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A Survey of Undergraduates' Extent of E-Learning Technologies Usability for Learning in a Federal University, South-South Geo-Political Zone, Nigeria

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Abstract. This study investigated the extent to which undergraduates of a particular federal University in South-South geo-political zone of Nigeria utilized e-learning technologies for their learning activities, based on age and gender. The sample consisted of 243 undergraduates who were randomly selected from five faculties in the University. The descriptive method of the survey type was employed; Checklist and Measuring Usability Questionnaire on e-learning were adapted for the study. The statistical tools used for analysis were frequency count, mean and simple percentages to interpret the research questions, while Chi-square was used to interpret the only hypothesis of the study. The study revealed an average level extent of use of e-learning technologies by the undergraduates; Age was found to be an indicator for e-learning technologies usability; and that there was no significant difference in usability of e-learning technologies for learning based on gender (X-squared (200) = 0.102, p (0.0950) > 0.05). It is recommended therefore, that, the authorities should encourage the undergraduates to utilize e-learning technologies more, in order to accelerate and possess quality improvements on their academic performance, ICT skills and interactivities with peers and lecturers alike.

Keywords: E-learning, E-learning technologies, Usability, Learning, Gender, Age

1. Introduction

World over, Information and Communication Technologies (ICTs) are seen to be dominating so much of the contemporary life and work of humans. The speed with which the world is moving into digital knowledge acquisition and application gives much to its acceptance and adoption. This is particular to educational sector where the technology had received global attention in its adoption and application. It is actually gaining ground all over in both developed and developing countries school systems. It has become so important that it has continued to grow and developing the 21st century. Ron (2008) opined that there is need for Universities to ensure that undergraduates are able to display appropriate levels of information literacy, demonstrate the capacity to identify a problem, locate and evaluate relevant information in order to engage with it.

Information and Communication Technology (ICT) and information technology (IT) can be used interchangeably in some cases. Information can be seen as idea conceived in the mind, whereas, communication is the transfer of that

information from the original source to the destination; where it is needed with the intention to produce a desired change in behaviour of the receiver. ICT is referred to as the varied collection of technological gear and resources which are made use of to communicate, generate, distribute, collect and administer information. It also referred to as the totality of methods and tools that are used in gathering, storing, processing and communicating information. Thus, information is the transfer of ideas, skills, and knowledge from the lecturer to the undergraduates (Faisal, Eslam, Shadi, Zahraa, & Ayman, 2010).

Technology is about the ways in which things are done with ease; the processes, tools and techniques that alter human activities. Faisal, et al (2010) stated that technology is becoming a necessity in University and using it gives lecturers the diversity of their lectures, displaying more information, and enhancing undergraduates learning. The use of these technologies in the Universities can help lecturers save time and allow them to pay more attention to the course content.

Olutola and Olatoye (2015) found ICT application in virtually all the available professions in the world and opined that e-learning technologies when made use of in education they are called ICTs. These ICTs are about the new ways in which undergraduates can communicate, inquire, make decisions and solve problems. They are various procedures, devices and methods for gathering and recognizing information, ordering and sorting out, condensing and orchestrating. dissecting and assessing and hypothesizing and predicting. In the mean time, That, these ICTs could enhance the quality of education in various courses and capable to enlarging undergraduates enthusiasm and responsibility, by making conceivable the acquirement of major abilities and by enhancing lecturers improvement. The need and subsequent introduction of ICT as a technology to support educational sector and the citizen has been initiated and documented in a policy statement in order to be implemented by the federal government (FRN, 2013). This laudable policy has been widely debated and substantially given to practice in the educational industry. The realization of the goals as well as the objectives of the policy document raises a lot of concerns among stakeholders in educational sector.

The coming of e-learning technology is a boost to ICTs and has turned the world into a global village. E-learning technology is said to be one of the bi-products of ICTs, hence, the future of ICT is essential for the development of e-learning technologies in Nigeria. It is the convergence of learning process with the use of internet facilities. That, since voluminous data have to be transported during the process of undergraduates' learning, there is therefore the need for such a technology like the e-learning technologies (smartphones, tablets and so forth) (Olaniyi, 2006). E-learning technologies could be used to move high volume of multimedia files such as video, text, data, audio, images from one medium to another. And that over two-thirds of University undergraduates used electronic technologies in their study while in class studying or doing homework. Hence, the use of e-learning technologies amongst undergraduates appears unavoidable. Corroborating this assertion, Lenhart, Purcell, Smith and Zickuhr (2010) stated that the world is moving into an era when e-learning technologies are not just for talking and texting, but also for accessing the internet and all it has to offer. They studied how teens and young adults' explored social media and internet based on age, and came up with different findings of how majority of the teens and young adults at a particular time flooded the different sites and to their times of withdrawals. That, the teens were engaged with different sites compared to the young adults; their ages in range were from 12 to 17 years and 18 years and above termed teens and young adults respectively. Matthews (2004) noted that e-learning technologies are not resources for making just phone calls, but rather to relate and interact socially online. It is a technology for smoothening, operating and coordinating undergraduates learning activities. Muyinda, Mugisa and Lynch (2007) described e-learning technology as a new model in education which was brought about as result of the revolution in mobile technologies.

Ali (2013) defined e-learning technology as a dynamic concept and a learning strategy that makes course contents available to undergraduates through mobile technologies anywhere and anytime. It was noted that the freedoms of undergraduates are equally relevant to the lecturers as well; and since learning is no longer limited to the four walls of the classrooms, undergraduates can learn individually with or without the lecturer. Rau, Gao, and Wu (2008) acknowledged the relevance of e-learning technologies to undergraduates' behaviour, enthusiasm, motivation and progress. Godwin (2012) stated that technology is going mobile and already undergraduates are surrounded and influenced by e-learning technologies like Smartphone, Portable computers, MP3 and MP4. Therefore, e-learning technologies are explained as sets of new technologies that would have substantial impact on the way teaching and learning exercises are being carried out. According to Gorichanaz (2011), these technologies are getting slimmer, faster, and cheaper by the day, with their interfaces getting simpler and more intuitive.

The educational advantages of using e-learning technologies over full-size computer system are attractive with clear and visibility images. A wide variety of e-learning technologies are available today like smartphones, PDAs, laptops, tablets which are used as e-learning technologies (Olanrewaju & Odewumi, 2018). Utulu (2012) stated that in Nigeria, e-learning technologies are used by undergraduates for communicating with lecturer in-charge of the courses, collecting data (recordings), sending emails, access Online Public Access Catalogue (OPAC) and share knowledge. E-learning technologies can facilitate undergraduates in various ways like not only learning contents easily, but also interacting with others anytime, anywhere at his convenience. Javid, Malik and Gujjar (2011) explained that e-learning technologies are helpful for the students for learning purposes. Students can use it for exchanging useful information with their classmates about their studies.

There are many issues concerning utilization of e-learning technologies for learning by researchers, one very important of them is gender. This issue of gender is still to be resolved amicably. On one hand, some scholars argue for a particular group to be favoured, while on the other hand, some others lay claim to have the opposite group as being the more favoured in relationship to usability aside the benefits to gain. Some authors presented arguments that the e-learning facilities are male favoured technologies, while some attributed successes of the usability to being female friendly; yet, another school of thought has it that both male and female can actually perform and utilize these technologies without hindrance when presented with same opportunities (Sanda & Kurfi, 2013; Olanrewaju, 2012; Palmen, 2011; Nsibirano, 2009). The gender issue needs to be clearly resolved by extensive research works the more in all areas of endeavour to finding lasting solution(s), so that both boys and girls can favourably be disposed to all benefits accrued to educational pursuits in any society without discriminations.

The utilization quality of e-learning technologies is the extent with which technology, interaction, content and offered services comply with expectations of undergraduates and lecturers by allowing them to learn and lecture with satisfaction respectively. The technology, interaction, content and services are seen as follows: technology refers to the technological problems that can make less difficult the use of the e-learning technologies; and Interaction has to do with the way the e-learning technologies interface and the software are made simple for students to use for learning. The content refers to the way the material is taught and the capability of the e-learning technologies to offer study activities to the undergraduates who should also be free to separately choose their course. Also, that services refer to provision of communication resources, auto-evaluation tools, help services, search engines, references and support to the undergraduates (Olanrewaju & Odewumi, 2018; Utulu, 2012; Javid, et al 2011).

The undergraduates can be encouraged to construct their own knowledge using e-learning

technologies, which in turn can be used to present materials that purposely lead them to programmed instructions in highly controlled manner. The use of e-learning technologies in education has a significant history. The relevance of e-learning technologies to undergraduates has to do with how undergraduates make use of these technologies in their studies. The real focus here is transfer of knowledge using these technologies, which is learning with universal opportunity. University education is necessary in helping the undergraduates make progress both technologically and socially.

It is worrisome to know that most undergraduates spend chunk of their time visiting unnecessary websites, watching pornography as well as texting, chatting, playing games, tweeting and socializing on social media instead of focusing on using the technologies for learning purposes. Nsofor, Ala and Gambaki (2012) concluded that to effectively use these e-learning technologies in higher education, lecturers and undergraduates alike must possess the necessary skills, for without proficiency, it may be difficult to realize the expected results and objectives.

Usability of technology is a measure of a person's experience arising from his interaction with a user interface which includes software application or a website. Also, usability as the quality of experience a user has at the end of his interaction with a product or system such as mobile devices and software applications (Kortum & Sorber, 2015). Ali (2013) defined usability as the ease with which undergraduates interact with e-learning technologies, how easily they understand the technologies. Also, how satisfied the undergraduates are with the functionality of the technologies, which includes software applications, tools, websites, devices and processes. Nielsen (2012) described usability as a form of quality assessment that is directed towards determining how trouble- free a system is. He explained that usability is a strategy that can be employed during a system design to ensure greater ease of use. Usability can be measured by five quality components to include the following: learnability; how easy is it for students to accomplish basic tasks the first time they encounter the design, and efficiency; once students have learned the design, how quickly can they perform tasks? Others are: memorability; when students return to the design after a period of not using it, how easily can they re-establish proficiency? Errors; how many errors do students make, how severe are these errors, and how easily can they recover from the errors? And satisfaction; how pleasant is it to use the design?

In any case, accessibility and usability of these technologies are basically inseparable in e-learning context for effectiveness and satisfaction as well as efficiency in which undergraduates could achieve learning of interrelated goals with a particular technology. It indicates that the lower the level of accessibility of e-learning technologies for undergraduates, the less usable it will be for them. E-learning technologies provide multitude of attributes and functions so much so that e-learning technologies have become part of everyday life of humans. Thus, increased popularity of e-learning technologies in recent years has attracted research attention (Halder, Halder, & Abhijit, 2015). In the usability of e-learning technologies, its usability extent is seen as the aggregate of value(s) attached to and or area(s) of coverage. The magnitude or weight of utilization will mean how much and more an individual utilizes the technologies for a particular thing which will invariably increase attention paid by such a one and particularly the undergraduates.

The extent of using e-learning technologies for learning could afford the undergraduates immense opportunities to creating knowledge of their own, have sufficient understanding of concepts that appeared difficult before and become independent to seeking knowledge among others. It could build and increase undergraduates' skills as well as competence in handling and or manipulating those technologies. The continual usability of the technologies could also lead to their proficiency and they could become empowered in order to creating wealth. This can bring the desired change envisaged in the undergraduates and they become self-reliant, one of the foremost national

objectives of education of the nation (Imitan, Chang & Issa, 2013; Pessu, & Danner, 2013).

The domestic education is becoming increasingly not being satisfied with by majority of the people and this has clearly shown a need for change. The digital era could have taken over from the traditional lecture method, and learners are of the expectations beyond just book knowledge since e-information in various formats of texts, audios and videos, are spread online at reach of all and sundry to be accessed, anytime, anywhere and by anybody (1World, 2014; Olanrewaju & Odewumi, 2017). The research carried out by 1World (2014) showed that 84% of respondents thought it necessary a step for Universities to incorporate more interactive technologies into their classrooms. However, the researchers opined that incorporating e-learning technologies into undergraduates' learning without availability of the necessary technologies and access to them will be an exercise in futility.

There are multiple benefits for using ICTs in the University. These include, more active learning, better undergraduates' attention and realization and Visual stimulation. They give more students-centred learning backgrounds to undergraduates and often create some kind of pressures for them and some lecturers. Also, they improve learning greatly and more undergraduates can be catered for. ICTs also make education more widely available and enhance the social integration of individuals with people of different abilities and cultural backgrounds. Other benefits are: that data in almost any subject and in diverse forms of media can be accessed from any place at different times of the day and by a limitless number of undergraduates, which is primarily relevant to different Universities in the developing countries. For instance, in Nigeria and also for those tertiary institutions in developed countries that have constrained and obsolete materials in their libraries. ICTs make it possible for undergraduates to access the views and thoughts of educators, experts and researchers all over the globe and also make it possible for undergraduates to communicate directly with them (Olanrewaju & Odewumi, 2017; Faisal, et al, 2010).

Several reasons account for why Universities make use of e-learning technologies, which is evident in the continuous growth being experienced as a result of the number of e-learning opportunities provided by Universities With the growing reliance on information systems and increasing rapidity of the introduction of new technologies into learning environment, studying undergraduate students' usability and efficiency of these technologies will continue to be of great concern. Are these technologies functional? If they are functional, are they being used as expected particularly by the undergraduates? To what extent are these e-learning technologies being used by the undergraduates? Will learning outcomes of the undergraduates being enhanced by their use of these e-learning technologies? These pertinent questions need to be answered to find lasting solutions to challenges faced by undergraduates in their abysmal academic performance in recent times. Thus, it is desirous to investigate the extent of e-learning technologies usability for learning among undergraduates of University.

2. Purpose of the study

The study examined extent of usability of e-learning technologies among undergraduates of a federal University in South-South of Nigeria. Specifically the study investigated:

- Extent of e-learning technologies usability by the undergraduates of a federal University in South-South of Nigeria
- Extent of e-learning technologies usability based on age and
- Usability of e-learning technologies based on gender.

3. Research questions

- What is the extent of e-learning technologies usability by the undergraduates of a federal University in South-South of Nigeria?

- What is the extent of e-learning technologies usability by the undergraduates based on age?
- Is there any difference in undergraduates' usability of e-learning technologies based on gender?

4. Hypothesis

$H0_1$: There is no significant difference between male and female undergraduates' usability of e-learning technologies.

5. Methodology

This research employed a descriptive research design of the survey. The population of this study were all undergraduates in Nigeria and the target population were undergraduates of a federal University in South-South geo-political zone of the country. From all the Faculties in University, five of them were randomly selected and they were: Faculty of Education, Faculty of Management Sciences, Faculty of Agriculture, Faculty of Arts and Faculty of Physical Sciences. Simple random sampling method was used to select fifty undergraduates from each of the faculties.

The study adapted Checklist and Measuring Usability with the USE Questionnaire by Ji, Park and Lee (2010) and Lund (2004) to elicit responses from the respondents respectively. The questionnaire was divided into sections A, B and C. Section A covered demographic information of the respondents while section B and C contained items bothering on the current views of undergraduates' usability of e-learning technologies using the 4-points likert-like scale of Strongly Agree, Agree, Disagree and Strongly Disagree. The researchers administered 250 copies of the questionnaire to the respondents and all the copies were retrieved from the respondents immediately for high return rate after they had filled them. Out of the retrieved copies, seven of them were not completely filled and were discarded. Hence, the respondents with 243 valid copies of the questionnaire became the study sample.

There were three research questions raised to guide the study and one hypothesis postulated. To analyse the data for the study, simple percentages and mean scores were used, while chi-square was used to interpret the only hypothesis of the study.

6. Results

Research Question 1: What is the extent of usability of e-learning technologies by undergraduates of a federal University in South-South of Nigeria?

Table 1: Usability of e-learning technologies extent by the undergraduates

S/N	Items	Frequency	%
1	Great extent	48	19.75
2	Average extent	117	48.15
3	Poor extent	78	32.10
	Total	243	100

Table 1 showed that 19.75% (48) of the respondents used e-learning technologies for learning to a great extent; 48.15% (117) of them used e-learning technologies to an average extent for learning, while 32.10% (78) of others used e-learning technologies to a poor extent. This implies that majority of the respondents used e-learning technologies to an average extent for learning. However, it could be seen that all the respondents in the study used e-learning technologies for learning, but at different levels of extent.

Research 2: What is the extent of e-learning technologies usability by the undergraduates according to age?

Table 2: Extent of e-learning usability responses by undergraduates based on age

S/N	Age range	Extent of use	Frequency	Mean	Mean %	Decision
1	16-20	Great extent	65(64.36)			
		Average extent	27(26.73)	2.56	85.33	Great extent
		Poor extent	9(8.91)			
2	21-25	Great extent	63(50.00)			
		Average extent	57(45.24)	2.45	81.67	Great extent
		Poor extent	6(4.76)			
3	26-30	Great extent	4(25.00)			
		Average extent	2(12.50)	1.63	54.33	Average extent
		Poor extent	10(62.00)			

Table 2 revealed the extent of e-learning usability of undergraduates according to the categorization in their ages; those within ages 16-20 had the grand mean score of 2.56 of the three levels of extent and translating to 85.33%. Their usability of e-learning technologies was at great extent level. For the category between ages 21-25, their usability level showed 2.45 grand mean score of 81.67% and with great extent of use. Whereas, the age range between 26-30 years had grand mean score of 1.63, translating to 54.33% and was at average extent in use. From the three categories in age regarding usability of e-learning in the institution of study, it is seen that the two categories of 16-20 and 21-25 years had great extent of level of usage, while the third category had average extent level of usage. In the two categories with great extent usability, it can be seen that the younger category (ages 16-20 had higher mean score and percentage than those of 21-25 years) used e-learning technologies more than the older ones. This could be seen in the study that the undergraduates within the lower ages used e-learning technologies more frequently and with greater extent than the older ones.

Hypothesis Testing

$H0_1$: There is no significant difference between male and female undergraduates' usability of e-learning technologies.

Table 3: Chi-square analysis on the difference in undergraduates' usability of e-learning technologies for learning based of gender

Extent	**Gender**		**Total**	**X^2**	**df**	**Sig.**	**Decision**
	Male	**Female**					
~~Great extent~~	~~27(11.11)~~	~~23(9.46)~~	~~50(20.57)~~				
Average extent	51(20.99)	45(18.52)	96(39.51)	.102	241	.950	Upheld
Poor extent	51(20.99)	46(18.93)	97(39.92)				
Total	129(53.09)	114(46.91)	243(100.00)				

P>0.05

Table 3 showed the X^2 value yielded .102 which is not significant with p-value .950>0.05. This revealed a non-significant result. Hence, the null hypothesis is upheld. This means that there is no significant difference in undergraduates' usability of e-learning technologies for learning based on gender**.**

7. Summary of findings

The results of this study are summarised as follows.

That the study sample used e-learning technologies for learning, but at different extent in levels. The majority of them with 48.15% had average extent of using e-learning technologies for learning as revealed.

The finding showed that two of the three categories in age range of 16-20 and 21-25 years had great extent usage of e-learning technologies for learning; with mean scores of 2.56(85.33%) and 2.45(81.67%) respectively. The third category in ages 26-30 had average extent of usage of the e-learning technologies for learning with mean score of 1.63(54.33%). The study

revealed that the younger respondents of the two categories with great extent used e-learning technologies for learning better and higher than their older counterparts; for they polled higher mean score and percentage. Also, it showed that the two younger categories of the study in age (16-20 and 21-25 years) as better and higher users of e-learning technologies for learning than their counterparts of 26-30 years of age (oldest of the three categories). This goes to show that, the younger, the possibility of utilising e-learning technologies more for learning.

In the study, male and female undergraduates were not significantly different in their usability of e-learning technologies for learning. The result revealed p-value of .950>0.05 which was not significant. Therefore, the null hypothesis is upheld.

8. Discussion of findings

The first finding of this study has it that the respondents utilized e-learning technologies for learning but at various levels of extent. Majority of them had average extent usability of the technologies for learning in the institution of study. Some of them had poor extent usability of the technologies, while very few respondents had great extent usability of e-learning technologies as revealed by the study. This finding is corroborated by other researchers that undergraduates utilized e-learning technologies well for learning: Kortum & Sorber (2015), Imitan, et al (2013), Olanrewaju, (2012) and Javid, et al (2011).

Another finding revealed extent of e-learning technologies usability for learning of three age categories of 16-20; 21-25 and 26-30; and found that the younger the respondent in age, the better, higher and greater extent of usability of the technologies. On the average, both groups of 16-20 and 21-25 had great extent in the usability of e-learning technologies for learning; but, the younger of the two groups (16-20 years) had higher magnitude of the mean score. The third and oldest category (26-30 years) had average extent in the usability of e-learning technologies for learning. This finding is in support of the work of Lenhart, et al (2010).

The third finding on gender revealed that male undergraduates were not significantly different from their female counterparts in the usability of e-learning technologies for learning. Though, differences existed between them, but the differences were not factors capable to influence usability of e-learning technologies for learning. They both had opportunities with technologies usability and utilized them maximally for learning. This finding corroborated that of Olanrewaju (2012) who found that males were not significantly different from females when both were given opportunity to manipulate technological gadgets for learning. The finding contradicted some findings relating to gender whose findings favoured males over their female counterparts (Olatokun, 2008; Lu & Chiou, 2010). It could be seen that when male and female are given the same opportunity with the right frame of mind and capacity to carry, in terms of intelligence quotient, they could perform optimally at the same level without hindrance.

9. Conclusion

The extent of utilising e-learning technologies for learning along age and gender were investigated in the study. It was revealed in the study after analysis and subsequent interpretation that the study sample utilized e-learning technologies for learning at optimal usability level; and being at well above average extent level in the study regarding their grand mean score. Another result of the study showed that there were differences in the usability of e-learning technologies for learning by the undergraduates based on age; and that the younger one was, the higher the usability level. This is an indication that age could be a factor to utilizing these technologies for learning.

The undergraduates of the study were not significantly different by gender in their usability of e-learning technologies for learning; though, males had higher mean score than their female counterparts. However, they still utilized e-learning technologies for learning maximally.

This goes to show that e-learning technologies were accepted, adopted and utilized for learning among undergraduates of the University where the study had been carried out regardless age and gender. And since this is an acceptable practice by all, the full integration and implementation of these technologies for learning should be encouraged and monitored well by the authority of the institution in particular, and other institutions of higher learning in general.

10. Recommendations

Based on the findings and conclusion of this study, these recommendations are made. That:

- University authority should integrate and fully implement the use of e-learning technologies for learning. She should maintain properly the existing facilities, procure more and monitor appropriately.
- Authority should encourage and motivate female undergraduates' usability of these technologies by promoting spirit of competitiveness among them. This will spur them to use the technologies well for learning and compete favourably often with their male counterparts. The spirit of industry among undergraduates should be promoted by the authority in the use of e-learning technologies.
- Students should be encouraged and properly monitored to utilize the e-learning technologies for learning solely and always, to improve well on their academic performance. They should shun other engagements online that inimical to their educational pursuits.
- Government should endeavour to fund education at all levels appropriately and particularly, tertiary level.

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