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Usage and Awareness of Cloud Computing Applications by Library Professionals of Sindh Province

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Usage and Awareness of Cloud Computing Applications by Library Professionals of Sindh Province

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Abstract

Purpose- The aim of the study is examine the usage and awareness level of cloud computing applications by library professionals of Sindh province. **Methods**- This study was quantitative survey based. The population of the study was library professionals who are working in different types of libraries likewise academic, special and community libraries of Sindh province. Sampling technique was random simple sample size was 165 library professionals (library assistant, assistant librarian, deputy librarian, librarian. Questionnaire was prepared in google form and distributed by email to selected respondents. **Results**- The result declared that 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 not publically due to security of data.

Practical Implication(s): This study will helpful for university administration as well as welfare department of government and development sectors to implementations of cloud computing and level of knowledge of library professionals.

Contribution to knowledge: The findings of this study are fruitful for authority/administration of libraries and information centers in Sindh as well as Pakistan.

Paper Type: Research

Keywords: Cloud computing, Library, library Management Software, Cloud-based ILMS.

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Introduction

The education world has witnessed immense and dynamic developments in the field of academic libraries in the recent days. Libraries play a significant role in the higher education system by enabling the resources to reach the end user. Libraries are in the stage of rapid transition from conventional set up to the modern outlook by enabling new technologies.

In India, academic libraries have blended their approach to serve both in digital and traditional formats. The major differences between traditional and modern libraries are lying in the type of collection of resources and their mode of information dissemination to their stakeholders. Now libraries have become a hub in educational institutions for teaching and learning activities wherein faculty, research scholars and students can explore huge information resources. The invasion of Information Communication Technology (ICT) brought many changes and unlimited opportunities in academic libraries to automate and disseminate information through cloud applications. Drastic changes have been witnessed in the field of library automation and library networking as per the requirement of the current trends present in the education system to meet the users' demands and to sustain in the digital world.

Cloud computing is an advanced phase of Information Communication Technology (ICT). It facilitates pooling the resources in remote servers and gives access to very large number of computers to access and share the information/resources over the internet. The concept of cloud computing is the improved version of grid computing, wherein thousands of computers are connected each other to share the information, but in cloud computing, thousands of computers are connected to remote, virtualized server,

installed somewhere in the world. The service providers maintain these sophisticated, hi-end servers. Most of the giant companies like Amazon, Google, IBM, Salesforce, etc. are involved in this business. The Cloud Service Provider (CSP) connects all his consumer devices with an internet connection to the server. Consumers can access the required type of services they have subscribed by the CSP which can be accessed through a browser or any other intermediate app they provided.

Cloud computing technology did not spare even the libraries from its magnificent influence. Libraries are always at the forefront of adopting new technologies and transformations. Libraries are the main beneficiaries of the Information Technology (IT) as they utilize the technology to a bigger extent and try to adopt the good features of IT as and when technology arrives. Most of the western libraries have adopted cloud technology for their in-house activities to provide good services to library stakeholders. However, when we look at Indian libraries, it is a different scenario altogether. Internet and cloud computing are few among them. Invasion of ICT and its applications inspired the librarians to automate libraries and provide good services to their stakeholders. Library automation is a giant leap in the library science filed. Cloud computing is the recent development in communication field. Latest development is entire world is embracing cloud computing and libraries are not exceptional. Cloud-based library management software is a cost effective, work effective to provide good services to the library users in academic libraries.

Review of literature

Originally the concept of cloud computing was proposed by a computer scientist John McCarthy at Massachusetts Institute of Technology (MIT) Centennial in 1961, who has also been regarded as the "Forefather of Cloud Computing". John McCarthy in one of his speeches stated that "Computing utility will be on par with telephone utility as quite common for everyone – with simple yet useful benefits" (McCarthy, 1992). The National Institute of Standards and Technology defines "cloud computing as a model for enabling ubiquitous, 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 with services provider interaction. Cloud computing is a method of availing computer resources from a provider, on-demand by a customer using a computer connected to a network" (Mell & Grance, 2011).

Based on the various service model, cloud computing is divided into three types.

1. **Infrastructure as a service (IaaS)**: This kind of cloud services consists of an ample range of various services, features, and resources, which support the organizations to build their cloud infrastructure on demand.

2. **Platform as a service (PaaS)**: This type of cloud services consists of cloud platforms to the organizations or users to maintain their IT infrastructure. The consumers, who wish to save the money and need not spend a huge amount on purchasing hardware, software, related technology, and hence IT infrastructure prefer this model of services.

3. **Software as a service (SaaS)**: In this type of cloud service model, already pre-installed customized software would be available with the service provider. Users need not purchase any software or hardware; instead the service provider will manage all these issues. Just users have to pay for using the software application based on a usage basis.

The word automation has been derived from Greek word 'Automatos' meaning acting of oneself ("Vocabulary.com," 2020). The concept of Library automation was started in the United States, the first attempt of library automation was recorded in the year 1930s. Herman Hollerith invented the punched

card technology. Dr. Ralph H Parker used Hollerith Punched card and tried to implement the library circulation system at the University of Texas, Austin ("Library automation," 1996). The development of Information Communication Technology (ICT) in developed countries inspired the librarians to work towards the automation of libraries. In the meantime, library of congress developed Machine Readable Catalogue (MARC) in 1960s. Online Computer Library Centre (OCLC) started a computer-based first library network in the world ("Understanding MARC Bibliographic: Parts 1 to 6," 2005). Microcomputers and storage devices entered the market during 1970s, all these have inspired generation of librarians to automate their libraries at the faster pace. Few libraries have developed their networks for the exchange of bibliographic records through the union catalog of records. L. Kleinrock, an American computer scientist opined that computer networks are in their infancy stage and in future, the field would become more advanced; the sophisticated communication network reaches every corner of the world through wireless technology, then we would probably see the spread of 'computer utilities' in all dimensions of human life (Kleinrock, 2003). Pandya from Sikkim University, India, conducted a detailed study on issues in implementing the library management software on cloud and the services on a SWOT basis. Further, he listed out the strength, weaknesses, opportunities and threats (SWOT), related to cloud computing and libraries (Pandya, 2012).

Nuria Lloret Romero of Polytechnic University of Valencia, Spain expressed that for in case of a small institution, adoption of cloud computing in the name of cost saving and operational efficiency may be very critical. In some other cases, lack of experience or lack of training in technology may increase the fear of losing data, security and privacy issues during cloud computing adoption. Further, the author has stated that we one would not be knowing the country, where the virtual server has been installed and also the cloud-computing legislature may be weak and unfavorable to us, all these would end up in trouble. So the author has suggested that, before purchasing the cloud-based application reviewing the service provider's profile is must (Romero, 2012). Deka Ganesh Chandra et al. have expressed that in case the library server has been installed within the premises, then the entire server maintenance work will come to library professionals along with the other operational duties. In case, the server has been installed on the cloud, the entire responsibilities of server maintenance would be on the shoulders of the service provider, where they would look after the upgradations of software, security patches, etc. the library professionals can concentrate on core activities of library (Chandra, Kathing, & Kumar, 2013). In the context of library, the term 'library automation' means using the computer and computer networking to perform in-house library activities in a faster manner with fewer human resources. The cloud-based library management system would reduce the library professionals' workload and engage them in the dissemination of information, attend the user's queries and provide referral and reference services.

Objectives of the study

1. To examine the awareness level of cloud computing of librarians.
2. To examine the purpose of use the cloud computing applications.
3. To find out most useful could application used by librarians.

Hypothesis:

- H 1: Personal factors have no significant effect on awareness of the cloud computing knowledge.

- H2: Personal factors have no significant effect on awareness of application of cloud computing used in libraries.

Research Methodology

This study was quantitative survey based. The population of the study was library professionals who are working in different types of libraries likewise academic, special and community libraries of Sindh province. The survey method is the best method to collect data from a large population. This method was adopted to collect the data from the librarians of Sindh province libraries. The tool used to collect the data is the Questionnaire. The questionnaire was designed based on the objectives of the study keeping in mind. It was prepared on an online survey tool. Sampling technique was random simple sample size was 165 library professionals (library assistant, assistant librarian, deputy librarian, librarian. Questionnaire was prepared in google form and distributed by email to selected respondents. The data gathered was analyzed using Microsoft Excel and the results were fruitful. The output gave us some interesting things. The results have been analyzed suitably and presented in the form of tables and charts in the subsequent sections.

Result and Discussion

1. Age group of respondents:

S/N	Age Group (in Years)	Respondents	Percent %
1	Between 21-30	7	4.1
2	Between 31-40	69	40.6
3	Between 41-50	70	41.2
4	Between 51-60	20	11.8
5	Above 60	4	2.4
	Total	**170**	**100**

Table 1: Age Group of the respondents

In Table 1 We find the details of the age group of the librarians taken into consideration of the survey and their contribution to the survey in terms of percentage. Between the age of 21-30 contributed least to the survey that is 4.1% (n=7), next category is of age between 31- 40 years with their contribution of 40.6% (n=69), next category between 41-50 years with their contribution 41.2% (n=70), next age group between 51-60 years with their contribution of 11.8% (n=20) and finally the age group of above 60 years contributed with their part of 2.4% (n=4). This table clearly exhibits the age group of 31-40 and 41 – 50 years have contributed lot to the survey and helped this study to reach certain valid conclusions.

2. Awareness of Cloud-based Library Management Software (LMS) in libraries:

Item	Yes	No
Awareness of Cloud Computing	110	60
Applications of Cloud Computing	90	80
Feasibility in Pakistan Context	120	50
Willing to implement the cloud computing applications	165	5

Table 2: Awareness of cloud-based LMS

Table 2 Fives a handy picture of awareness of cloud-based LMS among librarians. Among 165 librarians, that is around 64.70% (n = 110) said that they are aware of the cloud-based LMS and nearly $^{1}/3$ of the librarians that is around 35.30% (n = 60) are unaware of the said cloud-based LMS. Further, the librarians who have answered that they are aware of cloud-based LMS, and were given the option of choosing the cloud-based LMS, suitable for their library. A total of 110 respondents mentioned their choice of opting for the cloud-based LMS.

3. Areas of Cloud application used in libraries

Variables	Classifications used in library	Percentage
Areas of Applications used in libraries	Digital Library/Electronic Library	49.1
	Automated Library	1.8
	Online References	43.9

Table 3: Areas of Cloud application used in libraries

Table 3 shows that 49.1 % of respondents feel free that cloud computing can be applied in digital library. Others 43.9% of respondents are willing to implement into the online references. Other remains respondents 1.8 ratios interested in to library automation.

4. Purpose of Cloud Computing used in Libraries

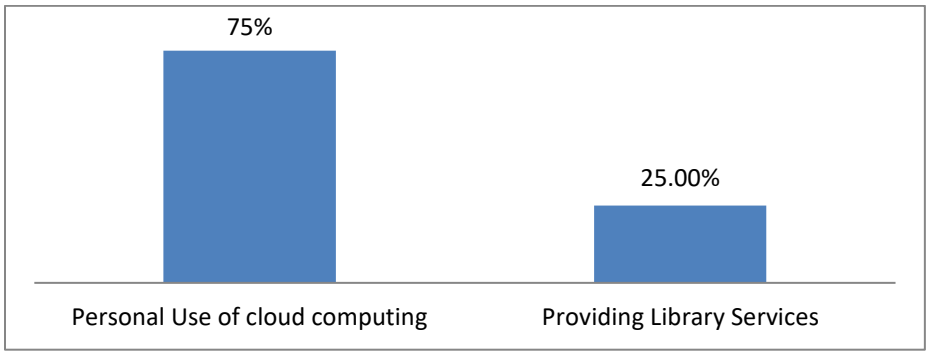

Figure 1: Purpose of using Cloud Computing

In the above figure 1 tell majority 75% of respondents are using cloud computing applications for personal. Only 25% of respondents are using cloud computing applications for library services providing.

5. Personal use of Cloud computing applications

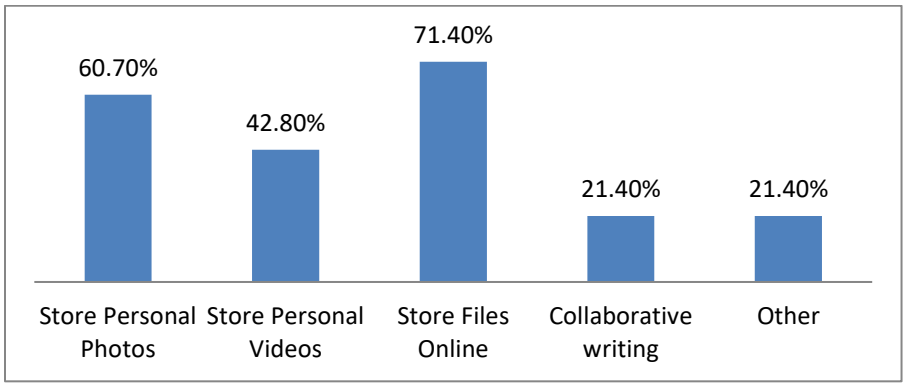

Figure 2: Personal use of Cloud Computing

In the figure2 personal use of cloud computing represents majority of respondents 71.40% use the cloud computing for the store files online. 60.70% of respondents are using the cloud computing for the store personal photos on cloud computing. 42.80% of respondents are using cloud computing for the store the personal videos. 21.40% of respondents are using cloud computing for the collaborative writing, and other personal use.

6. Professional Purpose of using cloud computing

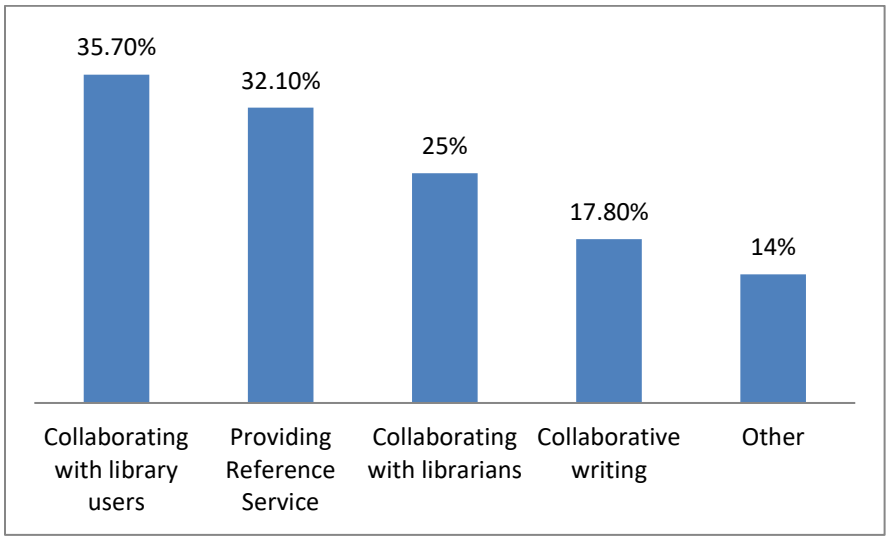

Figure 3: Professional use of Cloud Computing

In the figure3 professional use of cloud computing represents majority of respondents 35.70% use the cloud computing for the collaborating with library users. 32.10% of respondents are using the cloud computing for the providing reference service. 25% of respondents are using cloud computing for the collaboration with librarians. 17.80% of respondents are using cloud computing for the collaborative writing and only 14% of respondents are using cloud computing for unknown clouding computing use.

7. Chi-Square Values- Personal Factors and awareness of cloud computing

Personal factors	Chi Square values	p values	Accept/Rejected
Gender (Male/Female)	0.271	0.602	Accepted
Age Group in Years	0.243	0.885	Accepted
Education	0.057	0.812	Accepted
Experience in Years	57.000	0.000	Rejected

Table 4: Chi-Square Values- Personal Factors for cloud

Table 4 shows that experience hypothesis is rejected(s) in other cases like gender, age and education hypothesis is accepted.

8. Chi-Square Value-Personal factors and Awareness of Application Cloud Computing in Libraries

Personal factors	Chi Square values	p values	Accept/Rejected

Gender (Male/Female)	0.553	0.457	Accepted
Age group in Years	28.106	0.000	Rejected
Education	0.115	0.734	Accepted
Experience in Years	57.000	0.000	Rejected

Table 5 Chi-Square Value-Personal factors and Awareness for Cloud application

Table 5 shows that age group and experience are rejected and other likewise gender and education hypothesis are accepted.

9. Choice of Cloud-based LMS

LMS	**Frequency**	**Percentage**
KOHA	98	59.39%
D-Space	35	21.21%
Own Developed	20	12.12%
Any Other	12	7.27%

Table 3: Choice of Cloud-based LMS

Out of 110 librarians, a good number of librarians with 59.39 (n = 98) quoted cloud-based Koha, a fair number of librarians with 21.21 % (n = 35) suggested cloud-based dspace, next group of librarians with 12.12% (n = 20) cited cloud-based own developed and lastly 7.27% used any others software.

Conclusion

The result declared that 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 not publically due to security of data. The conclusion of the study is the age group between 21 to 60 years of respondents participated in the research. That is around 64.70% (n = 110) said that they are aware of the cloud-based LMS and nearly $^{1}/3$ of the librarians that is around 35.30% (n = 60) are unaware of the said cloud-based LMS. That 49.1 % of respondents feel free that cloud computing can be applied in digital library. Others 43.9% of respondents are willing to implement into the online references. Other remains respondents 1.8 ratios interested in to library automation. Majority 75% of respondents are using cloud computing applications for personal. Only 25% of respondents are using cloud computing applications for library services providing. Personal use of cloud computing represents majority of respondents 71.40% use the cloud computing for the store files online. 60.70% of respondents are using the cloud computing for the store personal photos on cloud computing. 42.80% of respondents are using cloud computing for the store the personal videos. 21.40% of respondents are using cloud computing for the collaborative writing, and other personal use.

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