Assessing the Adoption of E-Learning Technologies in Public Vocational Institutions in Jinja District, Uganda

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Abstract

Use of information and communication technologies (ICTs) to support teaching and learning is becoming increasingly common. This study set out to assess factors affecting adoption of E-Learning technologies by students in public vocational institutes in Jinja District. A cross sectional survey research design with quantitative approach was adopted. A total of 148 respondents were involved in this study. SPSS version 23 was used to analyze the data using descriptive and inferential statistics. The findings indicated that individual factors had a significant effect on adoption of E-Learning technologies in public vocational institutes in Jinja district. Institutional factors had no significant effect on adoption of E-Learning technologies in public vocational institutes in Jinja district. System factors had a significant effect on adoption E-Learning technological in E-Learning technologies in public

vocational institutes in Jinja district. Overall, the three factors (Individual, Institutional, System) contributed 0.313 (approximately 31%) in adoption of E-Learning technologies in public vocational institutes Jinja district. It was recommended that government should provide support to public vocational institutes in Jinja district with computers and other ICT equipment to enhance ICT utilization. The administrators or senior management should continue to encourage members of the public vocational institutes in Jinja district utilize ICTs in teaching and learning. The government through the ministry of ICT to invest in adequate and reliable ICT facilities, high internet speed and bandwidth. The government to develop appropriate policies that supports E-Learning   knowledge and use.

Key words: *e-learning technologies, public vocational institutions,*

Introduction

The explosive rise of information communication technologies (ICTs) in recent decades has sparked numerous innovations and advancements in all spheres of life, like health, agriculture and not excluding the educational industry (Shailendra, 2018). The International Telecommunication Union (ITU) conceptualizes ICTs as "all technologies used to handle information and aid communication, including telecommunication networks, computers, middleware, software, multimedia, and audiovisual systems" (ITU, 2012). In regards of this notion, new innovative learning approaches or information delivery have emerged as a result of advancements in ICTs, e.g use of E-Learning technologies and network technologies to generate relevant learning experiences for students in academic contexts. E-Learning technologies and network technologies are conceptualized as essential components of modern educational systems that enable remote and online learning experiences. E-Learning technologies refer to the digital tools, platforms, and resources used to facilitate educational activities and content delivery through electronic means. Network technologies, on the other hand, involve the communication infrastructure that allows seamless connectivity and interaction between learners, educators, and resources over the internet (Kimwise et al, 2017).

Adoption of E-Learning technologies in teaching and learning provide numerous benefits among which include assisting in higher students enrollment in higher education programmes, creating dynamic school administration, facilitating seamless assessment of students' assignments, increased efficiency in students/lecturers research and increased access to higher education as well as reading materials by students (Kimwise et al, 2017). Despite of the above mentioned benefits, the adoption of E-Learning technologies also faces some drawbacks which are summarized as follows; technical issues and infrastructure, lack of digital literacy, reduced social interaction, increased potential for cheating, teacher-student engagement to mention but a few.

In that regard, studies show that, in Uganda majority of population does not access meaningful education in particular especially vocational education due to numerous factors like location, high poverty level among the parents, cultural issues, and limited knowledge of use of ICTs (World Bank, 2020, UNESCO, 2018). Indeed, basing on the above trends or notion, the potential of E-Learning technologies adoption in accessing higher education may without doubt assist to overcome the above state of affairs. Therefore, this study intended to bridge this gap by exploring the factors affecting students' adoption of E-Learning technologies in teaching and learning at Public Vocational Institutions in Jinja district.

Statement of the Problem

The adoption of E-Learning technologies in vocational institutions refers to the integration and utilization of digital tools and platforms to enhance the teaching and learning experiences in vocational education. E-Learning technologies encompass various digital resources, software, and communication tools that facilitate the delivery of educational content, assessments, and interactions between students and instructors (Tate, 2018). The adoption of these technologies aims to improve access to quality education, promote skills development, and address the challenges faced by vocational institutions. In the context of Ugandan Public Vocational Institutions, there appears to be no proper indicators to show the usage/adoption of or investment in E-Learning technologies for teaching and learning (Nalubega, 2016). Besides, the government of Uganda launched programs to support the introduction of ICT in education, including the Education Management Information System, School Net Uganda, and the Institute for Information and Communication Development (IICD), in addition to introducing computer lessons as one of the

course units and setting up internet access in the aforementioned institutions. Despite these attempts, Nalubega (2016) empirical study found out that, vocational institutions in Uganda have not yet fully embraced the usage of E-Learning tools in their teaching and learning processes.

Additionally, Public Vocational Institutions still have a challenge to reach the minimal educational gains from integrating E-Learning technologies with more than 40% students graduating with low academic performance possibly as result of not knowing how to use ICTs in their studies (Bada, et al, 2020 & Nalubega, 2016). There have been claims that obstacles to the adoption of E-Learning in Uganda Public Vocational Institutions include bad internet connections, power outages, a lack of networked computers, a lack of time to develop content, a lack of proper training, a lack of staff in the E-Learning department to train lecturers, a lack of management support, and a lack of financial resources (Kabarun). Studies conducted in the past in the majority of educational institutions suggested that the failure of E-Learning adoption was caused by knowledge, policy, and practice gaps (Kimwise et.al 2019). Also to that effect, there is little research output to assess adoption of E-Learning technologies in Public Vocational Institutions in form of E-learning Technologies in Uganda, thus this study came in to bridge the bridge the above gaps by assessing the factors that influence the adoption of E-Learning technologies in Public Vocational Institutions in Jinja. And the factors assessed included; system factors, organizational, and individual (Vocational) characteristics.

Main Objective

The purpose of the study was to assess the factors affecting adoption of E-Learning technologies by students in Public Vocational Institutions in Jinja District.

Specific Objectives

This study was guided by the following specific objectives and research questions;

1. To determine the individual factors affecting students' adoption of E-Learning technologies in public Vocational Institutions in Jinja district.
2. To establish the institutional factors that contribute to adoption of E-Learning technologies in public Vocational Institutions in Jinja district.
3. To determine the system factors that contribute to adoption of E-Learning technologies in public Vocational Institutions in Jinja district.

Research Questions;

1. To what extent do individual factors contribute to adoption of E-Learning technologies in public Vocational Institutions in Jinja district?
2. To what extent do institutional factors contribute to adoption of E-Learning technologies in public Vocational Institutions in Jinja district?
3. To what extent do system factors contribute to adoption of E-Learning technologies in public Vocational Institutions in Jinja district?

RELATED LITERATURE

Individual Factors and Students' Adoption to E-Learning Technologies

In a related study carried out to analyze the reasons for the limited success in the adoption of eLearning by faculty in JKUAT and to propose appropriate solutions to help improve future uptake. It was found out that among the individual factors, computer anxiety was found to be significantly negatively correlated with computer literacy, LMS usage, frequency of LMS use and LMS adoption. Behavioral intention was significantly correlated to self-efficacy, computer playfulness and computer literacy and significantly negatively correlated to education level. Self-efficacy was significantly correlated to gender and computer literacy. Computer playfulness was significantly negatively correlated with age, educational level, designation, and significantly positively correlated to computer literacy. Gender was significantly correlated to faculty and significantly negatively correlated to age, and designation. Age was significantly correlated to period of service, education level, and designation and significantly negatively correlated to computer literacy and LMS.

Besides KENET, (2007) cited Kamau (2013) in reported a higher usage of internet and web portals by males than females in an e-readiness survey of 17 Kenyan Universities and 8 Colleges. They observed that 35% of male respondents used the Internet daily compared to 30% for the female respondents. Similarly, about 40% of the female respondents did not visit any Web portals compared to 33% of the male respondents. Mitchell, Clayton, Gower, Barr, and Bright, (2005) also reported that there were no gender differences in the levels of adoption of eLearning. On the other hand, Venkatesh and Bala developed the UTAUT model and validated the model empirically using post-training data pooled across studies. They reported that performance expectancy was moderated by gender and age. Their findings suggested that as younger cohort employees in the workforce mature, gender differences in how each perceives information technology may disappear.

The eLearning adoption was not significantly correlated to the Faculty / School / Institute (p = 0.082). Mukiri (2011) found out that there were differences between faculties in that those from SHRD and ICSIT were more flexible and believed that eLearning was compatible with their teaching methodology. Those from Engineering, Architecture, ITROMID (now COHES) and Sciences especially felt that it would be difficult to use eLearning for the practical laboratory sessions and were of the view that face to face contact was preferable. The faculty in ICSIT by the nature of their area of specialization are expected to have higher computer literacy level and were able to utilize it in their teaching. KENET, (2007) observed that students in the humanities and languages were more intense of users of Internet than students in engineering, science and medical sciences.

Galamoyo, (2011) looked into aspects that affect students at a higher education institution in developing nations as they adopt and use educational technology. The unified theory of acceptance and use of technology (UTAUT) was used in the investigation. The study found that behavioral intention to use Canvas was significantly influenced by performance expectancy and effort expectancy (p<0.001). Social influence on behavioral intentions was determined to be a statistically insignificant factor (p>0.05). Facilitating settings and behavioral goals were found to be important elements that favorably affect how the students actually use Canvas. The results from the data obtained partially support the UTAUT's ability to explain the factors responsible for the acceptance of educational technology in developing countries, in Nigeria to be specific. Furthermore the study contributes to the formulation of approaches and guidelines to enhance the adoption of educational technologies in developing countries.

Institutional Factors that Contribute to Adoption of E-Learning Technologies

The impact of organizational determinants on faculty acceptance of online teaching in terms of behavioral intention and perceived utility was examined by Li, et al (2023). Based on a statewide survey carried out in mainland China, data on 209,058 professors in 858 higher education institutions were analyzed using a multilevel structural equation model. The findings revealed that although in various ways, three crucial organizational factors—strategic planning, leadership, and teaching quality monitoring—had an impact on faculty members' adoption of online instruction. Teaching quality monitoring had a direct impact on both perceived usefulness and behavioral intentions, while strategic planning had a direct impact on perceived usefulness, leadership had a direct impact on behavioral intentions, and so on. Additionally, a mediator effect between strategic planning and faculty behavioral intentions—the perceived utility of online teaching—was discovered. In order to enhance faculty acceptance, college administrators and policymakers should effectively implement and promote online teaching and learning while also taking into account important organizational aspects.

In order to establish an adoption strategy for online learning, Galamoyo, (2011) conducted a study that looked at organizational variables, environmental factors, and technology-related factors. A Sukabumi, West Java, educational institution served as the research population. With a total of 112 respondents from various institutions ranging from elementary school education (SD), junior high school (SMP), and high school (SMA), the sampling strategy used a stratified random sample technique. To explain the causal relationship between the phenomena under inquiry, the research method used conclusive method phases mixed with explanatory surveys, and for more thoroughness, equipped with interview techniques. The results show organizational readiness that includes aspects of innovation, resources, leadership support, cost factors, and environmental support that includes the role of government, community support, and competition have a significant effect on the adoption of online learning.

Systems Factors That Contribute To Adoption of E-Learning

Related studies show that, system factors affect adoption of E-Learning technologies or application of ICT in higher education. Venkatesh and Bala, (2008) reported that the role of training is very important in the context of complex systems usage in teaching and learning, that are more central to employees 'work life. As the systems are more likely to beseech undesirable responses from employees due to their disruptive nature, effective training interventions can mitigate these undesirable responses and aid employees form favorable perceptions toward these systems. Venkatesh and Bala, (2008) further established that the anchors – that is, computer efficacy, perceptions of external control, computer anxiety, and computer playfulness – were significant predictors of ease of use at all points of measurement in a longitudinal field study conducted to test TAM3 in two organizations where the new system was voluntary. None of the determinants of perceived usefulness had a significant effect on perceived ease of use. TAM3 explained between 43% and 52% of the variance in perceived ease of use across different points of measurements and models. Low utilization of the LMS by the JKUAT faculty observed may be due to the low perceived ease of use. The low perceived ease of use may also be related the low attendance of LMS training.

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Kamau (2013) asserts that external systems characteristics such as capacity and reliability of IT infrastructure are significant factors for user adoption (Nanayakkara, (2007) has reported that developing online courses requires additional equipment and specialized software, for example, additional servers and a course management system and that lack of reliability, performance and timely support on infrastructure could inhibit both tutor and the student from accepting technology. Galamoyo, (2011) noted that the ultimate delivery of an eLearning solution relies on the availability of appropriate and adequate technology.

Nanayakkara and Whiddelt, (2005) reported that external systems characteristics such as capacity and reliability of IT infrastructure were significant factors for user adoption (100% of respondents). Similarly, the bandwidth and access to updated equipment were reported to cause problems for the implementation of eLearning as distance education at the University of Nairobi and Makerere University, but were not the limiting factor to the implementation of blended learning distributed on the internal network (Rytkønen and Rasmussen, 2010). On the other hand, Mitchell et al, (2005) reported that the reliability of computer technology was neither facilitating nor inhibiting, but with a trend toward the former. Factors reported to limit LMS adoption by JKUAT faculty included poor internet access, however access to computers was rated low. This indicates that access to computers was not a limitation for eLearning adoption

METHODOLOGY
Research Approach and Design
This study adopted a quantitative approach, since this study was theoretically driven and it aimed exploring the factors affecting adoption of E-Learning technologies in public vocational institutes in Jinja District. The study also used a cross-sectional descriptive survey research design. Cross-sectional design could allow data collection at one specific time. Khan and Smith (2007) argued that cross-sectional research describes and interprets phenomena and is concerned with conditions or relationships that exist, opinions that are held, processes that are going on, and effects that are evident or trends that are developing. The choice of this research design was justified since the study aimed at the exploring the factors affecting adoption of E-Learning technologies in Vocational institutes.

Study Population

The target population consisted of students who have been at the institution for more than a year. In addition, instructors and ICT Technicians participated in the study.

Sampling Strategies

The study employed simple random sampling and purposive sampling to select eligible respondents. Simple random sampling was used to select eligible respondents to ensure that all the eligible participants have equal opportunity of being included. Purposive sampling was used for identifying participants who are considered to be information-rich because of the position they hold. Therefore, instructors and ICT technicians were sampled using this criterion.

Sample Size

The sample size was determined using Krejcie and Morgan (1970) of sample determination.

Table 1.1: Sample Size of participants –the students

Respondent Category	Target Population	Sample Size	Sample Technique
ICT Technicians	2	2	Purposive
Instructors	35	32	Purposive
Students	165	118	Simple random sampling
TOTAL	**202**	**152**	

Research Instrument

Self-administrated structured questionnaires were used for collecting quantitative data. The questionnaires were had closed ended questions distributed in three sections: A, B and C. Section A was for background information of respondents. Section B asked questions on factors affecting ICT adoption and C assessed adoption of E-Learning technologies. The respondents were asked to indicate their opinions on each statement on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Data Analysis

After retrieving back the questionnaire and collecting the required data, it was then prepared for analysis by using Statistical Package for Social Scientists (IBM SPSS, version 24.0) software. Data analysis was done by use of means, standard deviations and regression.

Ethical Consideration

Ethics is about values, priorities, and morals. It gives direction and guidance to what should be done on the basis of obligation and responsibility (Najjemba & Kizito, (2022). In this study, permission for conducting the research was sought from the School of postgraduate Studies and Research. In addition to that, confidentiality and anonymity was ensured to participants by not having to write their names in the data collection instrument. Najjemba & Kizito, (2022) points out that the rights of subjects need to be protected or the statutory rights of members of the social community or groups being investigated, avoiding undue intrusion, obtaining informed consent, and protecting the rights to privacy of individuals and social groups. This study upheld Najjemba & Kizito, (2022 views on protecting the rights of the population targeted. Another ethical issue that was considered was the integrity of the participants.

FINDINGS AND ANALYSIS

Response rate: Out of the 152 questionnaires distributed, only 148 were dully filled giving a response rate of 97%. Background characteristics: The majority of respondents were male 66.89% (n = 99). The majority of respondents have were between age group 21-30 years 54.05% (n =80) and the least were 51 years and above 2.70% (n = 4). The majority of respondents were single 79.73 % (n=118). Finally, greatest proportion of respondents had certificate qualification 116(78.38%) and the least had master degree qualification 2.71(n = 4).

Descriptive Statistics on Factors Affecting Adoption of E-Learning Technologies

Variables	Number	Mean	SD
Individual factors	148	3.80	1.18
Institutional factors	148	2.65	1.36
System factors	148	2.62	1.33
Adoption of ELearning	148	2.75	1.41

From the descriptive analysis table above, the overall means of constructs were; individual factors=3.80, organizational=2.65 and technological factors=2.62. This implies that individual factors were boosting adoption of E-Learning technologies whereas system factors seemed not to influence effective adoption of E-Learning adoption technologies in public vocational institutes in Jinja District.

Correlation Results on Factors Affecting Adoption of E-Learning Technologies

Variables	1	2	3	4
1. Adoption of E-Learning	1.00			
2. Individual factors	0.344*	1.00		
3. Institutional factors	0.422*	0.179	1.00	
4. System factors	0.495*	0.161	0.669*	1.00

Interpretation from the above table: Adoption of E-Learning technologies had a positive significant correlation with individual factors ($r = 0.344$, $p < 0.01$), institutional factors ($r = 0.422$, $p < 0.01$), and systems factors ($r = 0.495$, $p < 0.01$). The strength of the correlation was highest for system factors and lowest for individual factors.

Linear Regression for predicting E-Learning adoption

Adoption	Coef.	St. Err.	t-value	p-value	[95% CI]	Sig
Individual	0.280	0.092	3.06	0.003	0.099-0.462	***
Institutional	0.151	0.107	1.40	0.164	-0.062-0.363	
Technological	0.386	0.107	3.61	0.000	0.174-0.598	***
Constant	0.258	0.345	0.75	0.455	-0.424-0.941	

Model Summary

Mean dependent var	2.711	SD dependent var	0.977
Adjusted R-squared	0.313	Number of obs	122
F-test	16.529	Prob > F	0.000
Akaike crit. (AIC)	301.851	Bayesian crit. (BIC)	313.067

*** p<.01, ** p<.05, * p<.1

Interpretation from the above tables;

From the linear regression table above, individual factors were statistically significant (β = 0.280, p = 0.003). A unit increase in the score of individual factors would increase adoption by 28%. And Institutional factors were statistically insignificant (β = 0.151, p = 0.164). Besides, System factors were statistically significant (β = 0.386, p< 0.001). Overall, three factors (Individual, Institutional, System) contributed 0.313 (approximately 31%) as show in the model summary table. This means 69% of other factors could have influenced adoption of E-Learning technologies in public vocational institutes in Uganda.

DISCUSSIONS

The study revealed that individual factors boosted adoption of E-Learning technologies whereas system factors seemed not to influence effective adoption of E-Learning adoption technologies in public vocational institutes in Jinja District. The findings of the system factors seem to be contrary to findings by Kamau (2013) who asserts that systems characteristics of an IT infrastructure are significant factors for E-Learning technologies adoption but again were in agreement with other researchers like; Semlambo et al., (2022) and Chatti & Hadoussa, (2021. The findings also showed that Individual factors were statistically significant and they were in agreement with prior studies by Chatti & Hadoussa (2021), Kanwal & Rehman (2017), Komuhangi, *et al.*, (2022).

Overall, three factors (Individual, Institutional, System) contributed 0.313 (approximately 31%) as show in the model summary table. This means 69% of other factors could have influenced adoption of E-Learning technologies in public vocational institutes in Uganda

CONCLUSIONS

From the study, the following conclusions were made;

The finding indicated that individual factors had a significant effect on adoption of E-Learning technologies in public vocational institutes in Jinja district.

Institutional factors had no significant effect on adoption E-Learning technological in public vocational institutes in Jinja district.

System factors had a significant effect on adoption E-Learning technological in E-Learning technologies in public vocational institutes in Jinja district.

RECOMMENDATIONS OF THE STUDY

Basing on the findings, the following recommendations were made,
1. The government to provide support to public vocational institutes in Jinja district with computers and other ICT equipment to enhance ICT utilization.
2. The administrators or senior management should continue to encourage members of the public vocational institutes in Jinja district utilize ICT in teaching and learning.
3. The government through the ministry of ICT to invest in adequate and reliable ICT facilities, high internet speed and bandwidth.
4. The government to develop appropriate policies that support E-Learning and training programs about E-Learning knowledge and use.

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