

**IMPACT OF BLENDED APPROACH MODEL IN TEACHING AND LEARNING FOR
HIGH SCHOOL STUDENTS IN KIRINYAGA COUNTY**

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NAIROBI**

DECLARATION

I declare that this research report is my original work and has not been presented for any degree in any institution

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DEDICATION

This work is dedicated to the Ministry of Education, all ICT teachers and administrators so that they can understand effects of integrating blended techniques in teaching and learning in high school.

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Abstract

Integration of information and Communication Technology has been a great contributor in Kenyan economy. In the recent years, Government, Non-government organization and private institutions have all been gearing to accommodate ICT in their functions. In this changing environment, Education cannot be exceptional. This work presents a framework on how ICT can be integrated in Educating Research, Teaching and managing challenges that are present in Education sector. With the current transition of curriculum from 8.4.4 to 2.6.6.6, the mode of study will be student oriented. Therefore, both teachers and learners need to be embrace ICT in the system.

CHAPTER ONE

INTRODUCTION

Change is inevitable and equally necessary in different stages of most procedures we encounter in different stages of our life. It is entirely dependent on us to take up the positives from the change and exclude the unpleasant ones. The Kenyan education system is no exception to this factor. Teaching and learning are not necessarily linked to schools; instead, it is a process that we participate in on a daily basis (Andersson & Grönlund, 2009). During the colonial era, schooling was discriminating allowing only the British and few Kenyans to enroll in classes. Formal education was made compulsory for each Kenyan a few years after independence. Management of learning institutions was under the Kenyan Government; this posed new obstacles in the management sector, as it was new to them. Learning institutions were few and costly for Kenyans to enroll in. The low turns up was also facilitated by the low affordability power by the citizens to sign up for classes. Over the past two decades, the education system has been subject to numerous changes aimed at improving the education level among citizens in the country. Programs such as Free Primary Education, Free Secondary Education, and partial fee payment for university undergraduates have been put in place to enable access to formal education.

The basis of this study is to investigate the status of e-learning readiness in public secondary schools in this county given the agreement by educators and policy makers across the world on the importance of ICTs to the future of education. The Ministry of Education has a concrete policy on ICT integration into education and training systems in Kenya. Mainly, this study focusses on the effect of e-learning readiness on e-learning adoption in secondary schools in this county, and specifically to assess the level of preparedness of public secondary schools in this county to implement E-learning so as to enhance access, equity and quality in secondary education (Ayere et al., 2010). According to the study, public secondary schools in Kenya lack adequate ICT infrastructure and connectivity to support effective E-learning delivery. These schools face major obstacles which can make E-learning very difficult to implement. A small number of the schools confirmed that they get relevant E-learning materials; whereas the remaining half complained about not receiving relevant material from the internet (Creswell, 2016). Let us note that the internet is a pool of knowledge that requires some sort of filter, otherwise irrelevance might become a bigger problem than it looks. As a matter of fact, only a

third of the schools claimed to have a reliable source of internet required to support e-learning. A majority of the remaining two thirds were connected to the internet alright, but lacked a secure connectivity. The region experienced power blackouts and occasionally brownouts, with some interviewees acknowledging a trio power outage within just a single week.

All along, old methods of teaching have been in use by lectures and written materials for teaching and learning, for the past two decades of formal education. This method has been successfully put in place effectively. It is associated with convenience and practicability. With the daily advancements in technology, a gap has been created on the possible use of technology in educating people. Geographical barriers, pandemics, and insufficient teachers are some of the major reasons that have led to the option of formulating a blended learning model with both online and physical learning simultaneously (Broadley, 2007). The blended learning model will enable a student to access learning content via the internet from any location. This will cut traveling costs and increase convenience. The government in an aim to accomplish this blended model has come up with a research team that will research the possible way of implementing this project. A deep look into the blended online format requirements, possible implementation model, assumed budget and possible time for implementation were some of the tasks put on paper for research. The following is a possible way of formulation and implementation of the proposed blended learning system in Kenya.

1.1 Background

A massive transition in the education department has been observed over the past couple of years regarding the application of internet usage and technology in learning. It has proven to be more effective than the previous learning methods. Most education stakeholders insist on the necessary curriculum adjustments to keep up with technological advancements though they have not pointed out specific extents of the modifications. Parents, students, and teachers all have a mutual feeling that incorporating computing and technology in learning will equip learners with vital skills in the changing world; this will be vital and involuntary for survival and progress (Apitep & Dolly, 2011). Blended learning is considered a modern method that helps solve the knowledge explosion problem, growth in demand for education, and reducing overcrowding in lectures. The availability of low barriers to entry into education, ability to enlighten and train,

employed worker's rehabilitation without running them into unemployment, and illiteracy elimination have also been achieved through blended learning (Lwoga, 2012). Blended learning certainly increases effectiveness, reduces time environment required for training, flexibility in the time and location for learning, gives way for live interviews and discussions on the net, provide up to date information for learners, provides simulations, animations, practical, and exercises for the practical works.

In the twenty-first century, blended learning is considered trendy for the teacher. It can be viewed as a method of enlightenment where diverse methodologies to achieve desired results are deployed purposefully to spread knowledge to learners. Additionally, the blended mode of learning combines the merits of e-learning and the benefits of classroom education; education type is based on the merging of traditional learning and e-learning. Blended learning has several definitions; according to one scholar Ismail, 2009; who argues of technological innovations in blending two methods of education face-to-face as well as distance education to achieve the faculty member of being a teacher or a mentor with learners face-to-face through these innovations. This level of ingenuity does not require specific electronic equipment or wisdom but rather deals in the quality of available of learning sources linked with content and learning activities. According to Makhanu (2010), sees it as a way of learning to help the learner achieve targeted outcomes by blending traditional education forms and e-learning with its patterns inside and outside the classroom. Blended learning can hereby be viewed as providing a physical communication channel, to be distinguished from other forms of mixed e-learning, and should increase the interaction among students; students and their tutors; and inform how students communicate with one another. Students need content that should come at a reduced teaching cost and enhancement of humanitarian aspects are some of indications on blended learning phenomenon. Blended learning is beneficial in the sense that it works simultaneously with the traditional model of education, thus maximizing learning results. It has also minimized the effort and resources required to achieve desired results.

Ouma et al. (2013) acknowledge that Kenya as one of the African countries has also made remarkable progress putting in place an ICT policy framework and implementation strategy complete with measurable outcomes and time frames. The process has had the benefit of sound

advice from officials and stakeholders and, perhaps more importantly, strong leadership from the office of the Permanent Secretary of the Ministry of Education. The top official also highlights some of the challenges hampering universal implementation from lack of resources, national ICT infrastructure, and even electrical supply - particularly in the rural areas. The researcher has also noted other silent yet important challenge which is the level of computer literacy among teachers in our schools. There is great improvement in Information and Communication Technology (ICT) implementation in education in Africa as a whole as Nyangorme (2014), observed in the African countries they surveyed. South Africa is clearly outstanding in African terms of being able to move its ICT agenda forward.

On the other hand, countries of North Africa that have both resources and high bandwidth connectivity with Europe have also been able to make excellent progress in implementing their ICT plans. Traditional educational methods such as lectures and textbooks have been replaced by Internet-Based Education (IBE) legitimately as an instruction method. IBE was developed to present teaching content using information and communication technologies ranging from integration of presentation slides and virtualization (Mulwa & Ndunge, 2011). Many learning institutions all over the world have embraced traditional teaching and learning methods such as face-to-face learning, textbooks, booklets, and verbal interactions. Lecturers and students have a fixed physical location for teaching and learning. Note that physical interaction enhances much more bonding; however, many students cannot be taught by the few available lectures. The advancements in information and technology globally and particularly in Kenya recently, this blended learning phenomenon has changed slowly due to electricity spread; however, more investment by the government is required to reach more citizens.

1.2 Statement of the Problem

Recently, the Kenyan government has successfully launched several initiatives, such as free secondary education, to increase enrollment in secondary schools in the country. It is a one-to-one reflection of activities in line with the Millennium Development Goals set by the government for the development of the education sector. As a result of these efforts, the number of secondary school students has almost doubled, raising the belief and sentiment that Kenya is heading for Education for All (EFA) (Awuor & Gitonga, 2014). Unfortunately, Kenya's

education system faces far greater obstacles than expected. These failures include: There are too many students compared to the number of teachers, there is a shortage of learning facilities nationwide, and there is a shortage of learning facilities and resources such as books, laboratories and libraries. This has had a profound impact on the quality of education at the secondary school level over time. Although e-learning has not been fully and successfully implemented in information and communication technology education, it is a remarkable solution to overcome these challenges arising from the lack of adequate facilities at the secondary school level. There are already some examples of e-learning models, but none have effectively incorporated e-learning at the secondary school level. The inspiration for developing such research was strongly influenced by the existence of such e-learning models.

1.3 Research questions

- i. What is the level of preparation for e-learning in a public secondary school in a county in Kenya?
- ii. What is the extent to which e-learning is adopted in public secondary schools in Kenyan counties?
- iii. What is the impact of e-learning preparation on the dissemination of e-learning in public secondary schools in Kenyan counties?

1.4 Justification of the Study

This study aims to clarify the extent to which e-learning is practiced in Kenya. It also shows the level of preparation for secondary schools regarding the implementation of e-learning strategies. This survey will help the Kenyan government provide important information on the factors that have influenced the implementation of e-learning in secondary schools and provide guidance on areas that need improvement. In addition, this study provides insights into student and teacher perceptions about the use of ICT tools and devices in the classroom and suggests how ICT learning and education can be used to improve user participation (Ngamau, 2013). I am. Governments will also be able to estimate and allocate funds for possible budgets for the implementation of the model. The survey also provides secondary school curriculum developers with important information that enables them to meet the diverse needs of students in different geographic regions. Distance learning is also achieved. In general, this study allows secondary

school managers to select the best, easiest, and fastest means of delivering and accessing content for teachers and students using information and communication technology. It can pave the way for implementing e-learning in schools.

The broader definitions used for the purposes of this project include the use of the Internet, intranets / extranets, audio and video tapes, satellite broadcasts, interactive television, compact disc read-only memory (CDROM), and other storage media. Included. Not only for content delivery, but also for interaction between teachers, students, and all stakeholders. Scholars say that technological advances have been the main inspiration for e-learning, starting with the incorporation of broadcasting in the 1920s. Murenzi (2009), as time goes on, more and more people will have access to the Internet. We have observed that they say that the cost of owning a computer has decreased and overall computer literacy has improved. These trends provide educational institutions with the ideal channel for delivering educational content. In addition, we found that e-learning is a whole new learning environment for students and requires a variety of skills to succeed. This is also recognized in New Media, adding that critical thinking, research, and evaluation skills are more important benefits. This requires students to increase and categorize the amount of information from different sources.

1.5 Research objectives

1.5.1 Overall objective

The central aim is to develop an e-learning model that is usable in Kenyan secondary schools. It should be possible to accommodate any school in any part of the country. Specifically, the objectives were:

- i. To determine the level of preparation for e-learning in a public secondary school in a county in Kenya.
- ii. To determine the extent to which e-learning is adopted in public secondary schools in Kenyan counties.
- iii. To determine the impact of e-learning preparation on the dissemination of e-learning in public secondary schools in Kenyan counties.

1.5.2 Specific objectives

- i. Investigate the level and factors of successful implementation of e-learning at the secondary school level in Kenya.
- ii. Determining factors that influence the implementation of e-learning in secondary schools in Kenya, identifying possible solutions to the problem.
- iii. This identifies the phases of the e-learning implementation and the specific content of each phase.
- iv. We propose an e-learning implementation model that can be used in public secondary schools in Kenya.

1.6 Assumptions of the study

It was assumed that the number of students in the sampled schools was an actual representation of the situations in other secondary schools in the country. Availability of electricity was presumed to be available in all the schools at all times and back necessarily available. Teachers in the sampled schools were 75 percent computer literate, which was the expected state for all the other schools in a similar category (Martin, 2011). The familiarity of computer use among students was assumed to be at a basic level with the expectation of gradual improvements all over the school. The expectation from the responses of interviewees was that they were honest to the core and as a representation of the actual situation in the schools. It was assumed that both the students and teachers were ready to adapt to the system with ease. The e-learning model was assumed to be applicable and executable in all of the schools in the country. The citation from which information was gathered was assumed to have been conducted without any subjectivity. Finally, the international institutions sponsoring the project are assumed to be genuine and will keep their promise of supporting the implementation of the model and see its growth to the best capacity.

The information obtained from the survey is very important to school leaders and all educators. This is to help assess how your investment in e-learning has contributed to the quality of education, improve your weaknesses and maintain your strengths. Other stakeholders in other schools planning or implementing e-learning programs will also benefit from this study by learning from the challenges of others and improving them before avoidable costs are incurred

(Masoumi & Lindström, 2011). Academically, the proposed research aims to contribute to the impact on existing literature, especially quality education, in the field of general e-learning. This research will also be the basis for further research. Researchers did not come across a study focused on the level of preparation for e-learning in the county's public secondary school, so this study filled this knowledge gap by answering the following study questions: Public secondary schools in the county are ready for e-learning programs, and how does this affect e-learning adoption?

1.7 Scope of the Study

The study generally targeted secondary schools all over the country to increase the information to be compiled. Kenya has at least 10,413 secondary schools distributed across 47 counties (Afshari et al., 2010). In a sample size of 15 schools per county, the study was carried out. These numbers of schools were issued with questionnaires with ten questions with a time frame of one hour. Most questions were open-ended to enable the collection of the most diversified form of information. The students were given the freedom to answer questions without interventions to avoid information compromise by surrounding people. It was carried out systematically from county to county, which seemed cost-effective. Interviews with teachers in the schools were the best method to significant first-hand uncompromised data. The personal level encounter with the teachers was also an advantage as authenticity was assured. This leads to the identification of genuine findings and conclusions later. The management boards of schools in all of the counties were also interviewed to get their perception of the proposal. Their level of preparedness financially and structurally was the aim of involving them. The county governments, in partnership with the national government, were also made a part of the research for the central part of the implementation process.

1.8 Limitation of the Study

It was not clean to set apart time for each instructors and college students to reply questionnaires, specially for the duration of magnificence time, bearing in thoughts that this studies needed to be executed for the duration of faculty days. It changed into hard for the reason that researcher needed to look forward to spoil instances whilst respondents have been to be had and really confined time. The frequency of touring the facts reasserts changed into frequent; In maximum

cases, the researcher needed to visit colleges extra than once, consequently growing fees and wastage of time for the duration of travelling for respondents. In a few colleges, to the quantity that a few respondent's ideas that the authorities changed into engaging in a desires evaluation to offer ICT equipment. This affected their responses to a few questions withinside the questionnaires because of anxiety. Because of the big numbers concerned in answering the questionnaires, it was not clean to get again all questionnaires remembering that the respondents needed to fill them of their unfastened time. It changed into hard to steady interview time with the faculty principals because of their busy schedules due to the fact the studies changed into executed at a time whilst colleges have been getting ready their applicants to take a seat down for the KCSE. Some instructors additionally regarded bored to death withinside the interviews as they noticed e-studying as their process replacement.

1.9 Definition of Key Terms

E-learning: This is the use of electronic media in content delivery and knowledge acquisition; the use of information and communications technologies to support both individual and institutional educational goals (Broadley, 2012). Information and communications technologies here mentioned may include the use of computers and other computer related gadgets, storage media such as CDs, DVDs, and memory cards, use of projectors and smart boards, among others, in a bid to pass content from the teacher to learner effectively. Implementation: This refers to the carrying out, execution, or practice of a plan, a method, or any design, idea, model, specification, standard, or policy for doing something. As such, implementation is the action that must follow any preliminary thinking in order for something actually to happen (Andersson & Grönlund, 2009). E-learning readiness: implies the mental or physical preparedness of a school to amalgamate modern technology in class for content delivery. Achievements: In Chapters 4 and 5 of this study, e-learning in public secondary schools in Kenya by tracking the number of days before implementation of the data through the data collected using statistical analysis. I used achievements to show the implementation. ICT: Refers to the use of technically integrated information.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

ICT is powerful in presenting or expressing information in a variety of ways. This is always done through various formats, text and images or tables and graphics, called multimedia presentations, or through the possibility of dynamically changing, such as a mathematical modeling and visualization of complex processes in science. According to Awuor and Gitonga (2014), ICT refers not only to the latest computer and internet-based technologies, but also to basic audiovisual equipment such as slides and slides, tape and cassette recorders, and radios. Videocassettes and TVs; and movies.

2.1.1 Background on E-learning

We consider e-learning to be any learning process and rely on effective communication of human knowledge via face-to-face classes or the Internet. He added that e-learning is also very effective when there is two-way communication between teachers and learners, and between learners. Another researcher goes back to the two way (Synchronized) challenge to how the concept of e-learning was introduced into electronic networks or CD-ROMs. Such an approach relies on one-way communication from the teacher to the learner, thus reducing the learning experience (Manduku et al., 2012). It considered the learner as an atomized individual and did not consider the social context in which the learning took place. According to Naman, e-learning is a tool that can be used to promote interactive and collaborative engagement. This is either synchronous or asynchronous. Learners and teachers hold regularly scheduled meetings or (more generally) use electronic forums at their own time, whether or not they all "meet" online at the same time. You can exchange ideas.

The most well-known form of synchronous electronic communication is text-based two-way real-time online chat, which is widely used in e-learning. In addition, another researcher not only sees synchronous instruction as the physical presence of teachers and students in the same place, but also uses information and communication technology to mimic traditional classroom perimeters, such as virtual classrooms. You can also include a more sophisticated form of synchronization instruction. This may include the use of video conferences and shared electronic

whiteboards, allowing either teachers or learners to create and modify learning materials in real time (Mutua & Ng'eno, 2016). Ideally, asynchronous instructions allow participants to control their schedule and adapt their learning to other commitments. This is a big bonus, especially for adult learners who live complex lives. Many of the technologies used in asynchronous e-learning also enable two-way communication between learners and teachers, or multi-directional collaborative communication between learners.

2.2 The extent to which e-learning implementation has been successful in secondary schools in Kenya

ICT addresses the issues of access and equity in education, thereby providing students with equal opportunities and thereby reducing discriminatory communication patterns. The Kenyan government is supporting the introduction of ICT in secondary schools and sees it as an important step in the production, communication and information sharing of knowledge between students and teachers. However, E-learning Africa Report (2013) claims that many secondary schools have computers, but these computers are underutilized (International Telecommunication Union (ITU). ICT integration in Kenya's education sector Small-scale, experimental, telecommunications under the Ministry of Education as a secondary school subject, led by the Kenyan government. Many development partners and NGOs have supported government implementation initiatives, including the ICT Global Alliance, ICT Trust Fund, Kenya, Microsoft, Intel, and Cisco School Computers. The results of e-learning by the Kenyan government include powering more than 300 local schools, equipping more than 500 public secondary schools with computer-related educational and learning tools, and leading the implementation of e-learning. Includes the establishment of a school unit. Introduce e-content for secondary schools and partner with development partners, NGOs and international companies to provide the infrastructure needed by secondary schools to computers. The deployment of eContent for secondary schools was carried out by KICD in March 2010, and Kenya is the first country in sub-Saharan Africa to deploy digital content for eLearning in schools. Intel has launched a program at Kamity Secondary School where students can study using a computer with an interactive educational program. As of 2009, the ratio of computers to secondary school level students in Kenya was 1: 150. The fact that secondary schools do not require the use of ICT, combined with the negative attitudes of school leaders towards the use of computers and the

Internet, further discourages learners from maximizing e-learning. Increase. At secondary schools in Kenya, the effectiveness of e-learning has not yet been felt. According to Broadley (2012), most secondary schools have some computer equipment, but very few have the basic infrastructure needed for education and learning. To implement e-learning, the Kenyan government has selected several public secondary schools. Construction of ICT infrastructure with 5 schools from each district, totaling 1021 secondary schools. The government purchased projectors and computer systems, trained teachers, funded schools to facilitate internet and LAN connections, and KICD signed a contract to provide digital content to selected schools.

Despite government efforts, the availability and use of ICT in secondary schools is still inadequate. Although ICT was introduced by the government into the education sector, the lack of reliable, high-quality data and the lack of guidelines for establishing relevant and comparable indicators are the complete e-learning in secondary school. It is hindering implementation. Most secondary schools have not yet implemented e-learning, so government efforts have been less successful. The government is determined to integrate ICT into public secondary schools across the country. Despite the recognition of its role in the country's economic development, some schools offering themes have a limited number of students taking the subject. A study by Madar & Oso (2014) states that half of the students in math, language, and humanities were not taught on computers, but more than half were taught on computers in science. According to her research, computers were used for education in NEPAD schools.

2.2.1 Types of E-learning

In literature, various types of e-learning are described by using the criteria time and distance. The following table gives a brief overview of these ‘types’ of e-learning.

	Near in place	Partly distant in place	Distant in place
Distant in time	Asynchronous e-learning. For example, talking a self-paced course, exchanging e-mail messages with a mentor and posting messages about a topic to a discussion group.		
Distant in time			Trainers and trainees never meet. For example, courseware distributed via the internet and

			communication via e-mail only
Partly distant in time	Face-to-face training is combined with for example electronic conferencing within one organization or campus.	Trainers and trainees meet for a kick off, and for an evaluation. The learning goes on at a distance in time and place.	Trainers and trainees use for example IRC or other tools to communicate about a problem or the courseware.
Near in time	Synchronous e-learning: communication occurs at the same time between individuals and information is accessed instantly. For example, real time chats, audio or video conferencing.		
Near in time			Trainers and trainees do not meet physically, but by using for example a video conferencing system a course is given or students are able to ask questions.

Table 2.1: Types of e-learning

As shown in the table above, variations in the configuration of e-learning offerings can be explained by several attributes. As you can see from the table above, the extent to which e-learning technology is used to offer courses varies greatly. The components of the e-learning course can be described by specifying which of the two attribute values for each dimension applies. E-learning can be synchronous (real-time) or asynchronous (flexible). Synchronized e-learning includes technologies such as video conferencing and electronic whiteboards that students must be present when delivering content (Broadley, 2012). Asynchronous applications include programmed instructions and tutorials that allow students to work through their own pace and your own time. Most of the courses available on the Internet are based on this asynchronous model. Students are involved in the appearance of distributed places such as distance education and the same place. ELEARNING applications also differ in cooperation that they contain them. Some courses are completely independent individuals, but others include group learning groups such as discussion forums and chat rooms.

The type of course delivery can be a completely electronic, with or without an instructor or a more mixed approach that integrates electronic and educational delivery to varying degrees. Many current e-learning products follow the latter mode and utilize different delivery modes.

There are many important steps in developing and delivering a successful Radiant Systems learning program. The first step is to perform a detailed analysis and create a training plan that will result in the most efficient and effective learning solution (Broadley, 2012). This is followed by a mixed training approach that includes classroom training, synchronous and asynchronous online training, and supporting printed matter. Training for a wide range of comprehensive training involves a changing audience. Step 3 is to develop interactive, viewer-related e-learning content. This includes both reasons and methods of attracting learners and improves overall knowledge retention. Step 4 brings e-learning to market through a variety of media that prepare and engage users in new ways of providing training. The fifth step is to ensure that you have enough time for e-learning in the workplace to support this type of learning and allow managers to learn at their own pace. Step 6 blames the learner regardless of the delivery mode selected by tracking the results and linking them to performance assessments. Step 7 is to provide appropriate technical and operational support to end users during training and after production to reduce frustration.

2.2.2 Trends of E-learning

E-mastering has moved thru some of wonderful phases - from Computer Based Training thru to Learning Management Systems and Courseware Management Systems to now embody an increasing number of huge scope of packages and activity. According to their paper title “Trends and Issues in E-mastering Infrastructure Development” indicated pretty wide variety of things with reference to mapping the evolving e-mastering landscape (Madar & Oso, 2014). They commenced with the aid of using noting that the continuing improvement in devoted e-mastering software program packages, usually called mastering control structures (LMS) or controlled mastering environments (MLE) has advanced wherein some of the early LMS carriers now provide their LMS as one software inside a set of products. They similarly referred to that e-mastering is now facilitated with the aid of using a growing variety of specialized e-mastering packages withinside the wider infrastructure and isn't always added with the aid of using controlled mastering surroundings such LMS. Much of this mastering takes place in context, for instance `simply in time` withinside the workplace.

They similarly discovered that Basic `devices of mastering` or `devices of instruction` are starting to shift far from the conventional path model (courseware) to generally smaller, extra

targeted, modules (mastering ware). Portals are broadly followed in e-mastering or even publishers are actually presenting price brought offerings to the e-mastering market, they gave an instance of McGraw-Hill who's presenting a unfastened Course Management System (Page Out) and Thomson Learning`s Text Choice affords 19easy get right of entry to virtual content material from which instructors can create custom mastering materials (Andersson & Grönlund, 2009). `M-mastering`, or cellular mastering, has emerge as installed as a vast vicinity of studies and improvement (e.g., thru the European MOBILEam project). However, it additionally brings with it a brand new set of constraints that effect the layout of e-mastering content material and packages no matter an increasing number of critical role (and diversity) of Web-enabled repositories inside e-mastering technical infrastructure little mastering object/courseware content material is contained inside them.

2.2.3 E-mastering models

Broadley (2012) reviews that the developing effect of postmodernism in instructional subculture and the appearance of the statistics age have known as for a thorough extrude in paradigms associated with the manner humans are knowledgeable and trained, and feature started to persuade academic layout with the upward push of constructivist theories. As a result, the sphere of tutorial layout similarly advanced to remember scholar mastering as a contextual experience, in which socially affected learner cognition is a function in mastering; subsequently, a much less goal and extra subjective constructivist belief of mastering has ended in more recent constructivist academic layout idea tactics withinside the 1990s. Being a polarized role to the structures view of tutorial layout, it has stirred a lively reaction from advocates of extra conventional models.

However, none of these models are suitable for addressing the consequences of a paradigm shift from the industrial age to the information age. As a result, instructional designers face the challenge of adapting their learning situation to the instructional design and development model, rather than choosing the right model to meet the needs of different learning situations. The instructional design (ID) model provides a procedural framework for systematically creating instructions and it integrates the basic elements of the instructional design process, such as target audience analysis and goal and objective determination, and can be used in a variety of situations

(Broadley, 2012). It stipulates how to integrate a combination of educational strategy components to create an educational course. The validity of a model is highly dependent on the context in which it is applied. Instructional design methods are contextual and not universal. The instructional design model provides a systematic approach to implementing the instructional design process for a particular educational initiative.

2.3 Factors affecting the implementation of e-learning models

Factors that influence the implementation of the e-learning model can be divided into two categories: organizational factors and personal factors.

2.3.1 Organizational Factors

Organizational factors deal with school operations, leadership, and the school environment. Effective leadership is important for integrating technology into schools, as organizational factors include effective leadership, organizational culture and strategy, structure and support mechanisms. Teachers are encouraged by effective teachers to use technology as a tool to support their educational goals. Leaders need to ensure that all school staff have technology-related learning opportunities. Leaders need to evaluate and evaluate the academic and administrative use of technology and make decisions according to the findings. Organizational culture is a key factor in successful organizational innovation (Madar & Oso, 2014). This includes organizational strategies, structures, support mechanisms, and actions that drive innovation and communication. A strategy, including vision, mission, and purpose, is essential to the implementation of e-learning, as the institution's vision and goals, as well as good missions and strategies, represent the position of technology in education. The school's e-learning vision should include goals, day-to-day activities, strategies, resources, budgets, curriculum, directions, assessments, and staff development to support the e-learning vision. It is important to develop and implement an e-learning school vision that promotes maximum knowledge, skills and aptitude for all students.

Therefore, leaders were specific and targeted to improve their skills in collaborating with teachers and to motivate them to use e-learning in their educational structure, flexibility, freedom, collaboration teams and group interactions. You need to create a plan. E-learning can enhance

the reputation of educational institutions, improve the quality of education and learning, and increase student learning flexibility. Teachers, students, and managers must embrace an e-learning program. Support mechanism (reward, resource availability). Management support is a key factor in a successful implementation of e-learning. Learners practice the new skills they need, management support, technical support, and incentives to effectively use technology in education and learning (Broadley, 2012). Managers need to provide support, rewards and incentives. Technical support should be complemented by peer support and well-trained student assistants, and should have strong administrative support through faculty involvement in decision making. Resources are important in implementing technology. Physical education facilities such as classrooms and other buildings are challenges in implementing ICT. Kenyan head teachers face the challenge of building expensive dedicated ICT (Computer Lab) rooms.

2.3.2 Individual factors

Teachers' attitudes towards the use of e-learning are influenced by individual characteristics, university policies and practices, technical factors, and educational factors. The instructor's educational style, educational philosophy, and personality determine successful design and education in any course. Teachers need to change their attitudes and adopt an online teaching mode. Resistance to computer integration arises from fear and incompetence, lack of skill and knowledge. Student participation and performance in e-learning includes student learning attitudes, independence, autonomy, self-determination, personality traits, students' willingness to achieve, responsibility, trust, tolerance, self-management, and learning (Madar & Oso, 2014). It can be affected by abilities. Successful e-learning requires students to be motivated to learn, self-discipline, accountability, and proper time management. The ability of both teachers and students to cope with new technologies, attitudes towards e-learning, and personality traits play a decisive role in the successful implementation of e-learning.

2.3.3 Successful implementation

Successful implementation stage of e-learning Compared to traditional learning methods, e-learning guarantees a wide range of learning materials that encourage learners to develop personal learning paths. E-learning is at your own pace, cheaper, with consistent content, and is not limited by geography or time constraints. Considering the above advantages, it is

recommended to carry out e-learning in a secondary school in Kenya. There are five phases to a successful implementation of e-learning.

2.3.4 E Learning preparation evaluation

An e-learning readiness assessment is a mental or physical assessment of an institution's readiness to implement an e-learning program. This assessment provides the information needed to conduct e-learning in secondary school. The information you need includes infrastructure availability, workforce availability, policies, and regulatory frameworks. A thorough analysis should also look at psychological, social, environmental, technical, human, financial, and content preparation (Andersson & Grönlund, 2009). Judgment of the success of e-learning implementation in secondary school is made through a critical analysis of e-learning readiness.

2.3.4.1 Building a Business case

An enterprise case is a record meant to persuade stakeholders that e-studying is really well worth implementing. It consists of modern coaching and studying shortcomings, benefits of e-studying as compared to the face-to-face method, prices concerned, and destiny financial savings if e-studying is adopted (Madar & Oso, 2014). At the secondary faculty level, it's miles crucial to make an enterprise case for e-studying to peer the advantages of it

2.3.4.2 Overcoming e-studying boundaries.

Barriers consist of individual, organizational and technical. The boundaries ought to be triumph over for a hit implementation of e-studying. For inexperienced persons to get right of entry to records easily, right schooling wishes to be performed to impart capabilities to apply generation. Top control ought to embody and sell e-studying and now no longer left to instructors only.

2.3.4.3 Assessing sources and making choices

Assessing sources and making the choice to shop for a group might also additionally determine to have an in-residence crew to construct guides, purchase off-the-shelf guides from a certified vendor, or out-sourced the necessities of an e-studying device. Availability of enough sources to increase very own device and whether or not there may be time to increase an e-studying device

will decide the selection group will use to put into effect e-studying (Broadley, 2012). In case the choice of purchasing is used the subsequent concerns ought to be checked; professionalism and qualifications of the vendor, preceding e-studying implementation success, and prices concerned withinside the implementation.

2.3.4.4 Starting small

Acceptance of e-studying may be aided in beginning small. Determination of sustainability of this system as soon as commenced may be decided whether or not it commenced small. Starting small approach piloting e-studying in decided on schools; earlier than complete implementation.

2.3.4.5 The e-studying Planning Framework (eLPF).

It is a four phased framework of e-studying implementation consisting of; emerging, engaging, enabling, and empowering. In emerge, section the instructor seems for technology which can update conventional coaching methods, face-to-face communication, withinside the classroom. It evolved with the instructor the use of the generation because the faculty investigates, plans, and sensitizes on the usage of ICT in content material delivery. In section 2, engaging, the ICT gear are utilized by the instructor for collaborative coaching, the gear complement academic practices on a short-time period basis. Coordination of making plans throughout the faculty is carried out with the aid of using the faculty and on the identical time, studying projects are attempted out (Andersson & Grönlund, 2009). In section three (enabling) the instructor makes use of generation as consistent with on the spot wishes. The instructor helps authentic, higher-order built studying with the aid of using participating with students. To meet inexperienced persons` wishes the faculty refines generation. The faculty on this section makes positive there may be a green network. In section four (empowering) the instructor creates customized higher-order real-global studying with the aid of using operating collaboratively with the student. The faculty displays and plans. Therefore, for complete implementation of e-studying and piloting this framework is crucial.

2.4.1 E-learning Implementation model

This method is ideal for educational institutions that teach a variety of curriculums and content. This method is not suitable for secondary schools because secondary schools are standardized

and use the same curriculum (Madar & Oso, 2014). It focuses on content development and how teachers handle content, rather than changes in learner behavior. This model is teacher-centric and works best only if the learner is involved in the entire process.

2.4.2 Gradual transition model of implementing e-learning

The model integrates various forms of learning and offers traditional face-to-face learning as the first level. The first level does not use ICT equipment, while the second level uses blended or hybrid learning. Blended learning is a mixture of synchronous and asynchronous learning styles, a mixture of different types of learning and basically, learners and teachers interact face-to-face and electronically (Broadley, 2012). The real-time interaction between the learner and the teacher is synchronous learning because all participants log in at the same time. Self-paced learning with time delays for participants is asynchronous learning.

2.4.3 The funnel model of implementing e-learning

This model resolves the contradiction between e-learning curriculum design and content delivery. This shows that e-learning implementation model design, teaching material development, and instructional design are important factors. The goal-achieving process model suggests the appropriate lesson design selected and the learning materials provided for the target learner. The science of creating specifications for the design, development, evaluation, and maintenance of materials that enable learning and achievement is called instructional design (Madar & Oso, 2014). The funnel model uses technology to deliver content. The technology can be either synchronous or asynchronous. The goal-achieving process model is primarily used at the higher education level, not at the secondary education level. However, if adjusted, it can be used at the secondary level.

2.5 Proposed e-learning model for public secondary schools in Kenya

The e-learning model proposed for public secondary schools in Kenya uses a face-to-face method of content distribution. Students meet teachers in classrooms, halls and fields. Physical location. Before implementing e-learning, the e-learning readiness assessment is analyzed. Important information is provided to school management through an e-learning assessment. The information obtained can be used to solve the various learning needs of students. Access

infrastructure availability, infrastructure accessibility, staff availability, policy, and regulatory frameworks (Webb et al., 2004). A resource assessment is done to decide whether to buy. ICT equipment suitable for a particular learner or teacher will be evaluated and purchased. The introduction of e-learning has removed barriers such as lack of teacher training on the use of ICT devices. Other barriers are: Lack of e-learning skills for teachers and students, inadequate infrastructure, negative attitudes for teachers and students. All barriers to a successful implementation of e-learning are removed. In this phase, e-content is developed and decisions are made about the tools and devices used for specific content.

2.5.1 Conceptual Framework

E-learning preparation affects how schools adopt the e-learning process, as schools must purchase the necessary computer peripherals and prepare to begin the recruitment process. This involves determining the infrastructure in terms of both hardware, software, and qualified staff for the school to initiate the e-learning recruitment process (Madar & Oso, 2014). Therefore, the preparation level is very important as it guides the school on how to initiate the adoption process. This is directly influenced by the personal characteristics of both the implementer and the student as a whole, as the success of the process depends on how it is absorbed and integrated into the traditional system. School characteristics such as size, daytime or dormitory, private or public, etc. also play a fundamental role in the recruitment process, as schools differ in implementing policies, especially when considering public and private schools.

CHAPTER THREE

METHODOLOGY

3.1. Research design

A descriptive survey was used in this survey. Descriptive research design collects data and information on a variety of topics. The purpose of the data is to know the level at which different conditions can be obtained from the interviewed people. Descriptive research is used in preliminary and exploratory research by gathering information, presenting it for summarizing and clarifying it, and interpreting it (Mugenda & Mugenda, 2003). The rationale behind descriptive research was to obtain statistical information about education so that policy makers and educators could make informed decisions. Descriptive research has several advantages. First, fact analysis makes it easier to understand research issues, and second, it is more time-saving and cost-effective. Third, descriptive research also helps identify e-learning models for comparing current learning styles and communicating future plans. Facts and data can be collected using both qualitative and quantitative methods of descriptive research. Using descriptive research also has some drawbacks, including: B. If the problem cannot be validated using statistical tools, the respondent may be affected by the presence of the observer, and an inaccurate answer may result in an observer effect. Another drawback is that the findings can be biased and the observational nature of the descriptive study makes the process unreproducible. The survey was conducted through a descriptive survey design to determine the level of e-learning preparation in the county's public secondary schools and how e-learning preparation affects the recruitment process. The research elements were very helpful in gathering statistics on the knowledge and attitudes of teachers and school leaders towards the concept of e-learning. This survey was considered appropriate as it targeted many members of the population that could not be fully surveyed. Therefore, sampling is needed to reach generalizations and conclusions about the entire population.

3.2 Population

The target population, also known as the theoretical population, is the entire population or group that the researcher wants to analyze (Mugenda & Mugenda, 2003). You need to identify and agree on a target population. After identifying the target population, extract sampling frames from the target population. A sampling frame is the number of individuals in the target

population that can be sampled and can be an institution, household, or individual. The survey surveyed a total of 4290 participants, with 233 teachers and principals and 4057 students. For example, if you want to estimate the number of parents who read a particular article in your child's school newspaper, all parents in that school are in the target group. It is an entity that is targeted at individual parents and the school can provide contact information to parents. This makes the contact information a sampling frame. Examples of target audiences are a company's customer base, a specific local population, and a specific high school student.

3.3 Sampling and Sample size

The sample size refers to the total number of respondents to the survey conducted in the survey. It can also be defined as part of a larger population (Webb et al., 2004). Sampling refers to the process of selecting groups to collect data for research purposes. If the sample size is too small, it will not reflect the reality of the population under study and will give inaccurate results. Larger sample sizes, on the other hand, result in less true representation and error tolerance. The template for this survey was obtained from public secondary school teachers and students. In order to obtain research samples, we used several sampling methods to obtain excellent representative samples. Because the study was larger and had different views, we used a combination of sampling techniques to obtain a more homogeneous sample. Respondents with specific characteristics were selected and interviewed. In this case, only teachers and students. We used cluster sampling to classify the schools surveyed. The school was divided into 9 clusters, with a sample size of 10% to 30% sufficient to represent the target population.

3.4 Research tools

Research, whether scientific, social, or literary in nature, requires access to credible and relevant information. Researchers use different ways to gather information such as, through journals, the internet and also interviewing people. Researchers may want secondary data or information gotten from other studies and from other researchers or use questionnaires and statistical data to obtain primary sources (Andersson & Grönlund, 2009). Some of the research tools used by researchers are; the internet, Libraries, Questionnaires and Surveys, Statistics, and Data Analysis. The internet is a big resource of information consisting of millions of pages and websites where one can get information. The obstacle researchers' face with the internet is the vast resources that

make it difficult to get relevant and credible resources. Libraries provide the most direct method of getting relevant and credible research materials.

The problem with libraries is that the information does not always show current opinions and studies. Questionnaires and surveys give researchers quantifiable information. This type of research tool is efficient in finding out cultural attitudes and opinions in certain regions. Statistics and data analysis, information gotten from questionnaires and surveys are compiled into statistical data. This research used different research tools to gather information. Questionnaire and interview schedules were used. Due to the large number of interviewees, questionnaires were used for both groups. Interview schedules were used on principals though those who were busy filled in questionnaires.

The sample of this study consisted of fifty public schools in this county. The fifty schools were selected from a sampling frame of one hundred and fifty-three sampling unit through convenient sampling. The researcher believes that this sample is enough to represent the population because it is a third of the population. Data for the study came from self-administered questionnaires which were distributed to schools, within each school the researcher administered a couple of questionnaires one for the Head teacher, and one for the teacher in charge of ICT or with some knowledge of computer, so in total the researcher expected about 100 questionnaires. The sample constituted a third boy's school a third Girls schools and a half of mixed school. This enabled the researcher to get the mixed perception of these groups as far as e-learning readiness is concerned.

3.5 Administration of research tools

Research tools can be administered in three ways; written surveys, verbal surveys, and mixed-mode surveys. Written surveys need minimum resources in terms of staff, time, and cost. The low cost of the survey ensures minimum sampling error (Broadley, 2012). Lack of direct contact there is minimum interviewer and respondent measurement errors. Even though written surveys give immediate results, they are prone to response biases due to the involuntary nature of an in-person written survey. Written surveys are also subjected to coverage error where population lists are incomplete or out of date. Non-response error is also experienced in written surveys whereby the respondents are less educated, illiterate, and disabled. Verbal surveys include face-

to-face and telephone interviews. Face-to-face is more flexible because one can capture gestures, verbal inflexion, and other body language. However, they use a lot of resources in terms of staff, facilities and time. It is hard to summarize and incorporate findings in data analyses from face-to-face interviews. The mixed-mode survey uses both written surveys verbal surveys. Written surveys are done first followed by the verbal survey method. To make the process efficient in administering research tools the process was made flexible. The researcher used mixed-mode survey. Questionnaires were distributed to the selected schools and collected the same day or a day or two later. When distributing questionnaires or collecting them, verbal interviews were carried out. The data was collected for one month.

3.6 Validity and reliability of research instruments

Validity is the accuracy and meaningfulness of inference and hence, validity is the results of data analysis that represent the phenomena being studied (Mugenda & Mugenda, 2003). In this research, research instruments were carefully designed in order to measure and collect data. The researcher's supervisor and other experts were consulted to assess the relevance of the content in the research tools against the objectives of the study. Getting consistent results or data from instruments after repeated trials is called reliability. The researcher carried out a pilot study in two public secondary schools to determine the reliability of research instruments. 50 respondents were used as a pilot study. The purpose of the pilot study was to detect short-coming in the design and administration of the research instruments. In estimating reliability, the researcher used the split-half method. The method entails applying one session that made the researcher get rid of the chance error caused by differing test conditions that would arise in case test-retest or the equivalent. Using odd-numbered items for one set and even-numbered items for the other set the questionnaires were separated. The sets were treated differently and scored accordingly and Cronbach alpha was 0.72. Cronbach alpha of 0.6 and above shows the reliability of the research instrument. Therefore, the instruments used in this research were reliable.

3.7 Data analysis and presentation

Collected data is called raw data and cannot be used in any application. The raw data must be interpreted to help make a decision or answer the research question. Data analysis converts the raw data into a more comprehensible form. There are five ways one can analyze data; mean,

standard deviation, regression, hypothesis testing, and sample size determination. Data presentation requires one to understand the data analyzed. There are three main data presentation forms; textual presentation, data tables, and diagrammatic presentation. For easy interpretation, the data was analyzed (Mugenda & Mugenda, 2003). Means, percentages, and standard deviations were used to analyze the data. The *mean* is the average or the most common value in a collection of numbers. The percentage is a relative value indicating the hundredth parts of any quantity while standard deviation is a measure of the amount of variation or dispersion of a set of values. Secondary data from literature were compared with analyzed data in order to assess the extent of implementation of e-learning and factors that will or have affected the implementation of e-learning and the stages e-learning has to undergo for it to be successful. The version used for data analysis was SPSS version 20.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter covers data analysis, discussions and findings of the research. The data is summarized and presented in form of frequency, percentage, cumulative percentage and tables. Data was collected from sampled public schools in this county. Consequently, the collected data was analyzed and interpreted in line with the objectives of the study which included: To determine the extent of e-learning readiness in public secondary schools in this county and also to establish the extent of e-learning adoption in public secondary schools in This county the analysis also sought to determine the influence of e-learning readiness on e-learning adoption in public secondary schools in the target County. Out of 100 questionnaires distributed for this research, only 60 usable questionnaires were returned giving a response rate of 60 per cent, which the researcher considered satisfactory for subsequent analysis.

The results of data analysis are structured as follows: presentation of the analysis of the response rate results, presentation of the descriptive statistics and finally the presentation of the inferential statistics. Researchers distributed some 800 structured questionnaires out of which 600 were received and considered to have been correctly filled. This gave a high response rate considered acceptable. Normally, when a case study design is conducted at the individual level, the acceptable response rate is half of total percentage. Scholars like Broadley (2012) agree that such a response rate stringent conditions is totally acceptable, and that the above response rate meet the criterion hence the response rate was appropriate for this study.

4.1.1 Percentage Response per School Type

Mixed schools had the highest number of response at 47% followed by Boys schools at 25% and lastly girls' schools at 23.8% as can be seen from the table below.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	3.2	3.2	3.2
	Boys	16	25.4	25.4	28.6
	Girls	15	23.8	23.8	52.4
	Mixed	30	47.6	47.6	100.0
	Total	63	100.0	100.0	

Table 4.1: Response frequency between boys and girls

4.2 Extent of E-learning implementation

Investigating the extent to which e-learning implementation has been successful at secondary school level in Kenya was the first objective of the study. The question of interest was establishing to what extent e-learning implementation has been successful in Kenyan secondary schools. The respondents were required to provide their opinion based on the liker scale of: 1 = strongly disagree (SD), 2 = disagree (D), 3 = Neutral (N), 4 = agree (A) and 5 = strongly agree (SA).

STATEMENT	N	M	SD
The school has some computer equipment such as tablets, desktop computers, printers, digital boards that encourages e-learning implementation.	542	3.79	.947
The school has digital content for the e-learning implementation	542	3.62	.873
Teachers are trained on the e-learning implementation in the school	542	3.82	.780
There are internet and local area network connectivity in the school	542	3.96	.852
Overall result	542	3.8	.863

Table 4.2: Preliminary analysis involved descriptive analysis.

This table reveals that there was an extent of e-learning implementation in the schools surveyed that affected the implementation of e-learning. This finding aligns with ITU, who asserts that many secondary schools in Kenya have ICT equipment. This study also asserts that the government of Kenya was in the process of equipping secondary schools with computers and their related equipment for teaching and learning and the launching of e-content for secondary

schools at the Kenya Institute of Curriculum development (KICD). Though there was general agreement that extent of E-learning implementation had effect on implementation of e-learning in secondary schools in Kenya, there was lack of surety about the degree of effect. In order to show the degree of effect, simple linear regression analysis was sought. The response variable y is the e-learning implementation performance indicator while explanatory variable x is extent of E-learning Implementation. The term ε is the residual and represents deviation of observed values of e-learning implementation from that approximated by the model (Maldonado et al., 2011). Linear regression analysis was therefore sought and the results interpreted in stages. The details provided in the table below inform regression analysis on the extent of E-learning implementation:

MODEL	Un-standardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	1.806	.298		6.058	.000
Extent of e-learning implementation.	.523	.078	.277		.000
Goodness of Fit R = .277a R2 = .077 Adjusted R2 = .075 F (1,540) = 44.749 P < 0.05(.000b)					
A. Dependent variable B. Predictors: (Constant), Extent of E-learning Implementation					

Table 4.3: Regression analysis on the extent of E-learning implementation

Upon analyzing the data presented above, R is the correlation coefficient. It provides a weak degree of positive correlation between the extent of E-learning Implementation and the implementation of e-learning. R-square showed that approximately 10% of the variation in e-learning implementation was attributed to variation in E-learning model. The adjusted R2 provides an idea of how the model may be generalized. It should be as close to R square as much

as possible if not the same. In this case, the difference for the final model is small. This means that if the model was derived from the population rather than a sample, then it would have accounted for approximately 0.2% less variance in implementation of e-learning. The overall model was statistically significant. The extent of e-learning in secondary schools therefore had effect on the implementation of e-learning in the schools. Un-standardized coefficient values were used to construct the regression equation. The Beta coefficient for E-learning Implementation was statistically significant as it made unique contribution in explaining performance. The formula presented above shows that optimum regression equation showing the relationship between E-learning Implementation and the extent of e-learning implementation in secondary schools was $y=1.806+.523 x$. This regression equation has a weak degree of positive correlation between e-learning implementation and its performance indicators. The regression equation above is explained by the variation in the extent of e-learning implementation and is statistically significant.

4.3 Factors affecting E-learning implementation

The second objective of the study was to determine factors affecting implementation of e-learning in secondary schools in Kenya. The question of interest was: What factors affect implementation of e – learning in secondary schools in Kenya? As with the previous study on the extent of e-learning implementation, the respondents were required to provide their opinion based on the liker scale. This table below shows the details of descriptive statistics of factors affecting implementation of e-learning:

STATEMENT	N	M	SD
There are internet and local area network connectivity in the school	542	3.83	.792
Effective principal and deputy principal encourage teachers to use technology as a tool to support the educational objectives	542	3.77	.697
The Principal and deputy principal are able to use ICT for teaching	542	3.79	.947
The Principal and deputy principal assesses and evaluates academic and administrative uses of technology	542	3.62	.873
Teachers are able to use ICT tools in different ways to teach	542	3.82	.780
Teachers use ICT to effectively communicate	542	3.96	.852
The school has vision on e-learning that promotes maximum knowledge, skills, and dispositions for every student	542	3.79	.947
There is adequate funds set aside for the e-learning implementation	542	3.62	.873
The teachers are trained to enable them use ICT tools	542	3.82	.780
There is an effective curriculum of e-learning implementation in the school	542	3.96	.852
Teachers perceive use of ICT in teaching and learning to be a positive move for the school	542	3.30	1.098
Students have accepted the new e-learning technology in the school	542	3.60	.918
Administrative support is a critical factor in a successful implementation of e-learning	542	3.76	.574
The school management provides incentives and rewards to staffs who are involved in e-learning implementation in the school	542	3.08	1.092
There are adequate physical infrastructure such as computer laboratory, classrooms etc. in the school	542	3.54	.888
The electricity in the school is enough and dependable; no unnecessary blackouts	542	4.04	.622
Majority of teachers have ICT skills that can enable them use ICT tools to teach	542	3.83	.792
Overall results	542	3.71	.846

Table 4.4: Descriptive statistics of factors affecting implementation of e-learning

KEY:

1.0-1.4= strongly disagree; 1.5-2.4 =disagree; 2.5-3.4 =neutral; 3.5-4.4= agree; 4.5-5.0= strongly agree; M=mean; SD=standard deviation.

The findings above reveal that the factors listed in the table affect e-learning implementation in secondary schools in Kenya. These findings concur with a study conducted by Andersson & Grönlund (2009) who argued that effective leadership is paramount for successful implementation of e-learning. According to these authors, leaders ought to learn to use ICT and

ensure that their staffs have opportunities to learn how to use ICT in teaching. They further state that school administrators should use ICT to evaluate both academic and administrative issues. This study also agrees with. In concept, ICT should be used as a toll to support educational objectives. In addition, this study also is in support of findings by Kiilu & Muema (2012) who stated that effective implementation of e-learning is influenced by explicit institutional visions and goals and a well-defined mission and strategy. Though there was general agreement that there were factors affecting E-learning implementation in secondary schools in Kenya, there was lack of surety about the degree of effect. In order to show the degree of effect, simple linear regression analysis was sought. The response variable y is performance while explanatory variable x is factors affecting Implementation of E-learning. The term ε is the residual and represents deviation of observed values of e-learning implementation from that approximated by the equation above. Linear regression analysis was therefore sought and the results interpreted in stages. The details of Regression analysis on the Factors affecting Implementation of E-learning are represented below:

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.706	.424		4.024	.000
Factors affecting E-learning implementation	.563	.114	.208	4.933	.000
Goodness of Fit:					
R = .208*					
R ² = .043					
Adjusted R ² = .041					
F (1,540) = 24.330					
P < 0.05(.000 ^b)					

Table 4.5: Factors affecting Implementation of E-learning

From this data, we can deduce that R is the correlation coefficient. It provides a weak degree of positive correlation between factors affecting E-learning Implementation and e-learning implementation. R2 of .043 measures part of performance which was explained by the factors affecting implementation of e-learning. This reflects some five percent of the variation in e-

learning implementation was attributed to variation in factors affecting the implementation of E-learning. The adjusted R2 provides an idea of how the model may be generalized. It should be as close to R2 as much as possible if not the same. In this case, the difference for the final model is small. The above equation has a weak degree of positive correlation between factors affecting E-learning Implementation and performance. This equation is properly explained by the variation in factors affecting the implementation of E-learning and is statistically significant.

4.3.1 Availability of Computer Laboratories

The researcher wanted to know how schools with computer lab and those without computer lab vary in various parameters per school category. The researcher found out that the average number of computers tend to be more in school with computer labs where boys school rank higher followed by girl’s school then mixed. The ICT personnel are completely missing in schools without computer lab while the schools with computer lab only have an average of one in a school. The researcher wanted to know how the number of students in the school relates to the number of computers in good condition in the school. The researcher found out that the correlation is 0.367 and is significant at the level 0.01 as shown in the table below, but when the correlation was again done while splitting the data by type of school, the researcher found out that boy’s schools have no significant correlation with regard to number of computers and their number in school. The girls’ schools on the other hand have significant correlation index of 0.67 at 0.01 level of significant as shown on the table below. The researcher also wanted to know whether there is internet in the schools. The research found out that only 45% of the school have internet while half of the school don’t have internet in the school. The researcher was also keen to ask how reliable these internet connections are and the answer is in the section of challenges in this report where 37% responded that the connection is not reliable.

Correlations			
		Number of students	Number of good computers
Number of Students	Pearson Correlation	1	.367**
	Sig. (2-tailed)		.004

	N	60	60
Number of Good Computers	Pearson Correlation	.367**	1
	Sig. (2-tailed)	.004	
	N	60	60
** Correlation is significant at the 0.01 level (2-tailed)			

Table 4.6: Correlations

4.4 Phases of e-learning implementation

The third objective of the study was to determine phases of e-learning implementation. Our research question aimed at answering through which phases of implementation e-learning should go through to ensure its effective adoption. Alike the previous studies, the respondents were required to provide their opinion based on the liker scale. The figure below represents descriptive statistics on phases of e-learning implementation.

STATEMENT	N	M	SD
E-learning readiness assessment will provide information necessary for implementation of e-learning in secondary schools	542	4.03	.676
Both teachers and students are mentally ready to start using ICT to teach and learn	542	4.13	.660
Teachers and students are ready socially to start using ICT in class	542	3.78	.725
The school environment is conducive for e-learning	542	4.38	.659
The school has enough manpower (Teachers and computer technicians) to enable the school adopt e-learning	542	3.18	.743
The school has enough ICT tools and equipment to enable the use of e-learning in classes	542	3.08	1.092
The school enough funding to facilitate e-learning	542	3.54	.888
The school has content on CDs while more content can also be accessed through the internet	542	3.83	.792
Overall results	542	3.74	.779

Table 4.7: descriptive statistics on phases of e-learning implementation

KEY:

1.0-1.4= strongly disagree; 1.5-2.4 =disagree; 2.5-3.4 =neutral; 3.5-4.4= agree;

4.5-5.0= strongly agree; M=mean; SD=standard deviation.

We can deduce from the data above that respondents agreed that phases of e-learning implementation affected performance of e-learning in secondary schools in Kenya. Student's prior experience with ICT tools is important for the implementation of e-learning though not mandatory. Scholarly illustrations dated 2013 go a step further to suggest that ascertaining existing levels of student's prior experience with ICT equipment will go a long way to helping schools plan, design and execute basic IT courses and enable learners to interact with the e-learning environment without difficulties (Mulwa & Ndunge, 2011). Though there was general agreement that phases of E-learning implementation affected e-learning implementation in secondary schools in Kenya, there was lack of surety about the degree of effect. In order to show the degree of effect, simple linear regression analysis was sought. The response variable y is the performance indicator for the implementation of e-learning while explanatory variable x is phases of E-learning Implementation. The term ε is the residual and represents deviation of observed values of the phases of e-learning implementation from that approximated by the model. Linear regression analysis was therefore sought and the results interpreted in stages.

The correlation coefficient after regression analysis on Phases of E-learning Implementation provides a weak degree of positive correlation between phases of E-learning Implementation and the implementation of e-learning. The study showed no difference of the variation in e-learning implementation was attributed to variation in phases of E-learning implementation. The adjusted R^2 provides an idea of how the model may be generalized. It should be as close to R square as much as possible if not the same. In this case, the difference for the final model is small. This means that if the model was derived from the population rather than a sample, then it would have accounted for less than one percent less variance in the implementation of e-learning. The overall model was statistically; this meant that for as much as the phases were important, they could be applied in no specific order. Un-standardized coefficient values were used to construct the regression equation. The Beta coefficient for phases of E-learning Implementation was statistically insignificant. It did not make unique contribution in explaining implementation of e-learning in secondary schools in Kenya. The equation derived shows that optimum regression equation showing the relationship between phases of E-learning Implementation and e-learning implementation was: $y=3.983-.051x$

This equation above shows a weak degree of positive correlation between phases of E-learning Implementation and e-learning implementation. The model is not explained by the variation in phases of E-learning Implementation and is statistically insignificant.

4.4.1 The extent of use of TV, Radio, CD player, Video Tape

The researcher wanted to know why half of internet usage in the schools was used in E-mail and basic communication. A tenth of the response was “internal use and other activities” while 30% was for teaching and learning. This is an indicator that most of the connectivity in various schools are not geared toward improvement of the learning in schools but is majorly for other various activities in the schools. The researcher also wanted to know to what extent the schools use various electronic teaching aids to teach in class. From the definition of e-learning we realized that it involves other devices other than the computer so the TV, Radio and other devices can very well indicate the direction of the e-learning in school. The researcher looked at these devices and got varying responses as can be seen in the table below. On average compact disk player is frequently used compared to other devices in the school where a majority of the respondents use it to smaller extent and very few use it to a bigger extent. The researcher wanted to know subjects where computer is used to teach student or demonstrate appoint to students in the school, and the extent of use. As can be seen from the table below, computer studies lead in use where a tenth of the respondent use computer to a large extent to teach the subject followed by other subjects like physics, mathematics, biology and chemistry, the use of computer in other subjects like Kiswahili and others were very little so the researcher decided to merge all of them together as other subjects. The table below shows computer use in various subjects:

Computer Studies		Mathematics		Biology		Physics		Chemistry		Others		
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
No extent at all	23	38.3	20	33.3	21	35.0	14	23.3	29	48.3	37	61.7
Very small extent	10	16.7	17	28.3	21	35.0	15	25.0	17	28.3	14	23.3

Small extent	8	13.3	6	10.0	11	18.3	17	28.3	10	16.7	5	8.3
Large extent	12	20.0	16	26.7	7	11.7	9	15.0	4	6.7	4	6.7
Very large extent	7	11.7	1	1.7	0	0	5	8.3	0	0	0	0
Total	60	100.0	60	100.0	60	100.0	60	100.0	60	100.0	60	100.0

Table 4.8: Computer use in various subjects

The researcher wanted to know how ready the schools are to fully roll out e-learning program. The found out that 33% of the respondents were not ready while 16% of the respondents were ready to small extend the remaining 7% were ready to roll out the program, 4% of the respondent appeared to be very confident enough.

4.5 Effects of e-learning technology and the implementation of e-learning in secondary schools

Finally the study sought on the overall effect of E-learning technology and e-learning implementation on students and teachers in secondary schools in Kenya. The respondents were required to provide their opinion based on the liker scale of: 1-5. Preliminary analysis involved descriptive analysis of waste management. The table below portrays the details of descriptive statistics of e-learning technology and e-learning implementation.

STATEMENT	N	M	SD
E-learning will help both teachers and students to appreciate learning more	542	3.77	.697
E-learning will help improve the school's performance in KCSE exams	542	3.79	.947
E-learning will reduce the time taken to access subject content	542	3.83	.792
E-learning will enable teachers teach better	542	3.77	.697
Learners will be more satisfied in school with the introduction and use of e-learning	542	3.79	.947
The content that will be accessed through e-learning will be more comprehensive than what we have now	542	3.79	.947
Overall results	542	3.79	.838

Table 4.9: Descriptive statistics of e-learning technology and e-learning implementation

The findings in table above reveal that the respondents agreed that E-learning technology will affect e-learning implementation in secondary schools in Kenya (M = 3.79; SD = .838). Though there was general agreement that E-learning technology will have effect on the implementation of e-learning in secondary schools in Kenya, there was lack of surety about the degree of effect. In order to show the degree of effect, multiple linear regression analysis was sought. The general multiple linear regression equation was: $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \varepsilon$

The response variable y is the performance indicator for the implementation of e-learning, x_1 is the effect of the extent of E-learning implementation, x_2 is factors affecting E-learning Implementation while x_3 is Phases of E-learning Implementation. The term ε is the residual and represents deviation of observed values of y from that approximated by the model. Multiple Linear regression analysis was therefore sought and the results interpreted in stages.

The details provided by regression analysis on E-learning technology on e-learning implementation show the extent effect of E-learning Implementation, factors of E-learning Implementation, Phases of E-learning Implementation. It provides a moderate degree of positive correlation between e-learning technology and e-learning implementation. Upon measuring the part of e-learning implementation which was explained by E-learning technology, it showed that approximately seven percent of the variation in e-learning implementation was attributed to variation in E-learning technology. The adjusted R² provides an idea of how the model may be

generalized. It should be as close to R square as much as possible if not the same. In this case, the difference for the final model is small.

This means if the model was derived from the population rather than a sample, then it would have accounted for approximately less variance in e-learning implementation. The overall model was statistically significant; and e-learning technology had effect on e-learning implementation in secondary schools in Kenya. Un-standardized coefficient values were used to construct the regression equation. The Beta coefficient for extent of E-learning implementation was 310, showing that it made significant contribution to e-learning implementation with the $p < 0.05$. On the other hand, beta value for Factors of E-learning implementation and Phases of E-learning implementation showed that they made insignificant contribution to the implementation of e-learning. The equation above shows that optimum regression equation showing the relationship between E-learning technology and e-learning implementation was: $y = 2.094 + .572x_1 - .085x_2 - .042x_3 + \epsilon$. This equation gives a moderate degree of positive correlation between e-learning technology and implementation of e-learning. The equation is seven percent explained by the variation in E-learning technology and is statistically significant to this study.

4.5.1 How ready are the schools to roll out the e-learning program?

The researcher wanted to know how ready the schools are to fully roll out e-learning program. They found out that 33% of the respondents were not ready while 16% of the respondents were ready to small extend the remaining 7% were ready to roll out the program, 4% of the respondent appeared to be very confident enough. The table below portrays schools' e-learning readiness.

E-learning readiness					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all	33	55.0	55.0	55.0
	Very small	16	26.7	26.7	100.0
	Ready	7	11.7	11.7	66.7
	Very Ready	4	6.7	6.7	73.3
	Total	60	100.0	100.0	

Table 4.10: Power consumption analysis for e-learning readiness

4.5.2 Challenges faced by E-learning phasing

In this section the researcher will analyze the various challenges noted that hamper the e-learning adoption and readiness in the schools sampled.

Commercial power supply

The researcher wanted to know how available the commercial power supply is to the schools. The researcher found out that 86.7% of the schools that responded were supplied by the KPLC while others have generators and are in the process of acquiring the commercial power supply.

Power Supply					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	8	13.3	13.3	13.3
	Yes	52	86.7	86.7	100.0
	Total	60	100.0	100.0	

Table 4.11: Commercial power supply

Power outage

The researcher wanted to know how frequently the schools with commercial power supply experience power supply outages in a month.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3 times per Month	7	14.9	14.9	14.9
	More than 3 times	32	68.1	68.1	83.0
	Once per month	5	10.6	10.6	93.6
	Twice per month	3	6.4	6.4	100.0
	Total	47	100.0	100.0	

Table 4.12: Frequency of power supply

CHAPTER FIVE

SUMMARY OF RESULTS, CONCLUSION AND RECOMMENDATIONS

This chapter summarizes the findings and makes conclusions based on the specific objectives of this study i.e. to investigate the effect of e-learning readiness on e-learning adoption in secondary schools in This county and more specifically to determine the extent of e-learning readiness in public secondary schools in This county and further to established the extent of e-learning adoption in public secondary schools in This county and also to even determine the influence of e-learning readiness on e-learning adoption in public secondary schools in This county.

5.1 Summary of findings and results

The first objective of the study was to investigate the extent to which e-learning implementation has been successful at secondary school level in Kenya. The study findings showed that respondents agreed that: the school had some computer equipment such as tablets, desktop computers, printers, digital boards that encourages e-learning implementation. The school has digital content for the e-learning implementation. Teachers are trained on the e-learning implementation in the school; and there are internet and local area network connectivity in the school. The overall results revealed that the respondents agreed with the e-learning implementation in their schools. Regression analysis revealed a weak degree of positive correlation between e-learning implementation and the extent of e-learning implementation. The model is explained by the variation in E-learning Implementation and is statistically significant. The second objective of the study was to determine factors affecting implementation of e - learning in secondary schools in Kenya. The study finding showed that the respondents agreed that: There are internet and local area network connectivity in the school. Effective principal and deputy principal encourage teachers to use technology as a tool to support the educational objectives. The principal and deputy principal are able to use ICT for teaching. Teachers are able to use ICT tools in different ways to teach. Teachers use ICT to effectively communicate. The school has vision on e-learning that promotes maximum knowledge, skills, and dispositions for every student. There are adequate funds set aside for the e-learning implementation.

The teachers are trained to enable them use ICT tools. The school has vision on e-learning that promotes maximum knowledge, skills, and dispositions for every student as administrative

support is a critical factor in a successful implementation of e-learning (Mulwa & Ndunge, 2011). The electricity in the school is enough and dependable; no unnecessary blackouts; and Majority of teachers have ICT skills that can enable them use ICT tools to teach. Based on the objective of the study which was to determine the extent of e-learning readiness in public secondary schools in This county and also to established the extent of e-learning adoption in public secondary schools in This county and to further determine the influence of e-learning readiness on e-learning adoption in public secondary schools in This county; The analysis indicates that the public secondary schools even though they have made a great stride towards being ready for the e-learning by laying down relevant infrastructure like electricity, computers availability, there is still need to overcome some challenges like power outage, internet availability, and even the e-learning content to successfully have a sustainable e-learning system. The situation as at now indicate that the public secondary school in This county are still not ready for e-learning and even the impact of e-learning adoption is still too low.

Computer availability to the students is also majorly during the class hour only, this might not be enough for the students to fully achieve the necessary skills to seamlessly use computer to even collaborate with other students on academic matters. The few available computers are still under lock and key and guarded by the administration in such a way that they cannot be used freely to achieve the e-learning goals. Internet availability to students is very low and only available during working hours, this indicate to the researcher that the students only access internet when they are in computer class which is really limiting especially when the school want to fully embrace e-learning environment. E-learning readiness is still very low in public secondary schools and this is justified by the 55% of the respondents responding that they are still not ready at all to roll out the e-learning program. The lack of e-learning content also contributes heavily to the low readiness status of the public secondary school where 45% of the respondents are not able to get any relevant e-learning content material that they can use in class.

On the hand the respondent was neutral that: Students have accepted the new e-learning technology in the school. Teachers perceive use of ICT in teaching and learning to be a positive move for the school. The school management provides incentives and rewards to staffs who are involved in e-learning implementation in the school and there is adequate physical infrastructure

such as computer laboratory, classrooms etc. in the school. The overall results show that respondents agreed that factors affecting e-learning implementation has effect on performance of secondary schools in Kenya. Regression analysis showed a weak degree of positive correlation between factors affecting E-learning implementation and e-learning implementation. The model is 4.3% explained by the variation in factors affecting e-learning Implementation and is statistically significant.

The third objective of the study was to determine phases of e-learning implementation. The respondents agreed that: E-learning readiness assessment will provide information necessary for implementation of e-learning in secondary schools; both teachers and students are mentally ready to start using ICT to teach and learn. Teachers and students are ready socially to start using ICT in class. The school environment is conducive for e-learning. The school enough funding to facilitate e-learning ;and The school has content on CDs while more content can also be accessed through the internet .The finding also revealed that respondents were neutral that: The school has enough manpower (Teachers and computer technicians) to enable the school adopt e-learning; and the school has enough ICT tools and equipment to enable the use of e-learning in classes .The overall result shows that respondents agreed that phases of e-learning implementation affected e-learning implementation in secondary schools in Kenya. Regression analysis showed a weak degree of positive correlation between phases of e-learning Implementation and e-learning implementation (Mulwa & Ndunge, 2011). The model is not explained by the variation in phases of E-learning Implementation and is statistically insignificant.

Finally, the study sought on the overall effect of E-learning technology and e-learning implementation on students and teachers in secondary schools in Kenya. The study finding revealed that respondents agreed that: E-learning will help both teachers and students to appreciate learning more. E-learning will help improve the school's performance in KCSE exams and will reduce the time taken to access subject content. Also, e-learning will enable teachers teach better. Learners will be more satisfied in school with the introduction and use of e-learning; and the content accessed through e-learning will be more comprehensive than what we have now. The overall result reveals that the respondents agreed that E-learning technology had effect on e-learning implementation in secondary schools in Kenya. The regression analysis

revealed a weak degree of positive correlation between E-learning technology and e-learning implementation. The model is seven percent explained by the variation in E-learning technology and is statistically significant.

5.2 Recommendations

The schools need to further invest in the ICT infrastructure to increase the information awareness to both the teachers and even the students. This will increase the access of computers to students and even teachers which will in effect build on the e-learning adoption methods and even encourage the stakeholders to further invest in acquisition of e-learning content. Secondly, the computers availability especially during student's free time like weekends needs to be encouraged to increase the time the students take to interact with the computers, this will increase their creativity and easy adaptation to e-learning program (Ngamau, 2013). Thirdly, the schools also need very reliable power back-up system to help reduced the effect of power outage. Most of the school's experience frequent power outage as can be seen from the findings and this has a serious effect on e-learning program. By having power backup, they can reduce this effect and even confidently schedule e-learning classes any time of the day without fear of power failure. The schools also need to employ ICT personnel with the right skills to help them in both maintenance and even the search for the relevant e-learning materials online which will in effect increase their chances of successfully rolling out the e-learning program. This study recommends adoption of the proposed model. Each school can compare its current position with regard to e-learning implementation and proceed to the next step as proposed in the model. As portrayed by the theory of diffusion of innovation and UTAUT, a training of teachers must be done. Simple ICT tools should be used and before e-learning is rolled out fully, there should be a pilot conducted to ascertain its tradability and compatibility. Further, this study also recommends that:

1. The management of secondary schools ensures that it acquires and installs the necessary ICT infrastructure to enable implementation of e-learning.
2. E-readiness assessment needs to be conducted in secondary schools in Kenya to pave way for the implementation of e-learning.
3. The government needs to empower teachers through capacity building in line with the requirements of e-learning and further provide computer technicians before the commencement of e-learning in secondary schools.

4. E-learning should be implemented considering the levels that exist in secondary schools in Kenya which are Forms 1 to 4.

5.3 Chapter conclusion

Conclusively, the entire discussion above shows that: Implementation of e-learning in public secondary schools in Kenya will positively influence both teachers and students; implementation of e-learning in secondary schools in Kenya will be influenced by both organizational and individual factors. As concerning the phases of e-learning implementation, this study concluded that their effect on e-learning implementation were insignificant. This study concluded that implementation of e-learning will influence the way teachers teach and the way students learn in public secondary schools in Kenya. This study recommends the implementation of the proposed model.

5.3.1 Proposed e-learning implementation model

The table featured below shows the five models discussed in this chapter listing their phases in three different categories; government, school and teacher. These categories are based on the different bodies involved in the implementation of e-learning at secondary school level. The table shows each model and the phases involved categorized into the different bodies involved in its implementation, thus giving responsibilities to each of them in the implementation of e-learning. The models proposed do not consider phases that fall under the government since this study was based on secondary schools. The assumption is that the government will do its part in facilitating e-learning in schools. It is worth noting that some of the phases presented overlap between the different categories. Some phases overlap between the different categories which mean that the bodies involved in the implementation of e-learning have varying activities to perform in each of these phases (Ngamau, 2013). In the case where phases are not overlapping, then it is the responsibility of that body to effect the phase to its fullest. The table below shows the phases of models and the body responsible for its implementation:

	Government	School	Teacher
Five steps to successful e-learning implementation by Ayesha, 2016.	<ul style="list-style-type: none"> • Assessment of e-learning readiness • Building a business case • Overcoming e-learning barriers • Assessing resources and deciding to buy • Start small 	<ul style="list-style-type: none"> • Assessment of e-learning readiness • Overcoming e-learning barriers • Assessing resources and deciding to buy • Start small 	<ul style="list-style-type: none"> • Overcoming e-learning barriers • Start small
eLPF by New Zealand, 2011	<ul style="list-style-type: none"> • Emerge • Enabling 	<ul style="list-style-type: none"> • Emerge • Engage • Enabling • Empowering 	<ul style="list-style-type: none"> • Emerge • Engage • Enabling • Empowering
E-learning implementation model by Omwenga et. al. 2004	<ul style="list-style-type: none"> • Tackling e-learning specific issues • Select program and courses • Develop e-content • Validate e-content • Mount e-content to the ELE • Pilot • Pilot evaluation • Unveil system 	<ul style="list-style-type: none"> • Establish e-learning modes • Tackling e-learning specific issues • Pilot • Pilot evaluation • Unveil system 	<ul style="list-style-type: none"> • Establish e-learning modes • Identify appropriate mode of delivery • Pilot • Pilot evaluation • Unveil system
Gradual transition model of implementing e-learning by Nyangorme, 2014			<ul style="list-style-type: none"> • Face-to-face classroom learning • Blended learning • Fully online learning
Funnel model of e-learning implementation by Madar & Oso, 2014	<ul style="list-style-type: none"> • Material development • Instructional design • Governance • Finance • Technology 	<ul style="list-style-type: none"> • Instructional design • Governance • Finance • Technology 	<ul style="list-style-type: none"> • Delivery

Table 5.1: Phases of models and the body responsible for its implementation

The proposed model begins from the Face-to-Face mode of content delivery. This mode of content delivery requires students to meet teachers in class rooms halls or fields; a physical location. The model presents assessment of e-learning readiness as an initial phase to e-learning implementation. It is important to analyze and assess readiness of e-learning implementation for any given organization before implementing e-learning. Assessment of e-learning will provide key information for the school leadership; information that can be used to provide solutions to the differing learning needs of students. Availability of infrastructure needs to be assessed including its accessibility, availability of manpower, policy and regulatory framework (E-learning Africa Report, 2013). The next phase is the assessment of resources and deciding whether or not to buy. At this phase, ICT equipment must be assessed. Equipment that fit particular learners and teachers must be sought for and purchased. Barriers to e-learning must be overcome if e-learning will be implemented. Barriers that include lack of teacher training in the use of ICT equipment must be dealt with at this step. Lack of teacher and student e-learning skills, lack of adequate infrastructure and negative attitude among teachers and students are the key obstacle to the implementation of e-learning in a school. Solutions for each barrier must be provided for e-learning to be implemented. It is at this phase that technicians need to be sought for. Once teachers are confident to use the equipment, instructional design can be worked on. At this phase, e-content will be developed.

Decisions on which tools and equipment to be used for particular content will also be decided upon. The next phase requires that a mode of e-learning be selected. As per scholarly perception, secondary schools have two options: blended learning or fully online learning. Once a mode has been selected, a pilot need to be conducted to ascertain that there will be learning and that the curriculum objectives can be achieved by using the mode selected for e-learning (Apitip & Dolly, 2011). In case the pilot fails, then a review of the particular phase that has prompted the failure will be necessary before the full implementation of the system. According to the model proposed, the mode that was piloted will be the mode of e-learning that will be affected. This model proposes that schools can use blended learning then move to fully online learning and vice versa. It is worth noting that e-learning does not eliminate the teacher, rather, it enhances the role of the teacher who now functions as a coach or a mentor and facilitates learning among students and promotes the application of the knowledge acquired.

This study acknowledges that not all schools will be fully equipped for e-learning to be conducted fully online. Blended learning will be a better option for most schools. Different storage media such as CDs and DVDs can be used to distribute learning materials to students while teachers meet learners on specific times to answer questions from learners and to evaluate learners based on materials given for learning. The effective use of computer technologies in teaching and learning is greatly influenced by teachers' perceptions and attitudes towards the use of these technologies (Mutua & Ng'eno, 2016). This study thus puts recommends teacher training (capacity) before e-learning is implemented. The other important step to consider on top of capacity building is the employment of computer technicians.

5.4 Suggestions for further research study

A further research needs to be done on the e-learning implementation model for private secondary schools in Kenya. This is because this study concentrated on public secondary schools; funded by the government. Also research needs to also be conducted on the effect of teacher training on the implementation of e-learning in secondary schools in Kenya and how this will affect pedagogy. In this study, the researcher did not consider pedagogy and how it will be affected by technology. The researcher conducted a survey on e-learning readiness in public secondary school in this county and recommended that a study should be carried to determine the effect of e-learning readiness on the students' performance in National exam. A research should also be carried out to survey the eLearning challenges in our public universities. E-learning effect on the quality of learning in our public universities is also a very good area of study.

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APPENDICES

Appendix I: Letter of Introduction

Antony Murimi Gichobi
P.O Box 41-10301,
Kianyaga
Email: gichobi.antonymurimi@gmail.com
Mobile 0718914148
11th June, 2022.

The School Principal,
.....High School
Kirinyaga.

Dear Sir/Madam

**RE: IMPACT OF BLENDED APPROACH MODEL IN TEACHING AND LEARNING FOR
HIGH SCHOOL STUDENTS IN KIRINYAGA COUNTY**

I am a Nairobi University Postgraduate Education student currently undertaking a research on the above topic within Kirinyaga area, secondary schools.

My utmost assurance is that all the information given herein will be held strictly with much confidentiality and only used for research. Reference will not be made to individuals or schools. Names shall not be requested from any respondent or institution. Responses shall be treated with utmost confidentiality.

I am looking forward to engaging you in this important exercise in your school.

Yours faithfully,

Antony Murimi Gichobi
L40/17321/2018

Appendix II: Questionnaire

The purpose of this survey is to gather information for a study on the deployment of e-learning in public secondary schools in Kenya. We promise to utilize the data you provide solely for this educational study. On this piece of paper, you should not write your name or the name of your college anywhere. Fill in the box with a check mark (___) that indicates your honest answer.

SECTION A: General Information

Kindly indicate your gender. Female [] male []

SECTION B: Extent of E-Learning Implementation

Key: SD = strongly disagree; D = disagree; N = neutral; A = agree; SA = strongly agree

STATEMENT	SD	D	N	A	SA
Tablets, PCs, printers, and digital boards are all available for students to use at the school.					
e-learning implementation is supported by digital resources at the school					
On the e-learning implementation in the school, teachers are taught.					
The school has access to both the local area network and the internet.					

SECTION C: Factors Affecting Implementation of E-Learning

STATEMENT	SD	D	N	A	SA
Effective principal and deputy principal encourage teachers to use technology as a tool to support the educational objectives					
The Principal and deputy principal are able to use ICT for teaching					
The Principal and deputy principal assesses and evaluates academic and administrative uses of technology					
Teachers are able to use ICT tools in different ways to teach					

SECTION D: Phases of E-Learning Implementation

STATEMENT	SD	D	N	A	SA
Both teachers and students are mentally ready to start using ICT to teach and learn					
E-learning readiness assessment will provide information necessary for implementation of e-learning in secondary schools					
Teachers and students are ready socially to start using ICT in class					
The school has content on CDs while more content can also be accessed through the internet					

Appendix III: Budget

Fees	Ksh. 2000
Expenses	Ksh. 4500
Data Collection	Ksh. 6000
Other direct projection cost	Ksh. 2000
Travel	Ksh. 2500
Overhead	Ksh. 5500
Total	Ksh. 22500