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Investigating the Level of Awareness and Usage of Educational Cloud Computing Applications in Tertiary Institutions in Kebbi State

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ABSTRACT

This research work investigated the level of awareness and usage of educational cloud computing applications in tertiary institutions in Kebbi State, Nigeria. This study adopted a descriptive survey design technique. The sample for this study comprises of 80 academic staff, 40 non- academic staff and 160 students randomly selected from eight public tertiary institutions in Kebbi State. The study used google form statistical analysis questionnaires as an instrument for gathering data, and the gathered data were analyzed using descriptive statistical tools, specifically: percentages, frequency count and mean statistics. To use mean statistics, options were coded as strongly agree, agree, disagree and strongly disagree with a rating of 4,3,2,1 respectively. The cut off mean of the numerical values of the code is 2.5. Any statement which returned a mean greater than or equal to 2.5 is accepted otherwise the statement is rejected. The study indicated that besides few academic staff who use highly educational cloud computing applications such as turnitin, moodle and flicker, majority of the respondents use cloud computing applications for social networking activities. Result from the study also indicated that majority of the respondents who currently use cloud computing applications gained awareness through self-discovery and interaction with their colleagues. The study therefore recommends that tertiary institutions in Kebbi State should organize workshops and conferences for both the staff and students on how to maximize the usage of highly educational enhancing cloud computing applications.

1. Introduction

Cloud computing is a rapidly developing and excellent promising technology. It has aroused the concern of the computer society of whole world. Cloud computing is Internet-based computing, whereby shared information, resources, and software, are provided to terminals and portable devices on-demand, like the energy grid. Cloud computing is the product of the combination of grid computing, distributed computing, parallel computing, and ubiquitous computing. It aims to build and forecast sophisticated service environment with powerful computing capabilities through an array of relatively low-cost computing entity, and using the advanced deployment models like SaaS (Software as a Service), PaaS (Platform as a Service), IaaS (Infrastructure as a Service),HaaS (Hardware as a Service) to distribute the powerful computing capacity to end-user[1].

The use of emerging technologies in tertiary institutions to support teaching and learning has clearly changed the way education is being conducted in many nations. Educational institutions are able to collaborate, network, share resources, and increase enrolment because of these technologies. It is common to see many online certificate and degree programmes being offered in many tertiary institutions around the world. As such, educational institutions throughout the World have become highly dependent on technology for teaching, learning and for conducting research. They continue to seek opportunities to rationalize the way they manage their resources. These opportunities have become even better with the introduction of a novel system of computing called cloud computing [2]. This research aims to investigate the available cloud computing applications, awareness and usage of these applications by tertiary institutions in Kebbi State.

1.1 Statement of the Problem

Educational cloud computing applications in tertiary institutions had important responsibilities for supporting teaching, learning and office work by the lecturers, students and non-academic staff. Educational course contents are translated into reality without physical face-to-face contact at the same time academicians are delivering lectures using some of this cloud computing applications for the production of good quality educational output thus making it easy for lecturers and students to teach and learn different things effectively.

Awareness and usage of educational cloud computing applications in tertiary institutions in Kebbi State has become a challenging issue for both lecturers and students which lead to a research to find out the available educational cloud computing applications from various published research papers and to know the extent of awareness and usage by staff and students in tertiary institutions in Kebbi State.

This research will help both the academic and non-academic staff and students in tertiary institutions within and outside the state to be aware of the major educational cloud computing applications available for use. Awareness of the available Cloud Computing Applications will also be of great benefit to lecturers and students while conducting researches. Deploying these applications while teaching, learning and carrying out research will afford users of these applications and researchers the opportunity to collaborate with experts in order to achieve their research goals/objectives.

1.2 Research Questions

The following are the research questions were formulated to guide the study, they include:

1. What are the available Supportive Educational Cloud Computing Applications for use by staff and students of tertiary institutions?
2. What are the levels of awareness on the Educational Cloud Computing Applications by staff and students of tertiary institutions in Kebbi State?
3. What are the levels of usage of Educational Cloud Computing Applications by the staff and students of tertiary institution in Kebbi State?

1.3 Objectives of the Study

This study is generally aimed at investigating the level of awareness and usage of educational cloud computing applications in tertiary institutions in Kebbi State, Nigeria. Specifically, the study seeks to:

1. To investigate the availability of educational cloud computing applications in the tertiary institutions in Kebbi State.
2. To determine whether or not the educational cloud computing applications are accessible by staff and students.
3. To investigate the utilizations of educational cloud computing applications by both staff and students.
4. To identify the educational cloud computing services rendered by tertiary institutions in Kebbi State.

2. Literature Review

Ref [2] presented a study that determined the available cloud computing resources and the extent of utilization of those resources by business education lecturers in teaching of office education and management courses in tertiary institutions in Anambra State. Two public Universities and two public colleges of education were surveyed to attain the purpose of this study. The institutions include Nnamdi Azikiwe University Awka, Chukwuemeka Odumegwu Ojukwu University Igbariam, Federal College of Education Technical Umunze and Nwafor Orizu College of Education Nsugbe. The study adopted descriptive survey research design. The population for the study was 36 business education lecturers drawn from two public universities and two public colleges of education in the study area. Two research questions and one null hypothesis guided the study. Data were collected by the researchers through personal contact using a 26-item structured questionnaire. Cronbach Alpha reliability method was used in determining the internal consistency of the instrument which yielded a reliability coefficient of 0.70 signifying that the instrument was reliable for the study. Analysis was done using mean and standard deviation to answer the research questions while t-test statistic was used in testing the null hypotheses at 0.05 level of significance. The study found among others that most of the identified cloud computing resources were not adequately available and the extents of their utilization was still significantly low. The study recommended among others alternative strategies for the provision of teaching resources in tertiary institutions rather than total reliance on government. Again workshop should be organized for Business Educator to train them on how to use the available resources in teaching office and management education courses.

Ref [3] presented the challenges and issues of security aspects in cloud computing method. The authors first look into the impacts of the distinctive characteristics of cloud computing, namely, multi-tenancy, elasticity and third party control, upon the security requirements. They later analysed the cloud security requirements in terms of the fundamental issues, i.e., confidentiality, integrity, availability, audit and compliance.

The authors of [1] explored the background and service models and also presented the existing research issues and implications in cloud computing such as security, reliability, privacy, and so on. The empirical model for cloud computing adoption by the higher education institutions. Successful migration to cloud computing by higher education institutions (HEIs) depends on well definition for transition strategies which requires deeply understanding the factors affect cloud adoption by the HEIs. The research provided a framework that shows the factors that influent the Somali HEIs to adopt cloud computing paradigm, and the researchers aimed to develop an implementation strategy that will enable the HEIs in Somalia to adopt easily and effectively to the cloud computing. So, the researchers employed a case study strategy which is appropriate for investigating a contemporary research phenomenon; Somali higher education institutions are the case study applied in this research. The research adopts quantitative research approaches. Nonetheless, a survey is used to provide an exploratory snapshot of the cloud computing adoption by the Somali higher education institutions (HEIs). Questionnaires were conducted to identify whether the HEIs in Somalia interest to adopt cloud computing and the questionnaires were conducted to reveal the level of understanding cloud computing and the factors that effect to adopt cloud computing. The analysis of the collected d through the questionnaire was undertaken using descriptive statistics as well as frequency analysis using SPSS V20.0 which is useful for the analysis of quantitative data means it is used for survey authoring, data mining, and statistical analysis [4].

The author of [5] presented a research paper aimed at identifying the challenges and threats to information security of cloud computing. Cloud computing provides many virtual services that can be managed and accessed by users through the web and user interfaces. It also enables users to store information that can be easily accessed globally. Despite the advantages of cloud computing, there are numerous challenges and threats to the users and service providers that may directly or indirectly affect the cloud computing system consequently affecting its information security. A critical review approach has been adopted as a method to identify the knowledge gaps in the literature. Several studies related to the information security challenges of cloud computing have been reviewed and critically evaluated. The critical review approach described in this paper resulted in a set of important information about the security challenges of cloud computing that must be taken into consideration by the users and service providers. Among the most important of these challenges are data encryption, network security, confidentiality, data privacy, malware, Authenticity, data breach, and the challenge of identity and access management. The study recommended the necessity to discover more information security challenges of cloud computing and to take the challenges discussed in this paper into account in order to protect the data and information of the organization and maintain its performance.

Ref [6] presented a study which examined the usage and awareness level of cloud computing applications by library professionals of Sindh province. The researcher deployed quantitative survey research technique. The population of the study was library professionals working in different libraries likewise in Sindh province. The study employed random sampling technique with a simple sample size of 165 library professionals (library assistant, assistant librarian, deputy librarian and librarian. Questionnaire was prepared in google form and distributed by email to selected respondents. Result of the study indicated that the knowledge and awareness of library professionals regarding cloud computing application is not very significant. Majority of library professionals are using cloud computing applications for their personal purposes without giving considerations to the security of data. This study will help university administrators as well as government to implement cloud computing to enhance the level of knowledge of library professionals.

Authors of [7] presented an algorithm for resource utilization problem in cloud computing based on greedy method. A privately-owned cloud that provides services to a huge number of users is assumed. For a given resource, hundreds or thousands of requests accumulate over time to use that resource by different users worldwide via the Internet. A prior knowledge of the requests to use that resource is also assumed. The main concern is to find the best utilization schedule for a given resource in terms of profit obtained by utilizing that resource, and the number of time slices during which the resource will be utilized. The problem is proved to be an NP-Complete problem. A greedy algorithm is proposed and analyzed in terms of its runtime complexity. The proposed solution is based on a combination of the 0/1 Knapsack problem and the activity-selection problem. The algorithm is implemented using Java. Results show good performance with a runtime complexity O((F-S)nLogn).

3. Methodology

This study adopted a descriptive survey design technique. The sample for this study comprises of 80 academic staff, 40 non- academic staff and 160 students randomly selected from eight public tertiary institutions in Kebbi State. That is: Federal University Birni Kebbi, Kebbi State University of Science and Technology, Aliero, Waziri Umaru Federal Polytechnic, Birnin Kebbi, Kebbi State Polytechnic Dakingari, College of Education, Argungu, College of Nursing and Midwifery, Birnin Kebbi, College of Health Sciences, Jega, and College of Basic and Advanced Studies, Yelwa Yauri. The study used google form statistical analysis questionnaires as an instrument for gathering data, and the gathered data were analyzed using descriptive statistical tools. Specifically, percentages, frequency count and mean statistics were used. To use mean statistics, options were coded as strongly agree, agree, disagree and strongly disagree with a rating of 4,3,2,1 respectively. The cut off mean of the numerical values of the code is 2.5. Any statement which returned a mean greater than or equal to 2.5 is accepted otherwise the statement is rejected.

3.1 Data Analysis and Interpretation

Table 1: Demographic Information

ACADEMIC STAFF			**NON-ACADEMIC STAFF**			**STUDENTS**		
Gender	Freq.	%	Gender	Freq.	%	Gender	Freq.	%
Male	58	72.5	Male	27	67.5	Male	104	65
Female	22	27.5	Female	13	32.5	Female	56	35
Total	**80**	**100**	**Total**	**40**	**100**	**Total**	**160**	**100**

From Table 1 above, 58 academic staff respondents representing 72.5% are male while 22 academic staff respondents representing 27.5% are female. 27 non-academic staff representing 67.5% are male while 13 are female.104 student respondents representing 65% are male while 56 student respondents representing 35% are female.

Research Question 1: What are the available Supportive Educational Cloud Computing Applications for used in your tertiary institutions?

Table 2: Current Usage level of cloud computing applications

Q1a	ACADEMIC STAFF			NON-ACADEMIC STAFF			STUDENTS		
Do you currently use cloud computing applications in your educational activities?	Response	Freq.	%	Response	Freq.	%	Response	Freq.	%
	Yes	67	83.75	Yes	18	45	Yes	43	26.87
	No	13	16.25	No	22	55	No	117	73.13
	Total	**80**	**100**	**Total**	**40**	**100**	**Total**	**160**	**100**

Table 2, shows that 67 academic staff respondents representing 83.75% currently use cloud computing applications in the studied tertiary institutions.45% of the non-academic staff respondents currently use cloud computing applications while only 26% of the student respondents currently use cloud computing application.

Table 3: Commonly used cloud computing applications by respondents

Q1b	ACADEMIC STAFF			NON-ACADEMIC STAFF			STUDENTS		
If your answer to question Q1a above is yes, please tick the cloud computing applications you have used for educational purposes?	Response	Freq.	%	Response	Freq.	%	Response	Freq.	%
	GoogleApps	55	68.75	GoogleApps	33	82.5	GoogleApps	12	7.5
	Moodle	8	10	Moodle	0	0	Moodle	3	1.9
	Gmail	77	96.25	Gmail	32	80	Gmail	110	68.75
	Instagram	28	35.00	Instagram	27	67.5	Instagram	111	69.38
	Zoom	73	91.25	Zoom	15	37.5	Zoom	108	67.5
	Dropbox	13	16.25	Dropbox	3	7.5	Dropbox	11	6.88
	Twitter	18	22.5	Twitter	12	30	Twitter	25	15.63
	Facebook	70	87.5	Facebook	30	75	Facebook	100	62.5
	Turnitin	52	65	Turnitin	4	10	Turnitin	6	3.75
	Skype	22	27.5	Skype	5	12.5	Skype	40	25.0
	Flicker	2	2.5	Flicker	0	0	Flicker	0	0

Table 3 shows that academic staff often use cloud computing applications like google apps, gmail, zoom, Facebook and turnitin. Such applications like moodle, instagram, dropbox are only used by few academic staff. Non-academic staff respondents use google apps, gmail, instagram and facebook and hardly use moodle and flicker. Student respondents often use Gmail, instagram, zoom and facebook and hardly use google app, moodle turnitin.

Research Question 2: What are the levels of awareness on Educational Cloud Computing Applications by Staff and Students of tertiary institutions in Kebbi State?

Table 4: Degree of awareness of cloud computing applications

Q2a	ACADEMIC STAFF			NON-ACADEMIC STAFF			STUDENTS		
Are you aware of cloud computing applications designed for educational support in tertiary institutions?	Response	Freq.	%	Response	Freq.	%	Response	Freq.	%
	Yes	72	90	Yes	21	52.5	Yes	50	31.25
	No	8	10	No	19	47.5	No	110	68.75
	Total	**80**	**100**	**Total**	**40**	**100**	**Total**	**160**	**100**

From Table 4, 72 academic staff respondents out of 80 sampled respondents representing 90% of academic staff respondents are aware of the existence of cloud computing applications designed for educational support. Almost half of the non-academic staff respondents are not aware of the existence of such educational support applications. From the sampled response of the students in the study area, only about one-third (31.25%) of them are aware of the existence of such applications.

Table 5: Rating of awareness of cloud computing applications

Q2b.	ACADEMIC STAFF	NON-ACADEMIC STAFF	STUDENTS
How would you rate your current level of awareness about educational cloud computing applications?	**Frequency**		
Not at all aware	7	13	60
Slightly aware	9	6	42
Moderately aware	5	4	10
Very aware	30	10	20
Extremely aware	29	7	28

Table 5 shows that 73 academic staff respondents out of the 80 sampled respondents are aware of educational cloud computing, similarly, 27 out of 40 non-academic staff are aware of educational cloud computing. Two third of the sampled student respondents are aware of educational cloud computing applications.

Table 6: Means of gaining awareness about cloud computing

Q2c.	**ACADEMIC STAFF**		**NON-ACADEMIC STAFF**		**STUDENTS**	
How did you become aware of these educational cloud computing applications? (Tick all that apply)	Freq.	(%)	Freq.	%	Freq.	%
Training/workshops provided by the institution	2	2.5	2	2.5	10	6.25
Colleagues or peers	20	25	25	62.5	73	45.63
Self-discovery through personal research	55	68.75	13	32.5	77	48.12
Professional conferences or webinars	3	3.75	0	0	0	0

From table 6, 55 academic staff respondents representing 68.75% became aware of cloud computing applications through self-discovery while carrying out personal research. 25% of academic staff respondents became aware of cloud computing applications through interaction with their colleagues, only few academic staff respondents gained awareness of cloud computing through training/workshop or professional conferences. Non- academic staff majorly gained awareness of cloud computing applications through colleagues and self-discovery. The students just like the non-academic respondents also gained awareness of cloud computing through their peers and majorly through self-discovery.

Research Question 3: What are the levels of usage on the Educational Cloud Computing Applications by the Staff and Students of tertiary institution in Kebbi State?

Table 7: Usage of cloud computing application for teaching and learning

Q3a	**ACADEMIC STAFF**			**NON-ACADEMIC STAFF**			**STUDENTS**		
Have you personally used any educational cloud computing applications for teaching or learning purposes?	Response	Freq.	%	Response	Freq.	%	Response	Freq.	%
	Yes	77	96.25	Yes	13	32.5	Yes	97	60.62
	No	3	3.75	No	27	67.5	No	63	39.38
	Total	**80**	**100**	**Total**	**40**	**100**	**Total**	**160**	**100**

From Table 7, 77 academic respondents representing 96.25% agreed that they have personally used educational cloud computing applications for teaching or learning purpose. Less than half of the sampled non-academic staff respondents have used cloud computing for teaching or learning purpose. More than half of the student respondents have personally used educational cloud computing applications for learning purpose.

Table 8: Institutional support on the usage of cloud computing applications

Q3b	**ACADEMIC STAFF**			**NON-ACADEMIC STAFF**			**STUDENTS**		
Have you received any training or support from your institution in using educational cloud computing applications?	Response	Freq.	%	Response	Freq.	%	Response	Freq.	%
	Yes	11	13.75	Yes	8	20	Yes	62	38.75
	No	69	86.25	No	32	80	No	98	61.25
	Total	**80**	**100**	**Total**	**40**	**100**	**Total**	**160**	**100**

From Table 8, the academic staff, non-academic staff and student respondents did not receive any significant training or support from their institution on the usage of educational cloud computing applications.

Table 9a: Purpose of Using of cloud computing application for teaching and learning by academic staff

ACADEMIC STAFF								
S/N	**Q3ci.** purpose of using educational cloud computing applications	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)	Mean	Standard deviation	Decision
1	I use Cloud Computing Application (CCA) for Online teaching and virtual classrooms	32	48	0	0	3.40	0.49	Accepted
2	I use CCA for Collaborative document editing and sharing	22	56	2	0	3.25	0.49	Accepted
3	I use CCA for Online assessment and quizzes	10	15	30	25	2.13	0.99	Rejected
4	I use CCA for Research and data analysis	50	28	2	0	3.60	0.54	Accepted
5	I use CCA for Communication with colleagues or students	74	6	0	0	3.93	0.27	Accepted
6	I use CCA for Administrative tasks (record-keeping, scheduling)	2	12	66	0	2.20	0.46	Rejected
	Grand mean					3.08		

From Table 9a above, usage of cloud computing application for online teaching and virtual classrooms by academic staff in the studied area returned a mean of 3.25 greater than the cut of mean of 2.5, it is therefore accepted. On a similar note, usage of cloud computing application for collaborative document editing and sharing return an acceptance mean 3.25. Usage of cloud computing application research and data analysis and communication with colleagues or student by academic staff returned an acceptance mean of 3.60 and 3.93 respectively. Usage of cloud computing application for online assessment and quizzes and for administrative purpose returned a rejection mean of 2.13 and 2.2 respectively. This simply means that academic staff in the research area rarely use cloud computing application for online assessment of their students' quizzes and administrative task. Generally, acceptable grand mean of 3.08, indicate that academic staff use cloud computing for the tasks outlined in Table 9a.

Table 9b: Purpose of Using of cloud computing application for teaching and learning by non- academic staff

NON-ACADEMIC STAFF								
S/N	**Q3cii.** purpose of use of educational cloud computing applications	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)	Mean	Standard deviation	Decision
1	I use Cloud Computing Application (CCA) for Online teaching and virtual classrooms	0	1	18	21	1.50	0.55	Rejected
2	I use CCA for Collaborative document editing and sharing	21	15	4	0	3.40	0.68	Accepted
3	I use CCA for Online assessment and quizzes	0	0	28	12	1.70	0.46	Rejected
4	I use CCA for Research and data analysis	15	20	4	1	3.20	0.73	Accepted
5	I use CCA for Communication with colleagues or students	12	17	8	3	2.95	0.90	Accepted
6	I use CCA for Administrative tasks (record-keeping, scheduling)	31	7	1	1	3.70	0.65	Accepted
	Grand mean					2.74		

From Table 9b above, non- academic staff do not use cloud computing applications for online teaching, virtual classroom, online assessment of quizzes, because these two tasks returned a rejection mean of 1.50 and 1.70 respectively. However, there is strong indication that non- academic staff use cloud computing for collaborative document editing and sharing, communication among colleagues and students, research and data analysis and carrying out administrative task. The acceptance grand mean of 2.74 recorded in Table 9b is an indication that non-academic staff in the research area also employ the usage of cloud computing application in their day to day activities.

Table 9c: Purpose of Using of cloud computing application for teaching and learning by students

STUDENTS								
S/N	**Q3ciii.** purpose of use of educational cloud computing applications	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)	Mean	Standard deviation	Decision
1	I use Cloud Computing Application (CCA) for Online teaching and virtual classrooms	12	10	114	24	2.06	0.72	Rejected
2	I use CCA for Collaborative document editing and sharing	52	47	30	31	2.75	1.11	Accepted
3	I use CCA for Online assessment and quizzes	15	18	109	18	2.19	0.75	Rejected
4	I use CCA for Research and data analysis	08	25	91	36	2.03	0.76	Rejected
5	I use CCA for Communication with colleagues or students	13	124	20	3	2.92	0.53	Accepted
6	I use CCA for Administrative tasks (record-keeping, scheduling)	12	11	100	37	1.98	0.78	Rejected
	Grand mean					2.32		

From Table 9c above, students to a larger extent do not use cloud computing applications for online teaching, virtual classroom, online assessment of quizzes, research and data analysis and administrative tasks because these tasks returned a rejection mean of 2.06, 2.19, 2.03 and 1.98 respectively. However, there is strong indication that students use cloud computing for collaborative document editing, sharing and communication among themselves. The rejection grand mean of 2.32 recorded in Table 10 is an indication that students in the research area do not effectively employ the usage of cloud computing application in their day to day academic activities.

4.0 Discussion

Analysis of the gathered data indicate that only a negligible number of academic staff do not use cloud computing applications. Close to half of the non-academic staff respondents (45%) currently use cloud computing applications while only one-fourth of the students (26%) currently use cloud computing, there is therefore need to further educate the students about the benefit derivable from the usage of cloud computing applications. Result of the study indicated that in addition to the commonest cloud computing applications such as google apps, gmail, instagram, zoom and Facebook, a few academic staff use highly educational relevant applications like turnitin, moodle and dropbox. Non-academic staff respondents use common cloud computing applications and hardly use highly educational inclined applications such as moodle and flicker. Students like non-academic staff respondents use the common cloud computing applications that are socially inclined and avoid those cloud computing applications highly educationally inclined. From the study it can be inferred that majority of the academic staff became aware of the existence of cloud computing applications designed for educational support through self-discovery while carrying out personal research. Almost half of the non-academic staff respondents are not aware of the existence of such educational support applications and those with awareness, gained awareness through colleagues and self-discovery. Majority of the students are also not aware of the existence of such applications. Few students who were aware, gained awareness of cloud computing through their peers and majorly through self-discovery. Evidence from the study clearly show that cloud computing applications are deployed by academic staff in the studied area for online teaching, virtual classroom, collaborative document editing and sharing, research and data analysis and communication with colleagues or students. On the other hand, non- academic staff also use cloud computing for performing such tasks as collaborative document editing and sharing, communication among colleagues and students, research and data analysis and carrying out administrative task. Student hardly use cloud computing for a highly inclined educational tasks, rather, they deploy cloud computing applications for collaborative document editing, sharing and communication among themselves.

5.0 Conclusion

This research work investigated the level of awareness and usage of educational cloud computing applications in tertiary institutions in Kebbi State, Nigeria. Result from the study indicated that majority of the respondents who currently use cloud computing applications gained awareness through self-discovery and interaction with their colleagues. There is no deliberate efforts from the sampled respondents' institutions to organize training, workshops, professional conferences to intimate them about the enormous benefits accruing from the usage of cloud computing applications. Result from the study also indicated that besides few academic staff who use highly educational cloud computing applications such as turnitin, moodle and flicker, majority of the respondents use cloud computing applications for social networking activities. The study therefore recommends that tertiary institutions should organize workshops and conferences for both the staff and students on how to maximize the usage of highly educational enhancing cloud computing applications.

REFERENCES

[1] Prasad, M. R., Naik, R. L., & Bapuji, V. Cloud computing: Research issues and implications. *International Journal of Cloud Computing and Services Science (IJ-CLOSER)*, *2*(2), 134–140, 2013. https://doi.org/10.11591/closer.v2i2.1963

[2] Uzuagu, A., Vivian, P., & Chukwuma, J. Utilization of cloud computing resources by business education lecturers in teaching office and management education in tertiary institutions in Anambra State, Nigeria. *VOCATIONAL AND TECHNICAL EDUCATION JOURNAL (VOTEJ)*, *2*(2), 281–289, 2020

[3] Jayalakshmi, K., Uma, K., Veena, A., & Santhosh, L. A quantitative analysis of security issues in cloud computing. *IMPACT: International Journal of Research in Engineering & Technology (IMPACT: IJRET)*, *5*(8), 51–60, 2017. Retrieved from www.impactjournals.us

[4] Adam, M., Elmutalib, E., & Mohamed, B. (2019). A quantitative study of the factors affect cloud computing adoption in higher education institutions: A case study of somali higher education institutions. *European Journal of Computer Science and Information Technology*, *7*(4), 16–39, 2019.

[5] Asghar, A. Major security challenges of cloud computing technology. *European Journal of Molecular & Clinical Medicine*, *07*(03), 2956–2971, 2020.

[6] Rahoo, L. Usage and awareness of cloud computing applications by library professionals of Sindh Province. *Library Philosophy and Practice (e-Journal)*. 2020. Retrieved from https://digitalcommons.unl.edu/libphilprac/4647,

[7] Al-shaikh, A., Khattab, H., Sharieh, A., & Sleit, A. Resource utilization in cloud computing as an optimization problem. *(IJACSA) International Journal of Advanced Computer Science and Applications*, *7*(6), 336–342, 2016