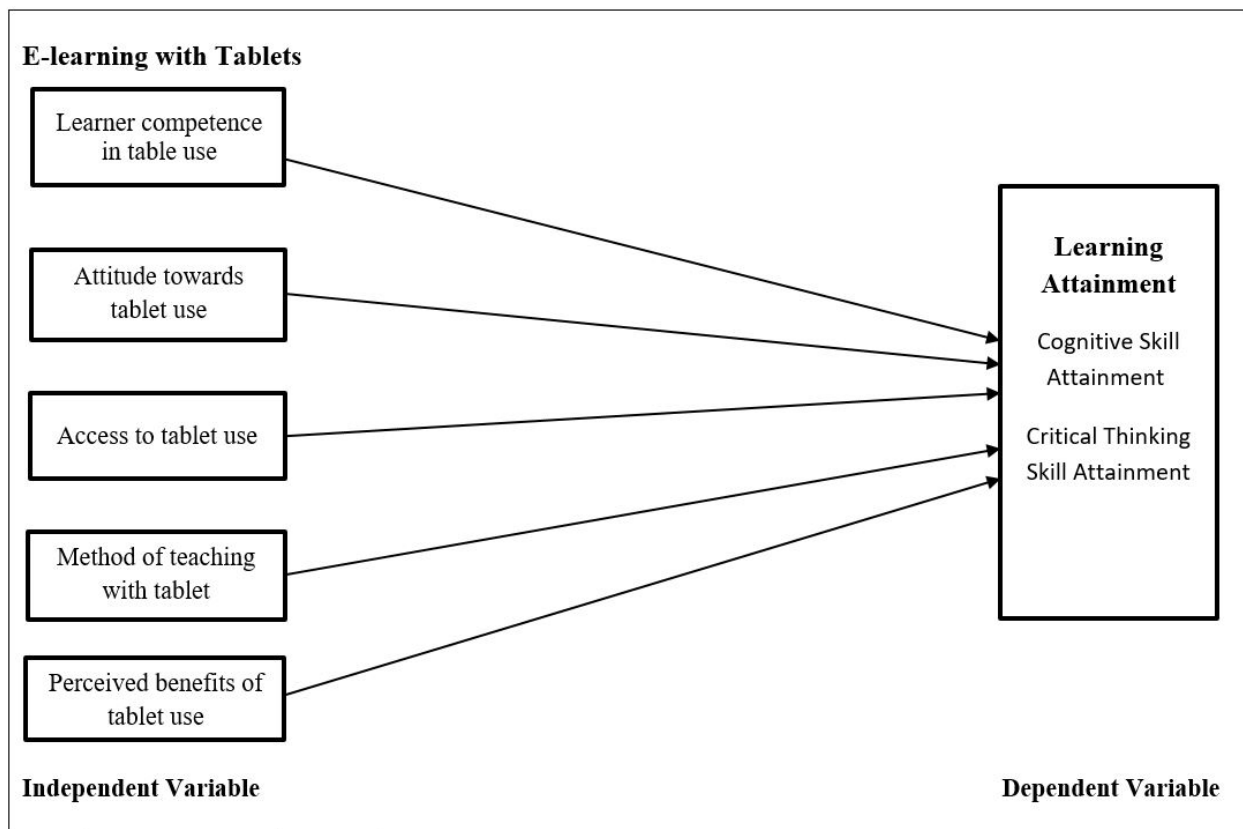
**Figure 3. The 3P model of student learning (Cybinski and Selvanathan, 2005)**

This model is a modified version of the 3P model (Biggs & Moore, 1993) established to illustrate the students' learning outcomes. This model was initially developed for evaluating learning and development programmes, but it has proved useful in evaluating the impact of technology integration and implementation in learning institutions. It has three stages in determining the effectiveness of e-learning; Presage refers to learners, bringing into the learning system some tendencies that are learning-related, such as prior knowledge, competence, access, values and expectations, ways of learning (Goh and Ku, 2011). (Fazeli et al., 2012) found out that competence in the use of computer use and positive attitude provide mental stimulation and thus improve cognitive skills. The product is the outcome/effectiveness of learning. The presage variables include the attitude of a learner towards learning, perception towards learning, learning styles/methods, technology level skills and technology access. According to (Nancy Mogikoyo, P. Pokhariyal and Josiah O, 2014), learners who have a positive attitude towards e-learning understand better during the learning process. The interrelationship between variables and the performance of learners is examined and contrasted from two teaching settings ; one is a teaching

environment supported by technology, and another is the perception of the traditional setting. Kituyi and Irene Tusbira, (2013) examined that various learning methods yield different outcomes. The use of technology performs better than others.

#### 2.6.4 Conceptual Framework

Having analyzed the above frameworks, the researcher decided to blend the framework by picking on the skills that come up from the other frameworks. ICT 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 learners and whether they have been developing their cognitive skill and critical skill. Below is the blended framework.



**Figure 4: A Conceptual Framework**

The above conceptual framework was used in this study; the independent variables are learner competence in tablet use, attitude towards tablet use, access to tablet use, method of teaching with tablet and perceived benefits of tablet that may influence the learning attainment of learners in primary schools in terms of cognitive skill and critical thinking skill attainment. The indicators

used for cognitive skill are; thinking, memory and attention while for critical thinking skill are; effective communicator, curious and inquisitive, careful and prudent, reflective and self-corrective and lastly proactive.

#### **2.6.4.1 Learner Competence in Tablet Use**

This is the skill acquired or thought to make it easy for the learner use of computer technology such as a tablet, a phone, a laptop among others, to deliver the improvement of cognitive skill of the learners during their learning process. This may include the use of software and hardware.

#### **2.6.4.2 Attitude towards tablet use**

This variable establishes whether learners have either positive or negative attitude towards the use of the tablet for e-learning. ICT is new to learners thus, it is worthwhile to come up with ways to make them appreciate the innovation and be ready to work for the good of the programme. To analyze, integrate, and synthesize data, children must illustrate the cognitive capabilities and memory needed to evaluate, solve, and reason.

#### **2.6.4.3 Access to tablet use**

This is the ratio of learners to tablet as well as the access to the internet at school to support learning process, time period on able use for the learning. It is practically important to find out how the tablet has influenced the cognitive skills of the learners with the opportunity of access to this technology.

#### **2.6.4.4 Method of Teaching with tablet**

This variable seeks to find out to what degree will techniques used on tablet for e-learning enhance their learning attainment in class and its effect on the learners. Use of the tablet provides exceptional access to educational materials. These are materials that take a wide variety of forms, including videos, audios, graphics image or photos, slideshow, and tutorials. This will provide an understanding of how digital learning content affects critical thinking skill of the pupil.

#### **2.6.4.5 Perceived benefits of tablet use**

We seek to establish how learners' perceive tablet use in learning influences their critical thinking skills. This may be influenced by specific variables which include variables such as previous experiences on tablet and individual learning styles.

The dependent variable in this study is the learning attainment which includes development in both the cognitive skill and critical thinking skill of learners. We seek to find out how learning attainment/outcome of the learners varies in light of independent variables with the integration of tablet.

#### **2.6.4.6 Learning Attainment**

Cognitive skill deals with the overall insight into the learner learning style such as thinking, memory, and attention. Critical thinking skill includes the ability for the learner to remember, understand analyze, apply evaluate and create content material. For one to have a critical thinking skill he/she must possess the cognitive skill. Therefore, it can be concluded that two skills work hand in hand.

## **CHAPTER 3: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter has explained the research methodology that will be used in this research.

### **3.2 Research Philosophy**

There are three research philosophies namely; positivism, interpretivism, pragmatism, and realism. As said by (J Oates, 2006), positivism research underlies what is called “the scientific method” that enables us to build knowledge through an iterative cycle. The study is independent of the human actors. Interpretive studies attempt to define, investigate and clarify how all variables are interrelated and interdependent in a specific social environment. The study is dependent of the human actors. Critical research focuses on the importance of the interest of various groups and use of powers. This research adopted positivism research which typically applies the scientific method to the study of human action.

### **3.3 Research Design**

A research design is blueprint for assortment, measurement & analysis of the needed data of research study (Kothari 2004). As such the design includes the research approach, population; sampling size and technique, project schedule, instruments for data collection, and data analysis methods. According to Gray (2009), As the overall plan, the research design reflects both the research problem structure and the study plan used to acquire empirical evidence.

The research design for this study is descriptive survey design, typically a precursor to explanations. This study seeks to understand the influence of the use of the tablet for e-learning in primary schools. For this research study, Kalawa primary school is used to address our research question in relation to the learning attainment on use of the tablet for e-learning to the learners.

#### **3.3.1 Research Approach**

The research study seeks to assess the learning achievements on use of tablet by learners in Kenyan primary schools who are the main beneficiary of the digital literacy programme. For this research study, we will use the inductive approach where we seek to move from specific observations of Kalawa Primary School, Kitui County to the broader observations.

### **3.3.2 Target Population**

The specific target for this study is 42 learners in Kalawa primary schools. The study area for this research will be Kitui County.

### **3.3.3 Sampling Design**

This research study targets the class six pupils of Kalawa primary school in Kitui County, Kenya.

### **3.3.4 Data Collection Techniques**

A questionnaire would be used by the researcher for this study. Data collection on objective two and three will require identification of factors that help in promoting cognitive skill and critical thinking skill attainment and overall learning attainment among learners.

### **3.3.5 Data Analysis**

The process of data analysis will involve coding, entering data into a computer and analyzing data thereafter to draw conclusions and recommendations. The respondents will involve rating specific aspects of the dependent variable and each independent variable on a Likert scale. Quantitative data obtained from closed-ended questions on the questionnaire will be analyzed by Statistical Package for Social Sciences (SPSS) to determine influence of tablet use on cognitive and critical thinking skill attainment of learners in Kalawa Primary School.

### **3.3.6 Ethical Considerations**

Research ethics is concerned with the responsibility of researchers, to be honest and respectful to the subjects of their studies and those affected by the results of their studies. It focuses on the issues, dilemmas and disputes about how to conduct research properly (Gray, 2009). Some of the ethical considerations considered include; guaranteeing confidentiality, voluntary participation, informed consent, integrity and no mischief to the participants.

### **3.3.7 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 each independent variable's contribution to the dependent variable. This research introduced a linear regression analysis and the following equation of multiple regression:

$$LA_i = \beta_0 + \beta_1 LCT_i + \beta_2 ATT_i + \beta_3 ATU_i + \beta_4 MTT_i + \beta_5 PBT_i + \varepsilon_i$$

Where:

LA : denotes the Learning Attainment

LCT : denotes Learner Competence in Tablet Use

ATT : denotes Attitude Towards Tablet Use

ATU : denotes Access to Tablet Use

MTT : denotes Method of Teaching with Tablet

PUT : denotes Perceived Benefits of Tablet Use

$B_0$  : is a constant, the value of LA when all values are 0

$B_1$  : denotes the regression coefficient of learner competence in tablet use

$B_2$  : denotes the regression coefficient of attitude towards tablet use

$B_3$  : denotes the regression coefficient of access to tablet use

$\beta_4$  : denotes the regression coefficient of the method of teaching with tablet

$\beta_5$  : denotes the regression coefficient of perceived benefits of tablet use

$\varepsilon_i$  : Error time assumed to be a white noise.

For this study, the independent variables were; learner competence in tablet use, attitude towards tablet use, access to tablet use, the method of teaching with tablet and perceived benefits of tablet use. The dependent variable was Learning Attainment.

### 3.3.8 Operationalization of the Research Variables

Operationalization is the method of defining both dependent and independent variables into measurable factors.

**Table 3.1: Operationalization of the Research Variables**

<b>Construct</b>	<b>Explanation</b>	<b>Operational Definitions</b>
Learner competence in tablet use	This variable assesses the effect of learner competence in tablet use on cognitive skill attainment. This is the skill acquired or thought to make it easy for the learner use of computer technology to deliver the development of cognitive skill. This may include the use of software and hardware of e-learning.	Users are categorized as being either a 'Beginner' or 'Experienced User' of computer technology. In order to be able to detect figures accurately and execute appropriate calculations, they must be able to comprehend and use complicated technical instruments.
Attitude towards tablet use	This variable determines the effect of attitude towards tablet use on cognitive skill attainment. This is a positive or a negative attitude towards the tablet use for e-learning.	ICT is new to learners thus, it is worthwhile to come up with ways to make them appreciate the innovation and be ready to work for the good of the programme. To analyze, integrate, and synthesize data, learners need to show the cognitive abilities and memory needed to evaluate, solve, and reason.



Access to tablet use	This variable determines the extent to which use of tablet influences cognitive skill attainment. This is whether learners have sufficient access to use of the tablet for e-learning process.	Tablet provides learners' exceptional access to educational materials, while also making it fun to engage help learners to keep learning and developing cognitive skill. Challenges such as insufficient facilities, limited access to tablet facilities in terms of learning hours, lack of technical staff and inefficient power supply derail the intervention of tablet in e-learning.
Method of teaching with tablet	This variable seeks to determine effect of the teaching method with tablet on critical thinking skill attainment.	With appropriate use of the tablet, i.e. use of audio-visuals, discussion forum, through self-reflection, learners should be able to show capacity to correctly gauge their performance in ability to further direct their learning
Perceived benefits of tablet use	This variable establish the effect of perceived benefits of tablet use on critical thinking skill attainment	Prior tablet adoption people conceptualized perceived benefit by perceived usefulness. Perceived efficiency is a grade indicator to which the use of the tablet will enhance learners' cognitive skill development.

### 3.3.9 Project Schedule

This research will spread across two academic semesters, which should be approximately six months.

**Table 3.2: Project Schedule**

No.	Task	Resource	Duration (days)	Start	Finish	Status
<b>1.0</b>	<b>Consultations and picking of project titles</b>					
1.1	Settle on a project title	Researcher	5	26/6/2017	30/6/2017	Done
1.2	Identify project supervisor	Researcher	1	3/7/2017	3/7/2017	Done
1.3	Register project title	Researcher/ Coordinator	1	10/7/2017	10/7/2017	Done
1.4	Liaise with supervisor on the viability of the project and way forward	Researcher/ Supervisor	10	11/8/2017	22/8/2017	Done
<b>2.0</b>	<b>Preparing the proposal</b>					
2.1	Chapter 1	Researcher/ Lecturer	15	8/2/2017	24/2/2017	Done previously
2.2	Chapter 2	Researcher	20	6/3/2017	31/3/2017	Done previously
2.3	Chapter 3	Researcher & Lecturer	12	10/4/2017	25/4/2017	Done previously
<b>3.0</b>	<b>Milestone 1 Presentation</b>	Researcher/ Panel	1	13/10/2017	13/10/2017	Done
<b>4.0</b>	<b>Working towards milestone two</b>					
4.1	Data collection	Researcher	1	15/1/2018	13/1/2018	Done
4.2	Data analysis	Researcher	50	22/1/2018	16/3/2018	Done
<b>5.0</b>	<b>Milestone two presentations</b>	Researcher/ Panel	1	6/6/2018	6/6/2018	Not done
<b>6.0</b>	<b>Working towards milestone three</b>					
6.1	Findings, conclusions, and recommendations	Researcher	15	2/4/2018	20/4/2018	Done
<b>7.0</b>	<b>Milestone three presentations</b>	Researcher/ Panel	1	6/6/2018	6/6/2018	Not done

## CHAPTER 4: DATA ANALYSIS, RESULTS AND DISCUSSION

### 4.1 Introduction

This section presents data analysis and interpretation of the findings with reference to research title and objectives. The findings are represented in summary tables and graphs of evaluation. Descriptive test, correlation, Kruskal Wallis test of correlation and tests of regression have been employed to answer below research objectives.

1. To assess the effect of learner competence in tablet use on cognitive skill attainment
2. To determine the effect of attitude towards tablet use on cognitive skill attainment.
3. To determine the extent to which access to tablet use influences cognitive skill attainment.
4. To determine the effect of the method of teaching with tablet on critical thinking skill attainment
5. To establish the effect of perceived benefits of tablet use on critical thinking skill attainment.

The data used in this research were acquired mainly from Kalawa Primary School.

### 4.2 Reliability Analysis

Reliability analysis for the instrument study was measured using Cronbach's Alpha. This test measures the internal consistency reliability of research tool used in a study. The highest possible Reliability coefficient is 1.0. For the study to be effective, alpha values have to be  $>0.6$ . The measured reliability of this study was 0.958 which is equivalent to 95.8%. Therefore, this scale is reliable for the study.

**Table 4. 1 Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.958	.970	60

### 4.3 Response Rate

The researcher administered 42 questionnaires to the respondents. A total of 42 questionnaires (representing 100%) was filled and returned. Out of these, 20 (representing 40%) of the questionnaires was administered to female learners while the other 30 (representing 60 %) administered to male learners This amounted to 100 questionnaires administered in total to the respondents in class six learners of Kalawa primary school.

**Table 4.2: Response rate**

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
	Male	30	60.0	60.0	60.0
Valid	Female	20	40.0	40.0	100.0
	Total	50	100.0	100.0	

### 4.4 Descriptive Analysis

#### 4.4.1 Analysis of responses for constructs measuring statements

##### 4.4.1.1 Mean and Standard Deviation

The respondents rated specific components of dependent variable and each independent variables on a Likert scale in the questionnaire which had five options, ranging from 1-5, where 1 meant Strong disagreement, 2 meant disagreement, 3 meant uncertainty, 4 meant agreement, and finally 5 meant strong agreement. During analysis, the first two (Strongly Disagree and Disagree) were united into disagreeing, and the last two (Agree and Strongly Agree) were combined into agreeing. These resulted in three measures (Agree, Uncertain and Disagree). A mean of <2.5 indicates disagreement, > 2.5 <3.5 indicates neutral and > 3.5 indicates in agreement.

#### 4.4.1.2 Descriptive Statistics for Learning Attainment

**Table 4.3: Descriptive Statistics for Learning Attainment**

##### Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Teaching instructor on tablet use helps to expand on what I know and make connections	50	2	5	4.22	.545
Acquired basic skill on tablet use assists to solve a math problem	50	2	5	4.18	.560
Use of pictures, audios and videos facilitates to remember information	50	3	5	4.28	.497
Use of pictures, audios, and videos helps to maintain focus during learning	50	3	5	4.22	.545
Ability to search information aids in finding out new information	50	1	5	4.18	.774
Ability to navigate easily helps to read actively	50	3	5	4.24	.476
Confidence in tablet use eases in organizing ideas	50	1	5	4.28	.757
Comfortability in tablet use assists to make a quick decision	50	3	5	4.22	.465
Enough time spent on the use of the tablet helps to remember information	50	1	5	4.30	.678
Availability of trainer to support on the use of the tablet aids to find out new ideas	50	2	5	4.02	.869
Good attention due to tablet use influences the ability to be alert to potential errors	50	2	5	4.16	.618
Level of confidence influence me to be creative in writing	50	2	5	4.10	.505
Ease of accessibility of information on the use of the tablet influence me to active to act on opportunities	50	2	5	4.26	.664

Level of interaction helps to seek help/ ask questions when necessary	50	2	5	3.98	.769
Good attention due to tablet use helps to build proper sentence and active to act on opportunities	50	2	5	4.18	.629
Availability of internet use enables to look for reasons, explanations, and meaning during learning	50	1	4	1.92	.829
Use of audio-visual during the learning process facilitates to clarify my thinking and to be creative in writing	50	2	5	4.00	.782
Games and simulations produce improved communication and discussion within the classroom	50	2	5	4.10	.580
Basic training on the use of tablet influence me in playing brain games	50	1	5	4.20	.728
Ability to organize ideas has helped me to be creative in writing	50	2	5	4.20	.535
Ability to remember the information has enabled me to build a proper sentence	50	2	5	4.26	.565
AVERAGE MEAN & STD. DEV				4.07	0.637
Valid N (listwise)	50				

The respondents generally agreed (mean of 4.07) on various aspects of learning attainment. These aspects included; teaching instructor on tablet use helps to expand on what I know and make connections (M=4.22, SD=0.545), acquired basic skill on tablet use assists to solve math problem (M=4.18, SD=0.560), use of pictures, audios and videos facilitates to remember information (M=4.28, SD=0.497), use of pictures, audios and videos helps to maintain focus during learning (M=4.22, SD=0.545), ability to search information aids in finding out new information (M=4.18, SD=0.774), ability to navigate easily helps to read actively (M=4.24, SD=0.476), confidence in tablet use eases in organizing ideas (M=4.28, SD=0.757), comfortability in tablet use assists to

make quick decision (M=4.22, SD=0.465), enough time spent on the use of tablet helps to remember information (M=4.30, SD=0.678), availability of trainer to support on the use of the tablet aids to find out new ideas (M=4.02, SD=0.869), good attention due to tablet use influence the ability to be alert to potential errors (M=4.16, SD=0.618), level of confidence influence me to be creative in writing (M=4.10, SD=0.505), ease of accessibility of information on the use of the tablet influences me to active to act on opportunities (M=4.26, SD=0.664), level of interaction helps to seek help/ ask questions when necessary (M=3.98, SD=0.769), good attention due to the tablet use helps to build proper sentence and active to act on opportunities (M=4.18, SD=0.629), availability of internet use enables to look for reasons, explanations and meaning during learning (M=1.92, SD=0.829), use of audio-visual during the learning process facilitates to clarify my thinking and to be creative in writing (M=4.00, SD=0.782), games and simulations produce improved communication and discussion within the classroom (M=4.10, SD=0.580), basic training on use of tablet influence me in playing brain games (M=4.20, SD=0.728), ability to organize ideas has helped me to be creative in writing (M=4.20, SD=0.535), and lastly, ability to remember the information has enable me build proper sentence (M=4.26, SD=0.565).

#### 4.4.1.3 Descriptive Statistics for Learner Competence in Tablet Use

**Table 4.4: Descriptive Statistics for Learner Competence in Tablet Use**

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
I have been taken through basic training in tablet use	50	4	5	4.30	.463
I can teach instructor how to use some of the software for learning	50	2	5	4.10	.463
I am able to record and play a voice or video during class period	50	1	5	3.80	.926
I am able to type or format a word document	50	2	5	3.30	1.074
I am able to browse/search for answers using search engines	50	1	5	3.24	1.170

I am able to navigate easily through folders and learning software	50	2	5	3.74	1.139
AVERAGE MEAN & STD. DEV				3.746667	0.873
Valid N (listwise)	50				

The respondents generally agreed (mean of 3.75) on various aspects of learner competence in tablet use to learning attainment. These aspects included; I have been taken through basic training in tablet use (M=4.30, SD=0.463), I can teach instructor how to use some of the software for learning (M=4.10, SD=0.463), I am able to record and play a voice or video during class period (M=3.80, SD=0.926), I am able to type or format a word document (M=3.30, SD=1.074), I am able to browse/search for answers using search engines (M=3.24, SD=1.170) and lastly, I am able to navigate easily through the folders and the learning software (M=3.74, SD=1.139).

#### 4.4.1.4 Descriptive Statistics for Attitude Towards Tablet Use

**Table 4.5: Descriptive Statistics for Attitude Towards Tablet Use**

##### Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
I feel confident in using a tablet	50	2	5	4.28	.607
I believe using tablet for learning is an important tool	50	2	5	4.24	.591
I enjoy using a tablet for my learning	50	2	5	4.22	.582
I feel more comfortable in using a tablet for learning	50	2	5	4.22	.582



Tablet use promote active learning	50	1	5	3.98	1.000
<b>AVERAGE MEAN &amp; STD. DEV</b>				<b>4.188</b>	<b>0.6724</b>
<b>Valid N (listwise)</b>	<b>50</b>				

The respondents generally agreed (mean of 4.19) on various aspects of attitude towards tablet use to learning attainment. These aspects included; I feel confident in using a tablet (M=4.28, SD=0.607), I believe using tablet for learning is an important tool (M=4.24, SD=0.591), I enjoy using a tablet for my learning (M=4.22, SD=0.582), I feel more comfortable in using a tablet for learning (M=4.22, SD=0.582) and lastly, Tablet use promote active learning (M=3.98, SD=1.000).

#### 4.4.1.5 Descriptive Statistics for Access to Tablet Use

**Table 4.6: Descriptive Statistics for Access to Tablet Use**

##### Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
I am allowed to carry tablet to home when necessary	50	1	4	1.96	.638
School has set an adequate time for learners to use the tablet	50	2	5	3.82	1.004
There is availability of tablet trainer to support learners on use of the tablet	50	1	5	3.54	1.232
The school is connected to a reliable power supply to ensure accessibility of the learning process without interruption	50	3	5	4.32	.513
The ratio of child to a tablet is sufficient for conducive learning	50	2	5	3.82	.800

The computer labs are sufficient for the conduct of e-learning	50	2	5	3.64	1.156
Permission to get information on e-learning platform is unlimited	50	1	5	2.58	1.263
Reliable internet connectivity has been installed in the school	50	1	5	2.10	.974
The tablet has given me an opportunity to learn from other schools	50	2	5	3.70	.995
AVERAGE MEAN & STD. DEV				3.28	0.953
Valid N (listwise)	50				

The respondents neutrally agreed (mean of 3.28) on various aspects of access to tablet use to learning attainment. These aspects included; I am allowed to carry tablet to home when necessary (M=1.96, SD=.638), school has set an adequate time for learners to use of tablet (M=3.82, SD=1.004), there is availability of tablet trainer to support learners on use of the tablet (M=3.54, SD=1.232), the school is connected to a reliable power supply to ensure accessibility of the learning process without interruption (M=4.32, SD=0.513), the ratio of child to tablet is sufficient for conducive learning (M=3.82, SD=0.800), the computer labs are sufficient for the conduct of e-learning (M=3.64, SD=1.156), Permission to get information on e-learning platform is unlimited (M=2.58, SD=1.263), reliable internet connectivity has been installed in the school (M=2.10, SD=0.974) and lastly, the tablet has given me an opportunity to learn from other schools (M=3.70, SD=0.995).

#### 4.4.1.6 Descriptive Statistics for Method of Teaching with Tablet

**Table 4.7: Descriptive Statistics for Method of Teaching with Tablet**

##### Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Tablet enables the use of audio- visual, i.e. audios, videos and pictures for learning	50	3	5	4.24	.517
Tablet helps create an engaging PowerPoint presentation	50	2	5	3.32	1.039
Tablet connects to the internet for the search of information online	50	1	4	2.28	.904
Use of tablet for learning process allows the use of the discussion forum	50	2	5	4.16	.681
Tablet helps create interactive content	50	3	5	4.20	.495
Tablet enables educational games and simulations in the classroom	50	3	5	4.26	.487
AVERAGE MEAN & STD. DEV				3.74	0.687
Valid N (listwise)	50				

The respondents generally agreed (mean of 3.74) on various aspects of the method of teaching with the tablet. These aspects included; tablet enable use of audio-visual, i.e. audios, videos, and pictures for learning (M=4.24, SD=0.517), tablet helps create engaging PowerPoint

presentation (M=3.32, SD=1.039), tablet connects to internet in search of information online (M=2.28, SD=0.904), Use of tablet for learning process allows use of discussion forum (M=4.16, SD=0.681), Tablet helps create interactive content (M=4.20, SD=0.495) and lastly, Tablet enable educational games and simulations in the classroom (M=4.26, SD=0.487).

#### 4.4.1.7 Descriptive Statistics for Perceived Benefits of Tablet Use

**Table 4.8: Descriptive Statistics for Perceived Benefits of Tablet Use**

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
The class has become more interactive and enjoyable	50	3	5	4.30	.505
Use of tablet has improved my confidence in learning	50	1	5	4.22	.648
Use of tablet has improved my attention to learning	50	3	5	4.34	.519
Tablet motivates me to learn	50	3	5	4.22	.465
Use of the touchscreen is enjoyable	50	3	5	4.28	.497
Accessibility to information is easier and faster	50	2	5	4.26	.664
AVERAGE MEAN & STD. DEV				4.27	0.550
Valid N (listwise)	50				

The respondents generally agreed (mean of 3.74) on various aspects of perceived benefits of tablet use to learning attainment. These aspects included; the class has become more interactive and enjoyable (M=4.30, SD=0.505), use of tablet have improved my confidence in learning (M=4.22, SD=0.648), use of tablet has improved my attention in learning (M=4.34, SD=0.519), Tablet

motivates me to learn (M=4.22, SD=0.465), use of the touch screen is enjoyable (M=4.28, SD=0.497) and lastly, accessibility to information is easier and faster (M=4.26, SD=0.664). The descriptive analysis results are as shown in Table 4.9 above.

#### 4.4.1.8 Summary of Mean and Standard Deviation Results

**Table 4.9: Summary of Mean and Standard Deviation Results**

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Learner Competence in Tablet Use	50	3	5	3.75	.602
Attitude Towards Tablet Use	50	3	5	4.19	.504
Access to Tablet Use	50	2	5	3.28	.505
Method of Teaching with Tablet	50	3	5	3.74	.350
Perceived Benefits of Tablet Use	50	3	5	4.27	.419
Learning Attainment	50	2	5	4.07	.392
Valid N (listwise)	50				

Learner competence in tablet use (M=3.75, SD=0.602), attitude towards tablet use (M=4.19, SD=0.504), access to tablet use (M=3.28, SD=0.505), method of teaching with tablet (M=3.74, SD=0.350), perceived benefits of tablet use (M=4.27, SD=0.419), and learning attainment (M=4.07, SD=0.392). The summary results of the mean are shown in Table 4.10 above.

#### 4.5 Correlation Analysis

The investigator carried out some test to see if linear regression would be appropriate to use for the study. By linear relationship, it means that the relationship can be characterized by a straight

line. The level of relationship between dependent variable and independent variables was measured using Pearson correlation

Pearson correlation coefficients ( $r$ ) varies from negative one (-1) to positive (+1). Negative value means a negative correlation and positive value means a positive correlation. A positive  $r$  value therefore demonstrates positive relationship between the two variables. This implies that the highest results are connected with the greatest results of the dependent variable on the independent variable. Likewise, the lower scores on the independent variable are connected with lower results on the dependent variable. A negative  $r$  value shows a negative relationship. This means the highest scores on the independent variable are associated with the smallest scores on the dependent variable. A correlation coefficient of zero indicates there is no predictable relationship between the variables at all. In instances where the Pearson coefficient is less than 0.3 means weak positive correlation, Pearson coefficient with greater than 0.3 and less than 0.5 shows moderate correlation and Pearson coefficient with greater than 0.5 shows strong positive correlation.

**Table 4.10: Learning Achievements and Determinants Correlation**

**Correlations**

		Learner Competence in Tablet Use	Attitude Towards Tablet Use	Access to Tablet Use	Method of Teaching with Tablet	Perceived Benefits of Tablet Use	Learning Attainment
Learner Competence in Tablet Use	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	50					
Attitude Towards Tablet Use	Pearson Correlation	.735**	1				
	Sig. (2-tailed)	.000					
	N	50	50				
Access to Tablet Use	Pearson Correlation	.729**	.610**	1			

	Sig. (2-tailed)	.000	.000				
	N	50	50	50			
Method of Teaching with Tablet	Pearson Correlation	.651**	.572**	.735**	1		
	Sig. (2-tailed)	.000	.000	.000			
	N	50	50	50	50		
Perceived Benefits of Tablet Use	Pearson Correlation	.697**	.783**	.666**	.636**	1	
	Sig. (2-tailed)	.000	.000	.000	.000		
	N	50	50	50	50	50	
Learning Attainment	Pearson Correlation	.714**	.878**	.645**	.636**	.850**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	50	50	50	50	50	50

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

The results of the analysis show that there are five positive correlations on learning attainment. These aspects included; learner competence in tablet use ( $r=0.714^{**}$ ), attitude towards tablet use ( $r=0.878^{**}$ ), access to tablet use ( $r=0.645^{**}$ ), method of teaching with the tablet ( $r=0.636^{**}$ ), and lastly, perceived benefits of tablet use ( $r=0.850^{**}$ ). There was no negative correlation in learning attainment. All the Pearson's coefficient  $r$  is close to 1 or  $r > 0.5$ . This means that there is a strong relationship between the independent variable (learner competence in tablet use, attitude towards tablet use, access to tablet use, method of teaching with tablet, perceived benefits of tablet use) and the dependent variables (learning attainment). This means that changes in learner competence in tablet use, attitude towards tablet use, access to tablet use, method of teaching with tablet, or perceived benefits of tablet use are strongly correlated with changes in the overall learning attainment.

Significance (2-Tailed) value tries to tell whether the variables under consideration are strongly correlated. If the significance (2-tailed) value exceeds 0.05, there is no strong correlation between the variables under consideration. It thus means that decline or rise in one variable are not strongly associated with decline or rise. If the value(2-tailed) is less than or equal to 0.05, it can be found that the correlation between your two variables is statistically important. That means that one variable's decline or rise are significantly associated with decline or rise in your second variable.

The significance (2-Tailed) value in the table above shows learner competence in tablet use, attitude towards tablet use, access to tablet use, method of teaching with tablet, perceived benefits of tablet use is significant at 0.00, 0.00, 0.00, 0.00, and 0.00 respectively. These values are below 0.05 hence, we can conclude that there is a statistically strong correlation between learner competence in tablet use, attitude towards tablet use, access to tablet use, method of teaching with tablet, perceived benefits of tablet use and learning attainment.

#### 4.6 Kruskal Wallis Test Statistics

The Kruskal Wallis test was also carried out on the information collected to establish if a statistically significant difference exists on an ordinal dependent research variable between two or more groups.

**Table 4.11: Kruskal Wallis Test**

**Test Statistics<sup>a,b</sup>**

	Learner Competence in Tablet Use	Attitude Towards Tablet Use	Access to Tablet Use	Method of Teaching with Tablet	Perceived Benefits of Tablet Use
Chi-Square	14.646	33.669	8.663	8.971	31.349
df	2	2	2	2	2
Asymp. Sig.	.001	.000	.013	.011	.000

a. Kruskal Wallis Test

b. Grouping Variable: Learning Attainment



The variables yielded varied Chi-square results at 2 degrees of freedom. Learner competence in tablet use yielded a chi-square measure of 14.646, attitude towards tablet use yielded a chi-square measure of 33.669, access to tablet use yielded a chi-square measure of 33.669, method of teaching with tablet yielded a chi-square measure of 8.663 and finally perceived benefits of tablet use yielded a chi-square measure of 31.349. The level of significance of learner competence in tablet use was 0.001, attitude towards tablet use was 0.000, access to tablet use was 0.013, method of teaching with tablet was 0.011 while perceived benefits of tablet use was 0.000. For the variable to be effective, the level of significance should be  $< 0.05$ . Therefore, all the variables had their level of significance is less than 0.05.

#### **4.7 Regression Analysis of dependent variable and independent variables**

##### **4.7.1 Analysis of all independent variables**

The research used a regression test to assess the proportion of variance the criteria or dependent variable has in the set of determinants or independent variables. The determination coefficient is a linear relationship measure. The R square proves how good one term is when the other is predicted. The value of another term can be perfectly predicted if R square is 1.0 given the value of one term. If the R square becomes 0.0, then it will be impossible to predict the other term at all by understanding one term. Overall, a greater R square value means you can strongly predict one term from another.

The R square of this study was 0.845 representing (84.5%), taken as a set, independent variables perceived benefits of tablet use, method of teaching with tablet, learner competence in tablet use, access to tablet use, attitude towards tablet use account for the overall learning attainment. Therefore, it is implying that these are important factors that influence the learners' learning attainment. Conversely, there are other factors (21.6%) contributing to learners' learning attainment.

**Table 4.12: Model summary between all independent variables**

**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	.919 <sup>a</sup>	.845	.827	.163	.845	47.937	5	44	.000

a. Predictors: (Constant), Perceived Benefits of Tablet Use, Method of Teaching with Tablet, Learner Competence in Tablet Use, Access to Tablet Use, Attitude Towards Tablet Use

**4.7.2 Analysis of variance model (ANOVA Model)**

The ANOVA results as shown in Table 4.14 below assesses the statistical significance of the results (R square of 85%) obtained. From the results indicated, the overall equation was found to be statistically significant ( $F=5, 44 =47.94, p<0.000$ ). Thus, the model (learner competence in tablet use, attitude towards tablet use, access to tablet use, method of teaching with tablet, perceived benefits of tablet use) is fit to predict learners’ overall learning attainment. This means that the predictors are able to account for a significant amount of variance in learning attainment.

**Table 4.13: ANOVA table showing the significance**

**ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	6.350	5	1.270	47.937	.000 <sup>b</sup>
1 Residual	1.166	44	.026		
Total	7.516	49			

a. Dependent Variable: Learning Attainment

b. Predictors: (Constant), Perceived Benefits of Tablet Use, Method of Teaching with Tablet, Learner Competence in Tablet Use, Access to Tablet Use, Attitude Towards Tablet Use

### 4.7.3 Coefficients of all independent variables

Results below in coefficients table, looks at each predictor individually on whether it contributes to the prediction of the dependent variable.

**Table 4.14: Coefficients Table for all independent variables**

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.461	.291		1.584	.120
Learner Competence in Tablet Use	.000	.068	.000	-.004	.997
Attitude Towards Tablet Use	.413	.082	.531	5.040	.000
Access to Tablet Use	.005	.079	.007	.065	.948
Method of Teaching with Tablet	.101	.103	.090	.973	.336
Perceived Benefits of Tablet Use	.349	.099	.373	3.536	.001

a. Dependent Variable: Learning Attainment

In this section, linear regression was done in relating the effect of each predictor variable on the dependent variable. Since all predictors have the same (Likert) scales, we prefer to interpret the b-coefficients instead of the beta coefficients. Therefore, unstandardized regression coefficients were used to explain the contribution of each predictor to explain dependent variable. If b-coefficients of unstandardized is more, the more contribution of the dependent variable and vice versa. The column also labeled Sig. Inform whether or not such a variable makes a statistically significant contribution to the equation. If the significance value was less than 0.05, then the variable would be bringing out a significant unique contribution to the prediction of the dependent variable. If

more than 0.05, this can be concluded that the variable would not make a important distinctive contribution to the dependent variable's forecast.

Our final model states that the attitude towards tablet use was found to be the independent variable with the strongest contribution of 0.413 on learning attainment and the variable is statistically significant to the equation at 0.000, when all the variables in the regression equation were entered. We found that the more positive attitude towards tablet use of learners, the greater the learning attainment. Also, perceived benefits of tablet use were found with a strong contribution of 0.349 on learning attainment and the variable is statistically significant to the equation at 0.000. Therefore, the more perceived benefits of tablet use by learners, the greater the learning attainment. Method of teaching with tablet was found to be with a less contribution of 0.101 on overall learning attainment and the variable has a significance of 0.336 which is not statistically significant to the predictor. Therefore, every unit increase in methods of teaching with tablet by learners, a 0.101 unit increase in learning attainment is predicted. Access to tablet use was found to be with a less contribution of 0.005 on overall learning attainment and the variable has a significance of 0.948 which is not statistically significant to the predictor. Therefore, every unit increase in method of access to tablet use by learners, a 0.005 unit increase in learning attainment is predicted. Learner competence in tablet use was observed to be with a significant impact of 0.000 on overall learning attainment and the variable has a significance of 0.997 which is not statistically significant to the predictor. Therefore, there was no significant impact on the overall learning attainment. Therefore, we can conclude that learner competence in tablet use did not meet the necessary criteria to significantly influence learning attainment so at this stage of the analysis they did not play a part.

The resultant model for the multiple regression analysis was;

$$LA_i = 0.461 + 0.000LCT_i + 0.413ATT_i + 0.005ATU_i + 0.101MTT_i + 0.349PBT_i + \epsilon_i$$

Where  $LA_i$  = learning attainment,  $LCT_i$  = learner competence in tablet use,  $ATT_i$  = attitude towards tablet use,  $ATU_i$  = access to tablet use,  $MTT_i$  = method of teaching with tablet,  $PUT_i$  = perceived benefits of tablet use and  $\epsilon_i$  = error time.

From the above regression it was revealed that learner competence in tablet use, attitude towards tablet use, access to tablet use, method of teaching with tablet and perceived benefits of tablet use of a constant zero, learning attainment would stabilize at 0.46. A rise in a unit of learner competence in tablet use would lead to improved learning attainment by 0.000, rise in a unit of

attitude towards tablet use would lead to improved learning attainment by 0.413, rise in a unit of access to tablet use would lead to improved learning attainment by 0.005, rise in a unit of method of teaching with tablet would lead to improved learning attainment by a factor of 0.101 and rise in a unit of perceived benefits of tablet use would lead to improved learning attainment by 0.349. This infers that attitude towards tablet use contribute most to learning attainment followed by the perceived benefits of tablet use, method of teaching with tablet, access to tablet use respectively while learner competence in tablet use contributed the least.

#### 4.8 Hypotheses Testing

The hypothesis stated in earlier section of this study was tested. The decision rule when accepting or rejecting a hypothesis is, accept when the p-value is less than  $\alpha$  and reject a hypothesis when the p-value is more than  $\alpha$ . For this study,  $\alpha = 0.05$  and will be compared with the p-values applicable to the stated hypotheses as shown in Table 4.16 below.

#### H<sub>1</sub>: Learner competence in tablet use have significant effect on cognitive skill attainment

Analysis of regression was carried out to determine the proportion of cognitive skills attainment (dependent variable) which could be predicted by learner competence in tablet use (independent variable). To test this hypothesis, the model  $Y_1 = \beta_0 + \beta_1 X_1 + \epsilon$  was fitted. Table 4.15 display the regression analysis results of cognitive skill attainment which could be predicted by learner competence in tablet use.

**Table 4.15: Regression analysis of learner competence in tablet use and cognitive skills attainment**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.663 <sup>a</sup>	.440	.429	.325

a. Predictors: (Constant), Learner Competence in Tablet Use

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.997	1	3.997	37.740	.000 <sup>b</sup>
	Residual	5.084	48	.106		
	Total	9.082	49			

a. Dependent Variable: Cognitive Skills

b. Predictors: (Constant), Learner Competence in Tablet Use

Coefficients <sup>a</sup>						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	2.429	.293		8.284	.000
	Learner Competence in Tablet Use	.475	.077	.663	6.143	.000

a. Dependent Variable: Cognitive Skills

Findings ( $H_1$ ) from table 4.16 showed that learner competence in tablet use had coefficients of  $\beta_1 = 0.475$  indicating that every unit increase learner competence in tablet use, there was a corresponding increase in cognitive skills attainment. With  $R^2 = 0.440$ , the model implies learner competence in tablet use explained 46 percent of the variation in cognitive skill attainment. The model thus failed to explain 54 percent of the variability, which means that there are other variables connected with learners' cognitive ability achievement which was not fitted in the model. Therefore, the model equation is,

$$Y_1 = 2.429 + 0.475X_1$$

Where Y is cognitive skill attainment and  $X_1$  is learner competence in tablet use

The p-value = 0.000 which is less than  $\alpha = 0.05$ . This infers that learner competence in tablet use has statistically significant effect on learners' cognitive skills attainment. Hence the alternate hypothesis was accepted and it was concluded that learner competence in tablet use is statistically significant effect on learners' cognitive skills attainment.

## **H<sub>2</sub>: Attitude towards tablet use have significant effect on cognitive skill attainment**

Analysis of regression was also used to clearly state the percentage of cognitive skills attainment (dependent variable) which could be predicted by attitude towards tablet use (independent variable). To test this hypothesis, the model  $Y_2 = \beta_0 + \beta_2X_2 + \epsilon$  was fitted. Table 4.17 shows the regression analysis results of cognitive skill attainment which could be predicted by attitude towards tablet use.

**Table 4.16: Regression analysis of attitude towards tablet use and cognitive skill attainment**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.814 <sup>a</sup>	.663	.656	.253

a. Predictors: (Constant), Attitude Towards Tablet Use

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.017	1	6.017	94.265	.000 <sup>b</sup>
	Residual	3.064	48	.064		
	Total	9.082	49			

a. Dependent Variable: Cognitive Skills

b. Predictors: (Constant), Attitude Towards Tablet Use

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.294	.302		4.281	.000
	Attitude Towards Tablet Use	.696	.072	.814	9.709	.000

a. Dependent Variable: Cognitive Skills

Findings (H<sub>2</sub>) from table 4.17 showed that attitude towards tablet use had coefficients of  $\beta_2 = 0.696$  indicating that every unit increase attitude towards tablet use, there was a corresponding increase in cognitive skill attainment. With  $R^2 = 0.663$ , the model implies an attitude towards tablet use explained 66% of the variation in cognitive skill attainment. The model thus failed to explain 34 percent of the variability, which means that there are other variables connected with learners' cognitive ability achievement which was not fitted in the model. Therefore, the model equation is,

$$Y_2 = 1.294 + 0.696X_2$$

Where  $Y_2$  is cognitive skill attainment and  $X_2$  is attitude towards tablet use

The p-value = 0.000 which is less than  $\alpha = 0.05$ . This implies that attitude towards tablet use has statistically significant effect on learners' cognitive skill attainment. Hence the alternate

hypothesis was accepted and it was concluded that attitude towards tablet use has a statistically significant effect on learners' cognitive skill attainment.

**H<sub>3</sub>: Access to tablet use have significant effect on cognitive skill attainment**

Regression analysis was also used to determine the proportion of cognitive skills attainment (dependent variable) which could be predicted by access to tablet use (independent variable). To test this hypothesis, the model  $Y_3 = \beta_0 + \beta_3 X_3 + \epsilon$  was fitted. Table 4.18 shows the regression analysis results of cognitive skill attainment which could be predicted by access to tablet use.

**Table 4.17: Regression analysis of access to tablet use and cognitive skill attainment**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.629 <sup>a</sup>	.395	.382	.338

a. Predictors: (Constant), Access to Tablet Use

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.588	1	3.588	31.346	.000 <sup>b</sup>
	Residual	5.494	48	.114		
	Total	9.082	49			

a. Dependent Variable: Cognitive Skills

b. Predictors: (Constant), Access to Tablet Use

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.453	.317		7.735	.000
	Access to Tablet Use	.536	.096	.629	5.599	.000

a. Dependent Variable: Cognitive Skills

Findings (H<sub>3</sub>) from table 4.18 showed that access to tablet use had coefficients of  $\beta_3 = 0.536$  indicating that every unit increase access to tablet use, there was a corresponding increase in cognitive skill attainment. With  $R^2 = 0.395$ , the model implies access to tablet use explained 40 % of the variation in cognitive skill attainment. The model thus failed to explain 60 percent of the variability, which means that there are other variables connected with learners' cognitive ability achievement which was not fitted in the model. Therefore, the model equation is,



$$Y_3 = 2.453 + .536X_3$$

Where  $Y_3$  is cognitive skill attainment and  $X_3$  is access towards tablet use

The p-value = 0.000 which is less than  $\alpha=0.05$ . This implies that access to tablet use has statistically significant effect on learners' cognitive skill attainment. Hence the alternate hypothesis was accepted and it was concluded that access to tablet use has a statistically significant effect on learners' cognitive skill attainment.

**H4: Method of teaching with tablet have significant effect on critical thinking skill attainment**

Regression analysis was also used to determine the proportion of critical thinking skill attainment (dependent variable) which could be predicted by the method of teaching with tablet (independent variable). To test this hypothesis, the model  $Y_4 = \beta_0 + \beta_4X_4 + \epsilon$  was fitted. Table 4.19 shows the regression analysis results of critical thinking skill attainment which could be predicted by method of teaching with tablet.

**Table 4.18: Regression analysis of method of teaching with tablet and critical thinking skill attainment**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.650 <sup>a</sup>	.422	.410	.294

a. Predictors: (Constant), Method of Teaching with Tablet

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.026	1	3.026	35.101	.000 <sup>b</sup>
	Residual	4.138	48	.086		
	Total	7.164	49			

a. Dependent Variable: Critical Thinking Skills

b. Predictors: (Constant), Method of Teaching with Tablet

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.332	.450		2.959	.005

Method of Teaching with Tablet	.709	.120	.650	5.925	.000
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a. Dependent Variable: Critical Thinking Skills

Findings ( $H_4$ ) from table 4.19 showed that method of teaching with tablet had coefficients of  $\beta_4 = 0.709$  indicating that every unit increase method of teaching with tablet, there was a corresponding increase in critical thinking skill attainment. With  $R^2 = 0.442$ , the model implies method of teaching with tablet explained 44% of the variation in critical thinking skill attainment. The model thus failed to explain 56 percent of the variability, which means that there are other variables connected with learners' cognitive ability achievement which was not fitted in the model. Therefore, the model equation is,

$$Y_4 = 1.332 + 0.709X_4$$

Where Y is critical thinking skill attainment and  $X_4$  is method of teaching with the tablet

The p-value = 0.000 which is less than  $\alpha=0.05$ . This implies that method of teaching with tablet has statistically significant effect on learners' critical thinking skill attainment. Hence the alternate hypothesis was accepted and it was concluded that method of teaching with tablet has a statistically significant effect on learners' critical thinking skill attainment.

**H<sub>5</sub>: Perceived benefits of tablet use have significant effect on critical thinking skill attainment**

Regression analysis was also used to determine the proportion of critical thinking skill attainment (dependent variable) which could be predicted by the perceived benefits of tablet use (independent variable). To test this hypothesis, the model  $Y_5 = \beta_0 + \beta_5X_5 + \epsilon$  was fitted. Table 4.20 shows the regression analysis results of critical thinking skill attainment, which could be predicted by the perceived benefits of tablet use.

**Table 4.19: Regression analysis of perceived benefits of tablet use and critical thinking skill attainment**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.833 <sup>a</sup>	.693	.687	.214

a. Predictors: (Constant), Perceived Benefits of Tablet Use

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	4.967	1	4.967	108.549	.000 <sup>b</sup>
Residual	2.197	48	.046		
Total	7.164	49			

a. Dependent Variable: Critical Thinking Skills

b. Predictors: (Constant), Perceived Benefits of Tablet Use

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.743	.313		2.376	.022
Perceived Benefits of Tablet Use	.760	.073	.833	10.419	.000

a. Dependent Variable: Critical Thinking Skills

Findings ( $H_5$ ) from table 4.20 showed that the perceived benefits of tablet use had coefficients of  $\beta_5 = 0.760$  indicating that every unit increase perceived benefits of tablet use, there was a corresponding increase in critical thinking skill attainment. With  $R^2 = 0.693$ , the model implies perceived benefits of tablet use explained 69% of the variation in critical thinking skill attainment. The model thus failed to explain 31 percent of the variability, which means that there are other variables connected with learners' cognitive ability achievement which was not fitted in the model. Therefore, the model equation is,

$$Y_5 = 0.743 + 0.760X_5$$

Where Y is critical thinking skill attainment and  $X_5$  is the perceived benefits of tablet use

The p-value = 0.000 which is less than  $\alpha = 0.05$ . This implies that the perceived benefits of tablet use have a statistically significant effect on learners' critical thinking skill attainment. Hence, the alternate hypothesis was accepted and it was concluded that the perceived benefits of tablet use have a statistically significant effect on learners' critical thinking skill attainment.

## **4.9 Discussion of the Findings**

### **4.9.1 Findings in the learner competence in tablet use on the cognitive skill attainment**

This section examined the respondents view on the following; I have been taken through basic training in tablet use, I can teach instructor how to use some of the software for learning, I am able to record and play a voice or video during class period, I am able to type or format a word document, I am able to browse/search for answers using search engines and lastly, I am able to navigate easily through folders and learning software.

From the results, majority respondents generally agreed that they have been taken through basic training in tablet use (M=4.30). In addition, the respondents agree that they can teach instructor how to use some of the software for learning (M=4.10). They also agree that they are able to record and play a voice or video during the class period (M=3.80) and lastly agree that they are able to navigate easily through folders and learning software (M=3.74). However, a majority are neutral on the ability to type or format a word document (M=3.30) and ability to browse/search for answers using search engines (M=3.24). From table 4.5 it can be observed that the overall mean is (M=3.75). Hence, there is an indication that respondents have the basic skills and knowledge essential to use the tablet for their e-learning

The regression model showed learner competence in tablet use explained 44% of the variation in cognitive skill attainment. This result indicates for every unit increase in learner competence in tablet use, there was a corresponding increase in learners cognitive skill by 47.5%. Multiple regression analysis confirmed that there was a strong relationship between learner competence in tablet use for learning and the cognitive skill attainment. The empirical findings of this study indicate that learner competence in tablet use statistically and significantly influenced cognitive skill attainment of learners in schools, which uses the tablet for learning, hence increase in learner competence in tablet use leads to increase in cognitive skill attainment and the overall learning attainment.

Teaching instructor on tablet use helps to expand on what I know and make connections, acquired basic skill on tablet use assists to solve math problem, basic training on use of tablet influence me in playing brain games

#### **4.9.2 Findings in the attitude towards tablet use on the cognitive skill attainment**

The study sought to establish if the respondents feel confident in using a tablet, believe using the tablet for learning is an important tool, enjoy using a tablet for my learning, feel more comfortable in using a tablet for learning and lastly, whether tablet use promotes active learning.

From the results, majority respondents generally agreed that they feel confident in using a tablet (M=4.28) and as well, they believe using the tablet for learning is an important tool (M=4.24). They also agree that they enjoy using a tablet for my learning (M=4.22). Furthermore, they agree that they feel more comfortable in using a tablet for learning (M=4.22) and lastly, respondents agree that they tablet use promote active learning (M=3.98).

The regression model showed the attitude towards tablet use explained 66.3% of the variation in cognitive skill attainment. This result also indicates for every unit increase in attitude towards tablet use, there was a corresponding increase in learners' cognitive skill attainment by 69.6%. Multiple regression analysis confirmed that there was a strong relationship between attitude towards tablet use for learning and the cognitive skill attainment. The empirical findings of this study indicate that attitude towards tablet use statistically and significantly influenced cognitive skill attainment of learners in schools which uses the tablet for e-learning, hence increase in attitude towards tablet use leads to increase in cognitive skill attainment and the overall learning attainment.

Confidence in tablet use aid in organizing ideas, comfortability in tablet use, assists to make quick decision,

#### **4.9.3 Findings in the access to tablet use on the cognitive skill attainment**

This sector asked the respondents their view on the following; I am allowed to carry the tablet to home when necessary, school have set adequate time for leaners to use, there is availability of tablet trainer to support leaners on use of the tablet, the school is connected to a reliable power supply to ensure accessibility of the learning process without interruption, the ratio of child to tablet is sufficient for conducive learning, the computer labs are sufficient for the conduct of e-learning, permission to get information on e-learning platform is unlimited, reliable Internet connectivity has been installed in the school and lastly, the tablet has given me an opportunity to learn from other schools.

The results confirm that, a most of respondents disagree that they are allowed to carry the tablet to home when necessary (M=1.96). Also, the respondents disagree that they have reliable internet connectivity has been installed in the school (M=2.10). However, the majority of the respondents are neutral on the permission to get information on e-learning platform is unlimited (M=2.58) and also, the school is connected to a reliable power supply to ensure accessibility of the learning process without interruption (M=4.32). The results also show that the respondents agree that School have set an adequate time for learners to use of tablet (M=3.82), there is availability of tablet trainer to support learners to use of tablet (M=3.54), the ratio of child to tablet is sufficient for conducive learning (M=3.82), the computer labs are sufficient for the conduct of e-learning (M=3.64), and lastly, the tablet has given them an opportunity to learn from other schools (M=3.70).

The regression model showed learner competence in tablet use explained 39.5% of the variation in cognitive skill attainment. This result also indicates for every unit increase in learner competence in tablet use, there was a corresponding increase in learners cognitive skill attainment by 53.6%. Multiple regression analysis confirmed that there was a strong relationship between learner competence in tablet use for learning and the cognitive skill attainment. The empirical findings of this study indicate that learner competence in tablet use statistically and significantly influenced cognitive skill attainment of learners in schools which uses the tablet for e-learning hence increase in learner competence in tablet use leads to increase in cognitive skill attainment and the overall learning attainment.

Enough time spent on the use of tablet helps to remember information, availability of trainer to support on the use of the tablet aids to find out new ideas,

#### **4.9.4 Findings in the method of teaching with tablet on the critical thinking skill attainment**

This sector asked the respondents their view on the following; The tablet enables the use of audio-visual i.e. audio, video and pictures for learning, tablet helps create engaging PowerPoint presentation, Tablet connect to internet for search of information online Use of tablet for learning process allows the use of the discussion forum and lastly, Tablet helps create interactive content, Tablet enable educational games and simulations in the classroom

From the results, majority respondents generally agreed that the tablet has enabled the use of audio-visual i.e. audio, video and pictures for their learning (M=4.24). Also, the respondents agree that the use of the tablet for learning process allows the use of discussion forum (M=4.16). Moreover, the respondents agree that tablet helps create interactive content (M=4.20). And lastly, respondents agree tablet enable educational games and simulations in the classroom (M=4.26). On the other hand, the results indicate that the respondents are neutral on tablet helping them create engaging PowerPoint presentation (M=3.32). Similarly, respondents are neutral on tablet connecting to the internet in the search for more information online (M=2.28).

The regression model showed learner competence in tablet use explained 42.2% of the variation in critical thinking attainment. This result also indicates for every unit increase in learner competence in tablet use, there was a corresponding increase in learners' critical thinking by 70.9%. Multiple regression analysis confirmed that there was a strong relationship between learner competence in tablet use for learning and the critical thinking attainment. The empirical findings of this study indicate that learner competence in tablet use statistically and significantly influenced the critical thinking of learners in schools which uses tablet for learning, hence increase in learner competence in tablet use leads to increase in critical thinking skill attainment and the overall learning attainment.

availability of internet use enables to look for reasons, explanations and meaning during learning, use of audio-visual during the learning process facilitates to clarify my thinking and to be creative in writing, games and simulations produce improved communication and discussion within the classroom,

#### **4.9.5 Findings in the perceived benefits of tablet use on the critical thinking skill attainment**

This subdivision asked the respondents their view on the following; The class has become more interactive and enjoyable, use of tablet have improved my confidence in learning, the use of the tablet has improved my attention in learning, tablet motivates me to learn, the use of the touch screen is enjoyable lastly, accessibility to information is easier and faster.

From the results, majority respondents generally agreed that the class has become more interactive and enjoyable (M=4.30). In addition, the respondents agree that use of tablet has improved their confidence in learning (M=4.22). Additionally, respondents agree that use of the

tablet has improved their attention in learning (M=4.34). Furthermore, respondents agree that the tablet motivates them to learn (M=4.22). In addition, the respondents agree that the use of touch screen is enjoyable (M=4.28). Lastly, respondents agree that access to information is easier and faster (M=4.26).

The regression model showed learner competence in tablet use explained 69.3% of the variation in critical thinking attainment. This result also indicates for every unit increase in learner competence in tablet use, there was a corresponding increase in learners' critical thinking by 76%. Multiple regression analysis confirmed that there was a strong relationship between learner competence in tablet use for learning and the critical thinking attainment. The empirical findings of this study indicate that learner competence in tablet use statistically and significantly influenced critical thinking attainment of learners in schools which uses tablet for learning, hence increase in learner competence in tablet use leads to increase in critical thinking attainment and the overall learning attainment.

Good attention due to tablet use influence the ability to be alert to potential errors, level of confidence influence me to be creative in writing, ease of accessibility of information on the use of the tablet influences me to active to act on opportunities, level of interaction helps to seek help/ask questions when necessary, good attention due to the tablet use, helps to build proper sentence and active to act on opportunities.



# **CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATION**

## **5.1 Introduction**

This section summarizes the findings, findings and recommendations for further study on similar research based on analysis and findings of this research report.

## **5.2 Summary of the Findings**

From results and discussion of the study, a summary of the study results could be drawn. To assess effect of learner competence in tablet use on cognitive skill attainment, the study sought to know whether the skill acquired or thought to make it easy for the learner use the tablet technology to deliver the development of their cognitive skill. Descriptive analysis of the mean indicated that the respondents generally agreed (mean of 3.75) on various aspects of competence in tablet use. The correlation analysis test was also done and results obtained indicate that there was a strong relationship ( $r=0.714^{**}$ ) between competence in tablet use and overall learning attainment. This means that changes in learner competence in tablet use are strongly correlated with changes in the learning attainment. The regression model findings indicate, for every unit increase in learner competence in tablet use, there was a corresponding increase in learners' cognitive skill attainment by 47.5%. Therefore, multiple regression analysis confirmed that learner competence in tablet use statistically and significantly influenced cognitive skill attainment of learners in schools which uses the tablet device for learning, hence increase in learner competence in tablet use leads to increase in cognitive skill attainment and the overall learning attainment.

To determine the effect of attitude towards tablet use on cognitive skill attainment, the study sought to know if having a positive attitude towards the tablet use of e-learning facilitates the development of cognitive skill. The descriptive analysis of the mean indicated that the respondents generally agreed (mean of 4.19) on various aspects of attitude towards tablet use. The correlation analysis test was also done and results obtained indicate that there was a strong relationship ( $r=0.878^{**}$ ) between attitude towards tablet use and overall learning attainment. This means that changes in attitude towards tablet use are strongly correlated with changes in the learning attainment. The regression model findings indicate, for every unit increase in attitude towards tablet use, there was a corresponding increase in learners' cognitive skill attainment by 69.6%. Therefore, multiple

regression analysis also confirmed that attitude towards tablet use statistically and significantly influenced cognitive skill attainment of learners in schools, which uses the tablet for e-learning.

To determine the extent to which access to tablet use influences cognitive skill attainment, the study sought to know whether learners have sufficient access to the use of the tablet for e-learning process or not. The descriptive analysis of the mean indicated that the respondents generally neutrally agreed (mean of 3.28) on various aspects of access to tablet use. The correlation analysis test was also done and results obtained indicate that there was a strong relationship ( $r=0.645^{**}$ ) between access to tablet use and overall learning attainment. This means that changes in access to tablet use are strongly correlated with changes in the learning attainment. The regression model findings indicate, for every unit increase in access to tablet use, there was a corresponding increase in learners' cognitive skill attainment by 53.6%. Therefore, multiple regression analysis confirmed that learner access to tablet use statistically and significantly influenced cognitive skill attainment of learners in schools that uses the tablet for learning, hence increase in access to tablet use leads to increase in cognitive skill attainment and the overall learning attainment.

To determine the effect of the method of teaching with tablet on critical thinking skill attainment, the study needed to know the extent to which techniques used on the tablet for e-learning will enhance the development of learners' critical thinking skill. The descriptive analysis of the mean indicated that the respondents generally agreed (mean of 3.74) on various aspects of method of teaching with tablet. The correlation analysis test was also done and results obtained indicate that there was a strong relationship ( $r=0.636^{**}$ ) between the method of teaching with tablet and overall learning attainment. This means that changes in methods of teaching with the tablet in tablet use are strongly correlated with changes in the learning attainment. The regression model findings indicate, for every rise in unit increase of method of teaching with tablet, there was a corresponding rise in learner's critical thinking skill attainment by 70.9%. Therefore, multiple regression analysis confirmed that the method of teaching with tablet statistically and significantly influenced cognitive skill attainment of learners.

Lastly, the study sought to establish the effect of perceived benefits of tablet use on critical thinking skill attainment. This may be influenced by specific variables which include variables such as previous experiences on the tablet and individual learning styles. The descriptive analysis of the mean indicated that the respondents generally agreed (mean of 4.27) on various aspects of

perceived benefits of tablet use. The correlation analysis test was also done and results obtained indicate that there was a strong relationship ( $r=0.850^{**}$ ) between perceived benefits of tablet use and overall learning attainment. This means that changes in the perceived benefits of tablet use in tablet use are strongly correlated with changes in the learning attainment. The regression model findings indicate, for every rise in unit increase of perceived benefits of tablet use, there was a corresponding rise in learners' critical thinking skill attainment by 76%. Therefore, multiple regression analysis confirmed that the perceived benefits of tablet use statistically and significantly influenced cognitive skill attainment of learners.

### **5.3 Conclusion**

This research investigated the influence of tablet use on cognitive and critical thinking skill attainment using class six pupils of Kalawa Primary School, Kalawa County as a sample size. Research findings established that learner competence in tablet use, attitude towards tablet use, access to tablet use, method of teaching with tablet, perceived benefits of tablet use have an effect on either cognitive skill or critical thinking skill attainment and overall learning attainment.

Therefore, the following conclusion was made: firstly, existing learner competence in tablet use has contributed significantly to cognitive skill attainment. This includes the ability to teach instructor on tablet use helps the learners expand on what they know and make connections, acquired basic skill on tablet use also assists to solve the math problem and basic training on the use of tablet enable learners to play brain games. Secondly, the attitude towards tablet, on the other hand, has contributed significantly to cognitive skill attainment. This includes confidence in tablet use by learner's aid them in organizing ideas and also comfortability in tablet use assists learners to make a quick decision. Thirdly, access to tablet use also has contributed significantly to cognitive skill attainment. This includes enough time spent on the use of tablet by learners helps them to remember information and availability of trainer to support on the use of tablet aids in finding out new ideas.

These findings are in tandem with the finding of (Sung a, Chang b and Liu, 2016) who asserts that several weeks of duration of mobile devices use for learning is helpful for producing positive learning attainment as learners to get familiar with the hardware and software. Hence, it aids in discovering new ideas such as the production of sound effects.

Fourthly, method of teaching with tablet did also have contributed significantly to critical thinking skill attainment. This includes the use of pictures, audios, and videos during learning facilitates learners to remember information, to clarify learners thinking, to be creative in writing and to read actively. These benefits are in tandem with Saadé, R. G., et al. (2012), who noted that using tools such as chats, email, and audios/videos, learners are engaged and motivated to solve the problem presented to them. Last but not least, perceived benefits of tablet use, on the other hand, has contributed significantly to critical thinking skill attainment. This includes the ease of accessibility of information on the use of tablet influence learners be active to act on opportunities, good attention due to tablet use influences the ability to be alert to potential errors, to build proper sentence and active to act on opportunities and the level of confidence and interaction helps to seek help/ ask questions when necessary. Gharib et al., (2016) noted that individuals with a positive perception in e-learning appear to possess personal characteristics and beliefs that are helpful to critical thinking.

Introduction of the tablet device for e-learning was intended to improve both learner's performance and quality of education in most Kenyan schools. Therefore, it can be concluded that the use of the tablet device for e-learning Plays a major role in improving the quality of education and the performance of learners.plays an important role in improving learners' performance and the quality of education.

#### **5.4 Recommendation**

The study comes up with the following recommendations

- i. Since the launch of tablets in Kenya is still a new phenomenon and schools are relatively at the start of their journey, having a basis to periodically evaluate the programme is therefore critical need. This study has also provided a basis for comparison.
- ii. Various stakeholders' should pay attention to teachers' suggestions and comments. This will provide ways of improving the programme.
- iii. The existing content for e-learning should be updated continuously by the relevant content providers. In such a manner, it will create learning to be more knowledgeable and be engaged for inquisitive learners both at school and at home.
- iv. There is the need for a range of professional learning programmes to extend the ICT competencies and improve learner's performance.

- v. Adequate access to tablet should be given to learners so that the benefit of ICT integration can be realized in education.

## REFERENCES

- Abu alsonos , (2006) Interactions among students themselves is rooted in a new paradigm due to the e-learning, where there is effective interaction and collaboration between teachers and learners and the in learning environment
- Abu alsonos , (2006) Traditional face-to-face form of interaction has shifted towards formation of communities of learners and also cooperative learning with the emergence of e-learning.
- Abu alsonos, Jihad. "The Impact Of Applying IT And E-Learning In Economic Information Systems". *American Journal of Applied Sciences* 3 (2).ISSN 1546-9239 (2006): 1722-1725.
- Adu, E.O.. and Olatundun, S.A. (2013). THE USE AND MANAGEMENT OF ICT IN SCHOOLS: STRATEGIES FOR SCHOOL LEADERS. *European Journal of Computer Science and Information Technology (EJCSIT)*, Vol.1, No.2, pp.10-16
- Ahmed Alismail, Halah, and Dr. Patrick McGuire. "21 St Century Standards And Curriculum: Current Research And Practice". *Journal of Education and Practice* Vol.6, No. 6.ISSN 2222-1735 (2015)
- Ahmad, Iqbal et al. "Effect Of E-Learning On Professional Development Of University Teachers". *Research Journal of Recent Sciences* Vol. 3(7).ISSN 2277-2502 (2014): 1-4.
- Almaqtri, Mahmoud. "How Effective Is E-Learning In Teaching English? : A Case Study". *Journal of Education and Human Development* Vol. 3, No. 2.SSN: 2334-296X (2014): 647-669
- A Publication of the School of Continuing and Distance Education. (2012). *The School of Continuing and Distance Education University of Nairobi*, Volume 2, Issue 1,(ISSN 2074-4722).
- Babu, Naresh, and D Bhanu Sree Reddy. "Challenges And Opportunity Of E-Learning In Developed And Developing Countries- A Review". *International Journal of Emerging Research in Management & Technology* Volume-4, Issue-6).ISSN: 2278-9359 (2015): 259-262.
- Bourlova, Tatiana, and Mark Bullen. "The Impact Of E-Learning On The Use Of Campus Instructional Space". (2005):
- Brooking, Gary. "Elearning For A Developing Economy". (2012):
- Creswell, J. W. (2013). *Qualitative Inquiry and Research Design.Choosing Among Five Approaches*.USA: Sage Publications.
- Ezenkwu, P. C., C. Aneke, and K. I. Akpabio. "AN ONLINE INTERACTIVE COMPETITION MODEL FOR E-LEARNING SYSTEM". *Nigerian Journal of Technology* Vol. 34 No. 3, (2015): 548 – 55.
- Fazeli, P., Ross, L., Vance, D. and Ball, K. (2012). The Relationship Between Computer Experience and Computerized Cognitive Test Performance Among Older Adults. *Oxford Journal*, pp.337-346.

- Finlayson, Helen et al. "E-Learning In Further Education: The Impact On Student Intermediate And End-Point Outcomes". *Centre for Education Research* ISBN 1 84478 724 9 (2006):
- Gray, D. E. (2009). *Doing Research in the Real World. 2nd Ed.* London: Sage Publications.
- Fleischer, H. (2012). What is our current understanding of one-to-one computer projects: A systematic narrative research review. *Educational Research Review*, 7(2), pp.107–122.
- Franco, F., Petracchi, C., Bruggeling, P., Santilli, R., Nadeau, A. and de Rosa, C. (2011). *E-learning methodologies A guide for designing and developing e-learning courses.* 1st ed. pp.2-8.
- Gharib, M., Zolfaghari, M., Mojtahedzadeh, R., Mohammadi, A. and Gharib, A. (2016). Promotion of critical thinking in e-learning: a qualitative study on the experiences of instructors and students. *Dove press Journal*, p.275
- Gunga, Samson, and Ian W. Ricketts. "Facing The Challenges Of E-Learning Initiatives In African Universities". *British Journal of Educational Technology* Vol 38 No 5 (2007): 896–906
- Haverila, M. (2009). The Influence of Experience, Ability and Interest on e-learning Effectiveness. *European Journal of Open, Distance and E-Learning*, pp.1 – 13.
- Ju-Yin Yanga; Yen-Chen Yenb (2016). College Students' Perspectives of E-Learning System Use in High Education. *Asian Journal of Education and Training*, 2(2): 53-62
- KASHORDA, M., & Waema, T. (2011). *ICT indicators in higher education: Towards an e-readiness assessment model.* Paper presented at the Proceeding and reports of the 4th UnontuNet Alliance annual conference
- Kituyi, G. and Tusubira, I. (2013). A framework for the integration of e-learning in higher education institutions in developing countries. *International Journal of Education and Development using Information and Communication Technology*, Vol. 9, pp.19-36.
- Kothari, C. R. (2004). *Research Methodology. 2nd Ed.* New Delhi: New Age (P) Ltd., Publishers
- Lombardi, M. M. (2007). Authentic learning for the 21st century: An overview. *Educause Learning Initiative*, 23 (1), 240-241.
- Mbithe Michael, Felistas, Redempta Maithya, and Selpher K.Cheloti. "Influence Of Teacher Competency On Integration Of ICT In Teaching And Learning In Public Secondary Schools In Machakos". Vol. 3, No. 4.2518-0169 (2016): 143-149.
- Md Osman, S., Jamaludin, R. and Fathil, N. (2016). An Analysis of Using Online Video Lecture on Learning Outcome: The Mediating Role of Student Interaction and Student Engagement. *Asian Online Journal Publishing Group*, Vol. 3, No. 2(ISSN: 2410-9991), pp.57-64.

- Melesse Tegegn, Kassahun. "The Influence Of E-Learning On The Academic Performance Of Mathematics Students In Fundamental Concepts Of Algebra Course: The Case In Jimma University". Vol.9 No. 2 (2014): 41.
- Mohammadia, Neda, Vahid Ghorbanib, and Farideh Hamidi. "Effects Of E-Learning On Language Learning". *Procedia Computer Science* ISSN 1877-0509 (2011): 464–468.
- Nahs Raqas Alotaibi, Khaled. "The Effect of Blended Learning On Developing Critical Thinking Skills". *Education Journal* Vol. 2, No. 4 (2013): 176-18.
- Nancy Mogikoyo, M., P. Pokhariyal, G. and Josiah O, A. (2014). Effects of computer and internet access and skills on attitudes towards video-based distance learning in institutions higher education in Kenya. *Prime Journals*, Vol. 3(11)(ISSN: 2315-5051), pp.926-931.
- New Media Consortium (2007). "Horizon Report, retrieved July 1, 2007 from [www.nmc.org/pdf/2007\\_Horizon\\_Report.pdf](http://www.nmc.org/pdf/2007_Horizon_Report.pdf)
- Oates, B. (2006). *Researching Information Systems and Computing*. ; London: SAGE Publications, p.286.
- Oketch, H., Njihia, J. and Wausi, A. (2014). E-learning readiness assessment model in Kenyas' higher education institutions: A case study of Nniversity of Nairobi. Vol. 5, No.6 (ISSN 2305-1493), pp.31-32
- Raafat George Saadé , Danielle Morin, Jennifer D.E. Thomas,. *Critical Thinking In E-Learning Environments*. 2012.
- Saadé, R. G., et al. Critical thinking in E-learning environments. *Computers in Human Behavior* (2012), <http://dx.doi.org/10.1016/j.chb.2012.03.025>
- Safiyeh Rajae, Safiyeh. "Effects Of E-Learning On Students' Motivation". *Procedia - Social and Behavioral Sciences* ISSN 1877-0428 (2015): 423 – 430.
- Songkram, Noawanit, and Jintavee Khlaisang. "E-Learning System To Enhance Cognitive Skills For Learners In Higher Education: A Review Of Possibly Open Education". *International Journal of the Computer, the Internet and Management* Vol.21 No.1 (2013): 17-23.
- Sung a, Y., Chang b, K. and Liu, T. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. *Computers & Education*, pp.252-275.
- Trilling, B., & Fadel, C. (2009). 21st century skills: Learning for life in our times. San Francisco, CA: Jossey-Bass.
- Tunmibi, Sunday, and Ayooluwa Aregbesola. "Impact of E-Learning And Digitalization In Primary And Secondary Schools". *Journal of Education and Practice* Vol.6, No.17.ISSN 2222-1735 (2015): 53-57.



Yengin, I. and Lazarevic, B. (2018). Mobile Apps for Learning Argumentation Skills: Exploring Student Perception of Dialog Games on Tablet Devices. *International Journal of Information and Education Technology*, Vol. 8(No. 2).

Yusuf, Nadia, and Nisreen Al-Banawi. "The Impact of Changing Technology: The Case Of E-Learning". *Contemporary Issues in Education Research* Volume 6, Number 2 (2013): 174-180.

# APPENDICES

## Appendix 1: Sample Questionnaire



UNIVERSITY OF NAIROBI  
College of Biological and Physical Sciences  
School of Computing and Informatics (SCI)

### Research Component

INFLUENCE OF TABLET USE ON COGNITIVE SKILL AND CRITICAL  
THINKING SKILL ATTAINMENT OF LEARNERS IN KALAWA PRIMARY  
SCHOOL, KITUI COUNTY

### LEARNERS' QUESTIONNAIRE

#### KALAWA PRIMARY SCHOOL

**Dear respondent,**

I am conducting a research on the influence of tablet use on cognitive skill and critical thinking skill attainment of learners in Kalawa primary school, Kitui County. The goal of this study is to assess the knowledge and skills pupils have gained with the introduction of e-learning through integration of tablet for e-learning. The research findings will be kept confidential and will be used for academic purposes only. Please complete the following questionnaire with specific regard to the above enquiry, by placing a tick in the appropriate box

**SECTION ONE: GENERAL INFORMATION**

a. Gender:

**MALE** [ ]      **FEMALE** [ ]

b. Class of study? (Please tick one)

**PRE-UNIT** [ ] **NURSERY** [ ] **ONE** [ ] **TWO** [ ] **THREE** [ ] **FOUR** [ ]  
**FIVE** [ ] **SIX** [ ] **SEVEN** [ ] **EIGHT** [ ]

c. Which category is your primary school? (Please tick one)

**BOYS DAY SCHOOL** [ ]      **GIRLS DAY SCHOOL** [ ]

**GIRLS BOARDING SCHOOL** [ ]      **GIRLS BOARDING SCHOOL** [ ]

**MIX DAY SCHOOL** [ ]      **MIXED BOARDING SCHOOL** [ ]

d. Are you using e-learning system for your learning process?

**YES** [ ]      **NO** [ ]

If yes continue filling Section B

**SECTION TWO: E-LEARNING INDICATORS**

Rate the following indicators

Specify level of your agreement with statements below by checking at the appropriate box. Use the ratings as: 1 = Strongly Disagree [SD], 2 = Disagree [D], 3 = Uncertain [U], 4 = Agree [A], 5 = Strongly Agree [SA]

		<b>1 Strongly Disagree</b>	<b>2 Disagree</b>	<b>3 Neutral</b>	<b>4 Agree</b>	<b>5 Strongly Disagree</b>
<b>Learner Competence in Tablet Use</b>						
1.	I have been taken through basic training in tablet use					
2.	I can teach instructor how to use some of the software for learning					
3.	I am able to record and play a voice or video during the class period					
4.	I am able to type or format a word document					
5.	I am able to browse/search for answers using search engines					
6.	I am able to navigate easily through folders and learning software					
<b>Attitude Towards Tablet Use</b>						
1.	I feel confident in using a tablet					
2.	I believe using a tablet for learning is an important tool					
3.	I enjoy using a tablet for my learning					
4.	I feel more comfortable in using a tablet for learning					
5.	Tablet use promote active learning					

<b>Access to Tablet Use</b>						
1.	I am allowed to carry the tablet to home when necessary					
2.	School has set an adequate time for learners to use the tablet					
3.	There is an availability of tablet trainer to support learners to use a tablet					
4.	The school is connected to a reliable power supply to ensure accessibility of the learning process without interruption					
5.	The ratio of child to the tablet is sufficient for conducive learning					
6.	The computer labs are sufficient for the conduct of e-learning					
7.	Permission to get information on e-learning platform is unlimited					
8.	Reliable Internet connectivity has been installed in the school					
9.	The tablet has given me an opportunity to learn from other schools					
<b>Method of Teaching with Tablet</b>						
1.	Tablet enables the use of audio-visual i.e. audio, video and pictures for learning					
2.	Tablet helps create an engaging PowerPoint presentation					
3.	Tablet connects to the internet for the search for information online					
4.	Use of tablet for learning process allows the use of the discussion forum					

5.	Tablet helps create interactive content					
6.	Tablet enables educational games and simulations in the classroom					
<b>Perceived Benefits of Tablet Use</b>						
1.	The class has become more interactive and enjoyable					
2.	Use of tablet has improved my confidence in learning					
3.	Use of tablet has improved my attention to learning					
4.	Tablet motivates me to learn					
5.	Use of the touchscreen is enjoyable					
6.	Accessibility to information is easier and faster					
<b>Learning Attainment</b>						
<b>Cognitive Skill Attainment</b>						
1.	Teaching instructor on tablet use helps to expand on what I know and make connections					
2.	Acquired basic skill on tablet use assists to solve a math problem					
3.	Basic training on the use of tablet influence me in playing brain games					
4.	Ability to navigate easily helps to maintain focus during learning					

5.	Confidence in tablet use aid in organizing ideas					
6.	Comfortability in tablet use, assists to make a quick decision					
7.	Enough time spent on the use of tablet helps to remember information					
8.	Availability of trainer to support the use of tablet aids to find out new ideas					
<b>Critical Thinking Skill Attainment</b>						
9.	Availability of internet use enables to look for reasons, explanations, and meaning during learning					
10.	Use of audio-visual during the learning process facilitates to clarify my thinking and to be creative in writing					
11.	Games and simulations produce improved communication and discussion within the classroom					
12.	Use of pictures, audios, and videos facilitates to remember information					
13.	Use of pictures, audios and videos helps to read actively					
14.	Ability to search information, aids in finding out new information					
15.	Good attention due to tablet use influences the ability to be alert to potential errors					
16.	Level of confidence influence me to be creative in writing					
17.	Ease of accessibility of information on the use of tablet influence me to active to act on opportunities					

18.	Level of interaction helps to seek help/ ask questions when necessary					
19.	Good attention due to tablet use helps to build proper sentence and active to act on opportunities					
20.	Ability to organize ideas has helped me to be creative in writing					
21.	Ability to remember the information has enabled me to build a proper sentence					

...End...

Thank you for your feedback



## Appendix 2: Reliability Test Results

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
I have been taken through basic training in tablet use	225.47	517.820	.723	.956
I can teach instructor how to use some of the software for learning	225.67	516.589	.782	.956
I am able to record and play a voice or video during the class period	225.97	508.127	.582	.957
I am able to type or format a word document	226.47	506.877	.522	.957
I am able to browse/search for answers using search engines	226.53	508.701	.439	.958
I am able to navigate easily through folders and learning software	226.03	502.834	.570	.957
Learner Competence in Tablet Use	226.03	509.669	.855	.956
I feel confident in using a tablet	225.49	513.355	.710	.956
I believe using a tablet for learning is an important tool	225.53	515.624	.644	.956
I enjoy using a tablet for my learning	225.55	514.495	.698	.956
I feel more comfortable in using a tablet for learning	225.55	516.304	.629	.956

Tablet use promote active learning	225.79	505.816	.588	.957
Attitude Towards Tablet Use	225.59	512.894	.882	.956
I am allowed to carry the tablet to home when necessary	227.81	540.627	-.262	.959
School has set adequate time for learners to use of tablet	225.95	497.305	.781	.956
There is an availability of tablet trainer to support learners to use of tablet	226.23	493.541	.698	.956
The school is connected to a reliable power supply to ensure accessibility of the learning process without interruption	225.45	516.790	.695	.956
The ratio of child to tablet is sufficient for conducive learning	225.95	518.465	.388	.957
The computer labs are sufficient for the conduct of e-learning	226.13	505.360	.511	.957
Permission to get information on e-learning platform is unlimited	227.19	515.918	.274	.959
Reliable Internet connectivity has been installed in the school	227.67	528.508	.085	.959
The tablet has given me an opportunity to learn from other schools	226.07	516.221	.355	.958
Access to Tablet Use	226.50	514.036	.828	.956

Tablet enables the use of audio- visual i.e. audio, video and pictures for learning	225.53	514.280	.797	.956
Tablet helps create engaging PowerPoint presentation	226.45	511.106	.449	.957
Tablet connects to the internet for search of information online	227.49	550.910	-.435	.961
Use of tablet for learning process allows the use of discussion forum	225.61	518.017	.477	.957
Tablet helps create interactive content	225.57	515.746	.768	.956
Tablet enable educational games and simulations in the classroom	225.51	517.040	.722	.956
Method of Teaching with Tablet	226.03	520.788	.772	.957
The class has become more interactive and enjoyable	225.47	515.372	.769	.956
The use of tablet has improved my confidence in learning	225.55	521.017	.400	.957
Use of tablet has improved my attention in learning	225.43	513.361	.834	.956
Tablet motivate me to learn	225.55	521.554	.541	.957
Use of touch screen is enjoyable	225.49	516.007	.754	.956
Accessibility to information is easier and faster	225.51	511.076	.724	.956

Perceived Benefits of Tablet Use	225.50	516.265	.883	.956
Teaching instructor on tablet use helps to expand on what I know and make connections	225.55	513.434	.790	.956
Acquired basic skill on the tablet use assists to solve math problem	225.59	523.533	.367	.957
Use of pictures, audios and videos facilitates to remember information	225.49	519.876	.580	.957
Use of pictures, audios and videos helps to maintain focus during learning	225.55	517.734	.613	.957
Ability to search information aids in finding out new information	225.59	511.094	.616	.956
Ability to navigate easily helps to read actively	225.53	513.886	.887	.956
Confidence in tablet use eases in organizing ideas	225.49	521.776	.315	.958
Comfortability in tablet use assists to make quick decision	225.55	516.657	.776	.956
Enough time spent on the use of tablet helps to remember information	225.47	515.920	.548	.957
Availability of trainer to support on use of tablet aids to find out new ideas	225.75	511.396	.537	.957

Good attention due to tablet use influences the ability to be alert to potential errors	225.61	515.781	.609	.957
Level of confidence influence me to be creative in writing	225.67	522.737	.445	.957
Ease of accessibility of information on the use of tablet influence me to active to act on opportunities	225.51	512.434	.678	.956
Level of interaction helps to seek help/ ask questions when necessary	225.79	514.936	.508	.957
Good attention due to tablet use helps to build proper sentence and active to act on opportunities	225.59	513.255	.688	.956
Availability of internet use enables to look for reasons, explanations and meaning during learning	227.85	539.900	-.190	.960
Use of audio-visual during the learning process facilitates to clarify my thinking and to be creative in writing	225.77	511.503	.597	.956
Games and simulations produce improved communication and discussion within the classroom	225.67	517.047	.602	.957
Basic training on use of tablet influence me in playing brain games	225.57	510.839	.665	.956

Ability to organize ideas has helped me to be creative in writing	225.57	516.680	.671	.956
Ability to remember the information has enable me build proper sentence	225.51	511.755	.829	.956
Learning Attainment	225.70	516.503	.933	.956

## Appendix 3: University Research Permit



**UNIVERSITY OF NAIROBI  
COLLEGE OF BIOLOGICAL AND PHYSICAL SCIENCES  
SCHOOL OF COMPUTING AND INFORMATICS**

Telephone: 4447870/4446543/4444919  
Telegrams: "Varsity" Nairobi  
Telefax: +254-20-4447870  
Email: [director-sci@uonbi.ac.ke](mailto:director-sci@uonbi.ac.ke)

P. O. Box 30197  
00100 GPO  
Nairobi, Kenya

Our Ref: UON/CBPS/SCI/ MSC/ITM/2016

22 March 2018

The Head Teacher  
Kalawa Primary School  
P.O. Box 15  
Kalawa ,Kitui

Dear Sir/Madam

**RE: RESEARCH PERMIT – DENIS YEGON REG. NO. P54/86149/2016**


The above named is a bona fide student pursuing an MSc course in Information Systems at the School of Computing and Informatics, University of Nairobi. He is currently carrying out his research on the project entitled "*Influence of Tablet use on Cognitive Skill and Critical Thinking Skill Attainment of learners in Kalawa Primary School, Kitui County.*"

The project involves gathering relevant information from various institutions and he has informed the office that he would wish to carry his research in your organization.

We would be grateful if you could assist Mr. Yegon as he gathers data for his research.  
If you have any queries about the exercise please do not hesitate to contact us.

Yours sincerely

**School of Computing & Informatics  
University of NAIROBI  
P. O. Box 30197  
NAIROBI**

  
DR. AGNES N. WAUSI  
DIRECTOR  
SCHOOL OF COMPUTING AND INFORMATICS

ANG/jsn

## Appendix 4: Research Authorization



### NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,  
2241349, 3310571, 2219420  
Fax: +254-20-318245, 318249  
Email: dg@nacosti.go.ke  
Website: www.nacosti.go.ke  
When replying please quote

NACOSTI, Upper Kabete  
Off Waiyaki Way  
P.O. Box 30623-00100  
NAIROBI-KENYA

Ref. No. **NACOSTI/P/18/51272/22012**

Date: **5<sup>th</sup> April, 2018**

Denis K Yegon  
University of Nairobi  
P.O Box 30197-00100  
**NAIROBI.**

#### **RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on *“Influence of tablet use on cognitive skill and critical thinking skill attainment of learners in Kalawa Primary School, Kitui County,”* I am pleased to inform you that you have been authorized to undertake research in **Kiambu and Kitui Counties** for the period ending **5<sup>th</sup> April, 2019.**

You are advised to report to **the County Commissioners and the County Directors of Education, Kiambu and Kitui Counties** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

  
**BONIFACE WANYAMA**  
**FOR: DIRECTOR-GENERAL/CEO**

Copy to:

The County Commissioner  
Kiambu County.

The County Director of Education  
Kiambu County.

*National Commission for Science, Technology and Innovation is ISO9001:2008 Certified*



## Appendix 5: License to Conduct Research

**THIS IS TO CERTIFY THAT:**  
**MR. DENIS K YEGON**  
of UNIVERSITY OF NAIROBI, 0-20210  
LITEIN, has been permitted to conduct  
research in *Kiambu , Kitui Counties*

on the topic: **INFLUENCE OF TABLET  
USE ON COGNITIVE SKILL AND CRITICAL  
THINKING SKILL ATTAINMENT OF  
LEARNERS IN KALAWA PRIMARY  
SCHOOL, KITUI COUNTY**

for the period ending:  
**5th April, 2019**

  
Applicant's  
Signature

Permit No : NACOSTI/P/18/51272/22012  
Date Of Issue : 5th April, 2018  
Fee Recieved : Ksh 1000



  
Director General  
National Commission for Science,  
Technology & Innovation

### CONDITIONS

1. The Licence is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.



REPUBLIC OF KENYA



National Commission for Science,  
Technology and Innovation

RESEARCH CLEARANCE  
PERMIT

Serial No.A 18139

CONDITIONS: see back page

**Appendix 6: Tablet Tool Kit**

