

# CLOUD BASED LIBRARY SERVICES IN ENGINEERING COLLEGES: AN EXPLORATIVE STUDY OF ACADEMIC SCHOLARS' AWARENESS AND PERCEPTIONS

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**Abstract:** Cloud computing technology has made its presence felt in Library and Information centres. Various cloud computing based services such as e-journal access, digital library hosting are being offered in Library and Information centres of engineering colleges. It goes without saying that faculties, research scholars and post graduate students of these colleges are making an active usage of these cloud based library services for their research activities. This study has an objective of exploring such usages.

**Keywords:** Cloud Computing; Library services; Academic scholars' perceptions.

## 1.0 Introduction

Cloud computing is a set up comprising of multiple organizations, multiple servers and multiple networks with Internet connectivity as the connecting bridge among these and the users. Cloud computing is nothing but providing computing services using an assembly of servers, storage, databases, networking, software, etc. over the Internet.

According to NIST "Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction".

## 2.0 Advantages of Using Cloud Based Library Services for Research Work.

In general, cloud computing offers several advantages in library context; reduction of cost in maintaining IT infrastructure, seamless access and managing of data, absence of geographical and time barriers etc. Most importantly it offers a unique advantage of making research results available much faster than dissemination through traditional channels. This is really a boon to academic researchers and more importantly, they need not even have to know where the data is. They need only any device that could connect to the cloud computing network such as mobile phone, tablet, personal computer, etc., and could get instant access to desired research information.

Apart from this, following two are the potential benefits of clouds for researchers:

### 2.1 Positive Impact on the Quality of Research:

A cloud computing environment provides the researchers faster, more advanced or more scalable resources which in turn help to derive more accurate results than that can be achievable with traditional approaches. The existing resources within the departments, institutions or within the local academic community could be augmented with the global level resources which positively affect the quality of research.

### 2.2 Positive impact on the quantity of research:

A cloud computing environment also improves the quantity of research, that is, the amount achievable within a given time. Access to more powerful resources allows faster analysis too. The researcher can quickly run tests over a variety of platforms and on virtual machines with different specifications, which can aid rapid prototyping, inter-operability testing and performance testing. This saves researchers' time.

**3.0 Objectives of the study**

The primary objective of the study is to measure the academic scholars' awareness of existence of cloud based library services and their perception of cloud based library services in engineering colleges situated in Bangalore region.

The specific objectives of the study are:

- To study the academic scholars' awareness on cloud technology.
- To identify the perception of the faculty members on cloud based library services.

**4.0 Hypothesis**

- ✓ There is a significant association between designation and awareness on cloud technology
- ✓ There is a significant association between designation of academic scholars' and perception on cloud based library services.

**5.0 Methodology**

Exploratory design was the methodology chosen for this research. Primary resources as well as secondary sources provided data. Questionnaires and sources like databases, journals and abstracts were used to get data. A carefully designed questionnaire tool was used to collect the primary data about the use of cloud based library services by academic members. Simple random sampling method was used to collect the data in this study.

300 academic scholars formed the sample. This included Professors, Associate Professors, Assistant Professors, Research scholars and Post graduate students working/studying in various engineering colleges situated in and around Bangalore region affiliated to Visweswaraya Technological University, Belagavi. On close analysis of the responses received, the information was found to be incomplete in 14 responses. At last, 239 (79.67%) valid questionnaires were selected for data analysis and interpretation. The data were interpreted, classified and transferred into statistical package for social sciences (SPSS 17.0).

**6.0 Data Analysis & Interpretation**

The responses received from the academic scholars are illustrated in the form of tables and figures, and outcome of the study is discussed below:

**6.1 Respondents by Academic Status**

300 questionnaires were distributed among the library users of different engineering colleges located in and around Bangalore city. They include 28 professors, 62 Associate professors, 112 Assistant professors, 150 Research scholars and 174 post graduate students. The category-wise details of the questionnaires distributed among sample population and the responses received, are detailed below in Table-1.

**Table -1: Respondents by Academic Status**

Academic Category	Questionnaire sent	Questionnaire received	% of Response
Professors	28(9.33)	13(5.44)	46.43
Associate Professors	35(11.67)	27(11.30)	77.14
Assistant Professors	63(21.00)	49(20.50)	77.78
Research Scholars	81(27.00)	69(28.87)	85.19
P.G. Students	93(31.00)	81(33.89)	87.10
Total	300	239	79.67

Out of 300 questionnaires distributed, 239 representing (79.67%) of the totals were received. These include 89 faculty (13 Professors, 27 Associate professors and 49 Assistant professors), 69 research scholars and 81 post-graduate students.

**6.2 Academic Status and Awareness on Cloud Computing Technology.**

To identify whether academic ranking influenced awareness about the cloud technology, the following tabulation showing both academic status and responses to the questions is made. The level of awareness according to their academic status was found to be almost similar at all academic status levels. However, in case

of professors, associate and assistance professors, and research fellows the level of awareness is found to be higher.

**Table - 2: Academic on Status and Awareness Cloud Computing Technology.**

Academic Category	Knew lot about this	Knew little about this	Don't Know	Total
Professors	8(3.74)	4(14.81)	1(12.50)	13(5.44)
Associate Professors	19(8.88)	5(18.52)	3(37.50)	27(11.30)
Assistant Professors	46(21.50)	3(11.11)	0(0.00)	49(20.50)
Research Scholars	60(28.04)	8(29.63)	1(12.50)	69(28.87)
P.G. Students	71(33.18)	7(25.93)	3(37.50)	81(33.89)
Total	214(89.55)	27(11.30)	8(3.35)	239(100.00)

**Chi-Square summary results**

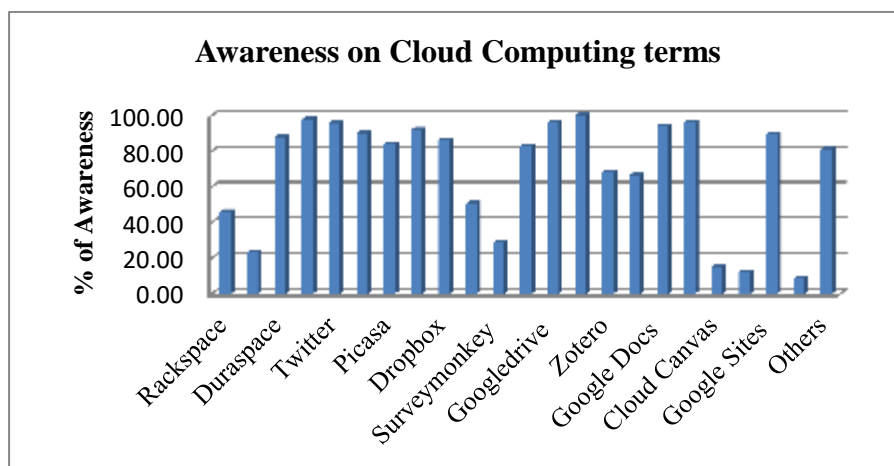
Chi square Calculated value	Degree of Freedom	Chi square tabulate value
17.353	8	15.407

The data tested through chi-square test revealed that there is no relationship between the academic status and awareness on cloud based library services

**6.3 Awareness of Cloud Computing Terms**

Academic scholars were asked to select which names, services or terms they were aware of from a list of twenty three terms displayed in a random order.

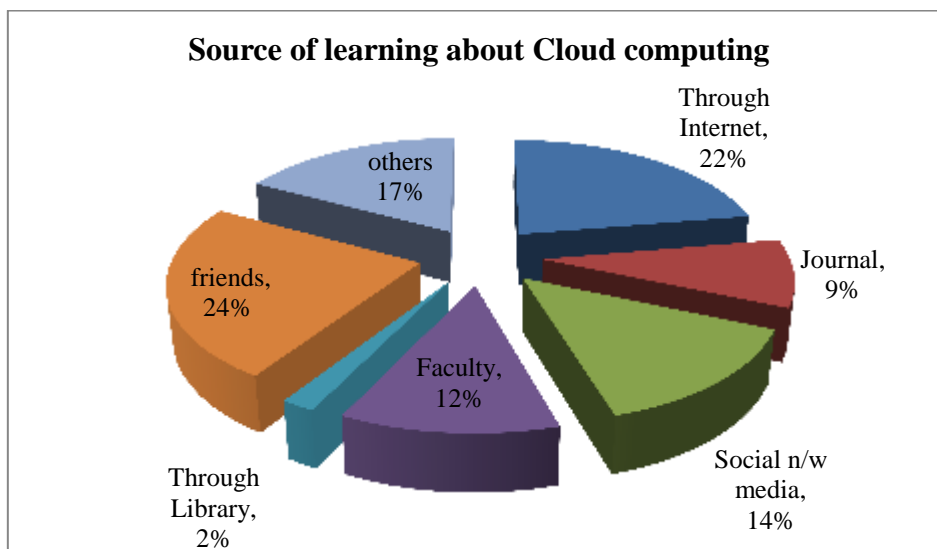
The most well-known terms (100%) were ‘YouTube, ‘Facebook’ (97.91%), Google Drive’and MS office online’ (96.23%’. Also more than half of the respondents were familiar with ‘Twitter’, ‘Google docs’, ‘SkyDrive’,‘Flickr’,‘Picasa’ and ‘Slideshare’. The least known were ‘Slide Rocket’ (8.79%), scholar’s familiarity with ‘Bundle net’ (12.13%) and others terms were found to be very low, whereas familiarity with ‘Open drive’(66.53%) and ‘Zotero’ (68.20%) found to be above average. The frequencies are shown in Figure 1.



**Figure-1: Awareness of Cloud computing terms**

**6.4 Sources of Learning on Cloud Computing Technology**

The most common way that these terms had been discovered was through professional friends (24%). Majority of the academic scholars were discovered through internet (22%) and through other channels (17%), similar number found out about cloud technology and services through social networking media (14%) and from their faculty members (12%). Relatively few respondents had first heard of these terms via academic journals (9%) and library and information centre (2%). Source of learning of Cloud computing terms is shown in Figure-2.



**Figure-2: Source of learning of Cloud computing terms**

**6.5 Library Services Offered Through Cloud Media.**

The data given in Table-3 shows the extent of awareness among the respondents of different academic category about the existence of cloud technology in library services.

**TABLE -3: Awareness on Library Services Offered through Cloud Media.**

Academic Category	Yes	No	Don't Know
Professors	3(2.86)	6(6.82)	4(5.44)
Associate Professors	6(5.71)	20(22.73)	1(2.17)
Assistant Professors	14(13.33)	29(32.95)	6(13.04)
Research Scholars	39(37.14)	19(21.59)	11(23.91)
P.G. Students	43(40.95)	14(15.91)	24(52.17)
Total	105(43.93)	88(36.82)	46(19.25)

**Chi-Square summary results**

Chi square Calculated value	Degree of Freedom	Chi square tabulate value
48.464	8	15.407

**6.6 Access to Cloud Based Library Services**

Researchers intended to know the opinion of respondents about accessing cloud based library services. In this regard following hypothesis was framed;

Hypothesis; “there exists relationship between the academic statuses of respondents and access to cloud based services and higher the academic status of the researcher, it is more in access to cloud based services”.

The respondents were thus asked to state whether they access to cloud services or not. The responses received are analyzed and are presented in Table-4.

**Table -4: Access to Cloud Based Library Services**

Academic Category	Yes	No	Don't Know
Professors	9(69.23)	3(23.08)	1(07.69)
Associate Professors	6(22.22)	18(66.67)	3(11.11)

Assistant Professors	14(28.57)	35(7.43)	0(0.00)
Research Scholars	39(56.25)	29(42.03)	1(1.45)
P.G. Students	60(74.07)	18(22.22)	3(3.70)
Total	128(53.56)	103(43.10)	8(3.35)

**Chi-Square summary results**

<b>Chi square Calculated value</b>	<b>Degree of Freedom</b>	<b>Chi square tabulate value</b>
47.771	8	15.407

The table reveals that a 43.10% (n=103) of respondents knew about cloud based services, and only 3.35 % ( n=8) respondents agreed that they did not have any idea about it.

Category-wise data also reveals that 69.23 % ( n=9) of professors, 22.22% (n=6) of Associate professors, 28.57% (n=14) of Assistant professors, 56.25% (n=39) of research scholars and interestingly 74.07 % ( n=60) of post-graduate students do had access to cloud computing technology based library services. The data tested through chi-square test showed no association between the academic status and access to cloud based library services.

**6.7 Category-wise Perceptions on Cloud Computing Technology in Library Services.**

The respondents were asked about different characteristics of cloud computing approaches and how they felt about them. The data given in Table-5 shows the different opinion on characteristics of cloud technology among the respondents.

**Table -5: Category Wise Perceptions on Cloud Computing Technology in Library Services.**

<b>Characteristics of Cloud Computing Technology</b>	<b>Professors</b>	<b>Associate Professors</b>	<b>Assistant Professors</b>	<b>Research Scholars</b>	<b>P.G. Students</b>	<b>Mean</b>
Cost Saving	2.92	3.62	4.38	4.21	4.06	3.84
Available anytime anywhere	3.14	3.25	3.03	3.96	3.33	3.34
Improve service quality	4.14	3.98	4.17	4.26	4.31	4.17
Easy to retrieve desired information	4.11	4.04	4.21	4.39	4.01	4.15
User centric	3.65	3.2	3.54	3.98	3.45	3.56
Lack of data security& Privacy	4.92	4.56	4.86	4.39	4.45	4.41
Lack of standards	2.26	2.15	2.17	1.29	1.98	1.97
Network connectivity	4.25	4.44	4.16	4.25	4.27	4.27
Dependency over external service providers	4.56	4.46	4.87	4.56	4.86	4.66
No control over remote servers	4.76	4.88	4.29	4.87	4.46	4.65

<b>ANOVA</b>					
<b>Source of Variation</b>	<b>Sum of Squares</b>	<b>d.f</b>	<b>M.S</b>	<b>F -ratio</b>	<b>F-limit@ 5%</b>
Between Academic Category	0.1758	4	0.04395	0.4487	2.63
Between Characteristics of Cloud	30.5567	9	3.39519	34.6654	2.15
Residual or Error	3.5259	36	0.09794		
Total	34.2584	49			

A study of data in Table-5 indicates the academic category-wise respondents' perception on characteristics of cloud technology. It is assessed with the help of ten factors. Out of total chosen ten factors, the respondents rate first order characteristics of cloud computing techniques in terms of 'dependency over external service providers' as it secures mean score 4.66 on a five point rating scale. This is the highest level of characteristics of cloud technology. The researchers rate second order characteristics of cloud based library services in terms

of 'No control over remote servers' as it scores mean 4.65 on five point scale. 'Lack of standards' is the third order priority as it scores mean score 4.41 on five point rating scale.

The ANOVA two-ways model is applied for further discussion. At one point, the computed ANOVA value is 0.4487, which is less than its tabulated value (F-limit=2.63) at 5% level of significance. Hence variation among the chosen academic category with respect to respondents overall perceptions on characteristics of cloud computing technology statistically identified as insignificant. At another point, the computed ANOVA value is 34.6654, which is greater than its tabulated value (F-limit=2.15) at 5% level of significance. Hence, variation among the attributes relating to academic status, overall perceptions on characteristics of cloud computing is statistically identified as significant.

## **7.0 Conclusion**

Today's knowledge-based society seeks library services in an innovative way. Serving library users in traditional ways no longer holds good. Modern users demand up-to-date information in the quickest possible way. Therefore library and information centres have to look towards technology to meet these demands. Cloud computing provides one such avenue. In addition to adapting this technology, the user community should also be made aware of the facilities provided under this technology. This study shows that nearly 46% of the academic scholars had a very less awareness about use of cloud based library resource and there is a very big gap between the users and cloud technology. It is therefore suggested that suitable training/orientation programmes are designed and provided to the users so that maximum utilization of cloud based library resources is made.

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