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UNDERGRADUATES' READINESS FOR UTILIZING CLOUD COMPUTING FOR LEARNING IN NIGERIAN UNIVERSITIES

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Undergraduates' Readiness for Utilizing Cloud Computing for Learning in Nigerian Universities.

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Abstract

Cloud computing is one of the newer technological tools users to have access to storage, space, processing and networking resources. However, studies revealed that learners enjoyed numerous benefits of cloud computing for fun; but not on the domain for learning. This study investigated undergraduates' readiness to utilize cloud computing resources for learning in Nigerian Universities. The study adopted descriptive research design, using quantitative survey method. Two research questions and one hypothesis were answered and tested respectively. The instrument employed was a researcher-designed questionnaire which contained two sections to ascertain Nigerian undergraduates' readiness for utilizing cloud computing for learning. A total of three hundred and ninety-eight (398) copies of questionnaires were retrieved out of 450 copies that were administered representing 88.44% responses were randomly sampled. Frequency counts, percentages and mean were employed to answer the study's research questions while the hypothesis was tested using t-test. The findings of the study revealed that majority of undergraduates are ready to utilize cloud computing for learning. However, there was no significant difference between male and female undergraduates' readiness to utilize cloud computing for learning. The study therefore concluded that undergraduates are ready to utilize cloud computing resources for pedagogical experiences despite perennial challenges encountered on their usage. The study recommended that Nigerian universities should encourage undergraduates to explore inherent benefits of cloud computing in other to improve their learning; irrespective of students' gender.

Introduction

Information and Communication Technology (ICT) has undergone various stages of innovations and inventions in order to ease pedagogic experiences in various institutions of learning. The use of ICT facilitates in no small measure in accessing and dissemination of information for teaching and learning via the use of myriads of ICT tools (Fisseha, 2011). ICT tools used for learning amongst others include social media like YouTube, Facebook, E-learning, virtual learning and current emergence of new technological tools called cloud computing (Dahunsi & Owoseni, 2015). The use of electronic platform in facilitating learning is gaining popularity due to attributed convenience and flexibility (Bates & Sangra, 2011; Waugh & Su, 2016; Samuel, Adebanjo & Onasanya, 2020) that are derived in their utilization and applications. The increased access and use of ICT to ease and improve instructional delivery (Samuel, Onasanya and Yusuf, 2019) led to global clamour for web-based platform termed cloud computing resources.

Cloud computing is a technology that is enabled by the availability of broadband networks and inexpensive end-user devices as well as commodity computing nodes that can be simply interconnected and controlled (Ahmed & Omar, 2015). Cloud computing is a technology that provides unlimited computational resources, applications for enabling omnipresent, easy, on-demand network access to a shared environment of configurable computing resources that can be provided on time and released with minimal management effort or service provider interaction (NIST, 2011) at reasonable costs. Cloud computing software that encompasses several services that are remotely controlled by a server, managed by a third party and accessed via the internet. Cloud computing provides both learners and educational practitioners with variety of online applications that can support wide range of learning scenarios (Gonzalez-Martinez, Bote-Lorenzo, Gomez-Sanchez, & Cano-Parra, 2015). These applications are usually web-based, accessible anywhere, anytime over the Internet, thus extending the exposure time to learning of students (Wu & Huang, 2011). Blood (2011) attested that cloud computing facilitate students' comprehension of pedagogic experiences by sharing contents via the use Google Spreadsheets in order to

personalize. The related cloud applications are Google Apps and Dropbox that are user-friendly and extensively employed in facilitating pedagogic experiences.

As a subscription-based technological tool used for accessing myriads of services like processing, storage space, and networking resources, cloud computing enables the user to access clients' data at any time from anywhere (Warwick, Garcia-Perez, & Odeh, 2015); which enable the data and information to be stored remotely and delivered through web-based connection to various users (Aaron, 2018). Barhonme and Ghailan (2015); Akpan and Ezinne (2017) and Samuel, Adebanjo and Onasanya (2020) attested that application of cloud computing resources as electronic communication tools for learning facilitate dissemination of knowledge, foster knowledge evaluation process, improve learners' creative and manipulative skills and problem-solving skills regardless of students' exposure, awareness and gender at any level in the university. Matt (2011) opined that proper adoption and integration of cloud computing into higher educational institutions would go a long way in revolutionizing educational service delivery to students in order to fully achieve its aim of global competitiveness via the use of new technological innovations irrespective of students' gender.

Study conducted by Kimbrough, Guadagno, et al. (2013) revealed differences in the use of internet between male and female students more often for social and not for educational function. Related study by Tekobbe (2013) showed that the female students frequently utilize electronic communication tools for educational purposes than their male counterparts. Iji, Abah and Anyor (2017) examined the impact of cloud services on students' attitude towards mathematics education in public universities. The findings showed that adoption of cloud services in facilitating learning has positive influence and confidence among students in studying that are mathematics education; thereby enable students to actively participate individually during teaching and learning mathematics. However, this study was not examined based on the moderating variable of university undergraduates' gender. Samuel, Adebanjo and Onasanya (2020) study revealed that there was no significant difference between male and female Nigerian undergraduates' access and utilization of electronic communication and collaboration tools for learning. This shows that students' utilization on web-based communication platforms based on gender has inconclusive findings. Hence, this study investigated the undergraduates' readiness to utilize cloud computing for learning in Nigerian public (Federal and State) universities. The use of cloud computing for learning has added advantage of experiencing flexibility of learning. Cloud computing is used in facilitating, accessing, disseminating and storing information via the internet with the aid of personal computers (PCs), iPhone, smartphone and so on. Khan (2019) further reiterated that cloud computing provides students with the flexibility, mobility and creation of speedy smart classroom that would facilitate pedagogic experiences with minimum time for accessing and dissemination of knowledge; thereby facilitating interactive, collaboration and personalized learning environment. This implies that the potentials of cloud computing have not been fully utilized maximally in facilitating learning in Nigerian university educational system. It has been observed that higher education students in Nigeria use cloud computing, but mostly for non-educational purposes. In addition, most of the studies on cloud computing were not specifically targeted at its use for learning among students. However, study conducted by Ofili (2015) focused on the use of cloud computing by small and medium enterprise (SME) in Nigeria; and not on their usage for teaching and learning tertiary institutions.

Purpose of the Study

The main purpose of the study is to find out undergraduates' readiness to utilize cloud computing resources for learning in Nigerian Universities. The study specifically

1. examined undergraduates' readiness to utilize cloud computing for learning in universities.
2. determined gender difference on undergraduates' readiness to utilize cloud computing for learning.

Research Questions

The following research questions were answered.

1. What is undergraduates' readiness to utilize cloud computing for learning?
2. What is gender difference on undergraduates' readiness to utilize cloud computing for learning

Research Hypotheses

This hypothesis was tested at 0.05 level of significance.
Ho_1: there is no significant difference between male and female undergraduates in their readiness to utilize cloud computing for learning.

Method

Research Type: this study adopted descriptive research design using cross-sectional survey method. A researchers-developed instrument was used to obtain the necessary information from the respondents.

Population, Sample and Sampling Techniques:

Two public universities (Federal and State) in Kwara State, Nigeria were purposively sampled. Universities in Kwara State were chosen as it serves as the link between the educationally-advantaged states of the southern Nigeria and the educationally less-advantaged of the Northern Nigeria. The respondents comprised both male and female undergraduates that cut across all the faculties in the sampled universities. A total of three hundred and ninety-eight (398) copies of questionnaires were retrieved out of 450 copies that were randomly distributed to fifteen (15) faculties representing 88.44% responses.

Research Instrument:

The instrument employed was a researcher-designed questionnaire which contained two sections to ascertain Nigerian undergraduates' readiness for utilizing cloud computing for learning. Section A consisted of a demographic information of the respondents while Section B sought information on Nigerian undergraduates' readiness to utilize cloud computing resources for learning. The developed rating scale used for undergraduates' readiness to utilize cloud computing resources for learning was Readiness to Utilize (U) and Not Utilized. The items were structured to elicit the respondents' responses based on Likert rating scale of Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SA) in section B on Nigerian undergraduates' readiness to utilize cloud computing resources for learning. Students' responses on Strongly Agreed and Agreed were collapsed as 'Agreed', while Strongly Disagreed and Disagreed responses were collapsed as 'Disagreed'. The draft of the instrument was adjudged for suitability of the items by the senior lecturers in the Department of Educational Technology at the University of Ilorin for face and content validity. The reviewed draft of the instrument was trial tested on university undergraduates outside the domain of which this study was carried out. Cronbach Alpha statistical instrument was used to ascertain the reliability index of the instrument and has $r=0.93$ $p<0.00$ at 0.05 level of significance on Nigerian undergraduates' readiness to utilize cloud computing resources for learning. The responses collected from the respondents were analyzed using frequency counts, means, percentages and t-test statistical instrument.

Data Analysis

Results and Discussions

Table 1:
Percentage Distribution of Respondents by Gender

Gender	Frequency	Percentage (%)
Male	217	54.5
Female	181	45.5
Total	398	100%

Table 1 show the demographic information of the sampled university undergraduates based on gender. The male and female undergraduates that were sampled are 217(54.5%) and 181(45.5%).

Table 2:
Undergraduates' Readiness Level to Adopt Cloud Computing for Learning

S/No	Items	A	%	D	%	Mean
1	I have installed compatible browser on my computer for cloud computing.	302	75.9	96	24.1	2.83
2	I have a webcam and microphone for simple multimedia participation in the cloud environment.	289	74.8	109	25.2	3.18
3	I have a reliable high-speed Internet connection	288	72.4	110	27.6	2.71
4	I have the web skills and mastery to use cloud computing resources for my learning.	225	56.5	173	43.5	2.56
5	I am comfortable and proficient at creating, and saving different types of files in the cloud environment.	282	70.6	116	29.4	2.85
6	I am comfortable with locating materials, setting bookmarks, and downloading files from the cloud environment.	274	68.8	124	31.2	2.79
7	I can manage my study time efficiently while using cloud-based resources for learning or to complete assignments on time.	122	30.6	276	69.4	2.20
8	I am self-motivated to use cloud-based resources for learning.	164	41.2	234	58.2	2.40
9	I have the knowledge and skills for relating well online in a cloud computing learning environment.	120	30.2	278	69.8	2.21
10	I seek for expert's assistance via email, discussion board, or chat when I am having academic related challenges.	273	68.6	125	31.4	2.70
	Grand Mean Scores	**234**	**58.8**	**164**	**41.2**	**2.64**

NOTE: Agreed (A) = Strongly Agree (SA) + Agree (A); Disagree = Disagree (D) + Strongly Disagree (SD)

Table 2 presents results on undergraduates' readiness level to adopt and utilize cloud computing for learning. The frequency counts of the respondents 302(75.9%) affirmed to have installed compatible browser on computer for cloud computing, have webcam and microphone for simple multimedia participation in the cloud environment 289(74.8%), have reliable high-speed Internet connection 288(72.4%), possessed web skills and mastery to use cloud computing resources for learning 225(56.5%), proficient at creating and saving different types of files in the cloud environment 282(70.6%), knowledgeable in locating materials, setting bookmarks and downloading files from the cloud environment 274(68.8%). However, the respondents sometimes seek expert's assistance via email, discussion board, or chat whenever they are having academic related challenges 273(68.6%), can't manage study time efficiently while using cloud-based resources to complete assignments and for learning 122(30.6%), needed self-motivation to use cloud-based resources for learning 164(41.2%) and possessed moderate knowledge and skills on cloud computing learning environment. The grand mean score of 234(58.8%) the respondents revealed positive affirmation of the undergraduates' readiness to adopt and utilize cloud computing for pedagogical experiences despite perennial challenges encountered on their usage.

Table 3:
Undergraduates' Readiness Level to Adopt Cloud Computing for Learning Based on gender

		Male				Female			
S/No	**Items**	**A**	**%**	**D**	**%**	**A**	**%**	**D**	**%**
1	I have installed compatible browser on my computer for cloud computing.	186	85.7	31	14.3	131	72.4	50	27.6
2	I have a webcam and microphone for simple multimedia participation in the cloud environment.	166	76.5	51	23.5	126	69.6	55	30.4
3	I have a reliable high-speed Internet connection	173	80.0	44	20.0	106	58.7	75	41.3
4	I possessed skills to use cloud computing resources for my learning.	182	83.9	35	16.1	101	61.3	70	38.7
5	I am proficient at creating, and saving different types of files in the cloud environment.	193	88.9	24	11.1	107	59.1	74	40.9
6	I possessed skills in locating materials, setting bookmarks, and downloading files from the cloud environment.	189	87.1	28	12.9	110	60.8	71	39.2
7	I can manage my study time efficiently while using cloud-based resources for assignments and learning	201	92.6	16	7.4	109	60.2	72	39.8
8	I am self-motivated to use cloud-based resources for learning.	210	96.8	7	3.2	121	66.9	60	33.1
9	I have the knowledge and skills for relating well online in a cloud computing learning environment.	206	94.9	11	5.1	123	67.1	58	32.0
10	I seek for expert's assistance via email, discussion board, or chat when I am having academic related challenges.	201	92.6	16	7.4	151	83.4	30	16.6
	Grand Mean Scores	**191**	**88.0**	**26**	**12.0**	**119**	**65.7**	**62**	**34.3**

Note: A = Collapse for Agree, D = Collapse for Disagree

Table 3 presents results on undergraduates' readiness level to adopt and utilize cloud computing for learning based on gender. The frequency counts of male and female are 186(85.7%) and 131(72.4%) respectively affirmed to have installed compatible browser on computer for cloud computing, have webcam and microphone for simple multimedia participation in the cloud environment 166(76.5%) and 126(69.6%), have reliable high-speed Internet connection 173(80.0%) and 106(58.7%), possessed web skills and mastery to use cloud computing resources for learning 182(83.9%) and 101(61.3%), proficient at creating and saving different types of files in the cloud environment 193(88.9%) and 107(59.1%), knowledgeable in locating materials, setting bookmarks and downloading files from the cloud environment 189(87.1%) and 110(60.8%) respectively for male and female university undergraduates. However, both male and female university undergraduates sometimes seek expert's assistance via email, discussion board, or chat whenever they are having academic related challenges 201(92.6%) and 151(83.4%) respectively, can't manage study time efficiently while using cloud-based resources to complete assignments and for learning 201(92.6%) and 109(60.2%), needed self-motivation to use cloud-based resources for learning 210(96.8%) and 121(66.9%); and possessed moderate knowledge and skills on cloud computing learning 206(94.9%) and 123(67.1%) respectively for male and female university undergraduates. The grand mean score of 191(88.0%) and 123(67.1%) the respondents revealed positive affirmation of the undergraduates' readiness to adopt and utilize cloud computing for pedagogical experiences in favour of the male undergraduate; despite the perennial challenges encountered on their usage.

Table 4:

t-test Analysis of Male and Female University Undergraduates' Readiness to Utilize Cloud Computing for Learning

Variable	N	$\bar{X}$	SD	Df	t	Sig	Remarks
Male	217	26.53	2.82	396	0.709	0.479	Not Rejected
Female	181	26.32	2.92				

Table 4 shows the t-test statistical analysis of male and female university undergraduates' readiness to utilize cloud computing for learning. The result of t (396) of 0.709 with p =0.479 significant value was greater than 0.05 alpha value. This implies that there was no significant difference between male and female undergraduates' readiness to utilize cloud computing for learning. Also, the mean score of male undergraduates (26.53) was greater than the female means score (26.32). This implies that the male undergraduates exemplified their readiness to utilize cloud computing for learning than their female counterparts.

Discusssion

The use of electronic platform in facilitating learning is gaining popularity due to attributed convenience and flexibility (Bates & Sangra, 2011; Waugh & Su, 2016; Samuel, Adebanjo & Onasanya, 2020) that are derived in their utilization and applications. The increased access and use of ICT to ease and improve instructional delivery (Samuel, Onasanya and Yusuf, 2019) led to global clamour for web-based platform termed cloud computing resources. Khan (2019) further reiterated that cloud computing provides students with the flexibility, mobility and creation of speedy smart classroom that would facilitate pedagogic experiences with minimum time for accessing and dissemination of knowledge; thereby facilitating interactive, collaboration and personalized learning environment. This study agreed with Blood (2011) that the use of cloud computing facilitate students' comprehension of pedagogic experiences in order to personalize learning. Based on gender, this study agreed with Barhonme and Ghailan (2015); Akpan and Ezinne (2017) and Samuel, Adebanjo and Onasanya (2020) that application of cloud computing resources as electronic communication tools for learning facilitate dissemination of knowledge, foster knowledge evaluation process, improve learners' creative and manipulative skills and problem-solving skills regardless of students' exposure, awareness and gender at any level in the university. This study disagreed with Tekobbe (2013) that the female students frequently utilize electronic communication tools for educational purposes than their male counterparts. However, it agreed with Samuel, Adebanjo and Onasanya (2020) that there was no significant difference between male and female Nigerian undergraduates' access and utilization of electronic communication and collaboration tools for learning. The findings from this study revealed that university undergraduates are ready to utilize cloud computing for learning irrespective.

Conclusions

This study investigated Nigerian undergraduates' readiness to utilize cloud computing resources for pedagogical experiences based on gender. The study's findings revealed that the university undergraduates showed high level of readiness to adopt cloud computing resources to facilitate their pedagogical experiences irrespective of their gender.

Recommendations

The following recommendations are suggested:

1. University undergraduates should be encouraged to explore the full benefit of cloud computing in other to increase their learning productivity irrespective of their gender.
2. University female undergraduates should be encouraged to maximize the inherent potentials in cloud computing resources in facilitating pedagogic experiences.
3. Government, non-governmental organizations and university administrator should endavour to procure newer devices that will facilitate quick adoption and utilization of cloud computing resources for teaching and learning in Nigerian universities.

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