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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.

***Key Words**: Digital Inclusion, Higher Education, Information and Communication Technology (ICT), ICT for Teaching, ICT for Learning*

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INTRODUCTION

The implementation of digital technologies in the world has improved the quality of education among the higher learning institutions which has facilitated 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 the growth of internet, web browsing and allowed high access in the media and communication. The technologies have made it possible for both

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

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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).

The Statement Issues

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. 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. 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. At the individual level people may have limited 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. The main goal of the 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 for the higher learning institutions in Kenya. The specific objectives of the study were to examine the influence of ICT digital access on digital inclusion, to examine the influence of ICT skills on the digital inclusion, to investigate the influence of the electronic channels used for teaching on the digital inclusion and to investigate the intervention of demographic factors i.e. age and gender and government policies on digital inclusion among staff and students in the higher learning institutions in Nairobi County

RELATED WORK

Lack of ICT knowledge and skills:-Information and communication technology (ICT) has introduced significant and lasting positive change in the world. Lecturers 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 teacher's interest, this impacts negatively towards teachers as they feel the institutions are not supporting them (Gumbau et al, 2016). According to Johnson et al, (2016) there is a lack of digital technology application in the classroom. 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.

Access to digital device: - 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).

Electronic channels used for teaching

Email: - According to digital marketing institute (2020) more than 90% of students preferred to receive information through email rather than any

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other medium, many students use email. The education institution engages potential students and uses a clear call-to-Action to provide more information and drive enhancement

Mobile Apps: - it is easy to access information through this kind of channel inform of alerts, calendars, directories, etc.

Notification and alerts: - Important reminders should be communicated through critical digital channels. notification systems have been used to provide SMS (text), voice and email

Social media: - 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.

Digitally Inclusive Communities' Framework: The framework was anchored on the premise of having all people, businesses, and institutions to have access to digital content and technologies that enable them to create and support healthy, prosperous, and cohesive 21st century communities. The framework aimed at creating an understanding on the benefits of advanced information and communication technologies. Fostering an equitable and affordable access to high-speed internet connected devices and online content to ensure that advantage of the educational, economic, and social opportunities is available through these technologies. The framework based on the foundational principles describes how a community supports its members in accessing and using digital technologies. The foundation principles are availability and affordability principle.

Theory of digital divide: - According to Beynon et al (2007) the development of digital divide index to highlight the multifaceted nature of this phenomenon within a regional context. The index allows the comparison of technology adoption rates, both regarding access and use, among four "at risk" groups (females, persons aged over 50 years old, persons with limited formal education and persons receiving a low income) with the technology adoption rates among the population average. These are markets, diffusion, infrastructures, human resources, competitiveness, and competition. ICTs, like any other technological inventions in the past, will be diffused by market forces.

Conceptual framework: - The main concern of this study was to qualitatively calculate digital inclusion in higher educational learning institutions among students and staff. The independent variables were influence of Access to ICT, ICT Skills and Knowledge and Electronic Channels used in teaching and dependent variable was Digital inclusion.

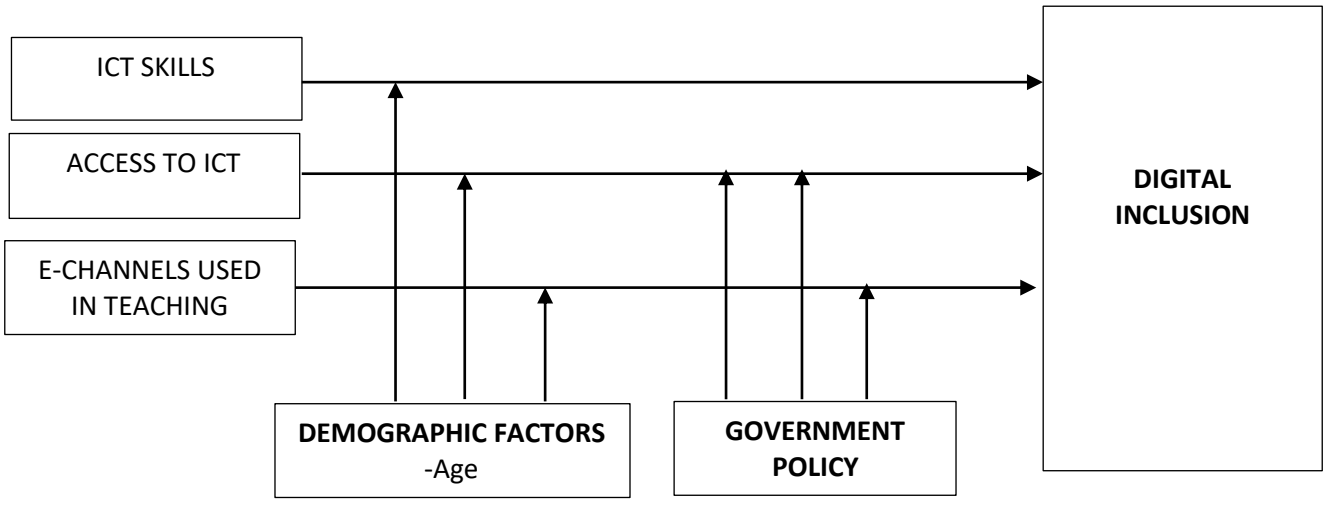

Figure 1: Conceptual Framework

Table 1: Operationalization of the Variables

VARIABLES	INDICATORS	MEASURES
INDEPENDENT		
ICT Access	Availability of technology Availability of communication structure Having access Having e-learning resources Availability of internet and communication services through mobile technology	Yes/No Yes/No Yes/No Yes/No Yes/No
ICT skills	Practical Office Skills Training undertaken Functional digital literacy rate for youth and the old	Yes/No Yes/No Likert Scale
E-channels used in teaching	Availability of e-channels Having access to e-channels at the institution Availability of computer lab Having access to internet Mobile service usage	Yes/No Yes/No Yes/No Yes/No Likert Scale
INTERVENING		
Age	Old people having access to e-channels What is your age	Yes/No 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 policy	Availability of e-learning policies Awareness of e-learning policies	Yes/No Yes/No
DEPENDENT		
Digital Inclusion	Ownership, use and influence of independent variables	Yes/No

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METHODOLOGY

A descriptive and inferential analysis was used to identify patterns in the data and draw conclusions. Cronbach's Alpha was calculated to measure scale reliability. The results were 0.895 which meant there was high consistency in the responses provided and thus all items making up the factors were considered for this study.

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)

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

Quantitative data was presented by use of tables, percentages, mean, mode and frequencies. Both Microsoft Excel program and SPSS version 26.0 were employed in analyzing the 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. 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. Qualitative data was analyzed by establishing the categories and themes, relationships/patterns and conclusions in line with the study objectives

RESULTS AND DISCUSSIONS

Response Rate:- 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.

Analysis of results: - A descriptive and inferential analysis were used to identify patterns in the data and draw conclusions. The Pearson Correlation was used in this study to show the linear relationship between two variables. A relationship was considered significant if the associated p value was less than 0.05. The Pearson Correlation results from this study revealed 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. The findings showed that there is an r value of 0.763, which is positive correlation between government policies and regulations and Digital inclusion. This indicated that a positive relationship exists. The r value of 0.157 indicated a positive correlation between Digital inclusion and E-channels used in teaching availability

Hypotheses assessment: - Inferential Analysis was used to test the research hypotheses of the study. The multiple regression analysis was used to test the hypothesis, where the research hypothesis was not to be rejected if the p value is 0.05 or less.

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Where the p value is greater than 0.05-research hypothesis was to be rejected.

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 were not well trained to assist student, departments were not well trained to handle the E-learning in the universities, and that computer skill among staff and students were moderate. It was also worth noting that the survey results clearly showed 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 was in place it was not fully used and practiced across all the departments in the higher learning institutions. Respondents highlighted that both students and lecturers were using internet to perform banking, there was no use of internet to purchase order and there was very high use of internet during entertainment and news. The survey result also showed that though the ICT digital access was available and easily accessible in higher learning institutions there was 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 showed 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 were lacking e-channels for teaching and students had no access to the existing channels. This 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 affected 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 had no impact on digital inclusion. On the government policy as an intervening factor affecting digital inclusion, the study revealed that there were policies in the institution but what was lacking was the staff and students' awareness on their existence hence slow and implementation of digital inclusion.

CONCLUSION AND RECOMMENDATION

The study concluded that staff and students of higher learning institutions used digital Technology in their personal lives but when it comes to its application in the classroom they had so many limitations which were both technical and logistical in nature. The problems associated were 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 was 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 was 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 was either connected to internet or had a phone or a laptop. The education institutions engaged potential students and staff and used a clear call-to-Action to provide more

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information and drive enhancement, this channel had a greater potential to connect with people on a conversation level. Most students were interested in university websites rather than its social media with 87% of students agreeing that websites were 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 moderns 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. The study concluded that there were no e-learning models, only e-enhancements of existing teaching and learning models and frameworks. The study concluded that sufficient, convenient free access to computers, internet, wireless networks and other communication technologies to support the needs of staff and students are key drivers of digital inclusion in the higher learning institutions

In line with the findings and conclusion of the study, the researcher would make the following recommendations on intrinsic factors affecting digital inclusion in higher learning institutions among staff and students. Higher learning institutions should foster an available and sustainable digital access to ensure that advantage of digital inclusion. The institutions can improve digital skills by fostering and placing complementary policies that create demands for skills upgrading in its digital world. Regarding electronic channels adopted for teaching in the higher learning institutions the study recommends fostering an equitable and affordable access to high-speed internet-connected devices and online content to ensure that advantage of the educational, economic, and social opportunities is available through these technologies.

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