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Editorial

The South Eastern Journal of Research and Sustainable Development (SEJRSD) is published twice a year. It is designed to disseminate knowledge to teachers, teacher-trainees, researchers, curriculum specialists and other interested stakeholders. SEJRSD has continued to serve as an effective instrument for development and innovation in education and equips researchers whose purpose is in development and innovation in educational sector.

The Editor-in-Chief of this Journal is sincerely thankful to the editorial team especially to the numerous subscribers to this volume of the Journal and to all those who contributed in one way or the other towards making this volume a reality.

Note to Contributors

The South Eastern Journal of Research and Sustainable Development (SEJRSD) is published twice a year, on line and hard copy. The journal publishes peer-reviewed, well researched findings and opinion papers from educators, teachers and other stakeholders in any discipline. The editorial board of SEJRSD therefore requests for original and thoroughly researched empirical and theoretical papers on trending issues in any field.

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- Any article submitted for assessment for publication should not exceed 12pages on A4 paper with 12points font size, Time New Roman Face and double line spaced
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AWARENESS OF CLOUD COMPUTING SERVICES BY NON-SCIENCE UNDERGRADUATE STUDENTS IN ANAMBRA STATE

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Abstract

The study investigated awareness of cloud computing services by non-science undergraduate students in Anambra State. One research question and one hypothesis guided the study. Descriptive survey research design was adopted and the population comprised 3,608 students in Federal, State and Private Universities in Anambra State. A sample size of 360 students was drawn using Taro Yamene model and multistage sampling procedure. An instrument titled: "Awareness of Cloud Computing Services Questionnaire (ACCSQ)" was used for the study. ACCSQ was validated by five experts. The reliability of ACCSQ was determined using Kuder-Richardson Formula 21 which yielded reliability index of .90. The instrument was administered to the respondents with the help of three research assistants who were lecturers in these universities and briefed on the purpose of the study. Data obtained were analysed using frequency and percentage to answer the research question and hypothesis tested at .05 Alpha level using Chi-square. The findings of the study included that the Federal university undergraduate students in Anambra State were aware of cloud computing services while those in State and Private Universities were not aware. Based on the findings, it was recommended among others that University management should make students' attendance to ICT orientation and awareness programmes compulsory activities in the school to serve as a means of creating awareness of cloud computing services and other ICT education.

Keywords: Awareness, Non-science undergraduates students, Cloud computing services

Introduction

Information and communication technology (ICT) is evolving rapidly and becoming more available and accessible. ICT refers to diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information (Obiadazie, 2015). Examples of ICT includes; computer, internet, radio, television, cell phone and cloud computing services. ICT has affected many areas of human endeavor and education is one of the many sectors it has positively affected (Obiadazie, 2016). The main contribution of ICT to education according to Young (2002) is easy access to information and learning especially to many learners who were constrained by geographical barriers and other commitments.

Over the years, different ICT such as computer, internet technology and cloud computing have emerged in education sector to improve teaching, learning and access to information. Cloud computing, the most recent technology is built upon the already existing technologies such as World Wide Web (WWW) and internet. Its evolutionary trend is traced via six computing paradigms: mainframe computing, personal computer (PC) computing, network computing, internet computing, grid computing and then, cloud computing. Characteristics such as virtualization, broad network access, resource pooling, rapid elasticity, on-demand provisioning, scalability and pay per use made cloud computing services effective technology for academic activities. The on-demand feature provides more user friendly customized environment than in grid computing where unused processing cycles of all computers in a network are harnessed to solve problems too intensive for any stand-alone machine including that the application has to be adapted to the target architecture (Mansuri, Verma & Laxka, 2014).

Cloud computing services seem to have helped in alleviating most problems students and teachers were encountering in e-learning scenario in developed countries because they are cost effective in hardware and software, has ability to create flexible learning environment, support mobile learning, provide computing intensive support, and ease computing needs to accomplish learning objectives (Jose, Miguel, Eduardo & Rafael, 2014). The safety and ease-of-use of cloud computing services has also resulted in the widespread adoption of information technology in institution of all sizes. Some institutions in developed countries have adapted the cloud to their own setting and made use of its great potential for innovative practices while others use cloud computing services for e-mail services, collaboration, data storage and virtual learning.

The term, cloud is a buzzword that needs clarification through suitable definitions. Iji, Abah and Anyor (2017) defined cloud as a set of hardware, networks, storage, services, and interfaces that enable delivery of computing as a service. It is a wide area network (WAN) from which remote computing resources and services such as combination of servers, networks, and applications are shared. The diagram representing the relationships among these various elements (applications, networks, servers, infrastructure, and platform) takes the shape of a cloud, thus the name, 'cloud'. Computing simply means any activity that uses computers to manage, process and communicate information. It includes development of hardware and software. Cloud computing is the delivery of computing services over the internet. Moreover, Landis and Blacharski (2010) defined cloud computing as computing on the internet as opposed to computing on a desktop. It is a type of computing that moved data and computing away from desktop and other portable computers into large data centers**.** According to Adeoye (2015), cloud computing relies on sharing of computing resources rather than having local servers or personal devices to handle applications. It is a novel means of providing access to diverse computer services via the internet (Fagbohun & Adetrimirin, 2016).

Users/Students can order web hosting in the cloud (Amazon or Rackspace), or consume digital media services such as movies and music on demand in the cloud (Apple Tunes, Amazon and Netflix), Storage (Dropbox or Google Drive) or even contract for housing and transportation services (AirBnB or Uber). Establishments such as Microsoft (MS), Google, International Business Machine (IBM), Hypertext Processor (HP), Amazon, Sales force, Amanda, Zamanda have different kinds of cloud-based applications and services like Microsoft Office 365, Google drive, Google documents (Google docs), Apple iCloud, Amazon cloud drive, etc. Now, Microsoft has created office online which like Google Docs, allow one to create office documents online with only a web browser.

Universities in Nigeria require cloud computing services to function effectively and efficiently since it focuses on supporting teaching and learning process, personal access to information and knowledge, communication and interaction and improving administrative procedures. They need cloud computing services as one of the major ways of providing effective education delivery to scholars globally. Universities have communities driven by connections such as connection among students, teachers, researchers, disciplines, and universities themselves and they need ICT to bring these communities, data and collaboration tools together in ways never before. Each of the

infrastructures in the university is an integral part of the university system; but ICT is undoubtedly the most significant of them all.

The university has been conducting research and how quickly the research findings can be disseminated and/or stored is very crucial. It is through ICT such as cloud computing services that the information and research needs of the university community specifically students can be satisfactorily met. The Federal Republic of Nigeria (FRN, 2013) in the National Policy on Education has made a promise to provide facilities and necessary infrastructure for the promotion of ICT in schools. The National University Commission has laid the foundation of adopting new technologies by insisting that the major criteria for any successful accreditation in any university must include investment in ICT. Responding to these challenges demand adopting and investing more on modern technologies such as cloud computing services that will promote learning beyond the limits of school buildings (Adeogun & Olisaemeka, 2009). Thus, universities should harness and utilize the inherent potentials of both male and female students irrespective of gender in the use of cloud computing services for a better quality education.

Higher institutions in Nigeria particularly Anambra State with their staff and students need to be aware and use of cloud computing services to meet their requirements in teaching, learning, research, group discussions, collaboration, conferences, publications, storage, admission, examination and course registration. Creating awareness of cloud computing services among students is necessary because according to Taylor (2006), we are living in a world in which opting out of technology system is more and more difficult and yet participating in those systems pushes us to accept structures we might oppose. Students' awareness of cloud computing services is very necessary. Awareness can be defined as an understanding of the activities of others which provides a context for your own activity (Vithoulkas & Muresanu, 2014). When people work together in an environment (virtual or not), they need information about the actions of their team-mates for successful collaboration. All the benefits of cloud computing services are useless if schools, students and teachers are not aware of their existence, importance and ways of application. Therefore, without awareness, there may be no use of cloud computing services.

The advent of awareness has made quite a good number of people to receive education on emerging ICT through different teaching and learning strategies (Kumar et al, 2013). Awareness raises consciousness and knowledge about events or objects and its benefits

like technology (Obuh & Bozimo, 2012). It is seen as central determinant of users' attitude towards any technology and an important factor that determines usage of various ICT in the digital environment. Information is meaningful and useful only if users are aware of its availability at the time it is needed (Haruna & Mabawonku, 2004). Awareness of cloud computing services can be directly linked to its use because one has to be aware that something exist before making use of it. Any cloud service which users are not aware of may not be properly used. A student who is not aware of cloud computing services may be deterred from using them ignorantly. Therefore, what is fundamental to the provision of cloud computing services is creation of user awareness.

Awareness of cloud computing services therefore involves knowledge of the existence and importance of cloud services and their ways of application. Most students at the point of entry into the university are young with many being fresh out of secondary school. Such students may lack proper and adequate awareness of the benefits of using these services. A number of ICT awareness and promotional programmes can serve as a means of creating awareness and training to such students and others in the use of cloud computing services. Lwoga, Sife, Busagala and Chilimo (2016) advised that potential users of cloud computing services need a number of awareness programmes via electronic media resources like radio, television, internet services, print media such as newspapers, magazines, newsletters and noticeboards. Universities can create awareness of cloud computing services to students and their community via organization of workshops, seminars, conferences, public lectures; and inclusion of ICT courses in students' curricula to increase their usage of the services. The effect of these awareness programmes will be felt if schools provide adequate number of ICT facilities, steady power supply, good management, adequate number of staff with knowledge and skill of ICT, and good internet services.

Students learning today, is no longer confined within the four walls of the classroom, instead, learning environment are improved to let students' access learning resources virtually anytime, anywhere. Students' awareness of free SaaS is important. Universities with poor ICT infrastructure, ill-equipped computer laboratory and ICT center require awareness of IaaS, SaaS and PaaS to help distance learning students especially those in the rural areas acquire quality education. Universities in Nigeria have low access to ICT that would enhance e-learning (Iji et al, 2017; Okai et al, 2014). Awareness of cloud computing services will help to manage the limitations of the slow pace of ICT growth. The level of awareness of cloud computing services by university undergraduate non-

science students in Anambra State is not yet established hence the need for the present research.

Statement of the Problem

The relative newness and under-development of cloud services in the country is seen as a challenge to cloud computing services awareness in schools because for any electronic learning technology to be effective, students must be aware of what it entails and be trained on the required competency needed for effective use. It is clearer then, that awareness of cloud computing services is the key to their use. Creating awareness of cloud computing services among undergraduate non-science students could be the key to their use. In order to ascertain the extent to which cloud computing services has helped in university undergraduate non-science students' education. It is imperative to evaluate the awareness of cloud computing services by undergraduate non-science students in universities in Anambra State. To the best of researcher's knowledge, a lot of research has been conducted to investigate the awareness and benefits of cloud computing in education but none has empirically determined the awareness of cloud computing services by non-science undergraduate students' in universities in Anambra State, Nigeria. The problem of this study is 'What is the non-science undergraduate students' level of awareness of cloud computing services in the Federal, State and Private universities in Anambra State?

Purpose of the Study

The purpose of the study was to ascertain the level of awareness of cloud computing services by non-science undergraduate students in universities in Anambra State. Specifically, it determined the level of awareness of cloud computing services among non-science undergraduate students in Federal, State and Private Universities in Anambra State

Research Questions

One research question guided the study.

1. What is the level of awareness of cloud computing services among non-science undergraduate students in Federal, State and Private universities in Anambra State?

Hypotheses

The following null hypothesis was tested at 0.05 level of significance:

1. There is no significant difference in the level of awareness of cloud computing services among non-science undergraduate students in Federal, State and Private Universities in Anambra State.

Method

This study adopted a descriptive survey research design. The study was carried out in five Universities in Anambra State. The population was made up of 3,608 non-science undergraduate students from Faculty of Arts (Federal = 2215, State = 855 and Private = 538) in universities in Anambra State. Non-science undergraduate students such as students in Faculty of Arts were used because their counterparts in other Faculties like Faculty of physical science, Engineering and College of Medicine are already using cloud computing services as part of their curricular activities. For instance, students in computer science, engineering, medicine, etc. use cloud computing services in most of their courses and project works.

Again, Faculty of Arts has non-science students and is common among Federal, State and Private Universities in Anambra State. The sample size was 360 non-science undergraduate students which was randomly selected as Federal = 221; State = 85 and Private = 54. The sample size was statistically determined using 'Taro Yamene' formula for a finite population since the population of undergraduate students in Faculty of Arts in each university was known. According to Ifeakor (2018), Yamene formula is used to determine the sample size where the population is known. Proportionate stratified random sampling was used in selecting the proportion of male and female students in the sampled Federal, State and Private universities. This yielded in these proportions: Federal University, 81 males and 140 females, State University, 31 males and 54 females and Private University: 18 males and 36 females.

The instrument for data collection was a researcher developed questionnaire termed 'Awareness of cloud computing services Questionnaire (ACCSQ)'. The instrument had two Parts. Part 1 sought information on the personal data of the respondent; Part II was used to collect data for the study. Part II had one section which sought information on the awareness of cloud computing services. The response format was: 'Aware' and 'Not Aware'. The validity of the instrument was established by five experts: one expert in Computer Education, one expert in Science Education, one expert in Adult and Vocational Education, and two experts in Measurement and Evaluation from Nnamdi

Azikiwe University, Awka and Chukwuemeka Odumegwu Ojukwu University (COOU), Anambra State. The comments of the five validates were noted while their suggestions were considered and incorporated in the final draft of the questionnaire. The reliability of the instrument was determined using Kuder-Richardson Formula 21 (K – R 21) to establish the internal consistency of the instrument since this section of the instrument was dichotomously scored and was administered once. Kuder-Richardson Formula 21 method is applicable to dichotomously scored items with equal difficulty (i.e. pass or fail/all or none) and involves a single administration of the instrument (Nworgu, 2015). The reliability coefficient obtained was .90. The researcher administered the copies of the questionnaire to the respondents with the help of four research assistants educated on the purpose of the study and trained on how to administer and collect back the filled questionnaire. Two weeks was used for the administration and retrieval of the completed copies of the questionnaire. All the 360 copies of the questionnaire distributed were properly filled, returned and used for data analysis. The research questions were analysed using frequency and percentage. Percentage score below 50 was regarded as no awareness while percentage score of 50 and above was regarded as awareness. Chi-square was used to test Ho_1 at .05 alpha level and in taking decision, a null hypotheses was rejected if probability (p) value is less than or equal to significant value of .05 ($P \leq 0.05$), otherwise, it was accepted.

Results

Research Question One: What is the level of awareness of cloud computing services among non-science undergraduate students in Federal, State and Private universities in Anambra State?

Table 1: Frequency (F) and Percentage (%) of Responses on the Level of Awareness of Cloud Computing Services among Federal University Non-science Undergraduate Students in Anambra State (N= 221)

Cloud Computing Services	Aware		Not Aware		Remark
	F	%	F	%	
Web Mail Services					
1. Gmail	214	96.8	7	3.2	A
2. Yahoo Mail	211	95.5	10	4.5	A
3. Hotmail	104	47.1	117	52.9	NA
Social Networking					
4. Twitter	215	97.3	6	2.7	A
5. WhatsApp	218	98.6	3	1.4	A
6. Instagram	215	97.3	6	2.7	A
Entertainment and Video Presentation					
7. YouTube	217	98.2	4	1.8	A
8. Google Video	208	94.1	13	5.9	A
Calendaring Services					
9. Google Calendar	176	79.6	45	20.4	A
10. Hotmail Calendar	33	14.9	188	85.1	NA
File Sharing Services					
11. Drop Box	93	42.1	128	57.9	NA
12. Slide Share	63	28.5	158	71.5	NA
Online Storage Services					
13. Google Drive	165	74.7	56	25.3	A
14. Sky Drive	86	38.9	135	61.1	NA
Business Productivity Online Tools					
15. Google Documents	139	62.9	82	37.1	A
16. Microsoft Office Online	169	76.5	52	23.5	A
Science and Statistical Applications					
17. AutoCAD Web Services	90	40.7	13	59.3	NA

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18. Hadoop Framework	20	9.0	201	91.0	NA
19. GitHub	28	12.7	193	87.3	NA
20. Simulation Software	89	40.3	132	59.7	NA
21. Scilab and R	11	5.0	210	95.0	NA
22. Net lab+	22	10.0	199	90.0	NA
23. Motion Pictures	150	67.9	71	32.1	A
24. Online Photo Editors	194	87.8	27	12.2	A
25. Online Video Editors	164	74.2	57	25.8	A

Conference and Collaboration Services					
26. Video Conferencing	192	86.9	29	13.1	A
27. Instant Messaging	211	95.5	10	4.5	A
28. Skype	111	50.2	110	49.8	A
29. ZOOM Webinar	142	64.3	79	35.7	A
Platform-as-a-Service					
30. Google AppEngine	68	30.8	153	69.2	NA
31. Amazon Simple Database (DB)	78	35.3	143	64.7	NA
32. Amazon Simple Storage Service (S3)	72	32.6	149	67.4	NA
33. Amazon Virtual Computing Lab	74	33.5	147	66.5	NA
Infrastructure as-a-Services					
34. Amazon Elastic Compute Cloud (EC2)	51	23.1	170	76.9	NA
35. Google Compute Engine	52	23.5	169	76.5	NA

Aware (A); Not Aware (NA)

Table 1 shows the frequency and percentage of responses on the awareness of cloud computing services among Federal university non-science undergraduate students in Anambra State. The analysis made indicates that the percentage of responses is 50% and above on the awareness of 18 cloud computing services out of the 35 listed. This implies that Federal university non-science undergraduate students in Anambra State are aware of cloud computing services. However, these non-science undergraduate students are not aware of the remaining 17 cloud computing services since the percentage of their responses is below 50% which is the acceptable cut-off score.

Table 2: Frequency and Percentage of Responses on the Level of Awareness of Cloud Computing Services among State University Non-science Undergraduate Students in Anambra State (N= 85)

Cloud Computing Services	Aware		Not Aware		Remark
	F	%	F	%	
Web Mail Services					
1. Gmail	85	100.0	0	0.0	A
2. Yahoo Mail	84	98.8	1	1.2	A
3. Hotmail	33	38.8	52	61.2	NA
Social Networking					
4. Twitter	85	100.0	0	0.0	A
5. WhatsApp	85	100.0	0	0.0	A
6. Instagram	85	100.0	0	0.0	A
Entertainment and Video Presentation					
7. YouTube	85	100.0	0	0.0	A
8. Google Video	62	72.9	23	27.1	A
Calendaring Services					
9. Google Calendar	68	80.0	17	20.0	A
10. Hotmail Calendar	7	8.2	78	91.8	NA
File Sharing Services					
11. Drop Box	18	21.2	67	78.8	NA
12. Slide Share	18	21.2	67	78.8	NA
Online Storage Services					
13. Google Drive	67	78.8	18	21.2	A
14. Sky Drive	16	18.8	69	81.2	NA
Business Productivity Online Tools					
15. Google Documents	37	43.5	48	56.5	NA
16. Microsoft Office Online	63	74.1	22	25.9	A
Science and Statistical Applications					
17. AutoCAD Web Services	37	43.5	48	56.5	NA

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18. Hadoop Framework	4	4.7	81	95.3	NA
19. GitHub	2	2.4	83	97.6	NA
20. Simulation Software	18	21.2	67	78.8	NA
21. Scilab and R	3	3.5	82	96.5	NA
22. Net lab+	2	2.4	83	97.6	NA
23. Motion Pictures	48	56.5	37	43.5	A
24. Online Photo Editors	69	81.2	16	18.8	A
25. Online Video Editors	64	75.3	21	24.7	A
Conference and Collaboration Services					
26. Video Conferencing	70	82.4	15	17.6	A
27. Instant Messaging	79	92.9	6	7.1	A
28. Skype	43	50.6	42	49.4	A
29. ZOOM Webinar	39	45.9	46	54.1	NA
Platform-as-a-Service					
30. Google AppEngine	24	28.2	61	71.8	NA
31. Amazon Simple Database (DB)	25	29.4	60	70.6	NA
32. Amazon Simple Storage Service (S3)	19	22.4	66	77.6	NA
33. Amazon Virtual Computing Lab	22	25.9	63	74.1	NA
Infrastructure as-a-Services					
34. Amazon Elastic Compute Cloud (EC2)	8	9.4	77	90.6	NA
35. Google Compute Engine	31	36.5	54	63.5	NA

Aware (A); Not Aware (NA)

Table 2 points at the frequency and percentage of responses on the level of awareness of cloud computing services among State university non-science undergraduate students in Anambra State. The analysis indicates that the percentage of responses is 50% and above on the awareness of 16 cloud computing services out of the 35 listed. This implies that State university non-science undergraduate students are not aware of cloud computing services. However, State university non-science undergraduate students in Anambra State are not aware of the remaining 19 cloud computing services since the percentage of their responses is below 50% which is the acceptable cut-off score.

Table 3: Frequency and Percentage of Responses on the level of Awareness of Cloud Computing Services among Private University Non-science Undergraduate Students in Anambra State (N= 54)

Cloud Computing Services	Aware		Not Aware		Remark
	F	%	F	%	
Web Mail Services					
1. Gmail	53	98.1	1	1.9	A
2. Yahoo Mail	54	100.0	0	0.0	A
3. Hotmail	25	46.3	29	53.7	NA
Social Networking					
4. Twitter	54	100.0	0	0.0	A
5. WhatsApp	54	100.0	0	0.0	A
6. Instagram	54	100.0	0	0.0	A
Entertainment and Video Presentation					
7. YouTube	53	98.1	1	1.9	A
8. Google Video	42	77.8	12	22.2	A
Calendaring Services					
9. Google Calendar	26	48.1	28	51.9	NA
10. Hotmail Calendar	5	9.3	49	90.7	NA
File Sharing Services					
11. Drop Box	10	18.5	44	81.5	NA
12. Slide Share	5	9.3	49	90.7	NA
Online Storage Services					
13. Google Drive	27	50.0	27	50.0	NA
14. Sky Drive	9	16.7	45	83.3	NA
Business Productivity Online Tools					
15. Google Documents	18	33.3	36	66.7	NA
16. Microsoft Office Online	21	38.9	33	61.1	NA
Science and Statistical Applications					
17. AutoCAD Web Services	11	20.4	43	79.6	NA
18. Hadoop Framework	4	7.4	50	92.6	NA

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19. GitHub	5	9.3	49	90.7	NA
20. Simulation Software	10	18.5	44	81.5	NA
21. Scilab and R	1	1.9	53	98.1	NA
22. Net lab+	3	5.6	51	94.4	NA
23. Motion Pictures	20	37.0	34	63.0	NA
24. Online Photo Editors	30	55.6	24	44.4	A
25. Online Video Editors	24	44.4	30	55.6	NA
Conference and Collaboration Services					
26. Video Conferencing	37	68.5	17	31.5	A
27. Instant Messaging	48	88.9	6	11.1	A
28. Skype	17	31.5	37	68.5	NA
29. ZOOM Webinar	24	44.4	30	55.6	NA
Platform-as-a-Service					
30. Google AppEngine	4	7.4	50	92.6	NA
31. Amazon Simple Database (DB)	6	11.1	48	88.9	NA
32. Amazon Simple Storage Service (S3)	4	7.4	50	92.6	NA
33. Amazon Virtual Computing Lab	6	11.1	48	88.9	NA
Infrastructure as-a-Services					
34. Amazon Elastic Compute Cloud (EC2)	4	7.4	50	92.6	NA
35. Google Compute Engine	6	11.1	48	88.9	NA

Aware (A); Not Aware (NA)

Table 3 shows the frequency and percentage of responses on the level of awareness of cloud computing services among Private university non-science undergraduate students in Anambra State. The analysis indicates that the percentage of responses on the Private university non-science undergraduate students' awareness of cloud computing services is 50% and above in 10 cloud computing services out of the 35 listed. This implies that Private universities non-science undergraduate students in Anambra State are not aware of cloud computing services. However, private universities non-science undergraduate students in Anambra State are not aware of the remaining 25 cloud computing services since the percentage of their responses is below 50% which is the acceptable cut-off score.

$H0_1$: There is no significant difference in the level of awareness of cloud computing services among non-science undergraduate students in Federal, State and Private Universities in Anambra State.

Table 4: Chi-square Analysis of Difference on the Non-science Undergraduate Students' Responses on their Awareness of Cloud Computing Services in Federal, State and Private Universities in Anambra State

Cloud Computing Services	FEDERAL		STATE		PRIVATE		X^2	P-value	Remark
	Aware F	Not Aware F	Aware F	Not Aware F	Aware F	Not Aware F			
Web Mail Services									
Gmail	**214**	**7**	**85**	**0**	**53**	**1**	**2.87**	**.23**	**Not-Sig**
Yahoo Mail	**211**	**10**	**84**	**1**	**54**	**0**	**4.32**	**.11**	**Not-Sig**
Hotmail	**104**	**117**	**33**	**52**	**25**	**29**	**1.72**	**.42**	**Not-Sig**
Social Networking									
Twitter	**215**	**6**	**85**	**0**	**54**	**0**	**3.83**	**.14**	**Not-Sig**
WhatsApp	**218**	**3**	**85**	**0**	**54**	**0**	**1.90**	**.38**	**Not-Sig**
Instagram	**215**	**6**	**85**	**0**	**54**	**0**	**3.83**	**.14**	**Not-Sig**
Entertainment and Video Presentation									
YouTube	**217**	**4**	**85**	**0**	**53**	**1**	**1.58**	**.45**	**Not-Sig**
Google Video	**208**	**13**	**62**	**23**	**42**	**12**	**28.16**	**.00**	**Sig**
Calendaring Services									
Google Calendar	**176**	**45**	**68**	**17**	**26**	**28**	**24.43**	**.00**	**Sig**
Hotmail Calendar	**33**	**188**	**7**	**78**	**5**	**49**	**3.12**	**.20**	**Not-Sig**
File Sharing Services									
Drop Box	**93**	**128**	**18**	**67**	**10**	**44**	**18.50**	**.00**	**Sig**

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Slide Share	**63**	**158**	**18**	**67**	**5**	**49**	**9.29**	**.01**	**Sig**
Online Storage Services									
Google Drive	**165**	**56**	**67**	**18**	**27**	**27**	**15.68**	**.00**	**Sig**
Sky Drive	**86**	**135**	**16**	**69**	**9**	**45**	**17.59**	**.00**	**Sig**
Business Productivity Online Tools									
Google Documents	**139**	**82**	**37**	**48**	**18**	**36**	**20.06**	**.00**	**Sig**
Microsoft Office Online	**169**	**52**	**63**	**22**	**21**	**33**	**30.12**	**.00**	**Sig**
Science and Statistical Applications									
AutoCAD Web Services	**90**	**131**	**37**	**48**	**11**	**43**	**8.87**	**.01**	**Sig**
Hadoop Framework	**20**	**201**	**4**	**81**	**4**	**50**	**1.62**	**.44**	**Not-Sig**
GitHub	**28**	**193**	**2**	**83**	**5**	**49**	**7.46**	**.02**	**Sig**
Simulation Software	**89**	**132**	**18**	**67**	**10**	**44**	**15.86**	**.00**	**Sig**
Scilab and R	**11**	**210**	**3**	**82**	**1**	**53**	**1.75**	**.55**	**Not-Sig**
Net lab+	**22**	**199**	**2**	**83**	**3**	**51**	**5.46**	**.06**	**Not-Sig**
Motion Pictures	**150**	**71**	**48**	**37**	**20**	**34**	**18.05**	**.00**	**Sig**
Online Photo Editors	**194**	**27**	**69**	**16**	**30**	**24**	**29.75**	**.00**	**Sig**
Online Video Editors	**164**	**57**	**64**	**21**	**24**	**30**	**19.79**	**.00**	**Sig**
Conference and Collaboration Services									
Video Conferencing	**192**	**29**	**70**	**15**	**37**	**17**	**10.43**	**.00**	**Sig**
Instant Messaging	**211**	**10**	**79**	**6**	**48**	**6**	**3.45**	**.17**	**Not-Sig**
Skype	**111**	**110**	**43**	**42**	**17**	**37**	**6.54**	**.03**	**Sig**
ZOOM Webinar	**142**	**79**	**39**	**46**	**24**	**30**	**12.49**	**.00**	**Sig**

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Platform-as-a-Service									
Google AppEngine	**68**	**153**	**24**	**61**	**4**	**50**	**12.25**	**.00**	**Sig**
Amazon Simple Database (DB)	**78**	**143**	**25**	**60**	**6**	**48**	**12.06**	**.00**	**Sig**
Amazon Simple Storage Service (S3)	**72**	**149**	**19**	**66**	**4**	**50**	**15.08**	**.00**	**Sig**
Amazon Virtual Computing Lab	**74**	**147**	**22**	**63**	**6**	**48**	**11.02**	**.00**	**Sig**
Infrastructure as-a-Services									
Amazon Elastic Compute Cloud (EC2)	**51**	**170**	**8**	**77**	**4**	**50**	**12.42**	**.00**	**Sig**
Google Compute Engine	**52**	**169**	**31**	**54**	**6**	**48**	**11.84**	**.00**	**Sig**

Significant (Sig); Not Significant (Not Sig)

The analysis in Table 4 shows that there is a significant difference between the non-science undergraduate students' responses on their awareness of cloud computing services in Federal, State and Private Universities in Anambra State. The analysis indicates that 23 cloud computing services out of the 35 listed have p-value less than the stipulated 0.05 level of significance. The null hypothesis of no significant difference is therefore rejected.

Discussion

The findings of research question one revealed that non-science undergraduate students' in Federal university are aware of cloud computing services while those in State and Private universities are not aware of cloud computing services. In other words, non-science undergraduate students in Federal university in Anambra State have more knowledge of a wide range of cloud computing service such as gmail, yahoo mail,

twitter, whatsapp, instagram, youtube, google video, google calendar, google drive, google documents, Microsoft office online, motion pictures, online photo editors, online video editors, video conferencing, instant messaging, skype, ZOOM webinar than their counterparts in State and Private Universities in Anambra State.

The findings of this work was found in the definition of awareness by Arunachalam (2011) who defined awareness as ability of having knowledge and conscious of new trends (technology) or system. This definition emphasized the importance of having knowledge and consciousness of new trends or system. These non-science undergraduate students' in the Federal University have knowledge of this new technology and can identify a good number of them in the cloud as well as electronic libraries in their university. The research of Irshad and Gapar (2017) in line with this revealed that lack of knowledge of cloud computing services hindered two third of the sampled respondents from being aware of cloud computing services and utilizing the advantages potentially offered by this technology.

Majhi, Meher and Maharana (2015) found that **LIS** professionals in Indian university libraries were aware of cloud technology and use it for five important purposes such as marketing of library resources and services, giving current awareness services to users, communicating library users, providing reference services to users and giving orientation services to the new users. The result of the study of Hamzah, Mahmud, Zukri, Yaacob and Yacob (2017) again revealed that 60% of the lecturers from university of Tenologi Mara Kampus Kota Bharu (UiTMKB) Malaysia were aware of the existence of cloud computing services implying that only 40% were not aware. Those who adopt infrastructure-as-a-service (IaaS), software-as-a-service (SaaS) and platform-as-a-service (PaaS) were 20%, 55% and 10% respectively. The study of Hamzah et al showed that most lecturers in UiTMKB use SaaS in teaching and learning process.

The result of this work, however, differs from the findings of studies such as Uwaifo (2012) that LIS students of Delta State University were aware of a wide range of electronic information resources in the library which are cloud computing services; Mpho and Nkqubela (2014) that found lack of awareness of cloud computing services among **SMEs** which also resulted in their slow adoption among SMEs in South Africa; Velmurugan (2014) that found no student awareness of e-library resources in the academic library of Engineering college Chennai; and Samah (2014) which also found that most students of Faculty of Engineering of Aden University, Yumen were not familiar with cloud computing services due to lack of resources. The present study may

be different from that of Mpho and Nkqubela (2014), Velmurugan (2014), and Samah (2014) because it studied awareness of cloud computing services by university non-science undergraduate students in Anambra State while Mpho and Nkqubela (2014), Velmurugan (2014), and Samah (2014) studied awareness of cloud computing services among SMEs of South Africa; awareness and utilization of e-library resources by Faculty members with reference to an Engineering College Chennai, Tamilnadu, India; and awareness of cloud computing services by students in Faculty of Engineering, Aden University, Yumen respectively.

The results further showed that there is a significant difference between the non-science undergraduate students' responses on their awareness of cloud computing services in Federal, State and Private Universities in Anambra State. The null hypotheses of no significant difference was therefore rejected. This implies that the awareness of cloud computing services by non-science undergraduate students in Universities in Anambra State are not the same. It could mean that some students in a particular university require more awareness than their counterparts in other Universities in Anambra State. It could also mean that the management of a particular University educate their students better on cloud computing services via orientation and other awareness programmes than their counterparts in other Universities in Anambra State. However, Federal University in Anambra State made better efforts towards their non-science undergraduate students' awareness of cloud computing services since only their students' are aware of cloud computing services as indicated in the result of research question one.

The findings affirmed that Ahmed and Kurshid (2016) which revealed a significant difference in the awareness of ICT usage in teaching and learning process among public and private sector university faculties with faculty members in public universities having higher awareness than those in private universities. The result of this work is different from the findings of Fagbohun and Adetimirin (2016) which revealed a positive significant relationship between awareness and use of cloud computing services. Fagbohun and Adetimirin revealed that undergraduates in private universities in Nigeria has high level of ICT literacy skills and use various cloud computing services and applications. The result may differ because Fagbohun and Adetimirin (2016) studied influence of ICT skills on the use of cloud computing services among undergraduates in private Universities in South West, Nigeria.

Conclusion

Based on the analysis, interpretations and discussions of findings of this study, it was concluded that non-science undergraduate students of Federal University in Anambra State were aware of cloud computing services while those in State and Private Universities were not aware of cloud computing services available in the cloud. This implies that State and Private Universities in Anambra State require desirable environment that could facilitate students' awareness of cloud computing services. One of the major ways to achieve the goals of education is to create desirable environment that facilitates learning. Most ICT facilities in schools are lying idle because teachers and students lack basic ICT literacy and computer operation skills. This implies that students' need awareness and orientation programmes via news channels like newsletters, notice board, etc. They also need cloud computing services user education, development of local content that will suit their needs, access to information provided in a more understandable format, and packages with local language. These could be achieved via the use of ICT. The use of ICT includes the development of ICT specifically for teaching and learning purposes and also the adoption of its general components in the teaching and learning process.

Recommendations

The following recommendations are made based on the findings and conclusions of this study:

1. Universities in Anambra State should include the use of cloud computing services in the curricular activities of non-science undergraduate students. This will help in creating awareness about cloud computing technology
2. The University management should make students attendance to ICT orientation programme a compulsory activity in the school for it to serve as a means of creating awareness of cloud services
3. Students should learn to use cloud computing services in creating personal learning environment tailored towards their needs. This will help them gain awareness of safe use of cloud computing services.
4. Parents should provide internet enabled devices to their children at the point of admission into the university to serve as a means of creating awareness and facilitating use of cloud computing services. Students need internet enabled devices because majority of SaaS products do not operate offline.

5. Teachers and students should attend professional development programmes in ICT career such as conferences, seminar, workshop, etc. This will help them learn various ICT skills needed for effective use of cloud computing services

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