

# Utilization of Cloud Computing Application

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**Abstract** In this technology era, educational institution heavily avail the technology for teaching, learning and researching across the world. The aim of the study is to describe the development of Cloud Computing Application Scale for its use and to verify the Utilization of Cloud Computing Application among the postgraduate students. The sample of the study consists of 100 postgraduate students in face to face courses and the researcher adopted survey method for the data collection. Factor analysis and ‘t’ test were employed for selecting and finalizing the items. Finally the researcher framed the well prepared Utilization of Cloud Computing Application scale.

**Keywords:** *cloud computing, utilization, application scale*

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## 1. Introduction

Cloud computing application is a new paradigm of the technology world and it is known as the third revolution. Cloud computing enables the migration, desktop application to web based applications such as Gmail, Google calendar, Face book, Skype, and blog. Cloud computing application provides long term mailing services and web based applications which are accessible with a variety of computer and mobile platforms. The students can freely share their data in the cloud computing application.

### 1.1. The Concept of the Cloud Computing-Views of Various Scholars.

Gartner IT Glossary defines cloud computing as a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using Internet technologies.

Buyya et al. define that a Cloud is a type of parallel and distributed system consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements established through negotiation between the service provider and Consumers.

According to NIST “Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models”.

## 1.2. Usefulness of Cloud Computing Applications in Education

By availing the services and cloud computing the following benefits can enjoy in the domain of education.

1. The students can submit their seminar papers through online.
2. Students check the research works undertaken in the areas related to their research area in the global contest.
3. Student can collect data through web tools for preparing an article.
4. Student can access at any time the web resources for enhancing their computer skill.
5. Students can visit the educational website for new updates.
6. Students can use web based materials for their study.
7. Students can download statistical package for data analysis
8. Students can download free software with the help of web tools.
9. Students can use Google applications for their research related works.
10. Students can read many research articles through online before selecting topics for their seminar presentations.
11. Students can include YouTube videos in their paper presentations.
12. Students can post their prepared presentations in internet.
13. Students can enjoy storage area provided by web tools.
14. Students can use online money transaction for their study purposes.
15. These apart they can enjoy a lot of benefit’s exploiting cloud computing facilities.

### 1.3. Studies related to Cloud Computing Applications in Education

Sabiti Majhi [21] Examined Awareness and usage of Cloud Computing Application among LIS Professionals: A case study of 17 Indian University Libraries. **Findings:** All the respondents (100%) from all the considered universities of Odisha indicated that they use the Internet. This implies the fact that the university libraries are well endowed with the technology. Seena S. T. (2014) examined attitude of Library Professionals' on Cloud Computing Applications: A Study on the Kerala University Library. **Findings:** The study revealed the majority of the respondents do not have any idea over the cloud computing technology and its application in libraries. Analysis also showed that the library professionals have a positive attitude towards the cloud computing applications in libraries. Mayank Yuvaraj [11] studied Cloud Computing Applications in Indian Central University libraries: A study of librarians' use. **Findings:** The analysis of this study shows that librarians in Indian central universities were engaged in various cloud computing activities to perform their routines. They show strong willingness to adopt cloud computing technology in the libraries. Irrespective of computer literacy and age, the library personnel are using various devices to harness the cloud computing tools. Kaushik, A. [3] supported Application of Cloud Computing in Libraries. **Findings:** This study provides cloud computing concepts and implications of cloud based applications in libraries in order to enhance their services in a more efficient manner. Neelam Swarnkar [13] verified Application of Cloud Computing Technology for Rural Development. **Findings:** This paper briefly explains the deployment of web based application on the cloud and knowledge of the internet to improve education, agriculture and healthcare in rural areas of Chhattisgarh. Mayank Yuvaraj [11] studied and examined the Librarians' behavioral intention to use cloud computing applications in Indian central universities. **Findings:** The result had shown that the cloud computing applications are easy for using and it is free from the mental effort for the librarians. Moreover Librarians foresee the usefulness of this technology and are willing to employ the same in the libraries. Rajni Jindal and Alka Singhal [17] Studied Social Networking based E-Learning System on Clouds. **Findings:** This paper has presented the architecture and implementation of a Social Cloud with E-learning; a combination of Cloud computing, Social networking and E-learning. Exploring the benefits of all technologies, it provides a business model where construction and maintenance is done by cloud providers and all the E-learning providers merge to form a social group to share and enrich the teaching content as well as teaching quality. Ganesh Sriram G. and Vijaya Aditya B. [6] investigated in Application Study on Cloud Computing Based Virtual Campus. **Findings:** By developing this model, most of the complex problems raised in the past will be eliminated and it is very easy to interact with it also. It provides the best opportunity for the students and Teaching staff in every aspect. Library Trainee [9] studied the cloud computing and its applications in libraries. **Findings:** This paper attempted to study how a cloud computing helps in freeing libraries from managing technology so that they can focus on collection, building, improved services and innovation.

Cloud computing encourages libraries and their users to participate in a network and community of libraries by enabling them to reuse information and socialize around information. The Cloud computing techniques and methods applied to libraries, can improve the quality of services and utilization of resources. Blessing F. Adeoye [1] reviewed utilization of cloud computing in education. **Findings:** Cloud computing is the better ICT utilization mechanism for educational institutions teaching, learning and a service delivery requirement, for it enables wise and strategic use of technology that significantly reduces the cost. Hossein Movafegh Ghadirli (2014) studied a paradigm for the application of cloud computing in mobile intelligent tutoring systems. **Findings:** It can increase the battery life of mobile devices while using the educational system as well as it raises the space of working memory and processing capacity of the education system. It also reduces learning costs and hardware dependency, and increases consistency, efficiency and reliability. Sanda Porumb [19] examined Cloud Computing and its Application to Blended Learning in Engineering. **Findings:** This article presents the blended learning concept based on cloud computing paradigms and the manner it can be customized for higher and postgraduate education in engineering. It starts from a functional analysis between traditional e-learning platforms and blended learning environments dedicated to higher and postgraduate education then it continues with the technological aspects and the deployment diagram of an e-learning cloud environment for engineering education. Christopher W. Taylor and D. Scott Hunsinger [20] made a study of student use of cloud computing applications. **Findings:** The results derived from this research show that at the university level, students' intentions to use Google Docs are positively and significantly correlated with the constructs from the Theory of Planned Behavior. All three constructs from the TPB (Attitude, Subjective Norm, Perceived Behavioral Control), as well as Affect, are significant when measuring students' intentions to use Google Docs. Future research using the Theory of Planned Behavior should consider the role of Affect, as it plays a significant role in this study in predicting intentions. Aremu D. R. and Babatunde Peter Jacob [2] stated Cloud Based E-Learning Model for Open and Distance Learning in Nigerian Universities. **Findings:** Cloud computing though has proven to be a major way to go with regards to E-Learning, most developed countries have been rapidly and intensively using the ICT to provide E-Learning through the establishment of Virtual Universities. E-Learning as a multibillion dollar activity provides an opportunity for Nigeria to meet her higher educational needs as well as conserve her scarce foreign exchange by drastically reducing the number of people going abroad for university education. Regina Miseviciene and Germanas Budnikas [15] studied the Application of Cloud Computing at KTU: MS Live @ EduCase. **Findings:** The research paper verified the fact that cloud computing technologies can help the schools to solve many of problems and improve the educational process. This case study showed a usability of the MS Live @ Edu environment while applying it during e-and blended learning as well as after its finishing. The most important features identified are social communication, collaborative processing of documenting using the integrated office and file storage and sharing. All these features are accessible 24/7 via Internet. Veronica Diaz and Joann Golas (2013) reviewed

the Privacy Considerations in Cloud-Based Teaching and Learning Environments. **Findings:** this paper discusses to further explore and address privacy locally and includes a comprehensive resource list for further reading. Minjuan Wang, et.al (2013) conducted a Mobile Cloud Learning for Higher Education: A Case Study of Moodle in the Cloud. **Findings:** Mobile cloud learning positively influences the learning process, as seen from both educators and learners. Although it may be more cumbersome for some to access the program than others, it makes it easier for more people to obtain knowledge through their mobile devices without worrying much about other hardware. In other words, mobile cloud learning brings the classroom to the student unlike other traditional methods. It is of benefit not only to the learners but also to the educators in their classroom management. Meanwhile, learners must run the risks, such as losing control of applications and damage to personal information security and privacy, to take advantage of mobile cloud learning. Victoria Klassen (2013) examined Privacy and Cloud Based Educational Technology in British Columbia. **Findings:** There is a distinction between institution-mandated use of cloud services and individual use of these services. However the two are related. As institutions decline to offer such services at an institution-wide level, more instructors (the technologically savvy ones) are turning to these services ad-hoc. Fu-Yuan Chiu [5] examined the application of a cloud-based student, teacher, and parent platform in English as a foreign language education. **Findings:** This study suggests that teachers and parents remind and supervise students in developing satisfactory habits of online assessment use before conducting online assessments or learning, to prevent students from becoming lost on the Internet. Finally, regarding the cloud education environments in schools, considering Taiwan for example, although nearly all schools are equipped with broadband Internet, wireless Internet access is rare. In response to the trend in mobile learning initiated by the emergence of electronic textbooks and tablet PCs, this study suggests that schools include wireless broadband Internet equipment in their budgets for computer-related equipment. Hence, the education vision of ubiquitous learning for students can be realized.

Above the explanation and studies highlight the importance of cloud computing applications in the Education field. In this connection, the related studies of cloud computing application in Education also strengthen the vital role of cloud computing applications in the field of education and enrichment of students. Hence, the main aim of this study is to explore the "Utilization of Cloud Computing Application". For this a questionnaire had been developed by the author, and the original version consisted of 62 items that had created on a Likert type scale. Based on the analysis of this questionnaire that is presented in this paper, further refinements of the questionnaire have been completed, and are presented with the results.

## 2. Method

### 2.1. Sample

The data for this study were collected from students who are studying Post graduate course in University Departments of the Bharathiar University. 100 had been

enrolled in the Postgraduate Face to Face Courses. This course is considered to be high esteem one in Bharathiar University, and only highly talent students are admitted into this course. The target population for this study included all students who are studying this course in a period of two or three years. This population would have consisted of about 1000 students. Among the 100 students who took part in the study, 100 (100%) completed the questionnaire on the last day of their end semester, although they had completed the course of one to three semesters earlier. Of the total 100 students in the sample 46.21% were male and the remaining 54.62% were female. There were uneven numbers of females in the study, as more female students than male students in the Post Graduate education of Bharathiar University. Of the complete sample, 51.26% were juniors and 43.74% were seniors. All students who had attended the classes from which the data had been collected, all the samples had responded to the questionnaire, and no non-response is encountered.

The Post graduate course, in which the students enrolled, had been designed to prepare student enrichment of their knowledge. This course covers the fundamental concepts of a specialized major. Basic statistical terms and techniques are required for the students to analyze research data of their end semester project. In this connection cloud computing applications are very useful for their studies. Finally, the students in this course are required to design and execute a research project related to their special major throughout the semester.

### 2.2. Statistical Procedure

The Utilization of Cloud Computing Application scale that was created by the authors of this paper consisted of items listed on a 5-point Likert scale. The score 1 represented the option "Never" while option 5 on the scale represented the category "Always". An initial pool of 62 Likert-type attitudinal items Utilization of Cloud Computing Application constructed. All the items positively worded.

At a preliminary examination, the 62 items of the Utilization of Cloud Computing Application measure go through with the subject experts, based on the experts opinion scale had to be diluted as a Forty five items remained in the pre-final version of the questionnaire. A principal factor analysis with varimax rotation had then used to create the factor structure (under one factor) of the 45 questions included in the scale. This analysis used to "reduce a set of observed variables into a relatively small number of components that account for most of the observed variance" (Marcoulides & Hershberger, 1997, p 164). In order to have factor and distinct meaning for both theoretical interpretation and practical implication, the orthogonal varimax method of rotation used to minimize the number of variables that have high loadings on more than one factor. To determine the optimum factor solution, the following criteria were used: (a) computation of the percentage of variance extracted, and (b) interpretability of the factors (Comrey & Lee, 1992). A factor loading with absolute value greater than 0.50 was considered sufficiently high to assume a strong relationship between a variable and a factor. Factor loadings less than 0.50 in absolute value were regarded as insignificant, and the

items containing such loadings were removed from the scale. In addition, it was decided that factors with only one or two items, even with loadings greater than 0.50, would be excluded from the final version of the scale. Furthermore, with respect to determining the number of factors, only factors with eigenvalues greater than 1.1 were considered as significant (Rummel, 1970). Finally, the factors that were developed from this study were analyzed further with the use of single dimension scaling. This creates a map of the locations of the factors in reference to each other, based on their similarities and dissimilarities. (Elena C. Papanastasiou 2007, P 18).

After the factor analysis the tool contains 28 items, the researcher had used one more statistical measure, namely 't' value to select the items the research tool collected from 100 post graduate students was arranged on the basis of the scores in the ascending order of magnitude. The highest 27 and lowest 27 of the respondent were identified. Totally 100 samples were taken into consideration for the analysis. Then for the high group and lower group the individual test item scores were scored. To establish the significance of the test items, the 't' test was calculated. Then 't' test for statements were greater than 2.046 at 0.05 level has been taken into consideration (Table 2)

**Table 1. Factor analysis for utilization of cloud computing application**

ITEMS	SIGNIFICANT AT 0.50 LEVEL	RESULT
1	.510	Significant
2	.686	Significant
3	.652	Significant
4	.705	Significant
5	.650	Significant
6	.688	Significant
7	.688	Significant
8	.503	Significant
9	.594	Significant
10	.583	Significant
11	.535	Significant
12	.699	Significant
13	.507	Significant
14	.559	Significant
15	.557	Significant
16	.669	Significant
17	.748	Significant
18	.658	Significant
19	.606	Significant
20	.668	Significant
21	.629	Significant
22	.690	Significant
23	.688	Significant
24	.590	Significant
25	.599	Significant
26	.559	Significant
27	.604	Significant
28	.669	Significant

### 3. Results

For the purpose of examining the reliability of the Utilization of Cloud Computing Application measure, Cronbach's alpha coefficient was used to measure the

internal consistency of the items in the scale. A final examination of the entire final version of the questionnaire (all 28 items) produced a reliability coefficient of 0.94 which is very satisfactory (Table 4). Once the inappropriate items were removed, 28 items remained in the scale. Details of the items significance value included in the final version of the scale are presented in the Table 1. The results of the factor analysis have produced a one factor solution. All the items in this factor with loadings greater than 0.50 had to do with the students' opinions about the Utilization of Cloud Computing Application in their careers. This factor consisted of 28 items, while the two items with the highest loadings on this factor were those of 'Utilization Cloud Computing application is useful for my career' and 'Cloud Computing application is connected to my field of study and research'. This factor therefore was named 'Utilization Cloud Computing application. This usefulness is interpreted as the perception that students' terms of Utilization will be useful and help them in their professional lives.

After finalizing the scale through factor analysis the researchers included 't' test for final scale. To establish the significance of the test items, the 't' test was calculated. then 't' test for statements were greater than 2.046 at 0.05 level has been taken into consideration. (Table 2) Split half coefficient used to measure the internal consistency of the items in the scale. A final examination of the entire final version (Appendix-A) of the questionnaire (all 28 items) produced a reliability coefficient of 0.94 which is very satisfactory.

**Table 2. 't' value for utilization of cloud computing application**

ITEMS	SIGNIFICANT AT 0.05 LEVEL	RESULT
1	4.33**	Significant
2	6.59**	Significant
3	8.02**	Significant
4	10.49**	Significant
5	9.11**	Significant
6	11.66**	Significant
7	9.91**	Significant
8	4.02**	Significant
9	4.97**	Significant
10	5.05**	Significant
11	4.37**	Significant
12	11.26**	Significant
13	3.98**	Significant
14	5.95**	Significant
15	5.33**	Significant
16	7.93**	Significant
17	11.28**	Significant
18	6.80**	Significant
19	6.00**	Significant
20	7.94**	Significant
21	7.24**	Significant
22	9.10**	Significant
23	12.74**	Significant
24	6.25**	Significant
25	6.28**	Significant
26	4.99**	Significant
27	6.31**	Significant
28	8.09**	Significant

\*\* 0.05 level tabulated value is 2.046.

Table 3. scale statistics

MEAN	VARIANCE	STANDARD DEVIATION	NUMBER OF ITEMS
91.17	515.65	22.70	28

Table 4.item statistics

ITEM	MEAN	STD. DEVIATION	N
ITEM1	3.11	1.27	100
ITEM2	3.61	1.30	100
ITEM3	3.23	1.33	100
ITEM4	3.28	1.32	100
ITEM5	3.10	1.33	100
ITEM6	3.15	1.35	100
ITEM7	3.23	1.30	100
ITEM8	3.48	1.41	100
ITEM9	3.94	1.22	100
ITEM10	3.86	1.14	100
ITEM11	3.74	1.08	100
ITEM12	3.27	1.22	100
ITEM13	2.98	1.25	100
ITEM14	2.69	1.30	100
ITEM15	2.83	1.32	100
ITEM16	2.84	1.24	100
ITEM17	3.20	1.24	100
ITEM18	3.54	1.29	100
ITEM19	3.47	1.25	100
ITEM20	3.23	1.27	100
ITEM21	3.38	1.26	100
ITEM22	3.39	1.31	100
ITEM23	3.31	1.30	100
ITEM24	3.15	1.35	100
ITEM25	3.26	1.33	100
ITEM26	3.18	1.33	100
ITEM27	3.11	1.20	100
ITEM28	3.05	1.24	100

Table 5. reliability of the tool

Method of reliability Analysis	reliability Co-efficients
Correlation between forms	0.829
Equal-length Spearman-Brown	0.907
Guttman Split-half	0.905
Unequal-length Spearman-Brown	0.907
Cronbach's Alpha	0.94

## 4. Conclusion

The major objective of the study is to verify the Utilization of Cloud Computing Application among Post Graduate students. The current study based on the Utilization of Cloud Computing Application scale indicated that students' Utilization of Cloud Computing Application is comprised in a single dimension. More specifically, an exploratory factor analyze using postgraduate students indicated that the Utilization of Cloud Computing Application scale consists of one meaningful factor. The factor is that of the Utilization of Cloud Computing Application in the student's professional life. The results of this study also need to be re-examined to determine if they can be replicated with other samples of students, as well as with different populations. In addition, the future exploration of the relationships between Utilization of Cloud Computing Application and student achievement in the education and research is an

important area that still needs to be examined further. Finally, it would also be useful to examine the process of utilization change the student's attitude, and what it is based on, by collecting student data at various points in the semester. The independent variables could all be integrated into a single analysis to determine how these variables all influence each other. Based on the statistical analysis the researchers confined this scale will be a highly reliable.

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## APPENDIX A

### UTILIZING CLOUD COMPUTING APPLICATION SCALE

S.No	Statements	Always	Often	Some Times	Rarely	Never
1	Using the cloud computing applications enhanced the efficiency of digital library works.					
2	Usage of cloud application increases my knowledge.					
3	I read online journals using cloud computing applications.					
4	Cloud computing applications enrich my research knowledge.					
5	I can clarify many subject related doubts using cloud computing applications.					
6	Cloud computing applications gives critical thinking related my subject and research.					
7	I feel that cloud computing applications increases higher order thinking skills.					
8	While I take seminar, I use power point slides (PPT) available in the internet.					
9	Use of web sources improves my quality of presentation to the semester exams.					
10	I collected more information using web tools than from reference books.					
11	I feel convenient while accessing the web.					
12	Due to adequate skills in computer increases my attitude of using cloud computing applications.					
13	I can get feedback of experts suggestions with regard to my study and research.					
14	I book e-ticket through cloud computing applications for my study related journey.					
15	I bought study related things through cloud computing applications.					
16	Using cloud computing applications enhanced universities working capability.					
17	Using cloud computing applications enabled to do class works quickly.					
18	Cloud computing applications are useful for the students.					
19	Cloud computing applications are customizable and interactive.					
20	Cloud computing applications can be used on any system					
21	Favour and encourage the use of cloud computing applications for my study.					
22	Cloud computing applications prepare for professional work.					
23	Cloud computing applications help for competitive in the job market.					
24	Cloud computing applications make me more efficient in performing computer tasks.					
25	Cloud computing applications will make others more aware of my work.					
26	Cloud computing applications protect my data from the theft.					
27	Cloud computing applications prevent unauthorized access to my files.					
28	Cloud computing applications prevent the loss of my data.					