



UNIVERSITY OF NAIROBI

DEPARTMENT OF COMPUTING AND INFORMATICS

INTRINSIC FACTORS AFFECTING DIGITAL INCLUSION IN HIGHER LEARNING
INSTITUTIONS AMONG STAFF AND STUDENTS IN NAIROBI COUNTY

BY

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DECLARATION

This is my Project Report and has not been presented in any other university or institution of higher learning for any award.

Signature



Date 20th August, 2021

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This project report has been submitted with my approval as a University Supervisor.

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DEDICATION

This project report is dedicated to my beloved husband John and children, Dorcas, Nelson, Sasha and Master Riek for their support, patience and understanding while I was pursuing this worthy course.

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ABSTRACT

The adoption of digital has started to massively increase within the education sector for knowledge; this is evident in huge investments in computers for classrooms and training of teachers to use technology while teaching. The implementation of digital technologies in the world has improved both quality and inclusion among the higher learning institutions which has facilitated the growth of internet, web browsing and allowed high access in the media and communication. In Kenya, while the e-learning has been adopted in the creation of virtual universities, only a few universities have adopted digital inclusion. Up to now a good number of students find it difficult to use e-learning due to poor and weak technological infrastructure in place. Learning has been based on face to face. There is lack of clear policies on e-learning, while learning activities is only accessed by the students available on the campus and not to all the students that cannot afford accommodation. The learning methods being used are traditional models of education which is based on face to face interaction between students and lecturers. This indicates that digital inclusion is not being practiced. The government of Kenya is still to make investments in the ICT sector at the university level, investments on high speed networks and installation of a large number of computers has not been implemented. Individuals may have limited experience, lack of skills or lack of willingness to use ICT, low education leads to low income which leads to low affordability and use of ICTs. Therefore, it is not very clear that ICT is being widely adopted and used at the higher education level. The aim of this study was to examine the intrinsic factors affecting digital inclusion in higher learning institutions among staff and students in Nairobi County. A descriptive survey comprising both qualitative and quantitative data was used in this study. The results showed ICT skills, Access to digital, e-channels used in teaching and government policies were important factors to Digital Inclusion implementation. The research examined Digital Inclusion in the context of Kenyan public higher learning institutions where it is not fully implemented and therefore may not adequately cover the process in other higher learning institutions. Digital Inclusion could be used to gain competitive advantage in a cost effective manner thus need to enhance successful implementation. The study sought to provide a better understanding on the intrinsic factors affecting digital inclusion in the higher learning institutions among staff and students in Nairobi County, where institutional policy makers use it as an experiential tool to strengthen their government-institution relationship. The results contribute to the body of research on implementation of Digital Inclusion.

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LIST OF ABBREVIATION AND ACRONYMS

ICT	Information Communication and Technology
SPSS	Statistical Packages for Social Scientists
CTC	Community Technology Centre
DLP	Digital Learning Program
BYOD	Bring-Your-Own-Device
TV'ET	Ethical Education and Vocational Training
FCC	Federal Communications Commission
COP	Community of Practice
DOI	Diffusion of Innovation
GOK	Government of Kenya

CHAPTER ONE

INTRODUCTION

1.0 Background

The implementation of digital technologies in the world has improved the quality of education among the higher learning institutions which has facilitated the growth of internet, web browsing and allowed high access in the media and communication. The technologies have made it possible for both students in urban and rural to get access to learning resources for higher learning education. Many universities have of late implemented online courses (MOOG) and video conferencing systems (Khalid, 2016).

According to David (2016) digital inclusion contains a process that goes beyond the access of computers and the internet. It is the technological literacy and ability to access the relevant services in general. He went further by including inclusion of ICT services to the marginalized societies to access the skills, to use ICT and benefit from electronic mediated knowledge in the society. The use of technology has improved people's lives with the incorporation of appropriation digital inclusion initiatives and has promoted self-sufficiency on those who have been applying it. The focus on digital inclusion programs has reduced poverty in a suitable manner. Fighting poverty consists as one of the central arguments in the formulation of public policies dealing with appropriation. However, a significant group of the population has either been digitally excluded such as students that have been accessing online learning during the ongoing period of covid-19 pandemic, who are living in rural areas. The availability of new technologies has increased the number of learning resources and has doubled the number of students who complete their higher education on time. The focus on technology access overemphasizes technological solutions, like the donation of laptops per child, and providing community labs, the known (Community Technology Centre).

Bonillar & Reho (2011) noted that various spaces and digital information resources have been created in recent years and has expanded the ICT sector by the expansion of cyberspace. They went further to state that the right to access information is a fundamental human right. The growth and widespread adoption of information and communication, has embedded in the lives of individuals including community and nation to ensure universal access Digital inclusion, Bureau of internet Accessibility (2017).

According to the inclusion survey (2015), digital inclusion has brought together high speed internet access information that has promoted success participation in the digital world. It has three broad facts: access, adoption and application. Nemel et al, (2013) noted that digital inclusion must go above physical connection and access of hardware, to promote inclusion, it goes further to include the empowerment of the local communities, it's aims is eradicate poverty, promote citizenship and better education for societies.

Developed countries have developed their digital inclusion. In Spain students own a number of ICT devices and do not have problems in using them for their academic and private purpose, however very few are not in a position to acquire ICTs (Ricoy et al; 2013). Internet access has been made a fundamental citizen right. They have implemented the migration from second generation of mobile technological from 3G to 4G (ITU, 2018)

In the United States, the student-to-instructional-computer ratio was five to one, and 98 percent of schools had internet access. In the United Kingdom, the student-to-computer ratio was twelve to one in primary school and seven to one in secondary school, with nearly universal internet access. This has been reflected in the European Union as a whole Canada, Australia and new land.

For countries to build an inclusive digital inclusion, it requires engagement and total backing from all sectors like: libraries, community based organizations, business, and government policy maker's digital inclusion strategies vary widely. The most common barriers are the cost of technology, technological innovations should be accessible and lack of skills affordable to all because of the implications they have for sustainable economic development. The most component of ICT that has been supporting the growth of digital is broadband adoption. Kenya's should not watch passively while other nations have adopted inclusions, the country should be the exporter of the broadband technology, to increase their productivity and help government to improve its openness and effacing, and gives new ways of communication (Imeboreshwa, 2016).

1.1 Statement problem of the study

In Kenya, while the e-learning has been adopted in the creation of virtual universities, only a few universities have adopted digital inclusion. Up to now a good number of students find it difficult to use e-learning due to poor and weak technological infrastructure in place. Learning has been based on face to face. The real picture in the universities portrays lack of

clear policies on e-learning, while learning activities is only accessed by the students available on the campus and not to all the students that cannot afford accommodation.

The learning methods being used are traditional models of education which is based on face to face interaction between students and lecturers. This indicates that digital inclusion is not being practiced. The government of Kenya is still to make investments in the ICT sector at the university level, investments on high speed networks and installation of a large number of computers has not been implemented. Khalid & Buss (2014) concluded that low income, ICT avoidance as the norm, lack of motivation and commitment, physical or mental disability, lack of hardware devices, and internet services and accessibility are the factors affecting digital adoption. Individuals may have minimal experience, lack of skills or lack of motivation to use ICT, low education leads to low income which leads to low affordability and use of ICTs. Therefore, it is not very clear that ICT is being widely adopted and used at the higher education level.

1.2 General objective

The main objective of this study was to examine the intrinsic factors affecting digital inclusion in higher learning institutions among staff and students in Nairobi County in order to develop a policy framework on digital inclusion among staff and students in the higher learning institutions in Kenya.

1.2.1 Specific objectives

1. To examine the influence of ICT digital access on digital inclusion among students and staff in higher learning institutions in Nairobi County
2. To examine the influence of ICT skills on the digital inclusion among students and staff in the higher learning institution in Nairobi County
3. To investigate the influence of the electronic channels used for teaching on the digital inclusion in the higher educational learning institutions in Nairobi County
4. To investigate the intervention of demographic factors i.e. age, gender and government policies on digital inclusion among staff and students in higher learning institutions in Nairobi County

1.3 Research question

1. How is the access of digital devices affecting digital inclusion in the higher learning students in Nairobi County?
2. What are the ICT skills among teachers and students in the higher learning institution in Nairobi County?
3. What are the electronic channels adopted for teaching in the institutions of higher learning in Nairobi County?

1.4 Significance of the study

The outcomes of this research are critical to the government and policy makers in their endeavor to implement digital inclusion in the higher learning institution. The research variable provided a way forward in tackling digital inclusion policies, access to ICT, electronic channels used for teachings and ICT skills. This report will help future researchers interested in carrying out studies in this area.

1.5 Justification of the study

This study tried to explore the factors influencing digital inclusion; since the government has invested a lot it is important to explore these factors so as to assist students and staff in adopting and using digital resources and services in place

1.6 Scope of the study

The study was conducted in Nairobi County, Kenya. The target population for the study were students and staff. It involved One hundred students and One hundred staff with the researcher assuming that all of them had knowledge of ICT.

1.7 Assumptions of the study

The study assumed that: -

1. Access of digital devices had gotten no relationship with digital inclusion.
2. ICT skills among teachers and students had gotten no relationship with digital inclusion.

3. The electronic channels used for teaching in higher learning had gotten no relationship with digital inclusion.

1.8 Delimitations of the study

Limiting a study is setting its scope. This research was delimited since it was conducted only in The Technical University of Kenya public institutions. The conditions in this Institution might be unique and very different from other institutions of higher learning and hence caution must be taken while generalizing the findings of this study to the rest of nation's institutions.

1.9 Limitations of the study

The respondents would not freely respond to the questionnaire due to fear of being intimidated by the employer. In this case, the researcher would inform the respondents that the information would be confidential. The use of identifiers would be restricted so that the identity of the respondent is concealed. In like manner the researcher would inform the participants of the purpose of the study and let them be aware that the information they gave out would be used in the study and strictly confidential. For respondents who did not give consent replacement was sought, even when using the information gathered from the respondents the researcher would not regard them as guinea pig.

1.10 Definition of key terms

Higher Education – It refers to post-secondary education at colleges or universities of higher learning. Higher education is defined as any qualification obtained at or above the diploma level in the Maldives Qualification Authority (MQA) framework. For instance: a diploma, an advanced diploma, a bachelor's degree, a master's degree, a doctoral degree, and a master's degree (MQA, 2009).

Information and Communication Technology (ICT) – Computers, the Internet, broadcasting technologies (radio and television), and telephony are examples of ICT (Khan, Hasan & Clement, 2012). ICT and Information Technology (IT), a word used in the Maldives and around the world, are used interchangeably in this study.

Small Island Developing States (SIDS) – A group of 52 tiny island developing countries dealing with comparable social, economic, and environmental issues (UN-OHRLLS, 2011).

ICT for teaching – ICT for teaching are “those technologies that support the teacher in their teaching of students. This could include a teacher computer (laptop, desktop or other device) that can be connected to a data projector and sound system to provide rich media to the entire class” (Douglas, 2011, p.128).

ICT for learning: ICT for learning “is characterized as being student-centric. It is ICT focused upon the needs of the student to continue their learning and as such this ICT needs not only to suit the learner but also to be available to the learner when they require it” (Douglas, 2011, p.129).

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviewed literature related to the study area. The section was subdivided into five sections based on digital inclusion containing Lack of ICT knowledge and skills, Access to digital devices, Electronic channels used for teaching, Digitally Inclusive Communities' Framework, theoretical framework and conceptual framework.

2.1 Lack of ICT knowledge and skills

ICT has introduced significant and lasting positive change in the world. Lecturers use digital Technology in their private lives but when it comes to its application in the classroom they have so many limitations which are both technical and logistical in nature. The problems associated are interrogation of digital technologies as a personal model from integrating digital technologies into the classroom which means that the frequency and constituents of technology usage are solely dependent on the interest of a given teacher, this impacts negatively towards teachers as they feel the institutions are not supporting them (Gumbau et al, 2016). Gomez (2017) detects a progressive decrease over training of teachers in the world of digital technologies. He mentions that some obstacles are related to academic discipline with which the teacher has adopted.

According to Johnson et al. (2016), there is a shortfall of digital technology use in the classroom, particularly with developing technologies like BYOD (bring-your-own-device), learning analytics, and adaptive learning. Teachers tend to turn it to support their lecture sessions and less towards student-centered activity, they concentrate on visual presentation rather than visual platform which can support teachers' lecture.

Kari sham (2018) argued that the government can improve digital skills by fostering and placing complementary policies that create demands for skills upgrading in its digital world. She went further to explain that government policies can change the marketing strategies.

In Africa, Mozambique and Rwanda are the first countries to benefit from the technical assistance from the World Bank to prepare a workshop on digital skills. Other participants include universities and technical education and vocational training (TVET) institutions, the

private sector and regulatory to address the visibility of technology, such as laptops and computer's (World Bank, 2020).

Ricoy et al (2013) conducted a survey among Spanish first year students, the finding revealed that the large numbers of students have several ICT devices and did not have any difficulty in using them for academic purpose. However, a small group could not afford ICTs and a second group lacked digital experience. This study did not explain if the two have a connection.

2.2 Access to digital device

According to chin (2014) studies indicate consistency on the access to ICT, from telephone handset to the internet, he explains a model that supports importance of per capita income in explaining the gap in computer and internet access, this model was used to explain the difference of those who are deprived from accessing computers and internet from countries like the United States and China.

Digital inclusion is the product of the 20th Century. It goes beyond access to computers and the internet regardless of physical, cognitive or financial abilities. It means the ability to access relevant online services. It is the process of the democratization of access to ICT, in order to include all marginalized Society. It ensures the inclusion of disadvantaged groups to have access to skills on use of ICT, and this will end up creating knowledge for The Society (Bonillar & Pretto society 2010).

Liebenberg et al (2012) conducted qualitative study that categorized students into groups: online and paper responses, the online group had a lot of experience and was more likely to have access to computers and internet at home than paperwork. The study was done in South Africa.

A study done by Madigan (2015) explored the extent to which first-year college students' digital access is influenced by their parents' educational level and family income. The Independent variables of the study were family income, educational level of the father, sale and the probability of having a home computer and internet access. The findings of the study revealed that only 10% of black students had a home computer, while the white response was higher than 144 more likely to have a computer. This study was done in the United States of America.

2.3 Electronic channels used for teaching

2.3.1 Email

According to the Digital Marketing Institute (2020), more than 90% of students prefer email to any other medium for receiving information, many students use email. This channel has a better ability to connect with people on a conversational level since the educational institution engages potential students and provides a clear call-to-Action to provide additional information and promote enhancement. Most students are interested in university websites rather than its social media with 87% of students agreeing that websites are very useful.

Steve (2015) noted that website services are important purpose for colleges with a service portal for all information. One of the common ways to access them is through mobile devices, it is important to update the website manually. Many higher learning institutions use websites to conduct e-commerce etc. for payments, submission forms on college websites.

2.3.2 Mobile Apps

This type of digital channels is becoming very popular among higher learning institutions, it is easy to access information through this kind of channel inform of alerts, calendars, directories, news and even lunch menus, it can integrate the phone, emails and text features into the app, it can be used to replace the website, however the website pages can be accessible through the app.

2.3.3 Notification and alerts

Important reminders should be communicated through critical digital channels; notification systems have been used to provide SMS (text), voice and email. Higher learning institutions should adopt this type.

With a lot of measurement when using it like adverts via mobile apps, but can be annoying as one is getting voice messages (campus suite blog 2015)

2.3.4 Social media

They are channels used on how business and organization are sharing information. Among these channels are Facebook, twitter, Instagram and YouTube, they are the major ones used by institutions, its advantages is that it can be used by many people and it can be linked to

many channels. Other channels are video, with channels sharing them like YouTube, vimeo, vine and periscope, they are now becoming very popular but there are times to use them. It is very important to note that some higher learning institutions are creating their own YouTube channels Linda (2010)

Technologies for communication have been used by students and staff at different sites to send and receive written, vocal, or visual information they can come from telephone lines, through computers and modems via a voice or audio graphic communication or through satellite

Computer networks is relatively expensive technology, that is used in class in classrooms across the country, it allows computers to receive and send information to other geographic sites this kind of channel has many advantages it allows many students/ lecturers to communicate , which sends up into very active participation on the part of learners, it also allow students to log on the networks at their own time, it also allows time to think when responding ,they encourage verbal communication, writing skills and they are good in record keeping.

It is very important to understand that not all communication technologies require the use of a computer and modem, alternative communication can be cost effective. Video pals, a program that began in 1990, encourages students to become video pen pals. Students sign up for the service and are paired with a suitable class in another part of the world. The US class creates a videotape, sends it to video pals for conversion to the foreign video standard (which is not the same as the US standard), and then attaches the converted tape to the video pal class (business communication channels, 2018)

This two-way video and audio technology delivers both visual and auditory, allowing professors and students to interact as much as possible. Monitors, cameras, and microphones are provided at the teachers' and many students' locations using these two-way video/two-way audio systems.

Both the teacher and the student can see and hear each other. Real-time communication takes place between the teacher and the students.

2.4. Digitally Inclusive Communities' Framework

Recognizing the cost to American competitiveness in a global market, as well as the fact that not every community member benefited equally, and that other communities were left out of the digital spectrum entirely. The Federal Communications Commission (FCC) was required by Congress to design a strategy to make sure that every American could access broadband. The model was built with the belief that everyone, including individuals, businesses, and institutions, should have access to digital content and technology that will assist them in creating and maintaining healthy, prosperous, and cohesive 21st-century communities. It was designed to help people comprehend the advantages of new information and communication technology. Fostering impartial and affordable access to high-speed internet-connected devices and online content to make sure that all people can benefit from the educational, economic, and social opportunities that these technologies provide. The framework, which is built on the core principles, explains how a community may help its member's access and use digital technologies. The availability and affordability aspects are the cornerstones. Communities need reliable and economical access to broadband technological infrastructure to be fully engaged and competitive in today's information-based society.

The principal's objectives are to provide residents, workers, and tourists with sufficient, convenient, and free access to computers, the internet, wireless networks, and other communication technologies to meet their needs.

2.5. Theory, Models and Frameworks

The rapid growth of ICT, according to Andrews (2011), warrants a reevaluation of whether learners' experiences of digital exclusion and inclusion are the same now as they were before technology became widespread. The ability to engage in more dynamic exchanges between learners through the use of synchronicity distinguishes traditional learning from e-learning in terms of digitization, which allows easy sharing of documents between teachers and learners, opportunities to extend collaborative learning beyond the classroom, access to more resources, and the ability to engage in more dynamic exchanges between learners. Technology allows us to learn in many ways, at different times, and in different places. There are no e-learning models, according to Andrews (2011), only e-enhancements of current teaching and learning models and frameworks. According to Conole (2010), many prominent pedagogical models and their application in e-learning are theoretically misunderstood by

practitioners who typically use a surface application of the model in practice, such as employing a theory to drive the design process, as in Wenger's Community of Practice (COP) (2011). Conole's (2010) review was meticulously connected with a learning theory or strategy and subsequent application, but this is rarely the case in practice. In addition, when utilized with learners, various models, frameworks, and apps may contain one or more learning theories or approaches. The Community of Inquiry framework, according to Garrison (2011), is based on a process of establishing meaningful learning experiences by developing three interconnected elements: social, cognitive, and teaching presence. For the purpose of satisfying personal and educational results, the teaching presence aspect is dependent on design, facilitation, and cognitive and social processes. If this is the case, a component of assessment must be included to establish whether the educational objectives have been met. As a result, it's possible to argue that a behaviorist learning theory is included in the Community of Inquiry framework. With this in mind, right braces have been added to indicate the range of applications that can be applied to one or more theories of learning or approaches, and double arrows have been added to show how theories of learning or approaches might be misaligned in practice. In addition, the titles have been updated to more accurately reflect the content of the table in respect to this study.

2.6. Empirical literature

Compared the LEXDIS participants' accounts to the findings of formal studies of disabled learners as well as less formal public reports of disabled learners' experiences (e.g. case studies published on teaching and learning websites). The study indicated that the findings of the LEXDIS study might be applied to other disabled students in higher education with some confidence. Finally, when compared to similar learner experience studies including primarily non-disabled students, our findings imply that disabled students can be as technologically agile as non-disabled students. The study indicated that the findings of the LEXDIS study might be applied to other disabled students in higher education with some confidence. For example, LEXDIS participants' confidence and comfort levels matched those reported by Conole et al. (2006), who describe the learners in their study as "evidently comfortable." However, we would argue that in the LEXDIS study, impaired students displayed their digital agility in different ways than non-disabled students, particularly through personal tactics.

2.7. Theoretical Framework

2.7.1. Theory of digital divide

The term "digital divide" was used in the mid-1990s to define the gap between those who have access to new forms of information technology and those who do not. The digital gap is still a major topic in public policy, affecting social, economic, and political challenges. Because members of online networks can gain various substantial benefits from their online connection, gaps across demographic groups in terms of Internet communication, computer network usage, and new communication technology networks must be explained rather than simply described Beynon et al (2007)

According to Beynon et al (2007) the establishment of the digital divide index to highlight the multifaceted nature of this phenomena within a geographical context. The index provides for a comparison of technology adoption rates, both in terms of access and use, among four "at risk" categories (females, people over 50, people with minimal formal education, and people with low income) with technology adoption rates in the general population. These are markets, diffusion, infrastructures, human resources, competitiveness, and competition. These variables were measured and combined into a single index. Emrouznejad et al (2010) created the digital divide index, which is based on defining and conceptualizing the ICT infrastructure, access, and user competence. These indices are based on key ICT indicators that have been agreed upon by the worldwide community and professional modelers as providing adequate assessments of the information society. The first group believes that, like every other technological innovation in the past, ICTs will be disseminated to the wide majority of society through market forces. The existing digital gap will simply be a transient phenomenon. Government intervention is unnecessary because government subsidies distort investment patterns and contribute to poor resource allocation (as cited in Mariscal, 2005). In a competitive atmosphere, technological innovation will flourish, and prices will fall for many users Haßler& Jackson, 2010).

A digital divide theory was adopted because of its geographical model. A neighborhood process was noted in diffusion theory. This theory explained how innovations were more likely to spread from a current adopter to new ones nearby covering all geographical areas.

The digital divide theory has been extensively subjected to research over two decades explaining its disadvantages to this study, it gained popularity in many fields like in the

information system, and business, economic and social science have examined multiple aspects of digital divide.

It has been explained by many organizations as a gap between individuals, however in this study it was between staff and students. It is also important to this study because its examinations of the use of ICT services like access were examined.

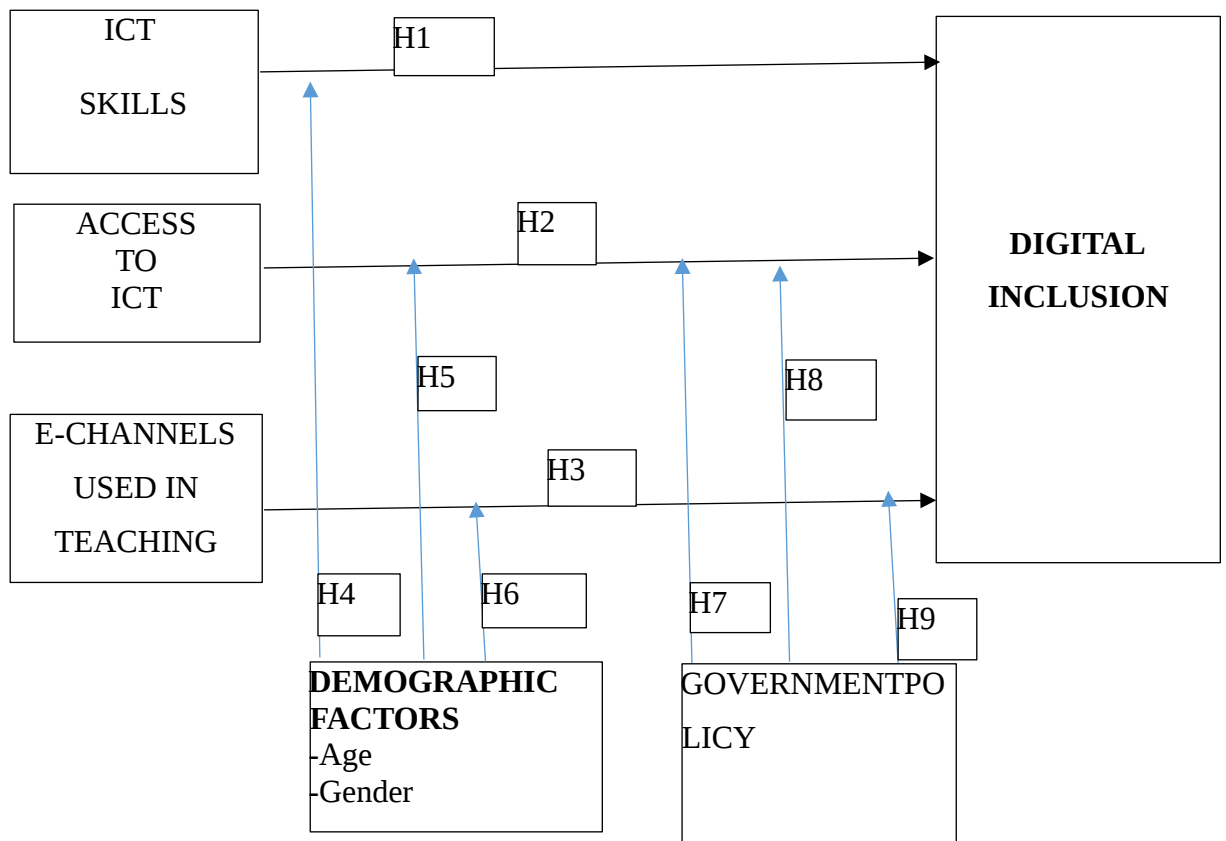
2.8. Conceptual framework

The main concern of this study was to qualitatively calculate digital inclusion in higher educational learning institutions among students and staff.

(Independent variable) (Dependent variable)

The main concern of this study was to qualitatively calculate digital inclusion in higher educational learning institutions among students and staff.

Figure 1: Conceptual Framework



Independent Variables Variable	Intervening Variables	Dependent
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(Source: Researcher 2021)

2.8.1. Measurement of variables

A conceptual framework, according to (Kombo and Tromp 2006), is a research instrument designed to help a researcher acquire awareness and comprehension of the topic under investigation in order to explain these findings. The independent variables are influence of Access to ICT, ICT Skills and Knowledge and Electronic Channels used in teaching and dependent variable is Digital inclusion.

2.8.1.1. Dependent Variables

The dependent variable is the digital inclusion in the higher learning institution, which relates to the use of ICT services among students and staff. The independent variables then feed into the processes in which the ICT services are used for teaching purposes.

2.8.1.2. Independent Variables

The independent variable can be categorized as access to ICT services in the Higher learning institutions, that is, ICT skills of both teachers and students and communication channels used in the institution which is therefore expected to affect the management of Digital inclusion.

2.8.1.3. Intervening Variables

The intervening variables in this study are gender, age and GOVT policy. Covid-19 pandemic has interfered with the access of ICT services during the pandemic by the students and staff living in the rural areas since movement has been restricted resulting into low access of ICT services. Researchers revealed that age has an impact in the use of ICT. Old people tend not to adopt ICT services while over 90% of youths are using ICT services in Kenya (GOK 2018). Most of the institutions established in the rural areas are still not accessing ICT

services due to poor GOVT policies that have affected allocation of ICT services both in the rural and urban areas.

2.8.1.4 Operationalization of variables

Table.1: Operationalization of Variables

VARIABLES	INDICATORS	MEASURES
Independent		
ICT Access	Availability of technology	Yes/No
	Availability of communication structure	Yes/No
	Having access	Yes/No
	Having e-learning resources	Yes/No
	Availability of internet and communication services through mobile technology	Yes/No
ICT Skills	Practical Office Skills	Yes/No
	Training undertaken	Yes/No
	Functional digital literacy rate for youth and the old	Likert Scale

E-Channels used in teaching	Availability of e-channels	Yes/No
	Having access to e-channels at the institution	Yes/No
	Availability of computer lab	
	Having access to internet	Yes/No
	Mobile service usage	Likert Scale
Intervening		
Age	Old people having access to e-channels	Yes/No
	What is your age	1=18-25
		2=26-30
		3=31-40
		4=41-50
	5=Older than 50	
Gender	What is your gender	1=Male 2=Female
Government Policies	Availability of e-learning policies	Yes/No
	Awareness of e-learning policies	Yes/No
Dependent		
Digital Inclusion	Ownership, use and influence of independent variables	Yes/No

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This section provides the research methodology for this study. The research methodology is presented in the following sequence: research design, research approach, target population, data collection procedures and instruments, data analysis and presentation.

3.2. Research Design

A research design's goal is to ensure that the evidence you collect allows you to answer the research question as clearly and objectively as feasible (Imelda, 2014). The study used a descriptive survey design, which is suitable for gathering data on people's attitudes, opinions, perceptions, habits, or any number of educational or societal issues (Orodho & Kombo 2002). A descriptive study is critical to the research process since it assists in demonstrating the existence of an issue and can lead to future research and theory formation Mutua, Oteyo, & Njeru, (2013); Imelda, (2014). Furthermore, a survey study was used since it allowed the researcher to gain a comprehensive grasp of the research problem across the online learning environment.

3.3. Target Population

This study targeted students and staff in Kenyan Public Universities in Nairobi County in the 2019/2020 academic calendar there were 412,845 students in 33 Kenyan public universities (Kenya National Bureau of Statistics, 2020). Two universities i.e. Technical University of Kenya and University of Nairobi were selected for this study. The student and staff population in the universities were as follows: University of Nairobi 62,363 and Technical University of Kenya 34, 170(Kenya National Bureau of Statistics, 2020)

3.4. Sample Selection and Sample Size

The students and staff in the two universities were selected through random selection.

The sample size is critical for obtaining accurate, statistically significant data and successfully conducting a study.

The sample size of the study was calculated using Yamane (1967) formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n=sample size, N=population size and e= Level of precision or Sampling of error

The population size is 96,533 and the sampling error is 5%. The ideal size from the calculation is 198.98 which is approximately 199.

A proportionate distribution was used to distribute the sample size in the two selected universities

Table.2: Sample distribution across Universities

University	Population(Kenya National Bureau of Statistics, 2020)	Sample
Technical University of Kenya	34, 170	100
University of Nairobi	62,363	99
TOTALS	96,533	199

Source: Researcher Data (2021)

3.4. Data Collection Instruments

A self-administered questionnaire and an interview guide were used to obtain primary data. A questionnaire is a form of research tool that comprises a set of matrix questions and other prompts for gathering data from respondents. The researcher compiled a list of study-related questions and presented them in the Google form questionnaire. A questionnaire was used because it gave both qualitative and quantitative data. Because resources and time were

limited, questionnaires were a more efficient and cost-effective way to collect information. It was also important to safeguard the participants' privacy.

3.5. Data Collection Procedures

Questionnaires were sent by email or WhatsApp to the staff and students of the higher learning institutions who were the respondents. The respondents were then given two days to respond to the questionnaires after which the researcher checked from the google form whether there was a response, if not, then a reminder email were sent out concerning the same. Some questionnaires were self-administered to the students and staff then a drop and pick method and collection was done after three days and follow up phone call or text message was done on respondents to solicit for response.

3.6. Instrument Validity

The term "instrument validity" generally refers to whether or not a device is measuring what it is intended to measure (Edward et al, 1994). For the purpose of this study, the researcher consulted his University supervisor to test and agree on relevance and suitability of various test items in the data collection instrument.

3.7 Pilot Study

Piloting was conducted with three students and one clerk in the higher learning institution with the aim was of improving the research instruments in collecting the intended data. Three students and one clerk participated in the pilot study. The participants in the pilot study have all of the same characteristics as the target demographic, as suggested by (Mulusa 1990). The participants in the pilot trial were not included in the actual study.

3.8 Data Analysis and Presentation

Data collection involves the process of preparing and collecting data. The goal of collecting data is to gather information to keep on record, make crucial decisions, or pass information on to others. The data gathered data was organized into categories that answered the researcher's research questions. Both Microsoft Excel program and SPSS version 26.0 were employed in analyzing the quantitative data collected. Table format was used to analyze questionnaires that had set columns for priority (nominal or ordinal scales) as well as those with Yes or No responses. Due to its ability to manage a huge amount of data, SPSS proved

efficient in analyzing the data for this inquiry. Also, this software has a broad array of statistical approaches tailored to certain topics in social sciences. The study used structured (closed- ended) questionnaire to get responses from respondents to gain a better and more insightful interpretation of the results from the study. In accordance with the study objectives, qualitative data was evaluated by establishing categories and themes, relationships/patterns, and conclusions (Dalen, 1962). The study also used secondary sources of data combined from ICT sectors like departments within the universities offering ICT courses, Ministry of Information and Technology (ICT), non-governmental organizations, non-organization reports, etc.

3.9 Ethical considerations

All sources of information were acknowledged, and the study followed proper research protocols. Before administration of the questionnaires consent was sought and given by the respondents. The study was completely free and open to anyone who wanted to take part. The researcher was forthright with the study subjects, explaining the goal of the study and assuring them of confidentiality and anonymity. Personal information was solely used for research purposes, and the names of the respondents were never disclosed to anyone else. Participants were notified of any limitations on the confidentiality of the information they provided. In all study materials, procedures were put in place to secure the confidentiality of the information and the anonymity of the participants. The study's findings were made available to the participants.

CHAPTER FOUR

RESULTS AND DISCUSSIONS OF THE STUDY

4.0. Introduction

This chapter focuses on data analysis, presentations, interpretation and discussions of research findings. The presentation was done based on the research objectives.

4.1 Data Analysis

This study's data was analyzed both quantitatively and qualitatively. The Statistical Package for Social Sciences (SPSS) and Microsoft Excel programmers were used for analyzing quantitative data while qualitative data was analyzed by establishing the categories and themes, relationships/patterns and conclusions in line with the study objectives.

4.2 Response Rate

Response is the proportion of the sample that participated as intended in all the research procedures. In the study, out of 100 subjects who participated 80 (80%) filled and returned. This questionnaire return rates met the minimum threshold, thus was deemed adequate for the study.

Table 3: Response Rate

Category	Frequency	Percentage
Response	80	80
Non-response	20	20
Total	100	100

Source: Researcher (2021)

4.3 Reliability of Constructs

Before the results were analyzed, a reliability test was performed on the constructs to see if each item fit and could relate as a group. The reliability test was successful because the

results were higher than the permitted value of 0.6 (Wambugu *et al.*, 2015). The average of items was 0.89 indicating high reliability and consistency thus all could be considered as determinants of Digital Inclusion effectiveness.

4.4 Objective 1:

To investigate the influence of demographic factors i.e. age and gender, and government policy on Digital Inclusion among students and staff of higher learning institutions

4.4 .1 Demographic Data

The researcher was interested in understanding the intervention of gender and age of the senior management, middle management, lower level management inclusive of all the staff in the respective levels and students on digital inclusion.

4.4.1.1 Gender

Table 4: Gender

VARIABLE	FREQUENCY	PERCENTAGE
Male	65	81.2
Female	15	18.8
TOTAL	80	100

Source (Researcher 2021)

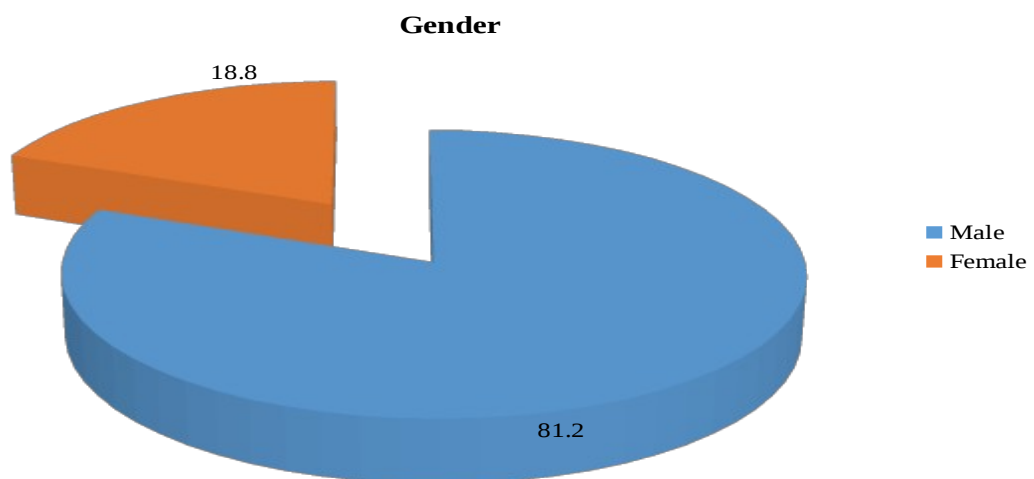


Figure 2: Gender

When asked to respond regarding gender, the respondent indicated as follows; 65 (81.2%) indicated male, and their remaining counter parts 15 (18.8%) indicated female. These findings show that majority of respondents of the respondents were male

4.4.1.2 Age

Table 5: Age

VARIABLE	FREQUENCY	PERCENTAGE
18-25	8	10
26-30	21	26.2
31-40	40	50
41-50	5	6.3
Older than 50	6	6.3
Total		

Source (Researcher 2021)

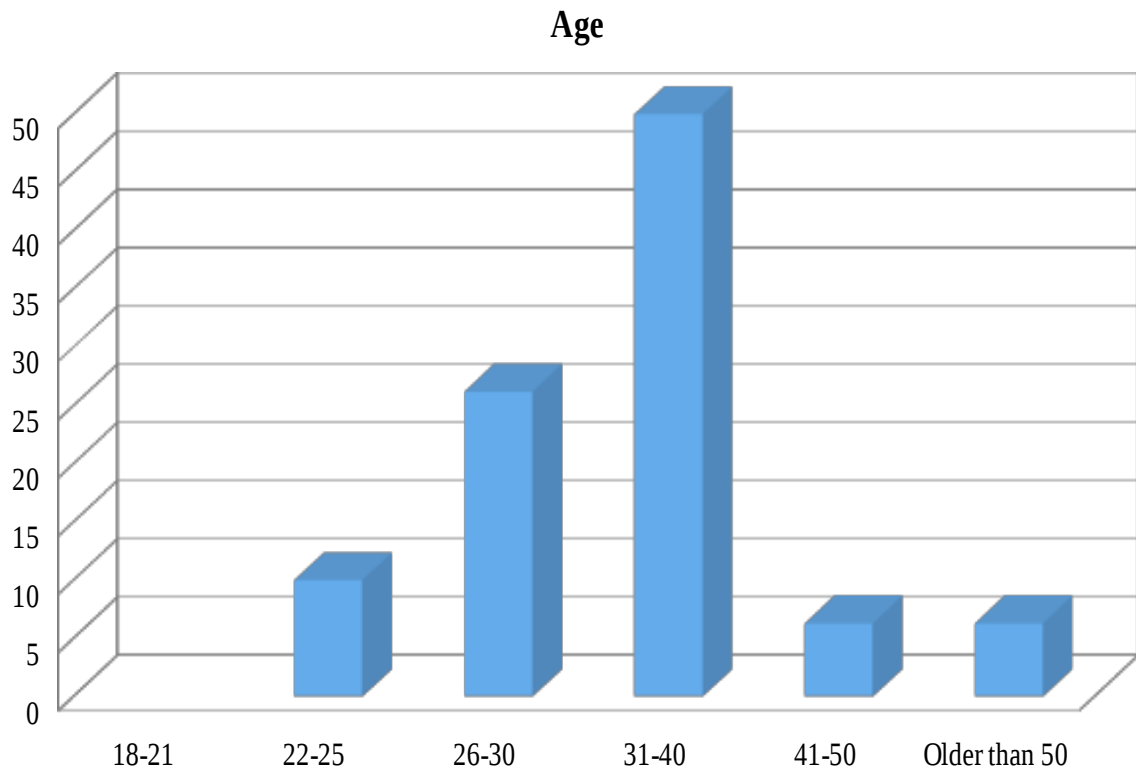


Figure 3: Age

Rating the variable above on figure 2, respondent indicated as follows, 40 (50%) indicated 31-40, 21 (26.2%) indicated 26-30 and 8 (100%) indicated 22-25. The study concluded that most of the respondents was drawn from 31-40 age group.

4.4 .2 Government Policy

Table 6: Government Policies on Digital Inclusion.

VARIABLE	FREQUENCY	PERCENTAGE
Yes	29	36.25
No	51	63.75
TOTAL	80	100

Source (Researcher 2021)

The findings above on figure 21 shows 51(63.75%) indicated NO. while 29(36.25%) indicated YES if the government have policies on digital inclusion. The study concluded that the governments have not effected policies on digital inclusion.

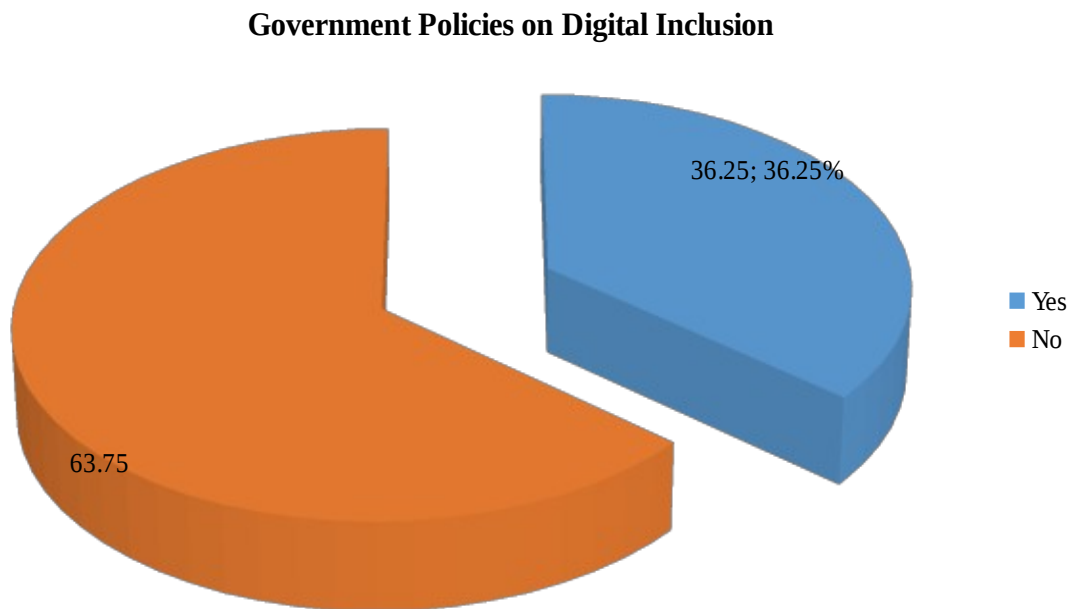


Figure 4: Government Policies on Digital Inclusion.

4.5 Objective 2: To examine the influence of access to electronic channels used in teaching in the higher learning institutions on digital inclusion.

4.5.1 Influence to Access Communication

Table 7: Influence to Access Communication

VARIABLE	FREQUENCY	PERCENTAGE
Always	32	40
Frequently	28	35
Occasionally	20	25

Rarely	0	0
Never	0	0
TOTAL	80	100

Source (Researcher 2021)

Figure 5: Influence to Access Communication

On Figure 3: The respondents indicated as follows 32(40%) indicated always, 28(35%) indicated frequently and 20(25%) indicated occasionally. The researcher concluded that both students and lectures are accessing internet.

4.5.2 Influence to Access Internet

4.5.2.0: Influence to Access Internet to Interacting with Public

Table 8: Influence to Access Internet to Interacting with Public.

VARIABLE	FREQUENCY	PERCENTAGE
Always	27	33.6
Frequently	34	42.5
Occasionally	17	21.3
Rarely	2	20.6
Never	-	-
TOTAL	80	100

Source (Researcher 2021)

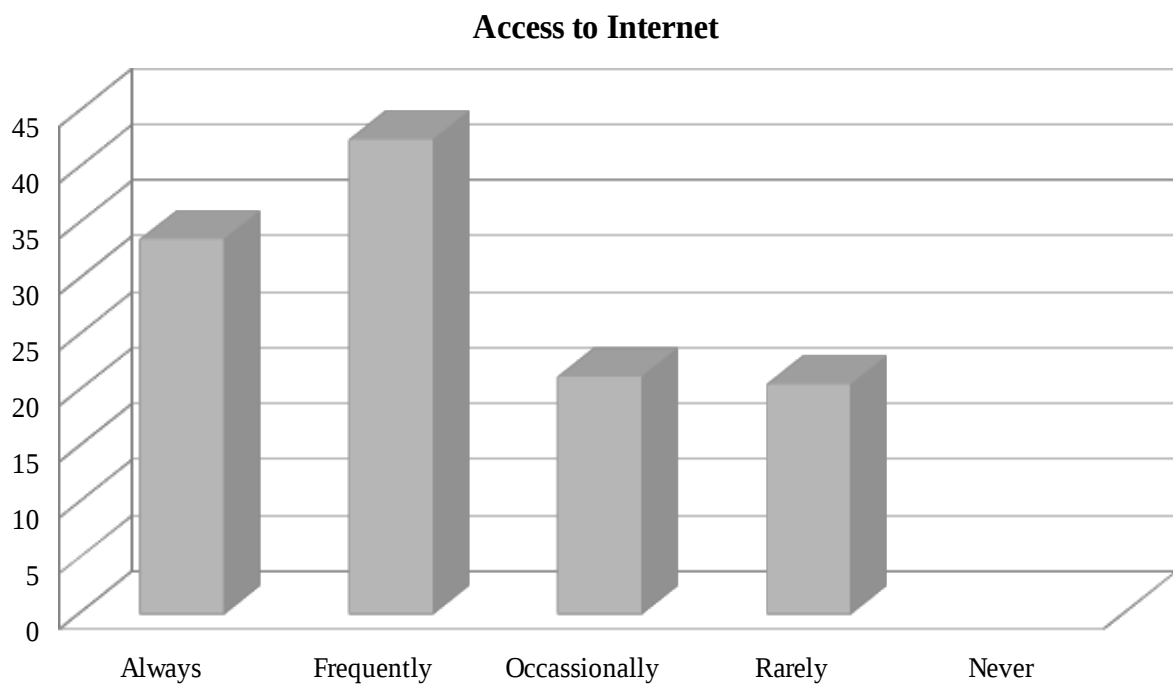


Figure 6: Influence to Access Internet to Interacting with Public.

As per figure above respondents indicated as follows 27 (33.6%) indicated always, 34 (42.5%) indicated frequently and 17 (21.3%) indicated occasionally using internet to interact with the public is very high in the institutions.

4.5.2.1 Influence to Access Internet to Perform Banking

Table 9: Influence to Access Internet to Perform Banking.

VARIABLE	FREQUENCY	PERCENTAGE
Always	21	26.3
Frequently	25	31.3
Occasionally	7	8.6
Rarely	27	33.8
Never	-	-
TOTAL	80	100

Source (Researcher 2021)

Rating influence to access internet to perform banking by respondents was as follows: 27(33.8%) agreed with rarely 25(31.3%) indicated frequently. The findings concluded that both students and lecturers are using internet to perform banking.

Figure 7: Influence to Access Internet to Perform Banking.

4.5.2.2 Influence to Access Internet to Purchase Order

Table 10: Influence to Use Internet to Purchase Order.

VARIABLE	FREQUENCY	PERCENTAGE
Always	6	7.5
Frequently	10	12.5
Occasionally	8	10
Rarely	20	25
Never	36	45
TOTAL	80	100

Source (Researcher 2021)

36 (45%) of the respondents 36 (45%) indicated never, 20 (25%) indicated rarely and 10 (10%) indicated frequently. The use of internet to purchase order is not being used in the instructions.

Figure 8: Influence to Use Internet to Purchase Order.

4.5.2.3 Influence to Use Internet during Entertainment and News

Table 11: Influence to Use Internet during Entertainment and News

VARIABLE	FREQUENCY	PERCENTAGE
Always	20	25
Frequently	28	35
Occasionally	27	34

Rarely	5	6
Never	-	-
TOTAL	80	100

Source (Researcher 2021)

On the use of internet during entertainment response was as follows: 28 (35%) indicated frequently 27 (34%) indicated occasionally and 20 (25%) indicated always. The study concluded that the use of internet during entertainment and news is very high in the institutions.

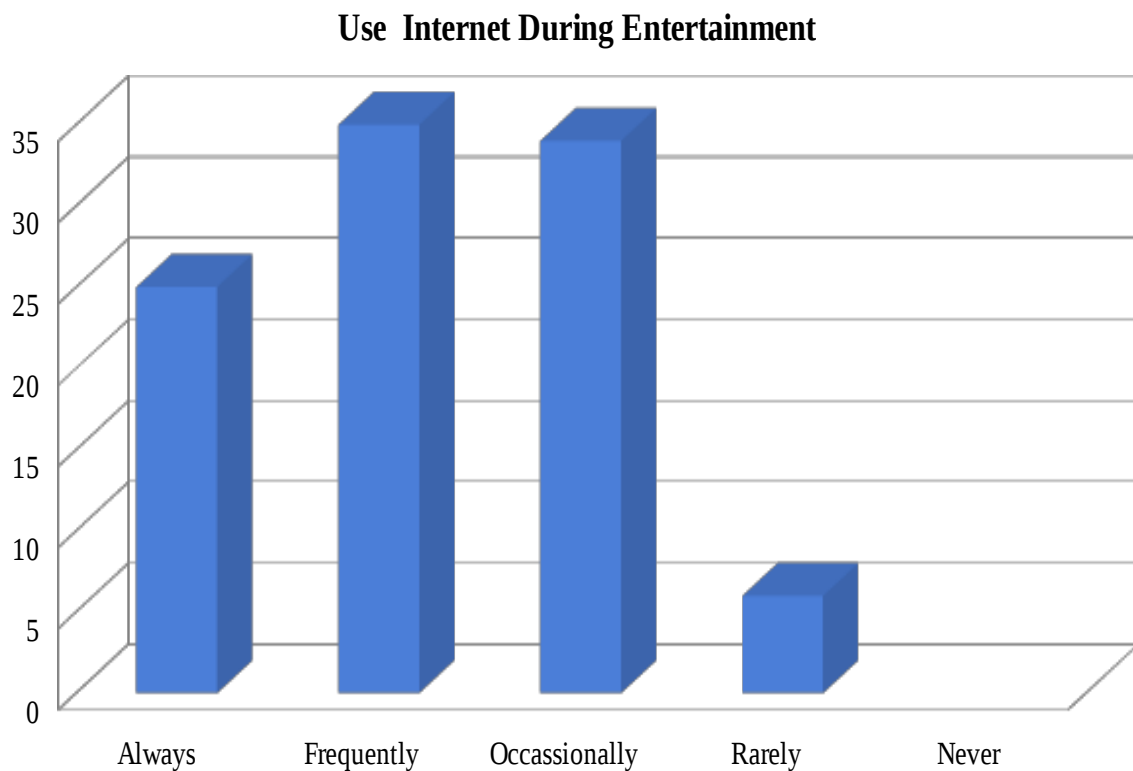


Figure 9: Influence to Use Internet during Entertainment and News

4.5.2.4 Influence to Access Internet When Researching

Table 12: Influence to Access Internet When Researching

VARIABLE	FREQUENCY	PERCENTAGE
Always	42	52.5
Frequently	38	47.5
Occasionally	-	-
Rarely	-	-
Never	-	-
TOTAL	80	100

Source (Researcher 2021)

The finding above on the figure 9 indicates 42 (52.5%) of the respondents agreed with always and the remaining counterparts 38 (47.5%) indicated frequently. A good number of institutions are using internet for research purposes.

Access to Internet when Researching

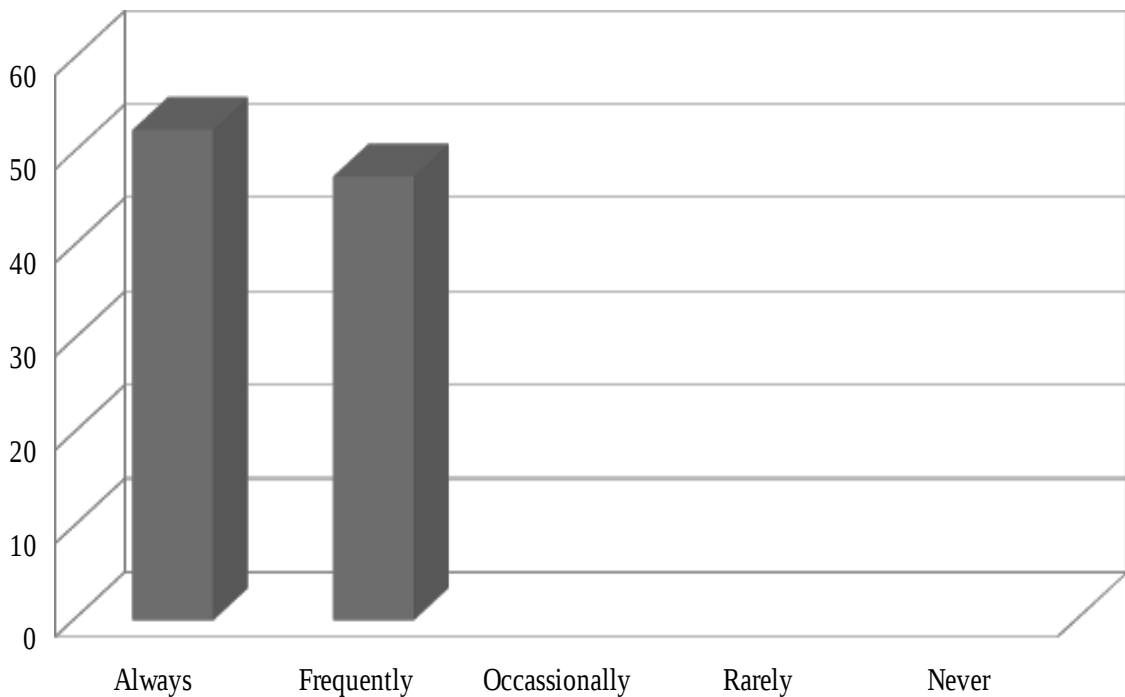


Figure 10: Influence to Access Internet When Researching

4.5.2.5 To Access Media and Government Services Using Internet.

Table 13: To Access Media and Government Services Using Internet.

VARIABLE	FREQUENCY	PERCENTAGE
Always	18	22.5
Frequently	19	23.7
Occasionally	28	35
Rarely	15	18.8
Never	-	-
TOTAL	80	100

Source (Researcher 2021)

28 (35%) of the respondents agreed with occasionally and 18 (22.5%) indicated always 19 (23.7%) indicated frequently. The researcher concluded that the institutions have been using internet.

Figure 11: To Access Media and Government Services Using Internet.

4.5.3 Number of Students on the Influence on Implement of E-Learning

Table 14: Number of Students on the Influence on Implement of E-Learning.

VARIABLE	FREQUENCY	PERCENTAGE
Yes	59	73.7
No	21	26.3
TOTAL	80	100

Source (Researcher 2021)

On the table 11 above 59 (73.7%) indicated YES and 21 (26.3%) indicated NO. The number of students in the university has influence decision on the implementation of E-Learning.

Number students on the Influence on Implement of E-Learning

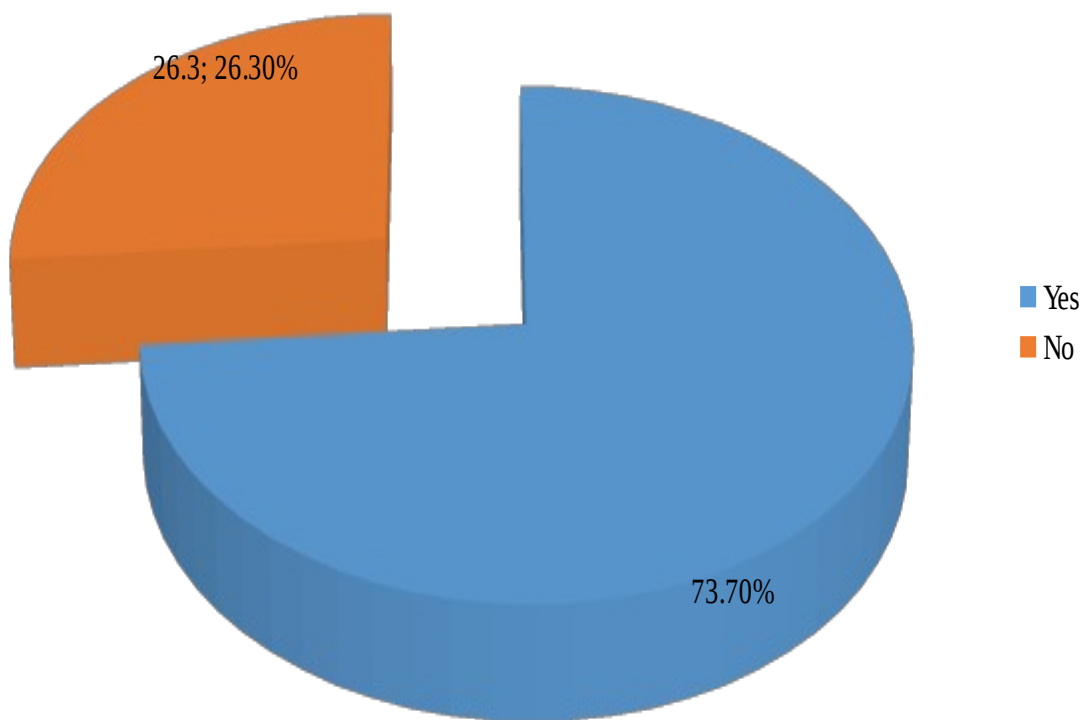


Figure 12: Number of Students on the Influence on Implement of E-Learning.

4.5.4 Literacy Level on the Influence Use of ICT

Table 15: Literacy Level on the Influence Use of ICT

VARIABLE	FREQUENCY	PERCENTAGE
Yes	80	100
No	-	-
TOTAL	80	100

Source (Researcher 2021)

Rating table 12 above all respondents indicated as follows 80 (100%) YES. The study concluded that literacy levels have influence on the use if I.C.T

Literacy level on the influence use of ICT

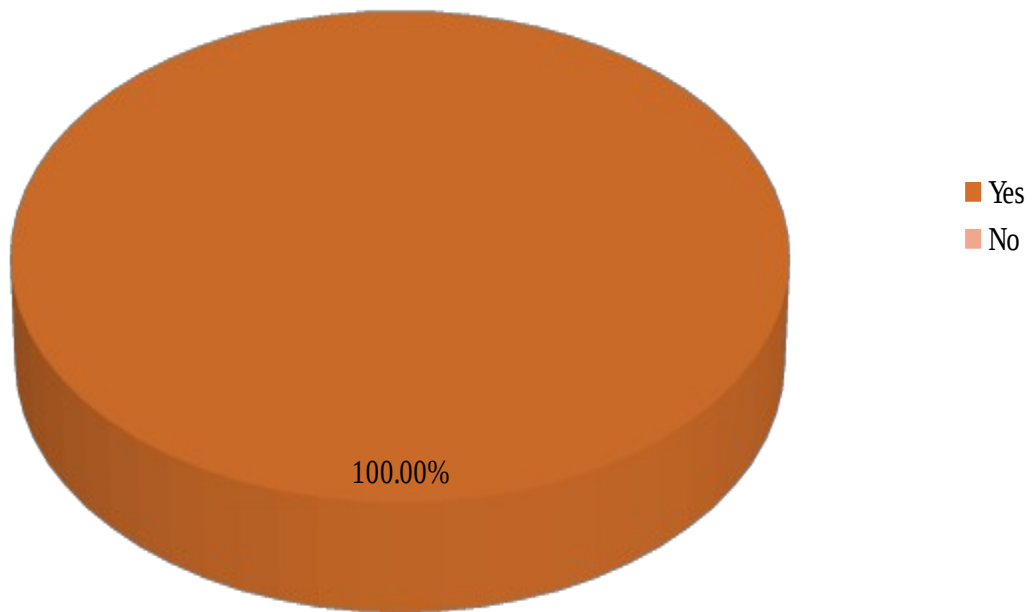


Figure 13: Literacy Level on the Influence Use of ICT

4.5.5 Students Access to Electronic Channel at the University

Table 16: Students Access to Electronic Channel at the University

VARIABLE	FREQUENCY	PERCENTAGE
Yes	29	33.25
No	51	63.75

TOTAL	80	100
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Source (Researcher 2021)

Data on table shows 13, 51 (63.75%) indicated NO, while 29 (33.25%) indicated YES. Most institutions are lacking channels for teaching and students have no access to the existing channels.

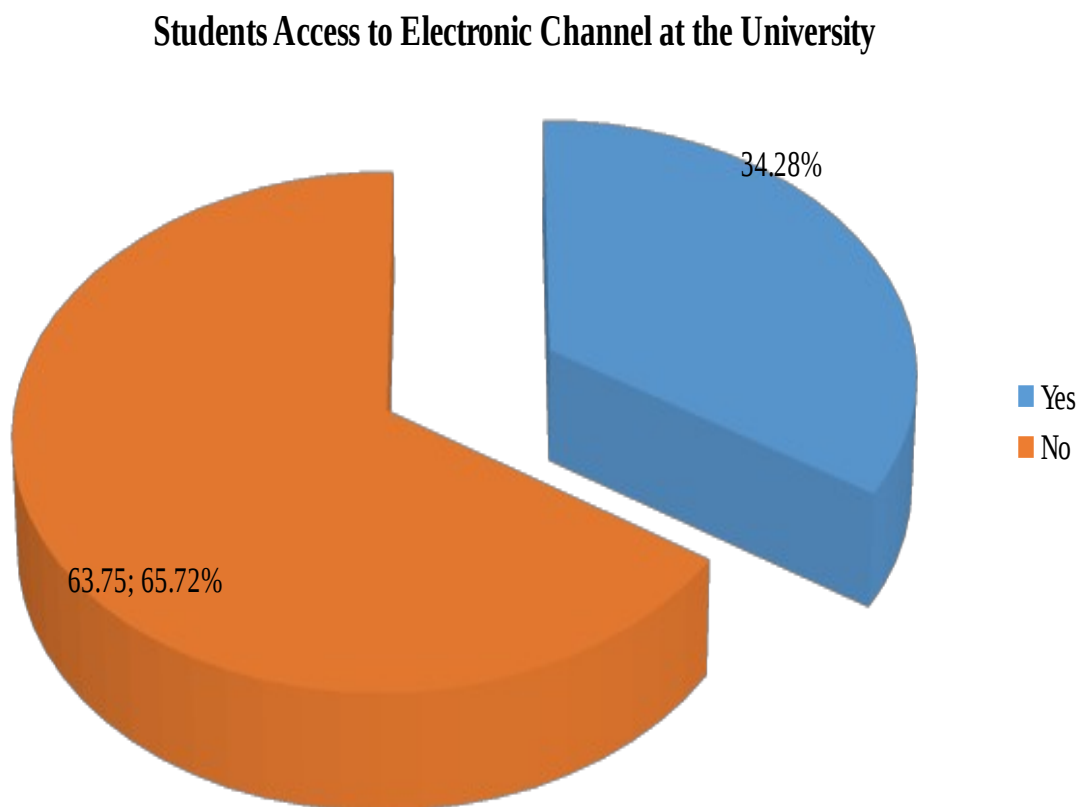


Figure 14: Students Access to Electronic Channel at the University

5.5.6 Age Influence on Access to Electronic Channels in the Institutions

Table 17: Age Influence on Access to Electronic Channels in the Institutions

VARIABLE	FREQUENCY	PERCENTAGE
-----------------	------------------	-------------------

Yes	69	86.25
No	11	13.75
TOTAL	80	100

Source (Researcher 2021)

According to table 14 above 69 (86.25%) indicated YES and the remaining 11 (13.75%) indicated NO. Age has been affecting the access to influence the use of electronic channels in the institutions.

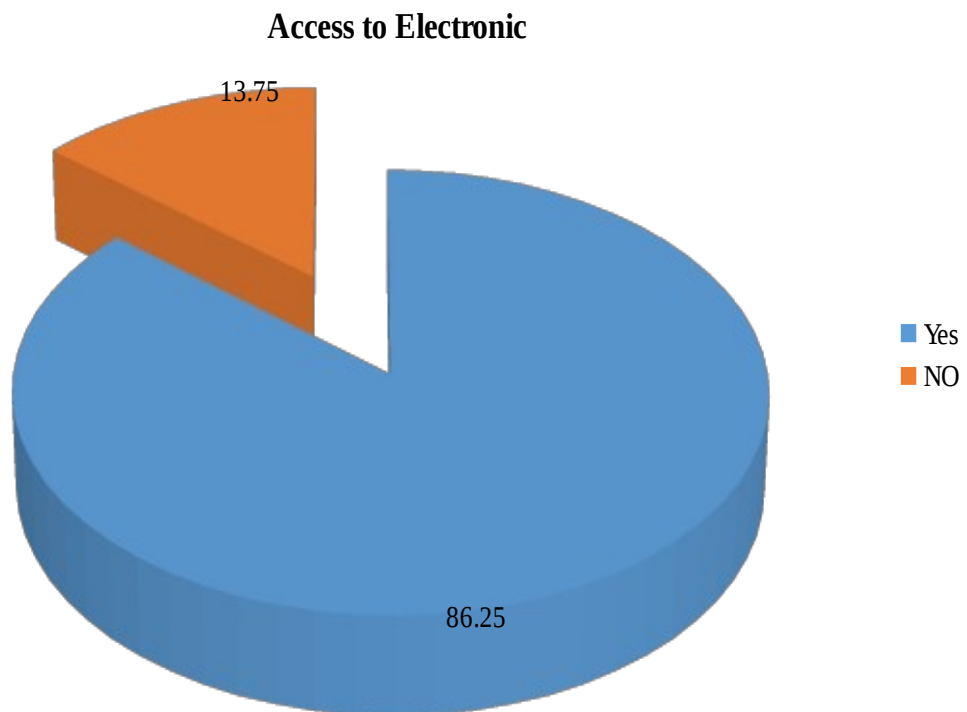


Figure 15: Age Influence on Access to Electronic Channels in the Institutions.

4.5.7 Old People on the Use of Electronic Channels

Table 18: Old People on the Use of Electronic Channels

VARIABLE	FREQUENCY	PERCENTAGE
Yes	32	40
No	48	60
TOTAL	80	100

Source (Researcher 2021)

As per the finding above in figure 15, 48 (60%) of the respondents indicated No, while 32 (40%) indicated YES. When responding about if old people use electronic channels. The study concluded that age has no influence to use of electronic channels

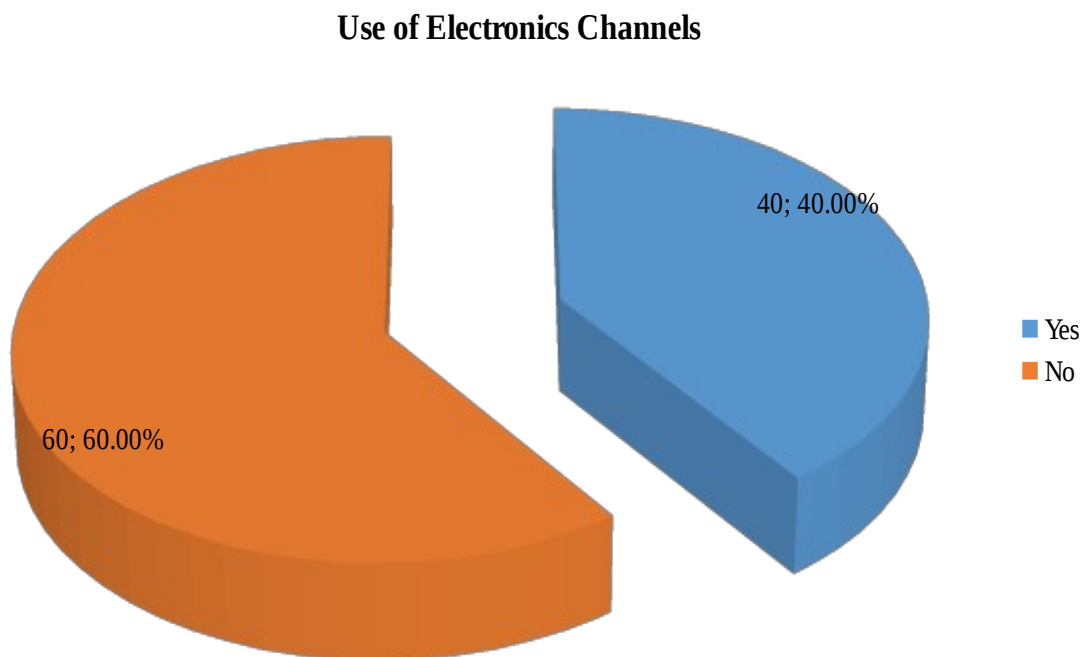


Figure 16: Old People on the Use of Electronic Channels

4.6 Objective 3: Influence of digital access on digital inclusion

4.6.0 University Owning E-learning

Table 19: University Owning E-Learning

VARIABLE	FREQUENCY	PERCENTAGE
Yes	63	78.75
No	17	21.25
TOTAL	80	100

Source (Researcher 2021)

When asked to comment if the university own an e-learning, the respondents indicated as follows 63 (78.75%) indicated YES and 17 (21.25%) indicated NO. Most universities have been using E – learning.

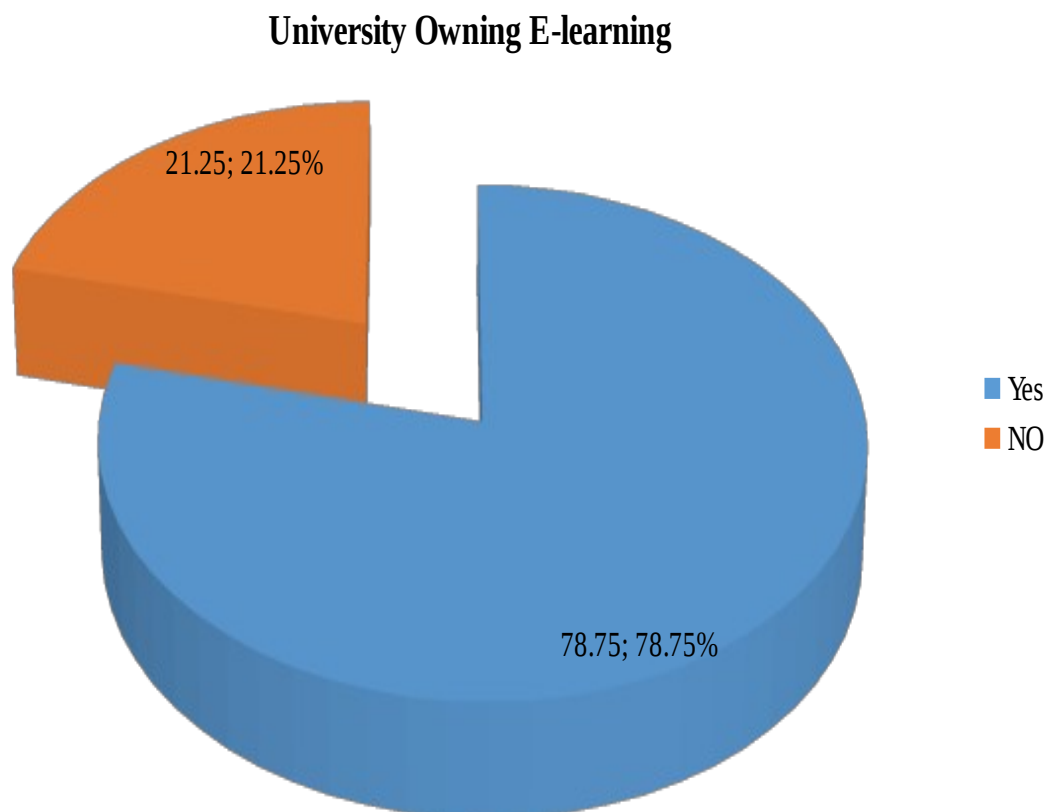


Figure 17: University Owning E-Learning

4.6.1 Providing Communication between students and department on time

Table 20: Providing Communication between Students and Department on Time

VARIABLE	FREQUENCY	PERCENTAGE
Yes	15	18.75
No	65	81.25
TOTAL	80	100

Source (Researcher 2021)

According to table 17 above 65(81.25%) of the respondents indicated NO regarding if the available technology able to provide communication between students and department, while 15 (18.75%) indicated YES. The researcher concluded that institution is unable to provide enough technology to provide communication between students and departments on time.

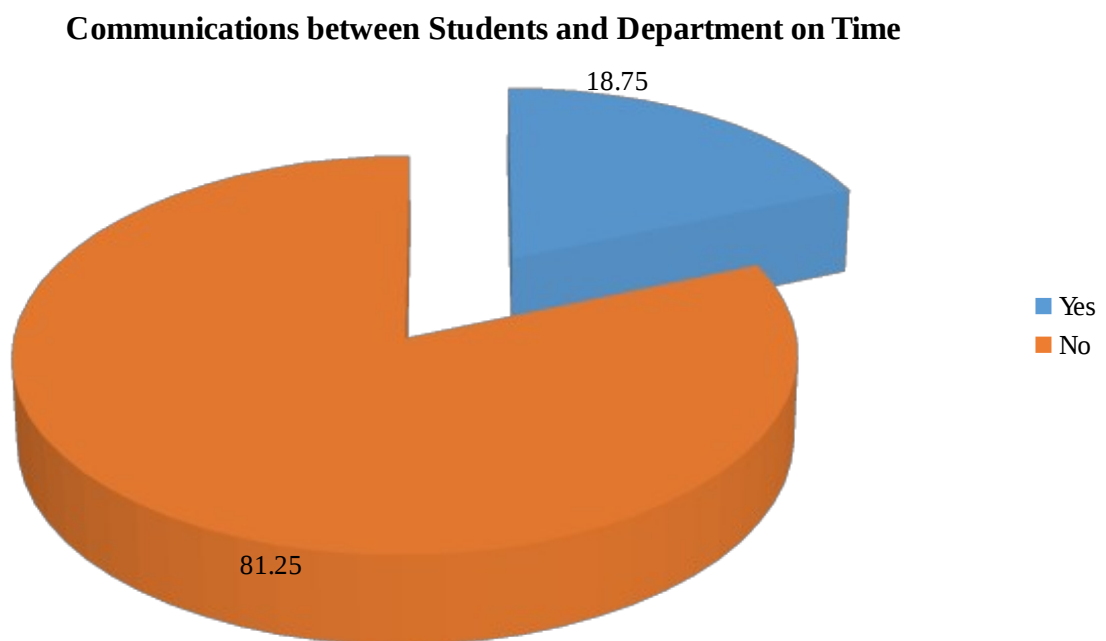


Figure 18: Providing Communication between Students and Department on Time

4.6.2 Available Communication Structure Adequate for Support of E-Learning

Table 21: Available Communication Structure Adequate for Support of E-Learning.

VARIABLE	FREQUENCY	PERCENTAGE
Yes	23	28.75
No	57	71.25
TOTAL	80	100

Source (Researcher 2021)

When responding to the factor above 57 (71.25%) indicated NO. while 23 (28.75%) indicate YES regarding enough communication structure to support e-learning. Most of universities have not acquired enough communication to support e-learning.

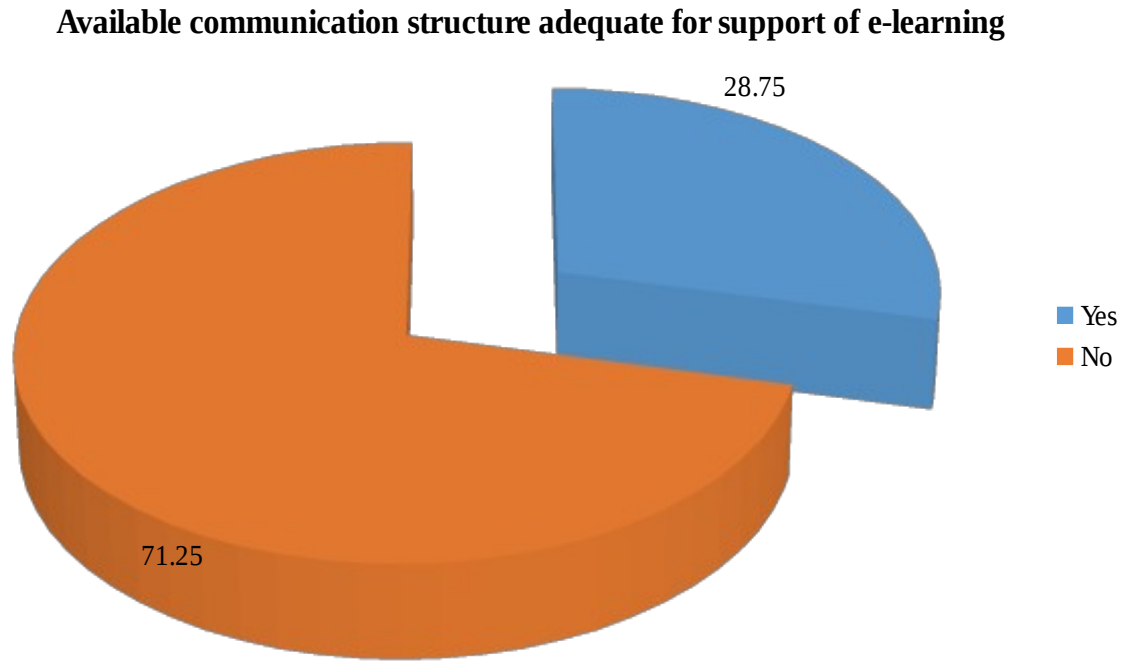


Figure 19: Available Communication Structure Adequate for Support of E-Learning.

4.6.3 Accessing E-Learning Resources is Very Easy

Table 22: Accessing E-Learning Resources is Very Easy

VARIABLE	FREQUENCY	PERCENTAGE
Yes	29	36.25
No	51	63.75
TOTAL	80	100

Source (Researcher 2021)

When asked to respond if accessing e-learning resources are very easy, respondents indicated as follows, 51(63.75%) indicated NO and 29 (36.25%) indicated YES. The study concluded that accessing e-learning is still not easy for both student and lecturers.

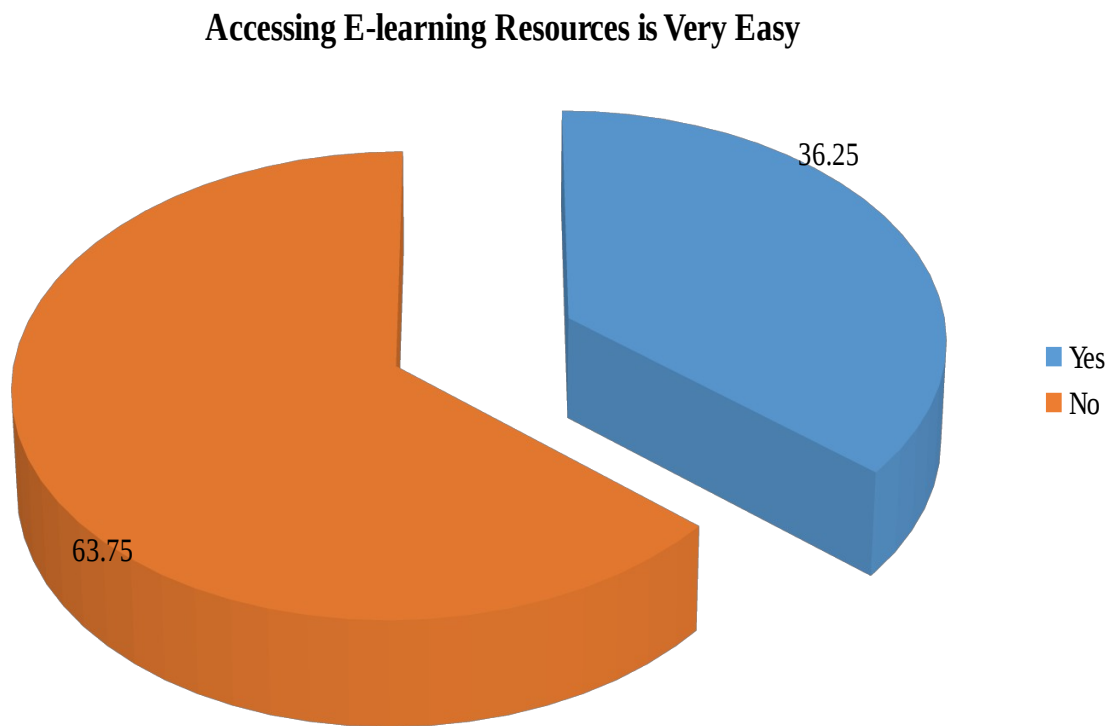


Figure 20: Accessing E-Learning Resources is Very Easy

4.6.4 Gender Influence on Digital Influence among Institutions

Table 23: Gender Influence on Digital Influence among Institutions

VARIABLE	FREQUENCY	PERCENTAGE
Yes	11	13.75
No	69	86.25
TOTAL	80	100

Source (Researcher 2021)

Regarding gender influence on digital influence among institutions respondents indicated as follows, 69(86.25%) agreed with NO and 11(13.75%) indicated YES. Gender has no influence on the digital among universities in Kenya.

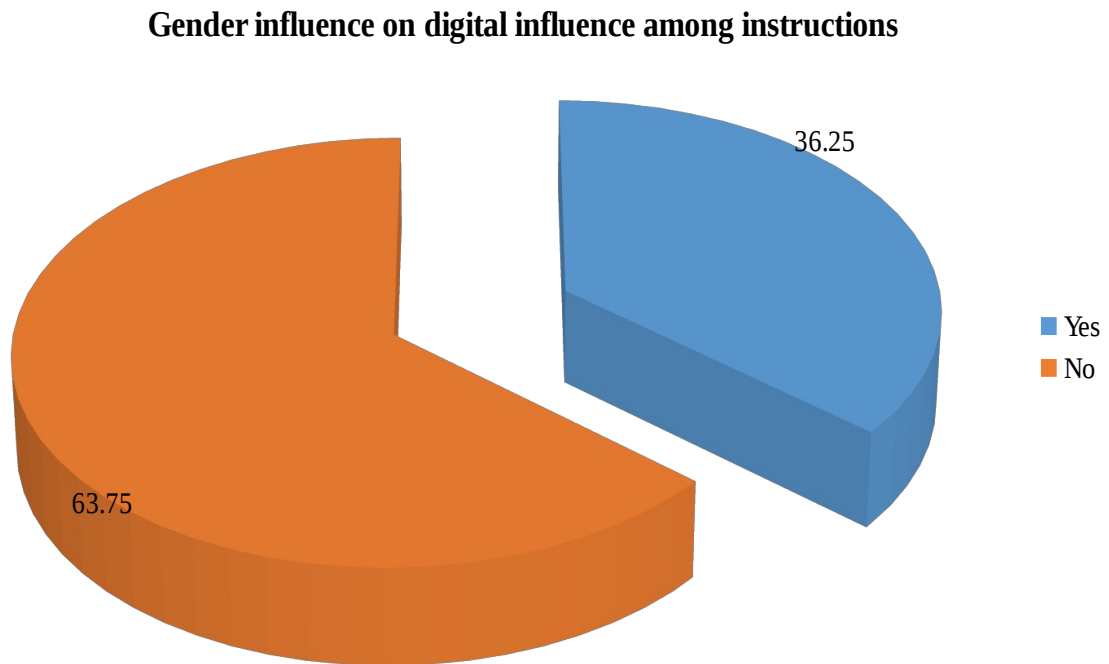


Figure 21: Gender Influence on Digital Influence among Instructions

4.6.5 Where to Access Internet

Table 24: Where to Access Internet

VARIABLE	FREQUENCY	PERCENTAGE
Mobile Device	39	48.75

Commercial facility like cyber cafe	23	28.75
Work	9	11.25
University	8	10
Home	1	1.25
TOTAL	80	100

Source (Researcher 2021)

When asked to respond on where respondents to access internet, the findings were as follow, 48.75% indicated mobile device, 23 (28.75%) indicated commercial facilities like cybercafé, 9 (11.25%) indicated work. mobile device is the most preferred way of accessing internet.

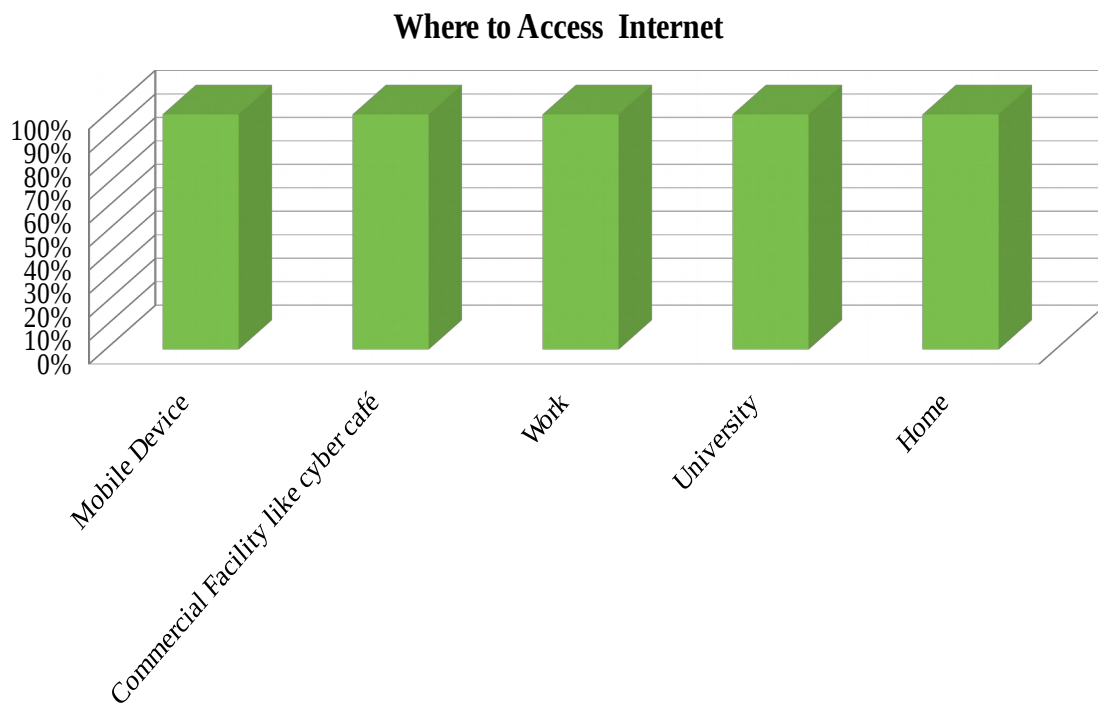


Figure 22: Where to Access Internet

4.6.6 In My Family One Member Has a Computer, Laptop E.T.C

Table 25: In My Family One Member Has a Computer, Laptop E.T.C

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	21	26.25
Agree	11	13.75
Neutral	21	26.25
Disagree	10	12.5
Strictly Disagree	17	21.25
TOTAL	80	100

Source (Researcher 2021)

Data above from figure 23 shows both 21 (26.25%) indicated strongly Agree and Neutral, while 17 (21.25%) indicated Agree. The researcher concluded that most of the students and lecturer’s family’s members have a computer, laptop etc.

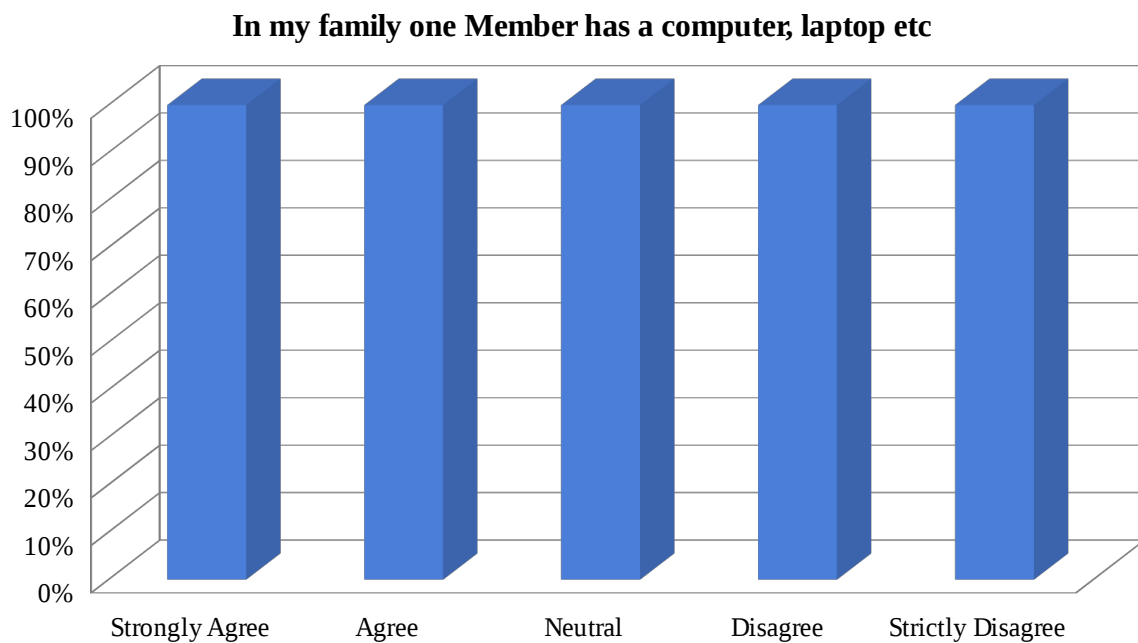


Figure 23: In My Family One Member Has a Computer, Laptop E.T.C

4.6.7 My Phone Can Access Internet

Table 26: My Phone Can Access Internet

Variable	Frequency	Percentage
Strongly Agree	45	56.25
Agree	30	37.5
Neutral	5	6.25
Disagree	-	-
Strictly Disagree	-	-
TOTAL	80	100

Source (Researcher 2021)

Rating on phone digital accessibility the respondents indicated as follows, 45 (56.25%) indicated strongly Agree, 30 (37.5%) Agree and 5 (6.25%) indicated Neutral. All students and lecturers are able to access internet using their phones.

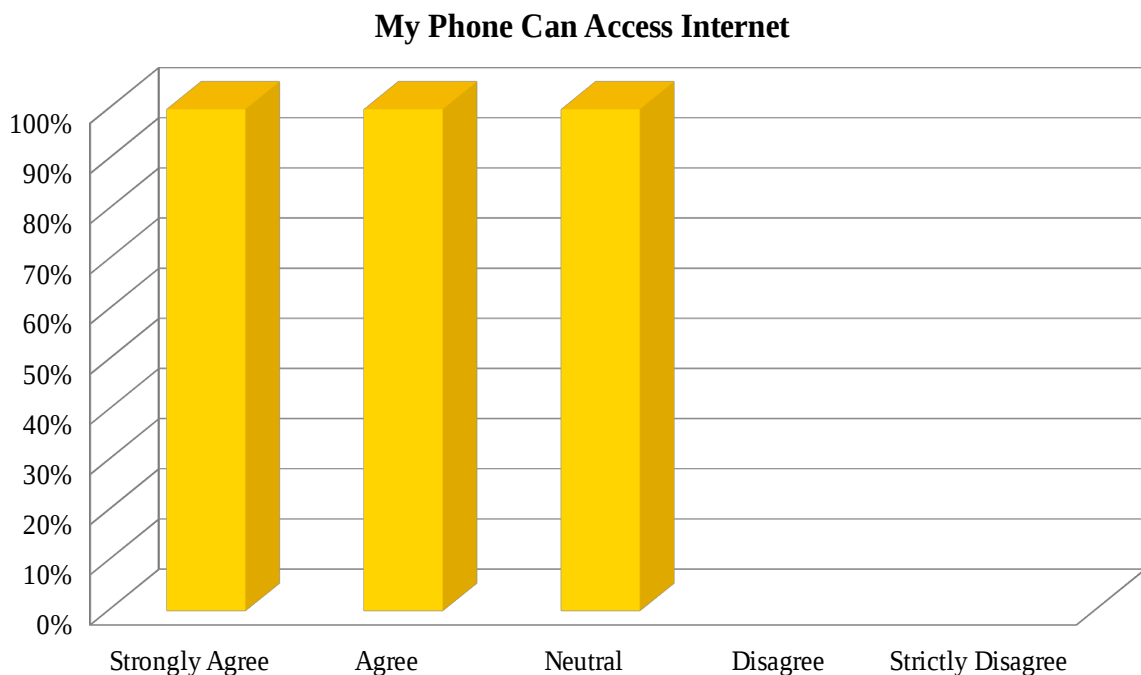


Figure 24: My Phone Can Access Internet

4.6.8 One of in My Family Member Has Subscribed to Internet Services

Table 27: One of in My Family Member Has Subscribed to Internet Services

Variable	Frequency	Percentage
Strongly Agree	31	38.75
Agree	29	36.25
Neutral	15	18.75
Disagree	5	6.25
Strictly Disagree	-	-
TOTAL	80	100

Source (Researcher 2021)

When requested to indicate if one of the respondent's family member has subscribed to internet services, 31 (38.75%) indicated strongly Agree, 29 (36.25%) indicated Agree and 15 (18.75%) indicated neutral. The study concluded that a good number of Kenyans have subscribed to various internet services

One of in my family member has subscribed to internet services

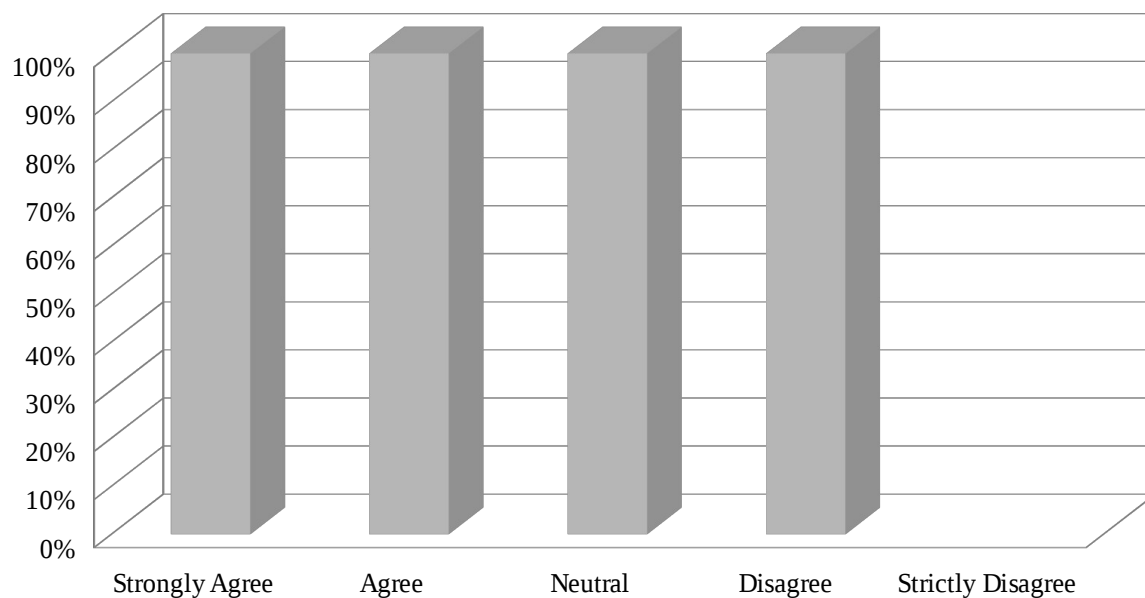


Figure 25: One of in My Family Member Has Subscribed to Internet Services

4.6.9 Our institution has a Computer Lab for Students

Table 28: Our institution has a Computer Lab for Students

Variable	Frequency	Percentage
Strongly Agree	18	22.5
Agree	12	15
Neutral	7	8.75
Disagree	31	38.75
Strictly Disagree	12	15
TOTAL	80	100

Source (Researcher 2021)

Rating on the variable above regarding if our college has a computer lab for students, the findings were as follows 18 (22.5%) indicated strongly Agree, 31 (38.75%) indicated Disagree and 12 (15%) did Agree most collage have computer lab for students.

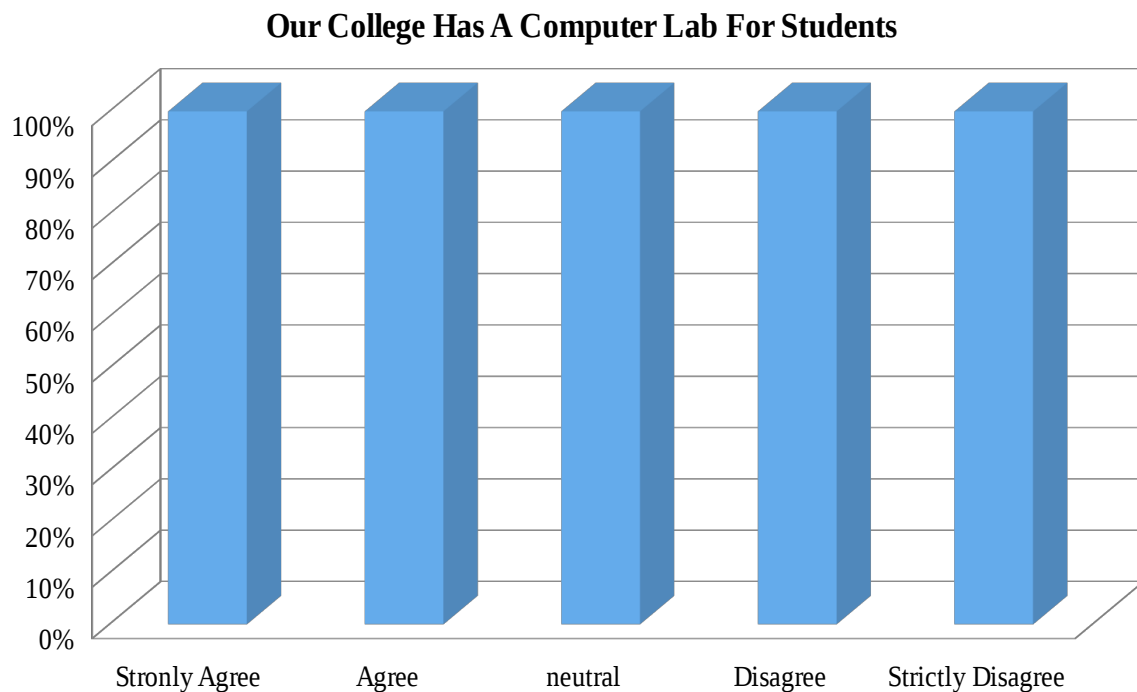


Figure 26: Our College Has a Computer Lab for Students

4.6.10 Access to Computer in College

Table 29: Access to Computer in College

Variable	Frequency	Percentage
Strongly Agree	17	21.25
Agree	13	16.25
Neutral	25	31.25
Disagree	17	21.25

Strictly Disagree	8	10
TOTAL	80	100

Source (Researcher 2021)

Respondents were asked to comment about access to computer in their college, responses indicated as follows 25 (31.25%) indicated Neutral, 17 (21.25%) both strongly Agreed and Disagreed with, 13 (16.25%) agreed. The study concluded that computer availability within colleges is not enough

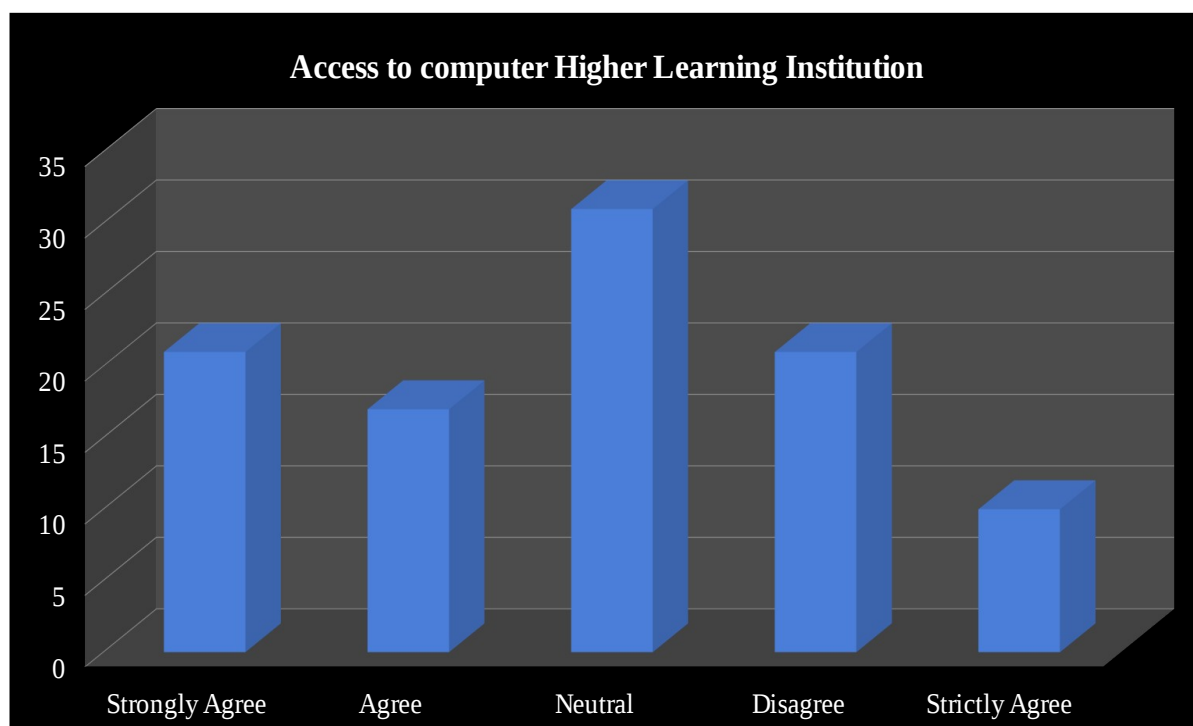


Figure 27: Access to Computer in Higher learning institutions

4.6.11: Using E-Learning

Table 30: Using E-Learning

Variable	Frequency	Percentage
Strongly Agree	16	20

Agree	12	15
Neutral	28	35
Disagree	14	17.5
Strictly Disagree	10	12.5
TOTAL	80	100

Source (Researcher 2021)

According to figure 28 above 28 (35%) of the respondents indicated Neutral, 16 (20%) indicated strongly Agree and 14 (17.5%) indicated strongly Agree/ Most institutions have not adopted E-learning.

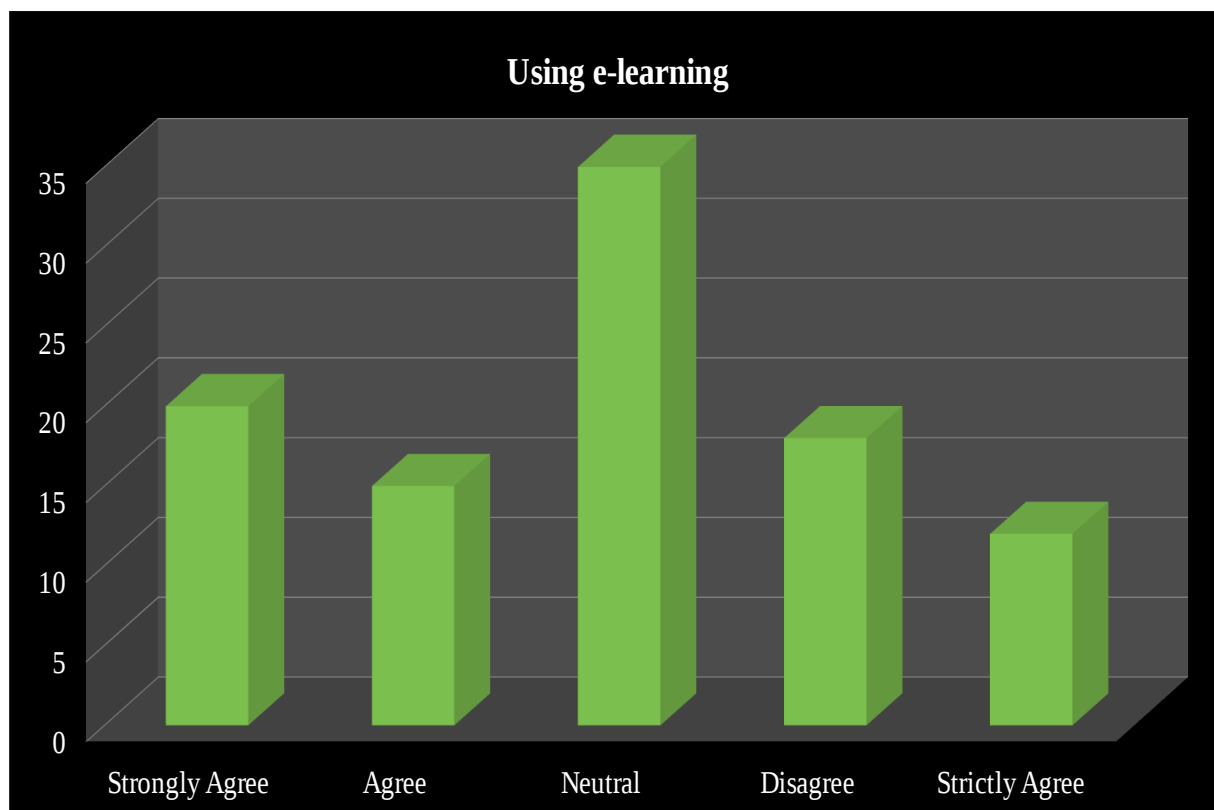


Figure 28: Using E-Learning

4.6.11.0 Most of Units Are Communicated Through E-Learning

Table 31: Most of Units Are Communicated Through E-Learning

Variable	Frequency	Percentage
Strongly Agree	6	7.5
Agree	20	25
Neutral	30	37.5
Disagree	10	12.5
Strictly Disagree	14	17.5
TOTAL	80	100

Source (Researcher 2021)

According to the above figure 29 respondents were asked to comment if most of the units are communicated through e-learning, the participants agreed as follows 30 (37.5%) indicated Neutral, 20 (25%) agreed and 10 (12.5%) did disagree. Most of the units are not communicated through e-learning channels.

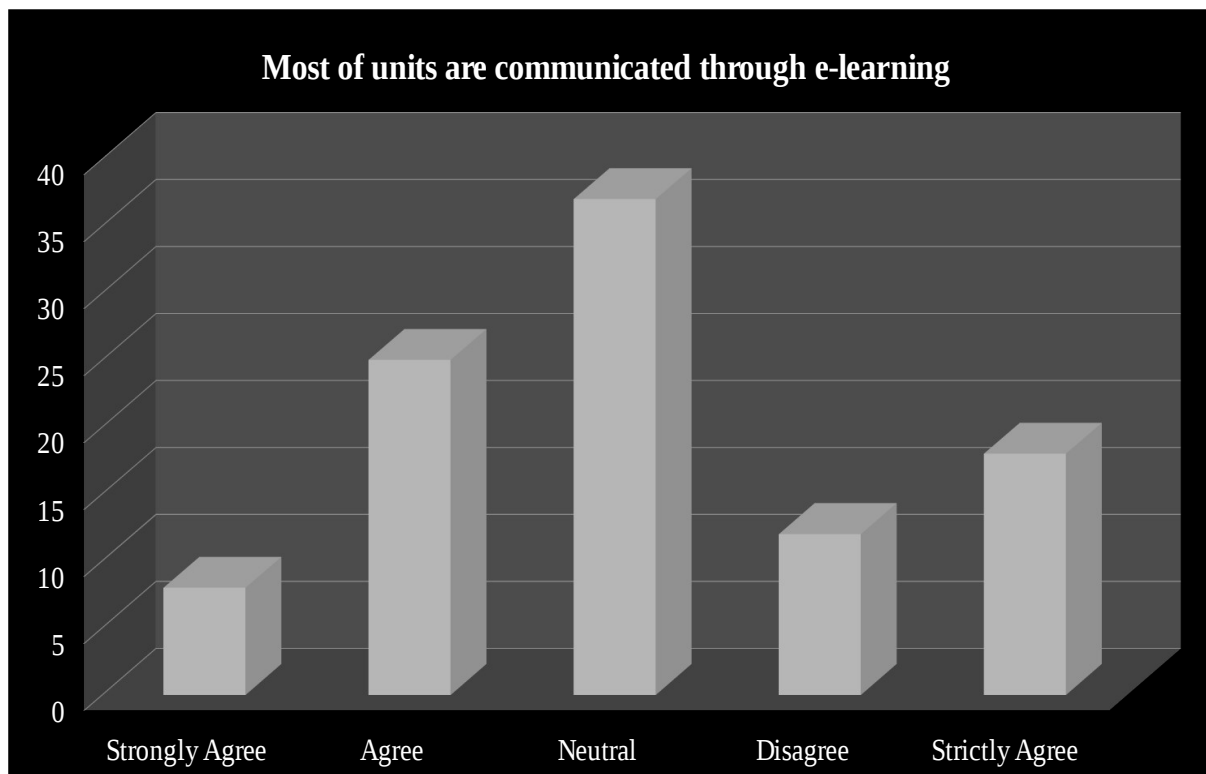


Figure 29: Most of Units Are Communicated Through E-Learning

4.6.11.1 Website Allows Interaction among Users in Universities

Table 32 Website Allows Interaction among Users in Universities

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	29	36.25
Agree	32	40
Neutral	15	18.72
Disagree	4	5
Strongly disagree	-	-
TOTAL	80	100

Source (Researcher 2021)

When asked to comment about website allows interaction among users in universities responds indicate as follows 32 (40%) indicated agreed followed closely with 29 (36.25) that agreed with strongly agreed and 15 (18.75%) indicated natural. The study concluded that website allows interaction among users in universities.

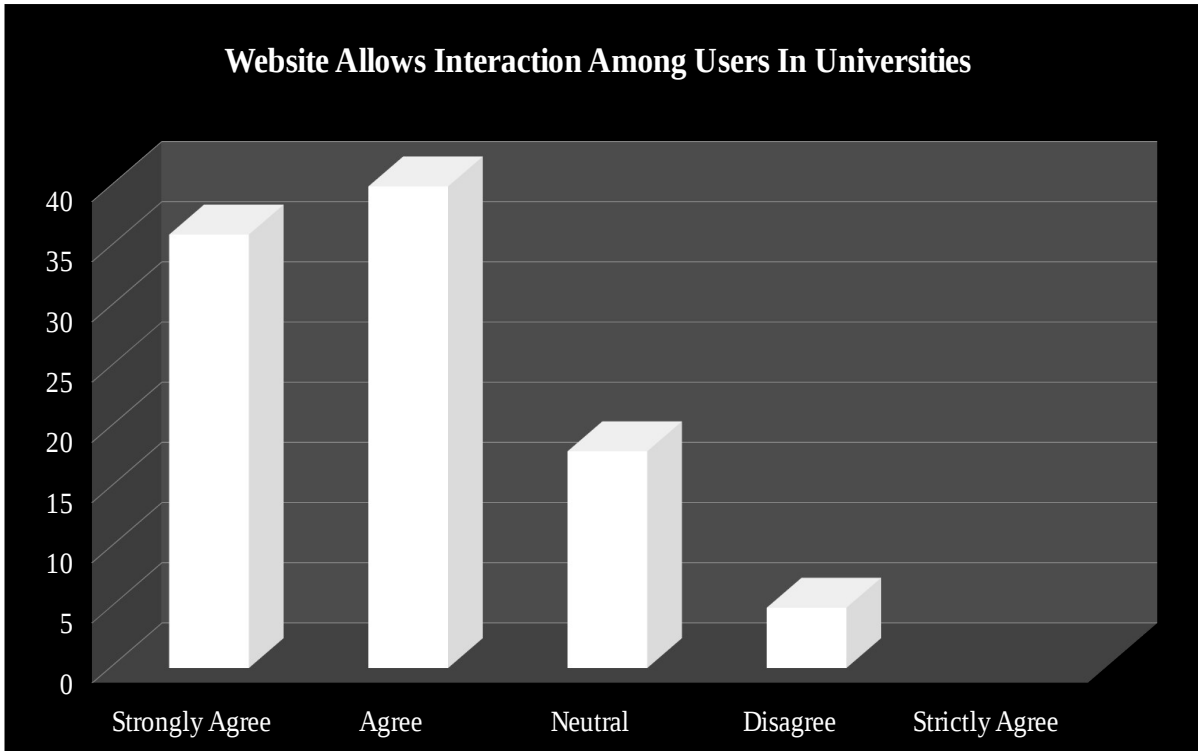


Figure 30: Website Allows Interaction among Users in Universities

4.7 Objective 4: Influence of ICT Skills and Knowledge on Digital Inclusion

4.7.0 Offering Basic Computer Training on Its E- Learning Students

Table 33: Offering Basic Computer Training on Its E- Learning Students

VARIABLE	FREQUENCY	PERCENTAGE
Yes	5	6.75
No	75	93.75
Total	80	100

Source (Researcher 2021)

According to the figure31 above 75(93.75%) indicated No regarding if basic computer training on its E- learning student is being offered and 5(6.75%) of their remaining counter parts indicated yes. collages do not offer basic computer training on its E-learning student.

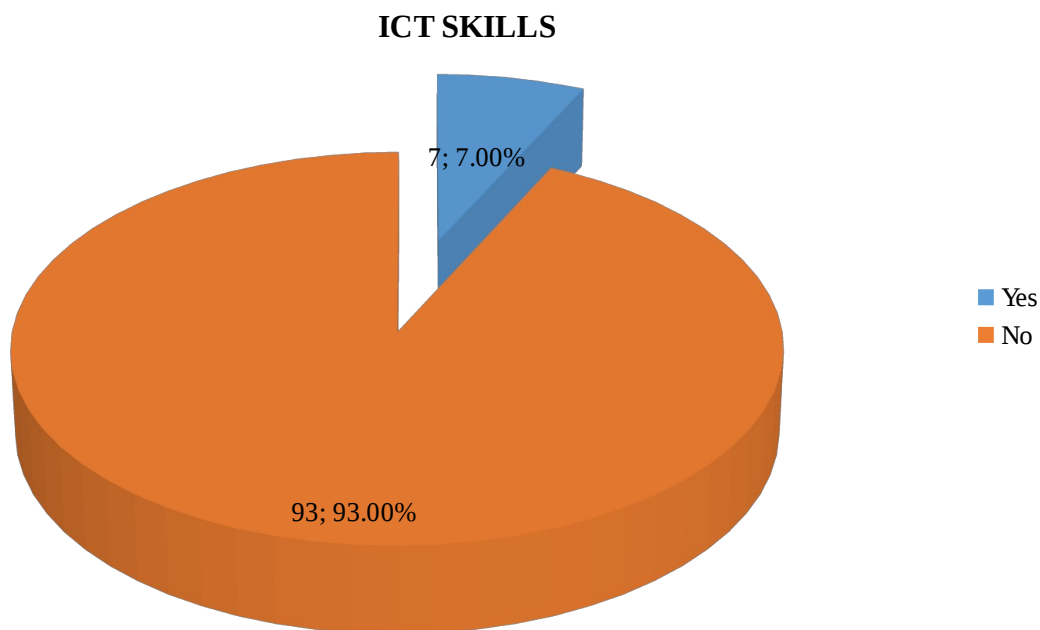


Figure 31: Offering Basic Computer Training on Its E- Learning Students

4.7.1 University Staff Is Well Trained to Assist Student

Table 34: University Staff Is Well Trained to Assist Student

VARIABLE	FREQUENCY	PERCENTAGE
Yes	8	10
No	72	90
Total	80	100

Source (Researcher 2021)

Rating on university staff are well training to assist student the response among student and lecturers indicated as follows 72(90%) agreed with No and 8(10%) indicated Yes. The study concluded that university staffs are not well trained to assist student.

University staff is well trained to assist student

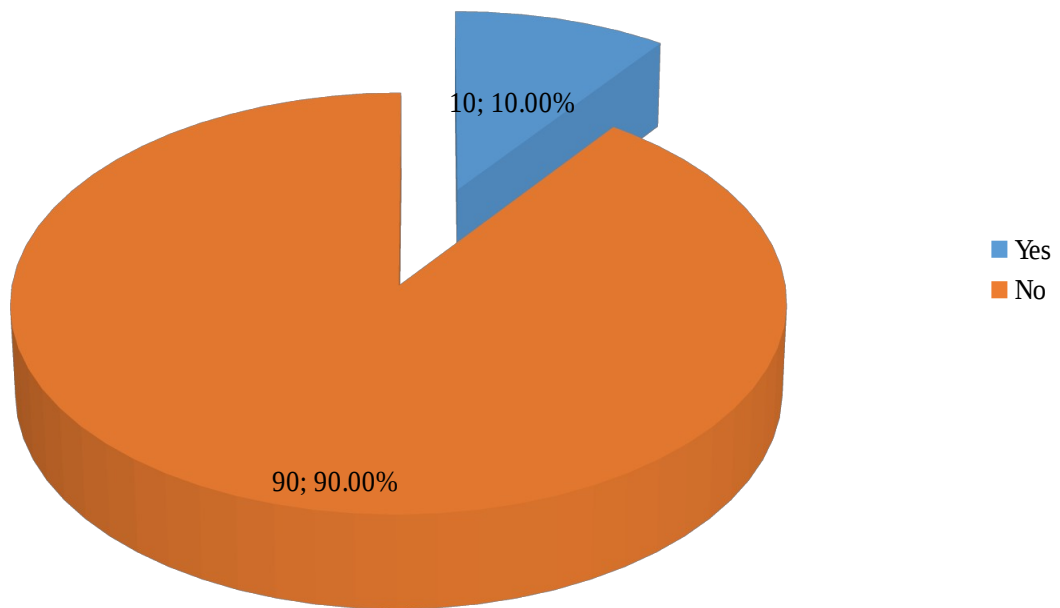


Figure 32: University Staff Is Well Trained to Assist Student

4.7.2 Departments Is Well Trained to Handle the E- Learning in the University

Table 35: Departments Is Well Trained to Handle the E- Learning in the University

VARIABLE	FREQUENCY	PERCENTAGE
Yes	3	3.75
No	77	96.25
Total	80	100

Source (Researcher 2021)

Data regarding the above variable clearly indicates 77(96.25%) indicate No when asked to indicate their opinion if departments are well trained to handle the E- learning while 3(3.75%) agreed with Yes. the study concluded that department are not well trained to handle the E-learning in the universities.

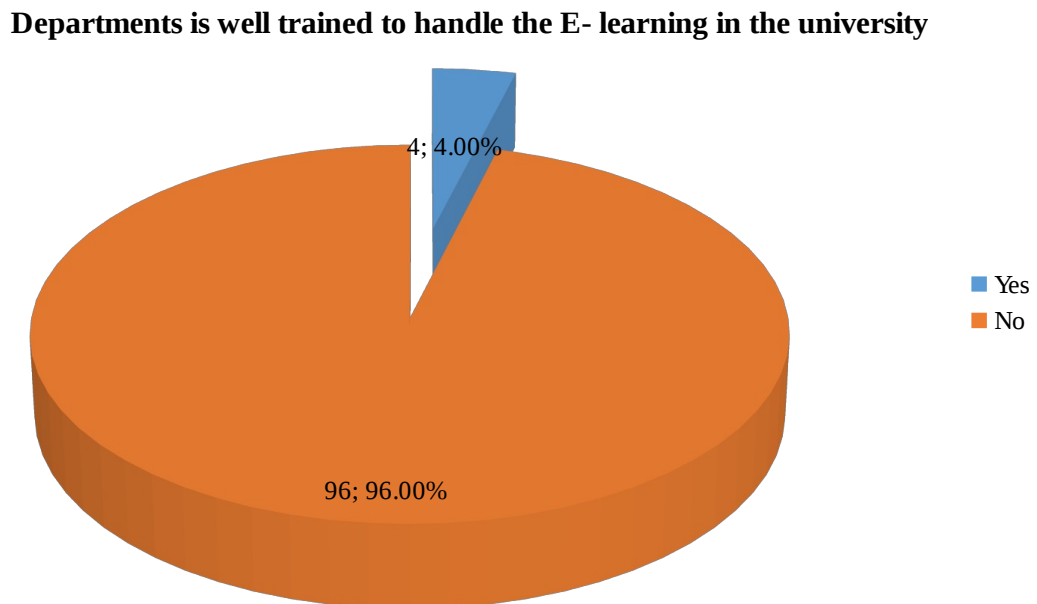


Figure 33: Departments Is Well Trained to Handle the E- Learning in the University

4.7.3 Level of Training Plays a Big Role in Empowering Digital Literacy

Table 36: Level of Training Plays a Big Role in Empowering Digital Literacy

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	35	43.75
Agree	25	31.25

Don't agree	9	11.25
Disagree	10	12.5
Strongly disagree	1	1.25
TOTAL	80	100

Source (Researcher 2021)

The finding in figure 35 above indicates 35 (31.24%) indicates strongly agree 25 (31.25%) indicated agree this is follows closely by 9 (11.25%) that agreed with don't agree. The level of training plays a big role in empowering digital littering.

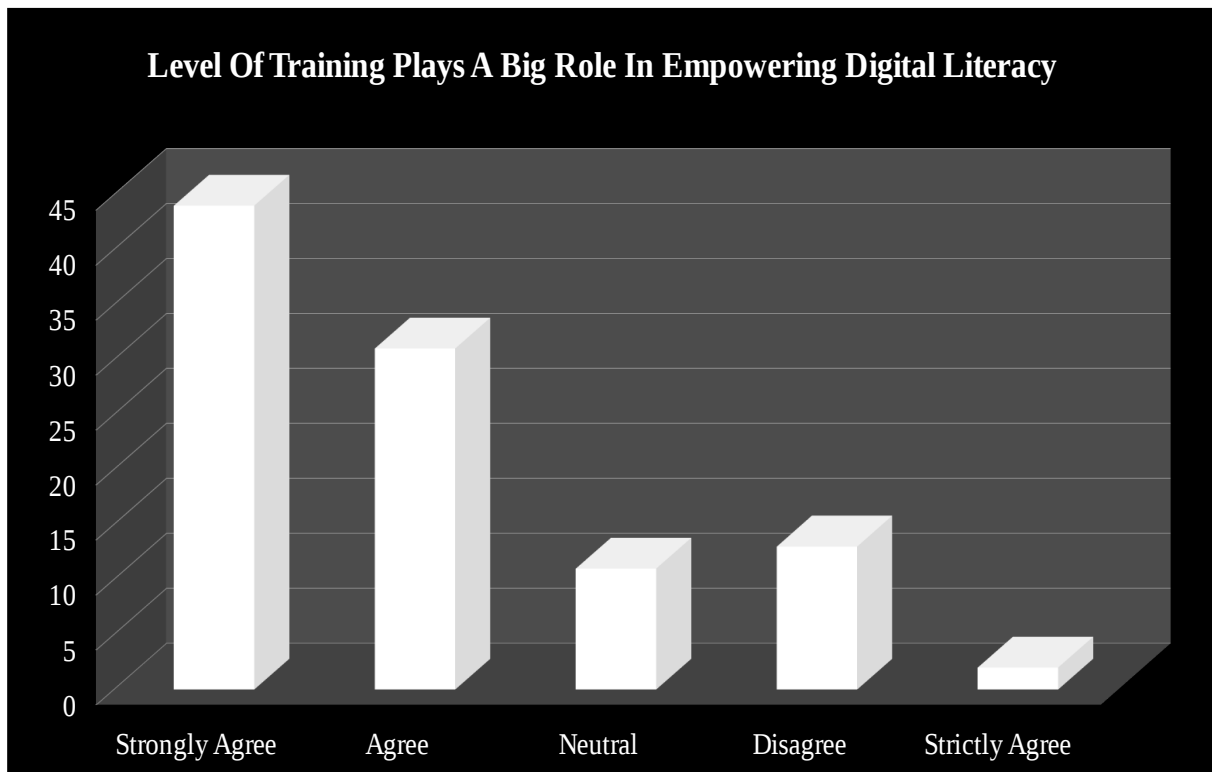


Figure 34: Level of Training Plays a Big Role in Empowering Digital Literacy

4.7.4 Level of Computer Skills Application of Software and Use

Table 37: Level of Computer Skills Application of Software and Use

VARIABLE	FREQUENCY	PERCENTAGE
Strongly good	32	40
Good	30	37.5
Neutral	21	26.25
Bad	3	3.75
Strongly bad	4	5
TOTAL	80	100

Source (Researcher 2021)

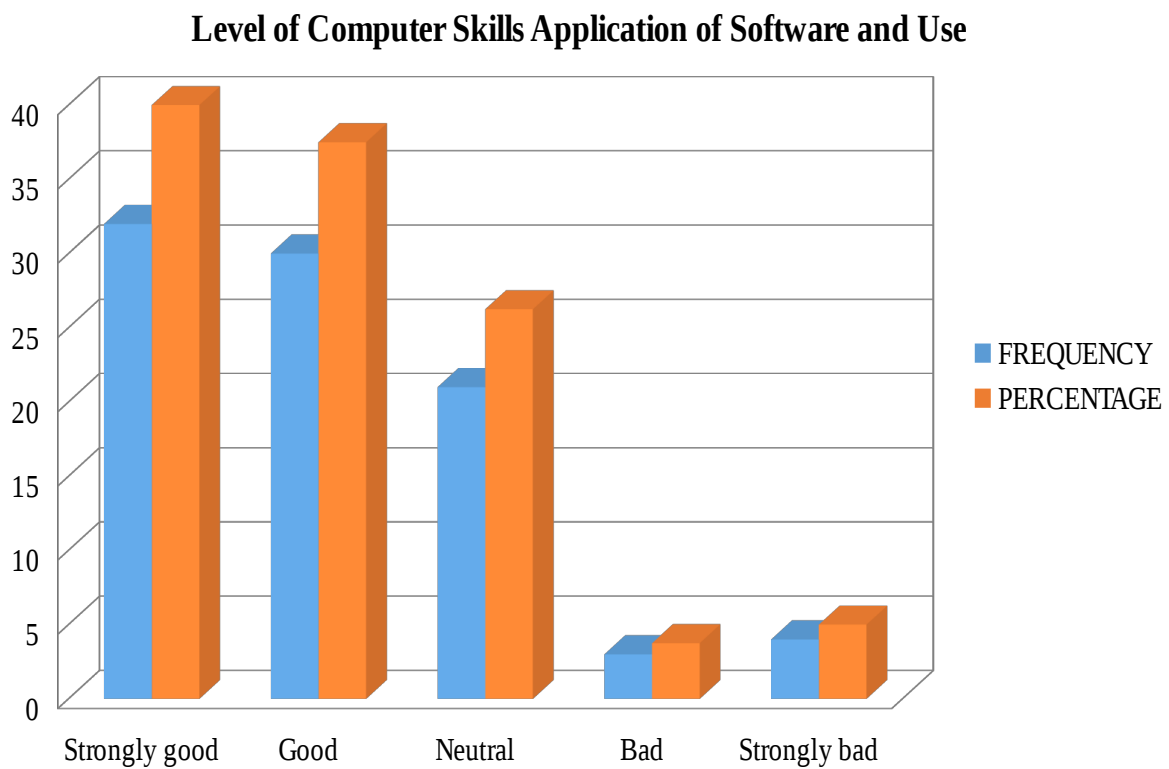


Figure 35: Level of Computer Skills Application of Software and Use

As per figure1 above 32 (40%) indicated very strongly 30 (37.5%0 indicated well, while 21 (26.25%) indicated neutral and 4 (9.75%) indicated bad regarding the level of computer skills

application of software and use. The level of skills application of software of software and use is moderate in the university

4.7.5 Level of Computer Skill of Words Processors

Table38: Level of Computer Skill of Words Processors

VARIABLE	FREQUENCY	PERCENTAGE
Strongly good	25	31.25
Good	14	17.5
Neutral	20	25
Bad	11	13.75
Strongly bad	10	12.5
TOTAL	80	100

Source (Researcher 2021)

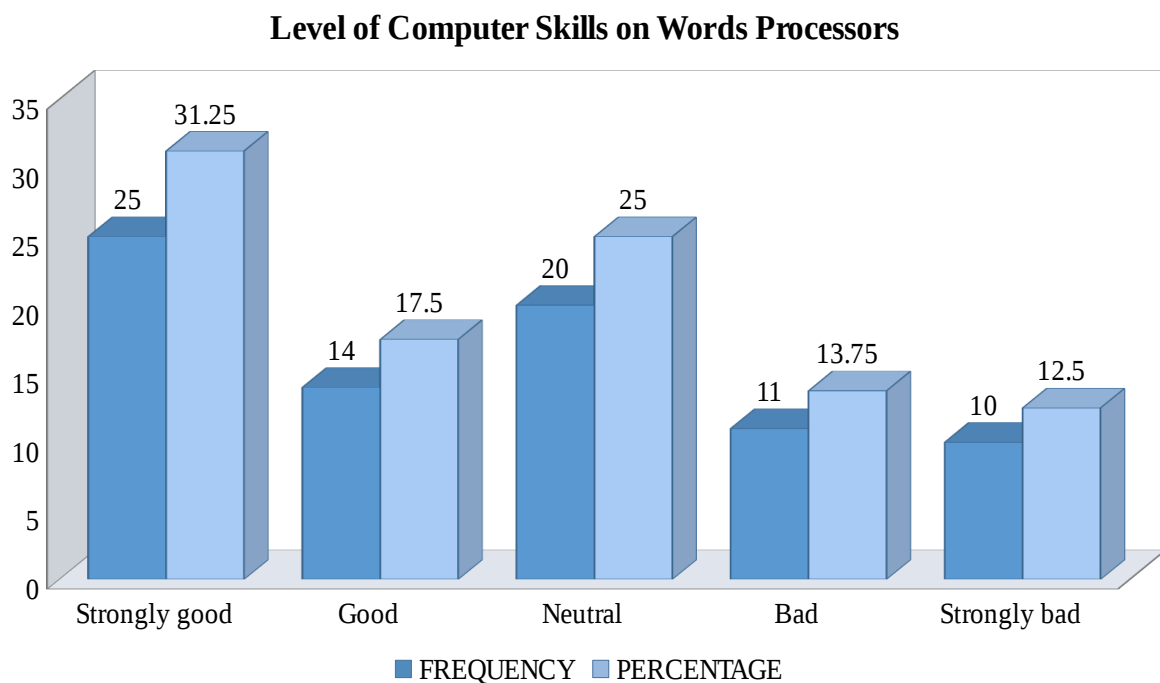


Figure 36: Level of Computer Skills on Words Processors

On the table 37 above 25 (31.25%) concurred with very bad 20 (25%) agreed with neutral 14 (17.5%) indicated good. when responding to the level of computer skills on words processors is still a bit low in the institution

4.7.6 Level of Spreadsheets Application

Table 39: Level of Spreadsheets Application

VARIABLE	FREQUENCY	PERCENTAGE
Strongly good	32	40
Good	30	37.5
Neutral	21	26.25
Bad	3	3.75
Strongly bad	4	5
TOTAL	80	100

Source (Researcher 2021)

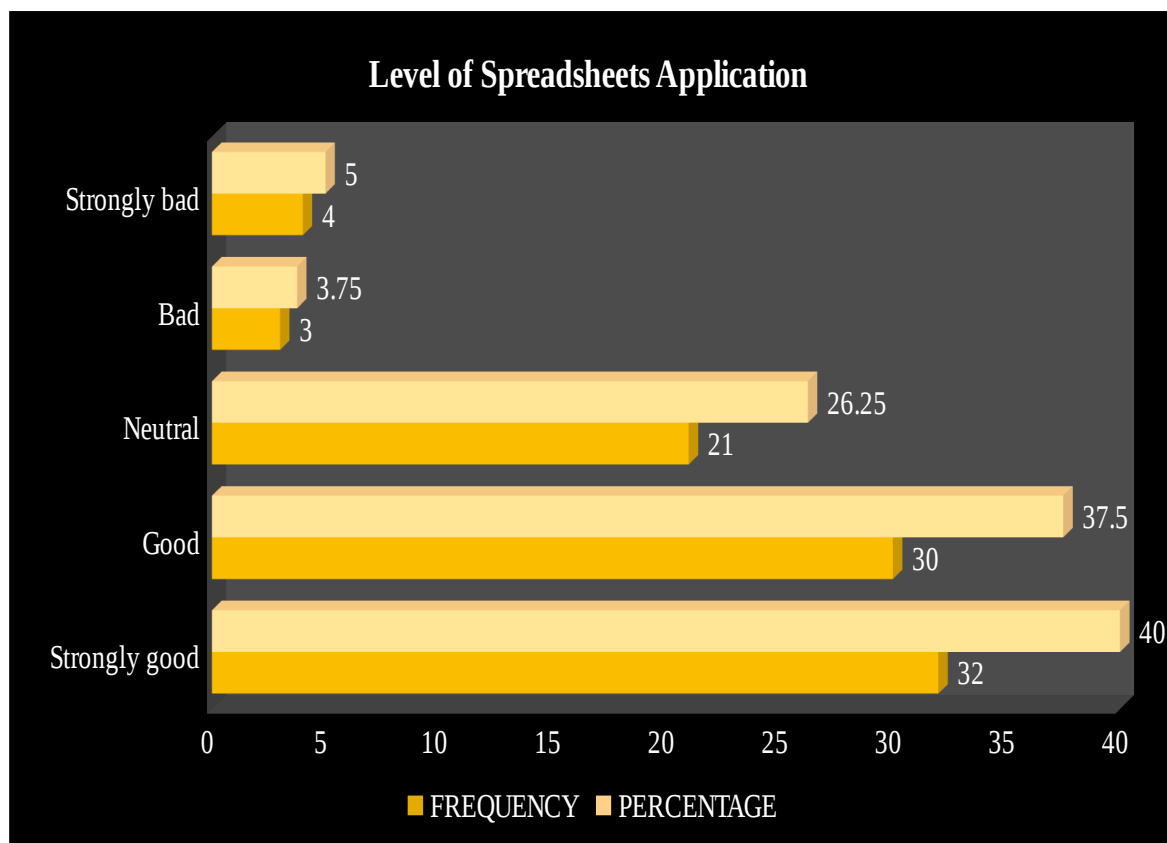


Figure 37: Level of Spreadsheets Application

According to the table 38 above 22 (27.5%) agreed with very good 20 (25%) indicated natural and 12 (15%) indicated badly on the level of spread sheet application. The level of skill on computer spreadsheets application is very low among institution in Kenya.

4.7.7 Level of Computer Skill on Web Browsers Ending

Table 40: Level of Computer Skill on Web Browsers Ending

VARIABLE	FREQUENCY	PERCENTAGE
Very good	26	32.5
Good	31	38.75
Neutral	10	12.5
Bad	10	12.5
Very bad	3	3.75

TOTAL	80	100
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Source (Researcher 2021)

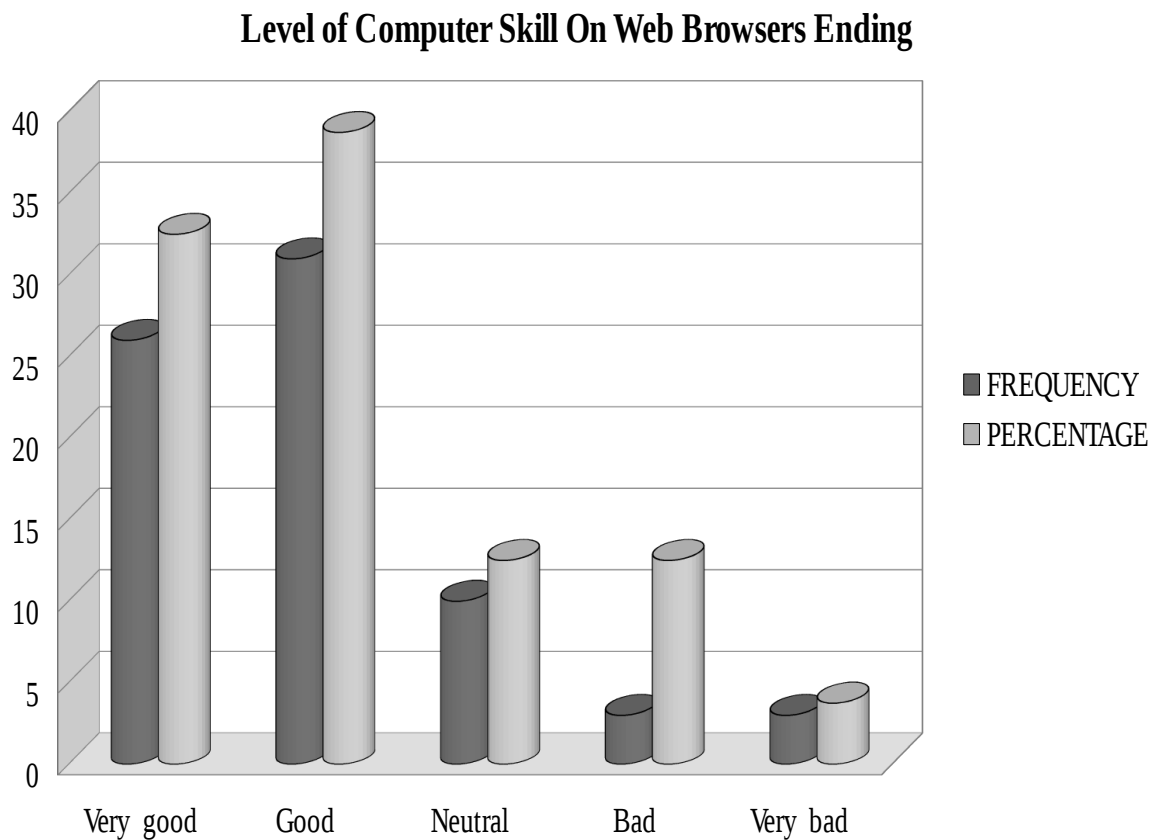


Figure 39: Level of Computer Skill on Web Browsers Ending

The table clearly indicates 26 (32.50%) indicated very good 31 (38.75%) indicated good and both 10 (12.50%) indicated neutral and both 10 (12.50%) indicated natural and bad. The level of computer skill on web browser engine is very high.

4.7.8 Level of Computer Skill on Microsoft Publisher

Table 41: Level of Computer Skill on Microsoft Publisher

VARIABLE	FREQUENCY	PERCENTAGE
Very good	21	26.25
Good	22	27.5

Neutral	5	6.25
Bad	2	15
Very bad	10	12.5
TOTAL	80	100

Source (Researcher 2021)

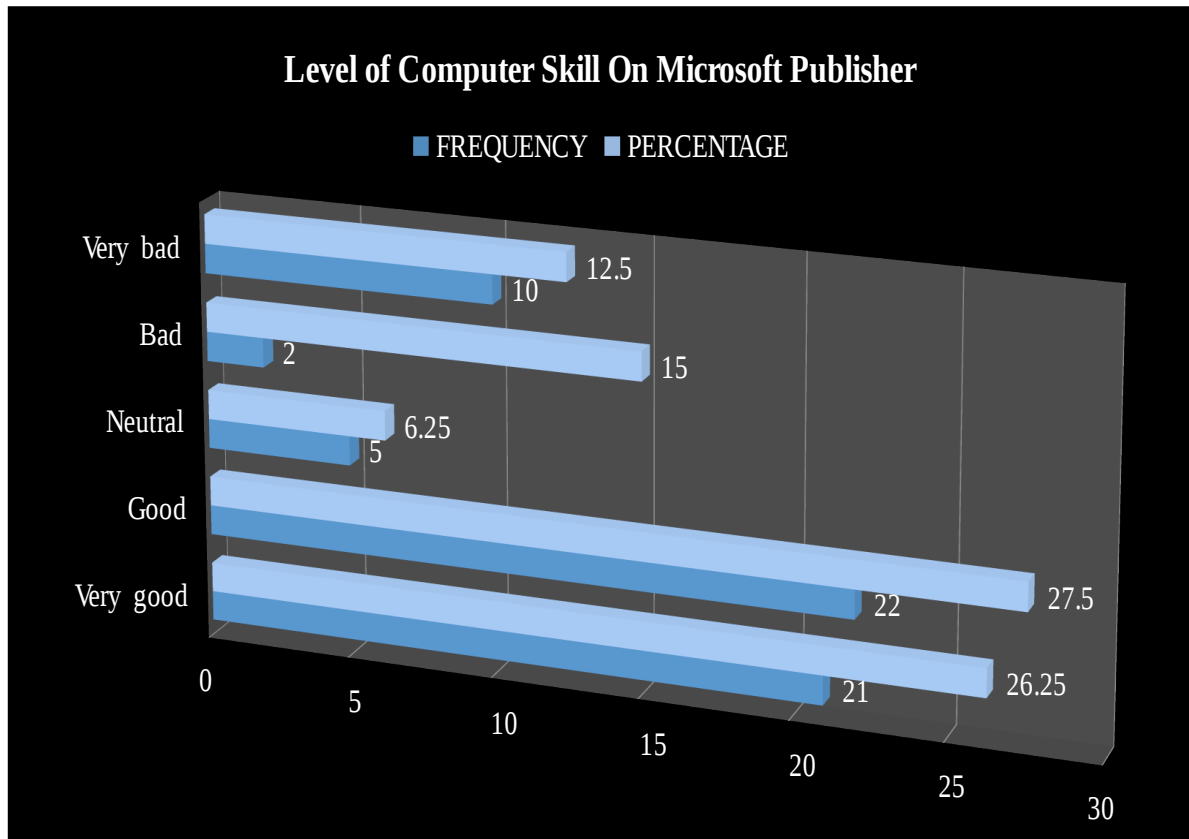


Figure 40: Level of Computer Skill on Microsoft Publisher

Respondent were asked to comment on the level of computer skill Microsoft publisher the results from respondent were as follows 22(27.5%) indicated good, 21(26.25%) agreed with very good, 22(27.5%) indicated good and 12(15%) indicated bad. The study concurred that computer skill on Microsoft publisher is moderated

4.8 Descriptive Analysis

The questions were graded on a scale of 1-5. When it comes to answering the question, 1 means strongly disagree, 2 means disagree substantially, 3 means disagree moderately, 4

means agree, and 5 means strongly agree. The standard deviations give variations of the responses from the mean.

The lower the percentage, the better the results, because it means the replies were close to the frequency response.

4.9 Inferential Statistics

4.9.1 Correlation Analysis

A statistical method for determining how closely two variables are related is known as correlation. It is symbolized by r . The Pearson Correlation was used to show the linear relationship between two variables in this research. The results range from 1 to -1, with 1 being the best. There is no correlation between two variables when the result of the r is 1, but when the result is 1, there is no relationship between two variables at all. There is no correlation between the two variables if the outcome is 0. Significant relationships were defined as those with p values less than 0.05.

Table 42.0 shows the Pearson Correlation data from this study and it reveals that there is an r value of 0.865 which is a strong positive correlation between Access to ICT and Digital Inclusion, there is an r value of 0.610 which is positive correlation between Digital inclusion and ICT knowledge and Skills. Therefore, commitment and available ICT skills and knowledge personnel influences implementation of Digital inclusion positively.

An r value of 0.763 indicates a favorable link between government policies and laws and digital inclusion, according to the study. This indicate that a positive relationship exists. The r value of 0.157 indicate a positive correlation between Digital inclusion and E-channels used in teaching availability.

Table 42: Pearson Correlation Coefficient Matrix

		DIGITAL INCLUSION	AGE	GENDER	POLICIES & REGULATIONS
ICT Access	Pearson Correlation	1			
	Sig. (2-tailed)				
ICT Skills and Knowledge	Pearson Correlation	.865**	1		
	Sig. (2-tailed)	<.001			
E-Channels used in teaching	Pearson Correlation	.610**	.461	1	
	Sig. (2-tailed)	<.001	.163		
Demographic factors -Age -Gender	Pearson Correlation	.763**	.482	.770**	1
	Sig. (2-tailed)	<.001	.223	.002	
Government policies and regulations	Pearson Correlation	.157	.108	.107	.080
	Sig. (2-tailed)	.002	.138	.374	.189

Source: Research Data (2021)

4.9.2 Regression Analysis

Used in explaining the relationship between ICT access, ICT skills and Knowledge and E-Channels used in teaching and the dependent variable Digital Inclusion. In determining the Digital Inclusion, the three independent variables were deemed to be adequate. The coefficient of determination, R-square = 0.657, backed this statement. These findings show that the three independent variables studied contribute 65.7% of the Digital Inclusion. As a result, other factors not examined in this study contribute to 34.3% of the variations in the Digital Inclusion.

Table 43: F summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.522 ^a	0.657	0.579	0.47195

4.9.3 Hypotheses assessment

The study's research hypotheses were tested using inferential analysis. The hypothesis was tested using multiple regression analysis, with the study hypothesis being approved if the p value was 0.05 or less. Where the p value is greater than 0.05-research hypothesis was to be rejected.

Table 44: Summary of Hypotheses results

Hypothesis	P_ Value	Rejected/ Not Rejected
H1: Influence of ICT access on Digital Inclusion	0.002	Not Rejected
H2: Influence of ICT Skills and Knowledge on Digital Inclusion	.004	Not Rejected
H3: Influence of E-Channels used in teaching on Digital Inclusion	.000	Not Rejected
H4: Testing Intervention of demographic factors i.e. age and gender on ICT Access	0.053	Rejected
H5: Testing the Intervention of demographic factors on ICT Skills and Knowledge	0.003	Not Rejected
H6: Testing the intervention of demographic factors on E-Channels used in teaching	0.001	Not Rejected
H7: Testing the Intervention of government policy and regulations on ICT Access	0.004	Not Rejected

H8: Testing the Intervention of government policy and regulations on ICT Skills and Knowledge	0.002	Not Rejected
H9: Testing the Intervention of government policy and regulations on E-Channels used in teaching	0.002	Not Rejected

4.10 Discussion

According to the data, majority of the respondents in this study were male. The findings concluded that both students and staff are using internet to perform banking. The internet use during entertainment and news among staff and students is very high in the higher learning institutions.

The researcher concluded that the institutions have been using internet. The number of students in the university has influence decision on the implementation of E-Learning. Most institutions are lacking channels for teaching and students have no access to the existing channels. Age has been affecting the access to influence the use of electronic channels in the institutions while Most universities have been using E – learning.

The researcher concluded that higher learning institutions are unable to provide enough technology to provide communication between students and departments on time. Most of universities have not acquired enough electronic communication to support e-learning. Mobile device is the most preferred way of accessing internet. The researcher concluded that most of the students and lecturer’s family’s members have a computer, laptop etc.

All students and lecturers are able to access internet using their phones. Most higher learning institutions have computer lab for students. Most institutions have not adopted E-learning while higher learning institutions do not offer basic computer training on its E-learning student and the level of training plays a big role in empowering digital literacy. The level of skills, application of software and use is moderate in the higher learning institutions. The study concurred that computer skill on Microsoft publisher is moderated

The study shows that recognizing emerging technological trends and implementation issues are important in increasing students and staff’s behavioral intention to practice digital inclusion. This means that to effectively attract higher learning institutions to adopt and

implement digital inclusion, the availability of electronic channels used in teaching, access to ICT resources, government policies on digital inclusion awareness and ICT skills and knowledge of both students and staff should be given a priority.

4.11 Summary of the findings

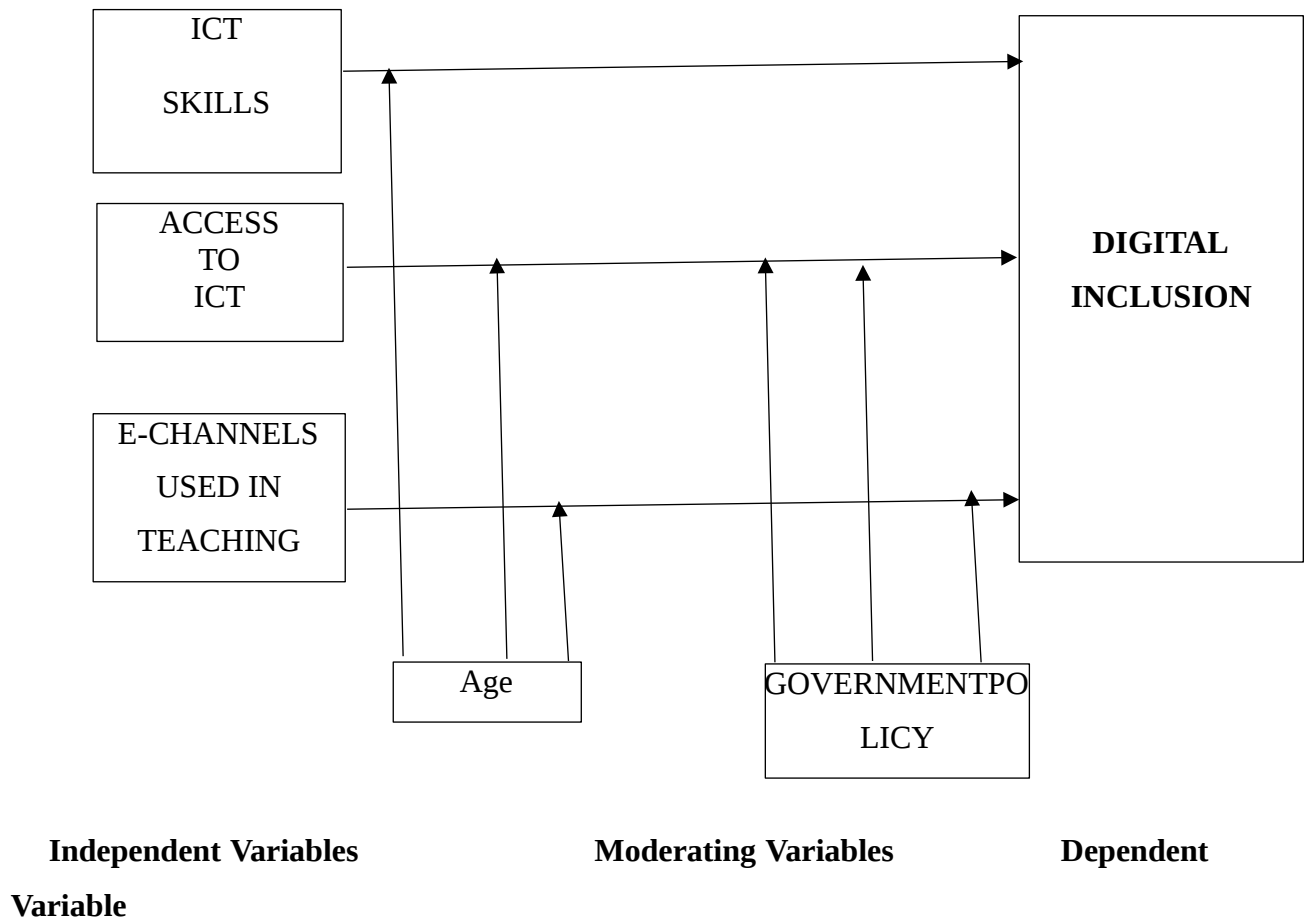
This research study was motivated by the need to determine the factors affecting digital inclusion in the higher learning institutions among staff and students in Nairobi County. The researcher sought to get and examine a subset of these factors by investigating their influence on digital inclusion. The factors examined and investigated were influence of ICT Skills, ICT digital access, electronic channels used in teaching and the intervention of demographic factors i.e. age and gender and government policies on digital inclusion. The survey results revealed that ICT Skills of both staff and students had a large impact on the promotion of digital inclusion. In particular, respondents yielded that university staffs are not well trained to assist student, department are not well trained to handle the E-learning in the universities, and that computer skill among staff and students are moderate. It is also worth noting that the survey results clearly show that staff IT proficiency increases the skills and experience which adds to output in the organization and helps in the implementation of digital inclusion. On the ICT digital access, the study revealed that though digital access is in place it is not fully used and practice across all the departments in the higher learning institutions. Respondents highlighted that both students and lecturers are using internet to perform banking, there is no use of internet use to purchase order and there is very high use of internet during entertainment and news. The survey result also shows that though the ICT digital access is available and easily accessible in higher learning institutions there is still staff and students' individual experience, perceived reliability, trust, perception of the usefulness of ease and computer attitudes which largely affects the way a person perceives digital inclusion. The survey result shows that ease of ICT digital access and use plays a key role in the process of implementing digital inclusion. On the electronic channels used in teaching, the study revealed that most institutions are lacking e-channels for teaching and students have no access to the existing channels. This has led to slow implementation of digital inclusion in the higher learning institutions in Nairobi County. On the demographic factors i.e. age and gender, the study revealed that Age has been affecting the access to influence the use of electronic channels in the institutions. In particular, respondents yielded that old people tend not to use electronic channels while gender has no impact on digital inclusion. On the

government policy as an intervening factor affecting digital inclusion, the study revealed that there are policies in the institution but what is lacking is the staff and students' awareness on their existence hence slow and implementation of digital inclusion.

4.12 Contributions of the Study

This study made significant contribution across higher learning institutions in digital inclusion implementation and practice. The contribution is the development of a conceptual framework that explains the intrinsic factors affecting digital inclusion among staff and students in the higher learning institutions in the country.

Figure 41: The Resulting Framework



CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Introduction

This chapter links the research objectives to the findings and gives conclusions of the results reported in chapter four. This chapter also includes implications and recommendations based on the findings.

5.2. Linking findings to Objectives

Objective 1: To examine the influence of ICT digital access on digital inclusion among students and staff in higher learning institutions in Nairobi County

Digital inclusion means the ability to access relevant online services. It is the process of the democratization of access to ICT, in order to include all marginalized Society. It ensures the inclusion of disadvantaged groups to have access to skills on use of ICT, and this will end up creating knowledge for The Society (Bonillar & Pretto society 2010). It goes beyond access to computers and the internet regardless of physical, cognitive or financial abilities.

The researcher sought to identify the available ICT digital access and examine its influence on digital inclusion in the higher learning institutions. The study gathered that higher learning institutions are not able to provide enough technology to provide communication between students and departments on time. Most of universities have not acquired enough communication to support e-learning.

Objective 2: To examine the influence of ICT skills and knowledge on the digital inclusion among students and staff in the higher learning institution in Nairobi County

The study sought to examine the influence of ICT skills and knowledge of staff and students of higher learning institutions on digital inclusion. The higher learning institutions do not offer basic computer training on its E-learning student and the level of training plays a big

role in empowering digital literacy. The level of skills, application of software and use is moderate in the higher learning institutions. The study concurred that computer skill on Microsoft publisher is moderated. The study shows that recognizing emerging technological trends and implementation issues are important in increasing students and staff's behavioral intention to practice digital inclusion

Objective 3: To investigate the influence of the electronic channels used for teaching on the digital inclusion in the higher educational learning institutions in Nairobi County

The study sought to investigate the influence of electronic channels used for teaching on digital inclusion in the higher learning institutions. From the literature review in chapter 2, the higher learning institutions commonly used e-channels are emails, mobile applications, notifications and alerts, and social media to enable staff and student's interactions. Most institutions are lacking channels such as computers and computer laboratories for teaching and students have no access to these existing channels. This has led to slow implementation of digital inclusion in the higher learning institutions in Nairobi County.

Objective 4: To investigate the intervention of demographic factors i.e. age and gender, and government policies on digital inclusion among staff and students in higher learning institutions in Nairobi County

The study sought to investigate the intervention of demographic factors i.e. age, and gender, and government policies on digital inclusion in the higher learning institutions. Age has been affecting the access to influence the use of electronic channels in the institutions while Most universities have been using E – learning. Gender has no influence on digital inclusion while government policies are moderately available though they are not clearly defined to the staff and students of higher learning institutions

5.3. Conclusions of the Study

The study concluded that staff and students of higher learning institutions use digital Technology in their personal lives but when it comes to its application in the classroom they have so many limitations which are both technical and logistical in nature. The problems associated are interrogation of digital technologies as a personal model from integrating digital technologies into the classroom which means that the frequency and constituents of technology usage depend solely on the given personal interest. There is a lack of digital

technology application in the classroom and mostly with the emerging technologies such as, BYOD (bring-your-own-device), learning analytics and adaptive learning.

The study concluded consistency on the access to ICT promotes digital inclusion. The study sought to examine to what extent digital access for students is influenced by their parent's educational level and family income. The Independent variables of the study were the probability of a family having a home computer, phone and internet access. The study concluded that almost every family is either connected to internet, has a phone or a laptop.

The education institutions engage potential students and staff and uses a clear call-to-Action to provide more information and drive enhancement, this channel has a greater potential to connect with people on a conversation level. Most students are interested in university websites rather than its social media with 87% of students agreeing that websites are very useful. Technologies for communication have been used by students and staff at different sites to send and receive written, vocal, or visual information they can come from telephone lines, through computers and modems via a voice or audio graphic communication or through satellite. Computer networks is relatively expensive technology, it is being used in class in classrooms across the nation, it allows computers to receive and send information to other geographic sites this kind of channel has many advantages it allows many students/ lecturers to communicate, which sends up into very active participation on digital inclusion.

According to the study there were no e-learning models, only e-enhancements of current teaching and learning models and frameworks.

A crucial driver of digital inclusion in higher education, according to the study, is providing sufficient, convenient free access to computers, the internet, wireless networks, and other communication technologies to meet the demands of staff and students.

5.4. Recommendations

In line with the findings and conclusion of the study, the researcher would propose the following recommendations on intrinsic factors affecting digital inclusion in higher learning institutions among staff and students.

1. On ICT digital access affecting digital inclusion in the higher learning institution study recommended that institution should foster an available and sustainable digital access to ensure that advantage of digital inclusion.
2. On the ICT skills among teachers and students in the higher learning institution, the institution can improve digital skills by fostering and placing complementary policies that create demands for skills upgrading in its digital world.
3. The study also recommends that higher education institutions support fair and reasonable access to high-speed internet-connected devices and online content to ensure that students can benefit from the educational, economic, and social benefits offered by new technologies.

5.5. Further Research

The study analyzed the intrinsic factors affecting digital inclusion in the higher learning institutions. However, during the research study, it was found that there are other factors which are also critical in the continuation of digital inclusion, such as ‘Work through public-private partnership’. The study recommended further research in this area. The study also recommends a look on Widening Digital Inclusion Participation in higher learning institutions in entire Kenya.

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travel firms in Nairobi. *International Journal of Business, Humanities and Technology*, 2(4), 76–91.

APPENDIX I:
QUESTIONNAIRE

Dear Respondent,

Good day!

I am bona fide Master of Science student in Information Technology Management at the School of Computing and Informatics, University of Nairobi undertaking a study titled: “Intrinsic Factors affecting Digital Inclusion in Higher Learning Institutions among Staff and Students in Nairobi County”.

Would you be kind to fill up this questionnaire?

May, 2021.

INSTRUCTIONS FOR COMPLETING THIS QUESTIONNAIRE

Do not write your name, surname or any other personal names or numbers on the questionnaire.

The questionnaire will not take longer than 15 minutes to complete.

PART A: A DEMOGRAPHIC

1. Your responses to questions 01 through 03 will be used to create general aggregate profiles, not to identify you as an individual. Also, keep in mind that answers to specific questions will be used to determine response accuracy [where necessary].

2. **What is your gender?**

Male () Female ()

3. **AGE-GROUPPROFILE**

<input type="checkbox"/>	Between 18 – 21	<input type="checkbox"/>	Between 22 - 25	<input type="checkbox"/>	Between 26 – 30
<input type="checkbox"/>	Between 31 – 40	<input type="checkbox"/>	Between 41 - 50	<input type="checkbox"/>	Older than 50

4. What is your level of education?

Primary – Form 4 () Form 4 – University () University – Masters ()

PART B: INFLUENCE OF THE ELECTRONIC CHANNELS USED IN TEACHING ON DIGITAL INCLUSION

1. Please give specific reasons that impact your decision to use the internet or browse:

	Always	Frequently	Occasionally	Rarely	Never
To communicate					
Interacting with public					
To perform banking					
To purchase ordering					
During entertainment and news					
When researching					
To access media and government services					
Any other if available					

Please indicate below by Ticking Yes or No

2. Do you think the number of students in the university has influence decision on the implementation of E-learning?

Yes () No ()

3. Do you believe that literacy levels influence the use of ICT?

Yes () No ()

If your answer to question 6 above is NO, kindly explain your answer

.....

4. Do the students in the University have access to electronic channels?

Yes () No ()

If your answer to question 7 above is YES, Kindly state the electronic channels within your institute.

.....

5. Do you think that all students are able to access electronic channels?

Yes () No ()

If your answer to question 8 above is NO. Kindly explain briefly why you think all students are not included to access Electronic Channels

.....

6. Do you think that age has influence on access to electronic channels in the institutions?

Yes () No ()

If your answer to question above is NO, kindly explain your answer.

.....

7. Do you think old people use electronic channels?

Yes () No ()

If your answer to question above is NO, kindly explain your answer.

.....

PART C: INFLUENCE OF DIGITAL ACCESS ON DIGITAL INCLUSION

Please kindly indicate below by indicating (yes) or (no)

8. Does the university own an e-learning

Yes () No ()

If your answer to question above is NO, kindly explain your answer.

.....

9. Is the available technology able to provide communication between student and department on time?

Yes () No ()

If your answer to question above is NO, kindly explain your answer.

.....

Do you think the available communication structure adequate for support of e-learning?

Yes () No ()

If your answer to question 11 above is NO, kindly explain your answer briefly.

.....

10. Accessing e-learning resources is very easy

Yes () No ()

If your answer to question 12 above is NO, kindly explain your answer.

.....

11. In your opinion what do you think universities should do to make individuals access internet?

.....

12. Do you think that gender has influence on digital influence among the institutions?

Yes () No ()

If your answer to question above is NO, kindly explain your answer.

.....

13. Does the government have policies on digital inclusion?

Yes () No ()

If your answer to question above is YES, kindly explain some of the government policies towards digital inclusion?

.....

Where do you access internet? (Tick Below)

Mobile Device	Commercial Facility Like Work	University	Home
	Cybercafé		

14. Please rate how much you agree or disagree with the following variables in relation to your software's accessibility.

	Strongly Agree	Agree	Neutral	Disagree	Strictly Disagree
I have a desktop computer, laptop, iPad					
One of my family members owns a computer, laptop, or other electronic device.					
My phone has internet connectivity.					
One of my family member has subscribed to internet services					
Our institution has subscribed to internet services					
A computer lab is available to students at our college.					
We have access to computer in our					

college					
Your institution have been using e-learning					
Most of units are communicated through e-learning					
The ICT infrastructure					
Website allows interaction among users in universities					

PART D: INFLUENCE OF ICT SKILLS AND KNOWLEDGE ON DIGITAL INCLUSION

15. Does the institution offer basic computer training on its e-learning students?

Yes () No ()

If yes, how long is the training offered (a) less than a week (b) one week (c) two weeks (d) more than 2 weeks

.....

16. University staff are well trained to assist students

Yes () No ()

If your answer to question above is NO, kindly explain your answer.

.....

17. The department is well trained to handle the e-learning in the university

Yes () No ()

If your answer to question above is NO, kindly explain your answer.

.....

18. How do you strongly agree / disagree with the following statement?

The level of training plays a big role in empowering digital literacy? Please tick one

Strongly Agree	Agree	Don't Agree	Disagree	Strongly Disagree

19. To what extent is your level of computer skills on the parameters listed below? (Tick only one)

	Very good	Good	Neutral	Bad	Very bad
Application of software and use					
Word processors					
Spreadsheets application					
Web browsers with search of engines					
Microsoft publisher					
Others					

PART E: MEASURING DIGITAL INCLUSION

20. Does the institution own e-learning platform?

Yes () No ()

21. Does the institution own staff and student digital literacy training policy?

Yes () No ()

22. Does the institution have adequate digital trained personnel to handle communication between the departments?

Yes () No ()

23. Does the institution own e-learning policy?

Yes () No ()

Thank you for your corporation!

APPENDIX II:

LETTER OF INTRODUCTION

Sarah Atieno Osida,

P.O Box 72635-00200,

Nairobi.

Date:.....

The Vice Chancellor

Technical University of Kenya

P.O Box 58428-00200

Nairobi

Dear Sir/ Madam,

RE: REQUEST TO BE ALLOWED TO CARRY OUT RESEARCH WITH YOUR STAFF AND STUDENTS

I am bona fide Master of Science student in Information Technology Management at the School of Computing and Informatics, University of Nairobi.

I hereby write to request your institution to allow me collect data on Intrinsic Factors Affecting Digital Inclusion in the Higher Learning Institutions among Staff and Students in Nairobi County. Brief interviews with staff and students will be conducted, as well as the distribution of questionnaires and group discussions with the concerned personnel and students. My sessions, if approved, will not disrupt routine university operations because I will work around your timetables. It will take less than one hour per day during business hours.

Yours Faithfully,

APPENDIX III:

PROJECT WORK PLAN DURATION

1. Problem identification -----15th February 2021
2. Writing proposal -----15th February-March 2021
3. Submitting the proposal for correction -----31st March 2021

4. Defending the proposal ----- 6th April 2021
5. Data collection ----- 4th May 2021
6. Data analysis and findings ----- 5th July 2021
7. Correcting the proposal ----- 15th July 2021
8. Project submission ----- 24th August 2021

Appendix IV

GANTT CHART

project name	project duration	project start date	project end date
project proposal		15/02/2021	28/08/2021
Task Task description	Task	start date	End date
ID	duration		
1	problem identification & documentation	1	1/2/2021
			28/02/2021
2	literature review	2	1/3/2021
			1/4/2021
3	methodology	1	2/4/2021
			3/5/2021
4	data collection	2	4/5/2021
			4/7/2021
5	data analysis and finding		
	conclusion	1	5/7/2021
			6/8/2021
6	conclusion	1	5/7/2021
			6/8/2021

APPENDIX V:

LIST OF REQUIRED RESOURCES

Hardware required

1. Stationeries
2. A laptop (Core i7-8750H,16 GB RAM, 500GB HDD)
3. Operating system: - windows
4. RAM 4 GB and above.
5. Hard disk 500GB.
6. Postman/personnel.

Software required

1. Internet
2. Software All open source

APPENDIX VI:

ESTIMATED RESEARCH BUDGET

<i>No.</i>	<i>Item</i>	<i>Quantity</i>	<i>Cost(KES)</i>
1	Travelling costs	As needed	10,000
	Stationery and printing	As needed	10,000
	Laptop	1	45,000
	Pilot testing	As needed	2,000
	Personnel / Research Assistant	1	10, 000
	Internet	5 months	10,000
	Miscellaneous		7,000
	TOTAL COST		94,000

APPENDIX VII:
PLAGIARISM REPORT