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Factors for adoption of e-learning technologies in Ugandan high education institutions

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Abstract
This research identifies the factors that affect adoption e-learning technologies in Ugandan High Education Institutions. Despite the enormous potential that e-learning technologies have in enhancing teaching and learning at Higher Educational institutions, the adoption of such technologies in Ugandan Higher Educational institutions is low. Effective adoption of such technologies requires that a number of issues be taken into account which among these includes technological and individual factors. To attain the objective of this study, a questionnaire was used to collect data from 380 participants (students, lecturers and ICT support) from four Ugandan Higher Education Institutions. Results showed that factors that are affecting adoption of e-learning technologies in Ugandan HEIs were; Patronage, Compatibility, Trialability, Complexity, Relative Advantage, Perceived Usefulness, and Perceived Ease of Use while as Observability factor did not influence behavioral intention to adopt e-learning technologies in Ugandan HEIs. This study concludes that well-designed trainings should be provided for the students, lecturers and ICT support staff to familiarize them with the fundamental knowledge on how to use the e-learning technologies in Ugandan HEIs as well as trial opportunities to build a better understanding in the operational functions.

Keywords: E-learning technologies, Compatibility (CPA), Complexity (CPL), Observability (OB), Relative Advantage (ADV), Patronage (P), Perceived Ease of Use (PEOU), Perceived Usefulness (PU), and Trialability (TRA)

1. Introduction
Although the advent of e-learning technologies presents the best cost effective strategy to teaching and learning, the success of these innovations primarily depend on their adoption (Njenga, 2011) [16]. Investment in e-learning technologies alone by different institutions/organizations is not enough as its full benefits can only be realized from their full adoption and utilization. E-learning technologies if well utilized have the capacity to enhance students critical thinking, eliminate geographical barriers, support lifelong learning, reduce costs and increase efficiency at HEIs. E-learning technologies are technologies which are based on the backbone of Information and Communication Technology (ICT) infrastructure. Ideally, e-learning technologies include: internet, computers, World Wide Web (web 2.0), television, radio, Compact Discs (CDs), Digital Versatile Discs (DVDs), video conferencing, mobile technologies, and electronic learning platforms (Gyambrah, 2007; Njenga, 2011 [16]; Kasse & Balunywa, 2013 [9]; Kituyi & Tusubira; 2013) [11].

2. E-Learning technologies in Ugandan HEIs
Few literatures are available about adoption of e-learning technologies in Ugandan HEIs. Use of ICTs in education system in Uganda started with development of a national ICT policy which was originated in 1998 by the Uganda National Council of Science and Technology (UNCST) (Torach *et al*., 2006) [22]. Though, the policy underscored investing in ICT in education right from primary to tertiary levels. ICT programmes have taken a long time to be deeply felt in at HEIs though they have been initiated at lower levels like secondary and primary (Farrell & Isaacs, 2007). Kasse & Balunywa, (2013) [9] in their study on assessment of e-learning utilization revealed some of e-learning technologies available in Ugandan HEIs include; Education Management Information System (EMIS), learning management systems (LMS), web portals. Kasse & Balunywa, (2013) [9] highlight adoption of ICT in education is being inhibited by limited internet bandwidth, lack of financial resources, inadequate human resource capacity, individual perceptions, technological factors and unstable power supply. Kituyi, & Tusubira (2013) [11] further argue that though the use of ICT in HEIs has the potential to enhance the quality of teaching and learning. Therefore due to the above state of affairs, this study sought to investigate the factors affecting e-learning technologies adoption in Ugandan HEIs.

3. Research methods
To identify the factors for adoption of e-learning technologies in Ugandan HEIs. A descriptive field survey was used. The field study resulted into the identification of factors for adoption of e-learning technologies in Ugandan HEIs. Data was collected from 380 participants (students, lecturers and ICT support staff) from four HEIs in Uganda (Kampala International University (KIU), Makerere University (MAK), International health sciences university (IHSU), and Mbarara University of science and technology (MUST)) using a cross-sectional design. A questionnaire was used as a tool of data collection as per research approach. This tool was used because it enabled the researcher to collect a larger amount of data within the shortest time possible and it could also eliminate the bias as the respondents could fill it independently allowing them time to think correctly while answering the questions in the questionnaire
A random simple sampling method was used to ensure that all intended participants or respondents have equal chance of being represented and sample size (n = 380) was calculated

using solven's formula (Maleko *et al*., 2011).

$$n=N/1+N(0.05)\ 2$$

Where:

n = the sample size.
N = the total population.
0.05 = the sampling error

4. Findings

4.1 Factors for E-learning Technologies Adoption in HEIs

Adoption of e-learning technologies in teaching and learning in Ugandan higher education institutions is affected by many factors which include; Patronage, Compatibility, Trialability, Complexity, Relative Advantage, Perceived Usefulness, Perceived Ease, Observability and behavioral intention.

4.1.1 Patronage

Results revealed that majority of the participants agreed that good communication among technical personnel and users (31.9%), being sure of where to go in case something goes wrong when using e-learning technologies (36.4%), and competent technical staff in their universities and support from top management (41.1%) supported e-learning technologies adoption in Ugandan HEIs.

4.1.2 Compatibility

Results revealed that majority of the participants strongly agreed that e-learning technologies are compatible with most aspects of their work (43.1%). 44.2% of the participants also agreed that e-learning technologies fit their life style, hence supporting e-learning technologies adoption. 46.1% of the participants agreed that e-learning technologies are very compatible with the way they like to work.

4.1.3 Observability

Results revealed that majority of the participants strongly agreed that they have seen e-learning technologies in use outside their university (36.1%). 34.7% of the participants agreed that e-learning technologies are easy for them to observe others using them in their university, hence supporting e-learning technologies adoption.

4.1.4 Trialability

Results revealed that majority of the participants strongly agreed that they have had a great deal of opportunity to try many of e-learning technologies (33.3%). 43.6% of the participants agreed that they know where they can go to satisfactorily try out various uses of e-learning technologies while 35.6% of the participants also agreed that they were permitted to use e-learning technologies on a trial basis long enough to see what they could do.

4.1.5 Complexity

35.6% of the participants strongly agreed that using e-learning technologies does not take too much of their time. 33.3% strongly disagreed that it does not take too long to learn how to use e-learning technologies. While 26.7% of the participants strongly agreed that interacting with e-learning technologies does not involve large amount of mental effort.

4.1.6 Relative Advantage

Relative advantage construct showed that 35.6% of the participants strongly agreed that e-learning technologies are of ease of use. 33.3% of the participants strongly agreed that e-learning technologies are convenient to what they do and 25.8% of the participants strongly agreed that e-learning technologies enable them to accomplish teaching and learning efficiently.

4.1.7 Perceived Usefulness

Results revealed that majority of the participants strongly agreed that e-learning technologies can enhance their effectiveness in their university (55.6%), can increase their productivity in doing work (55.3%), can enable them to accomplish tasks more quickly (57.8%) and are useful in their work(50.3%).

4.1.8 Perceived Ease of Use

Results revealed that majority of the participants strongly agreed that e-learning technologies are easy for them to learn (50.3%), are easy for them to operate (46.9%) and are not difficult for them to understand (41.9%).

4.1.9 Behavior intention

Results revealed that majority of the participants strongly agreed that if there is free training on the use of e-learning technologies (34.4%), and if supported by university management (37.2%), they will have the intention to adopt e-learning technologies

5. Discussion of results

5.1 Patronage

Basing on the field results which revealed that majority of the participants agreed that good communication among technical personnel and users, being sure of where to go in case something goes wrong when using e-learning technologies; competent technical staff in their universities and support from top management support affects e-learning technologies adoption in Ugandan HEIs. These results concur with Ngai *et al*. (2007) [14] findings that the degree of support given to users in adoption of an innovation bears a major influence on the perception of usefulness of that innovation. Njenga, (2011) [16] & Ssemaluulu, (2012) [20] assert that if innovations are to be adopted by intended users, top management needs to appropriate the necessary resources, and create a policy or a vision for support and use of such innovations, and at the same time drive the policy to realize the vision. A perceived lack of managerial support is likely to significantly hinder the users perceiving e-learning technologies as useful and resulting into not adopting them.

5.2 Compatibility

Results from the field study showed that most of the participants strongly agreed that e-learning technologies are compatible with most aspects of their work. These findings concur with Njenga (2011) [16] that innovations with a high compatibility are more readily adopted. If the cost of incompatibility is higher than the relative advantage, most people are unlikely to adopt a given innovation. Furthermore, the e-learning technologies in HEIs will be adopted if the effort required to use them is less than that required to use the traditional modes of teaching and learning (Njenga, 2011) [16]. Besides, this means that the e-learning technologies must work better than the existing choices so that adopters are convinced

to think that these technologies bring benefits and advantages to some degree (Duan *et al*., 2010) [6]. In other words the e-learning technologies will be adopted if they are compatible with students, lectures, and ICT support staff needs in Ugandan HEIs.

5.3 Observability

Participants strongly agreed that they have seen e-learning technologies in use outside their university and that e-learning technologies are easy for them to observe others using them in their university. These findings were found in contradiction with that of Ng, (2012) who established that observability had no significant influence on adoption of e-learning at Universiti Sains Malaysia. This implies that if students, lectures and ICT support staff do not see the benefits that can be perceived from e-learning technologies or the ease with which e-learning technologies can be observed or visible in Ugandan HEIs, they will not accept and adopt them (Ng, 2012; Abukhzam & Lee, 2010) [2]. To support this further, if a user of a new system or an innovation observed it being used by others, there is a probability that the system will be adopted. In other words, seeing others use the technology reinforces a favorable attitude. This is consistent with the findings of Hofstede (1980) [8] where a person's attitude and behavior are greatly affected by others. Result demonstrability was a significant factor among Chinese IT users. When the results of using a technology could be clearly communicated to others, they had a more favorable attitude to adopt it (Mao & Palvia 2006) [17].

5.4 Trialability

Participants strongly agreed that they have had a great deal of opportunity to try many of e-learning technologies. Trialability was found significantly influencing perceived ease of use and behavioral intention to e-learning technologies in Ugandan HEIs though it didn't significantly influence perceived usefulness. These results are consistent with other studies (lee, 2007; Ng, 2008; Njeng, 2011) [12, 15, 16] that trialability as influencing factor and found that trialability was a significant variable for technology adoption. Other related studies Karahanna *et al*., (1999) [10] assert that the ability to try out a technology is only salient for end users before they adopt because the experimentation helps them overcome uncertainties and makes the change process less demanding. A study by Yang, (2007) [23] reported that when the users perceived higher trialability, they perceived higher levels of usefulness, and ease of use of a system.

5.5 Complexity

It was shown that complexity impinges on adoption of e-learning technologies in Ugandan HEIs. These findings are consistent with other similar studies that complexity had a direct and a significant effect on perceived usefulness and perceive ease of use of an e-learning systems (Njeng, 2011; Teo, 2012) [16]. In a study done by Ng, (2008) [15] complexity was found to be insignificant in predicting the adoption an e-learning technology. Besides, similar findings by (Park, 2009; Alenezi *et al*., 2010) [18, 3] allege that if users foresee anxiety when using technologies, then they will develop negative feelings toward the technologies (Al-alak & Almnawas, 2011) [1]. Basing on the above arguments, if students, lecturers and ICT support staff find the e-learning technologies to be simple or easy, they would be provoked and would put forth more endeavors to master challenges that may take place (Ng, 2008) [15].

5.6 Relative Advantage

The respondents strongly agreed that adoption of e-learning technologies in Ugandan HEIs could be of ease of use, convenient and enable students, lecturers and ICT support staff to accomplish teaching and learning efficiently. This also meant that an increase in relative advantage would lead to an increase to adopt e-learning technologies in Ugandan HEIs. Similar results from (lee, 2007) [12] found that perceived relative advantage positively affected intentions of users to adopt e-learning technologies.

5.7 Perceived Usefulness

Participants strongly agreed that e-learning technologies can enhance their effectiveness in their university, increase their productivity in doing work, enable them to accomplish tasks more quickly and are useful in their work. Davis *et al*., (1989) [5] concur with these findings that perceived usefulness is a direct determinant of users' intentions to adopt technology. Byomire (2014) [4] argues that people will consider a system to be useful when it enhances their job performance. Therefore, e-learning technologies to be adopted, their perceived usefulness must be visible to the potential adopters. Students, lecturers and ICT support staff in Ugandan HEIs to adopt e-learning technologies will base on their relative advantage and their perceived cost being lower than the perceived benefits.

5.8 Perceived Ease of Use

Participants strongly agreed that e-learning technologies are easy for them to learn, easy to operate and not difficult to understand. These results corresponds with Davis *et al*., (1989) [5] that an application which is perceived to be easier to use than another is more likely to be accepted or adopted by users. An innovation is perceived as being consistent with existing values, past experience (norms), habits, values and lifestyle and perceived needs of adopters (Njenga, 2011) [16]. Related studies found that Perceived ease of use influenced student intention to use internet-based learning indirectly through Perceived usefulness (Lee *et al*. 2011) [13]. If the effort required the students, ICT support and academic staff in Ugandan HEIs to transform the traditional modes of learning or studying into electronic modes, as well as the systems and structures that need to be transformed are perceived ease then this will predict their beliefs to adopt e-learning technologies.

5.9 Behavioral intention

Participants strongly agreed that if there is free training on the use of e-learning technologies, and supported by university management, there will be the intention to adopt e-learning technologies. These results affirm that if users of innovations like e-learning technologies are given support this will result into their intention to adopt it. However, behavioral intention has been shown to explain or predict an individual's performing a conscious act, such as deciding to accept (or use) a technology (Byomire, 2014) [4]. Studies reveal that, system usage behavior is influenced by individual's intention-to-use the system (Davis *et al*., 1989) [5]

6. Conclusions

The study established that the factors affecting e-learning

technologies adoption in Ugandan HEIs are, Patronage, Compatibility, Observability, Trialability, Complexity, Relative Advantage, Perceived Ease of Use, Perceived Usefulness. Therefore, ICT intervention programs need to focus on promoting factors. This study suggests that well-designed trainings should be provided for the students, lecturers and ICT support staff to familiarize them with the fundamental knowledge on how to use the e-learning technologies in Ugandan HEIs as well as trial opportunities to build a better understanding in the operational functions. The trainers' frequent demonstration of the use of e-learning technologies would help the students, lecturers and ICT support staff form positive perceptions, which in turn influences their behavioural intention to adopt e-learning technologies. Trainers should introduce and describe the benefits of e-learning technologies and their relevance to their job performances. Last but not least, trainers and e-learning technologies designers should carefully consider the needs of e-learning technologies users and ensure that the e-learning technologies effectively meet their job needs and demands.

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