

# Perception of University Library Head and IT Server Administrators on the Impact of Cloud Computing on Information Access and Use in the Library of National Open University of Nigeria

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## ABSTRACT

*National Open University of Nigeria (NOUN) has 78 Study Centres scattered across Nigeria and its students are spread across the nation. In order to provide services and access to its users, the University Library needs to secure a platform where access must be unfettered and not location specific. The study tends to investigate the impact of cloud computing on information access and use in this library. The study adopted the qualitative methodology approach. The population of this study consists of five (5) members of NOUN Headquarters Library Abuja, namely the University Librarian and four (4) staff of the Information Technology (IT) unit. These personnel are responsible for the administration of cloud computing technology. Purposive sampling technique was used in selecting the population. The findings of this study show that NOUN librarians are engaged in various cloud computing activities. These librarians show strong willingness to adopt cloud computing technology in the libraries. Irrespective of their level of computer literacy & age, they are using various devices to harness the cloud computing tools. Conclusion and recommendations were made to the effect that, for instance, the University Librarian in collaboration with NOUN Information Technology staff should introduce the cloud-based video service. Also, cloud-based software should also be introduced to its information services as these will equally boost the Library services delivery. Examples of such software include Ning, Survey Monkey, Wufoo, Stumbleupon, my Goya and Ms online.*

**Keywords:** *Cloud Computing, Information Access, Information Use, Library, National Open University of Nigeria*

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## 1. INTRODUCTION

The establishment of the National Open University of Nigeria (NOUN) represents an attempt by the Federal Ministry of Education and its agencies to incorporate ICT into the Nigerian education system (Oyelekan, 2008). NOUN is an Open and Distance Learning (ODL) institution formally resuscitated on the 12<sup>th</sup> of April, 2001, which provides its services via online medium. For example, NOUN operates a Learning Management System known as ILEARN for lectures and notes. It also operates a digital library known as INFORMATION GATEWAY which also offers Multimedia tutorials.

Distance Educational Learners' characteristics are different from students in the traditional universities. They are generally adults, employed and have family responsibilities. Their motivation levels are generally high and are willing to take responsibility for their own education. Mostly they are self-directed and study on independent basis. They choose a variety of ways for learning and take control over their learning. They are mainly constrained by the problems of access and retrieval of the required information from libraries. The problems as described by Angel and Budnick (2018) are:

- a. The distance learning institution may not offer library services to the learners.
- b. Learners have reluctance to travel long distances to use the library
- c. Lack of information literacy skills.
- d. Lack of knowledge in using libraries or using electronic information sources.
- e. Reluctance to approach the librarian and library staff members for help in retrieving the information.

The Open and Distance Education institutions can initiate a consortium that will plan, co-ordinate and implement a national level digital library for the benefit of distance learners. Each individual member institution of the association should share its learning resources. This way, a wide range of collection of learning materials can be developed. This should be made available to the learners and accessible through the Intranet and the Internet. Cloud computing adoption can be interlinked with the digital library to address the copyrights and other related issues. There is a great deal of debate about what cloud computing is, or is not. Hayes, (2008) defined cloud computing as a kind of computing which is highly scalable and use virtualized resources that can be shared by the users. Users do not need any background

knowledge of the services before using it. Moreover, a user on the internet can communicate with many servers at the same time and these servers exchange information with one another. Basically, data and adoption in the cloud are available through the internet; it can also be accessed from everywhere and from any device with internet connectivity.

Essentially, cloud computing makes data and applications available through the internet. Through a web browser from any device, one can access services on the cloud. Kaushik & Kumar, (2008) opined that the combination of servers, networks, connection applications and resources constitute what is referred to as 'cloud'. To understand Cloud Computing better, we could compare the technology with local computing. In this latter traditional approach, library runs its applications on a server that the library owns and maintains, mounted in a rack in a computer centre or computer room. One can see the server and touch it. Some library personnel are responsible for keeping the operating system up-to-date, configuring the software, and performing other technical and administrative routine. The library pays the cost of the server, hardware's and electricity bills for power and ventilation.

On the contrary, Cloud Computing takes a much abstract form. The hardware on which it resides is not of direct concern of the service users. One is aware of the existence of the server and data somewhere out in the cloud but where they are located is not a concern. Services and resources are presented promptly through automation and virtualization. Romero (2012) considered Cloud Computing to be a highly scalable platform promising quick access to hardware and software over the internet in addition to easy management and access by non-expert users. It relies on technologies such as virtualization, programming techniques such as multi-tenancy and/or scalability, load balancing and optimal performance to ensure that resources are offered quickly and easily.

Today's society is one which the quality of life as well as prospects for social change and economic development increasingly depend on information and its exploitation. The source, organization, storage, dissemination, and retrieval of information are the bedrock of our contemporary society. As such, individuals, corporations, and communities depend on information to take educated decisions. Aliyu (2006) remarks that in our complex modern society, an ever-widening range of decisions depend on wise use of information. According to Goldner (2012), libraries can take advantage of cloud computing to

get out of technology headache such as hardware breakdown, software problems, staff training deficiency and focus on collection building, patron services and innovation.

Adegbore (2010) further explains that hardware breakdown, software problems, unreliable and epileptic power supply, inadequate funding, staff training deficiency and planned obsolescence of commercial software are part of the challenges facing automation of libraries.

With these challenges facing automation of library resources, the National Open University of Nigeria Library adopted cloud computing in the provision and management of its resources. More importantly the nature of the institution is that of Open and Distance Learning. This implies that learning is relatively virtual and online. Hence most of the resources are electronic and web-based. Unlike conventional universities where teaching and learning is situated in a centralized place, National Open University of Nigeria has 78 Study Centres scattered across the nation and its students are spread across the nation. Consequently, in order to provide its services and access to its users, the library needs to secure a platform where access must be unfettered and not location specific.

The researchers tend to investigate cloud and its impact on Open and Distance Library. Specifically, the objectives are:

1. To identify the information services provider using cloud computing in NOUN Library
2. To identify the impact of the adoption of cloud computing for information access and use in National Open University of Nigeria Library.

The study examines cloud and its impact on Open and Distance Library of the National Open University of Nigeria in Abuja Main Library. The research questions are:

1. What are the Information services provided using cloud computing in National Open University of Nigeria Library ?
2. What impact has the adoption of cloud computing had on information access and use in National Open University of Nigeria Library ?

Hence, an investigation of this nature is significant to place Cloud Computing within the sphere of library

computation to enhance improved productivity and efficiency in library services.

This study adopted the qualitative methodology approach. The target population of this study consists of five (5) members of National Open University of Nigeria Library, which includes the University Librarian and four (4) staff of the Information Technology (IT) unit of NOUN Headquarters Abuja Library who are responsible for the administration of cloud computing technology in the Library. The IT staff list consists of 24 staff but those that are directly in charge of the administration of cloud computing are 4, hence the use of the 4 IT staff for effective result. The Focus Group interview involves the researcher personally interviewing staff of the Information Technology (IT) unit, based on a structured set of questions that have been prepared before the interview. This enabled the researcher to explain or elaborate on any question that is not well understood by the respondents.

## 2. LITERATURE REVIEW

### 2.1 Why Cloud Computing Technology

Today's organization and businesses depend on technology for successfully delivering and achieving their set corporate goals. Markoritch & Willmoh (2014) remarked that customers want a quick and seamless digital experience and they want it now. Thanks to companies such as Amazon and Apple, they now expect every organization to deliver products and services swiftly, with a seamless user experience. Be that as it may, technology has been complex, expensive, and difficult to manage. Hence, organizations find themselves severely constrained because they do not have adequate specialized personnel and funding to use technology to its full potential. Clouds computing can help turn the tables, lowering costs of expense and expertise. Breeding (2012) observed that this approach to technology offers opportunities for organizations to lower their overall costs for technology, improve performance of high used services, support widely distributed users and increase reliability.

For many organizations, local computing involves high cost. The costs of server and hardware procurement, installation, and maintenance, the cost of personnel, and the up-front cost associated with software licenses. For example, the capacity of most servers greatly exceeds the current needs of organizations. Because this equipment must last for at least five years, organizations tend to purchase excess capacity beyond immediate needs to

accommodate anticipated growth in use. Cloud Computing technology eliminates the need to purchase and maintain local server and hardware. It changes the perception of infrastructure as something to be bought, housed and managed to infrastructure as a service.

Quick and easy access to Cloud-based services can be achieved because cloud computing includes distribution over a network, where a program or an application may run on many connected computers at the same time. Breeding (2012) observed that most cloud computing environments are built from thousands of generic computers clustered together. Through clustering and virtualization software, individual computer blade can be added to increase capacity. Even when a given component fails, the cluster just works around it making cloud a very fault tolerant technology. Hence, cloud infrastructure is all about making many different discrete computers work together as an organic whole. (Cooper, 2017).

In order to contend with the barrage of information available in today's world, a medium and an institution, such as library, needs to be put in place for proper acquisition, processing, documenting, retrieving and disseminating of information for use. According to Smith (2002), in today's Information Age, increasing importance is placed on information. As an information agency, library acquires, interprets, processes, preserves, and documents information in print and non-print formats for easy access and retrieval. Also, as conservator of knowledge, library conserves knowledge for use when needed.

The mode of information storage and transmission has undergone many radical changes in formats ranging from print books to other information storage and transmitting media like non-print sources such as Compact Disc (CD), Diskettes, Magnetic tapes, CD ROMS, hard disks, punched paper tapes, and internet publications. Others include zip disks, educational video and transparencies, books on cassettes, micro form publications, electric publications, machine readable tape, etc. Ordi (2006) observed that these are useful for storage of data, information, and programs for safe keeping. Today, we could talk of an alternative medium for library to perform its function as predicted by Gates, (2000) that in the future, there would be instantaneous and seamless communication and commerce around the globe from almost any device imaginable, which has been realized via the computing technology known as cloud computing. Furthermore, Cloud refers to a server connected through a communication network such as internet, intranet, Local

Area Network (LAN) or Wide Area Network (WAN) such that any user with permission to access the server's processing power and resources can use it to run an application, store data or perform any other computing task anywhere in the world and without the use of Personal Computer (PC) every time to run the application. Thus, access to Cloud-based services is ubiquitous provided there is internet connectivity. End users with little or no knowledge in its technicalities can access cloud-based applications through a web browser in computers of any kind such as PC, smart phones, iphone, ipad, blackberry, android, etc while the business software and user's data are stored up on servers in a remote location. Examples include Amazon Web Services, Google App engine, etc.

Cloud Computing technology facilitates sharing resources and services over the internet rather than having these services and resources on local servers, nodes or personal devices. Cloud-based services which appear to be provided by real servers or hardware are in actual fact served by virtual servers or hardware simulated by software running on one or more real machines. Such virtual servers or automation do not physically exist and can therefore be moved around and scaled up and down without affecting the utility of the user.

As a technology, it can be considered a model for enabling convenient, on-demand network access to shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction. The major advantage of Cloud Computing is that it reduces IT complexity by leveraging the efficiency of pooling of on-demand self-managed virtual infrastructure consumed as a service. This service goes by differing names: Software as-a-Service (SaaS), Platform as a Service (PaaS), Infrastructure-as-a-Service (IaaS), etc. Additionally, these services may be offered in public, private or hybrid networks. Google, Amazon, IBM, Oracle cloud, Rackspace, Sales, Zoho, Microsoft are well known cloud vendors.

Library automation typically relies on a narrow base of appropriately skilled professionals to keep abreast of the rapid pace of technical change while maintaining, indeed extending, robust and fully operational online services and collections. In both respects, it is stretched beyond capacity with evident deleterious effect. Lacking the resources to develop core systems components such as search and retrieval tools, user interfaces and user profiling services, user authentication and authorization

services that work across individual collections and services, library automation adopts a tendency toward a more ad hoc approach that meets the most pressing demands involving development work. Although viable in the short term, the strategy severely threatens to undermine a position over which the library exerts only a tenuous hold, that of the trusted provider of high-quality information services.

Library by its nature and function is involved in sourcing, acquiring, organizing, documenting, and dissemination of information. This information needs to be provided or made available when needed with ease and at comfortable cost. Cloud Computing Technology in broad terms allows a library to focus less of its technology budget and personnel on activities that involve necessary but routine support for library operations, allowing it to focus more on creating strategic or innovative service (Breeding 2012). Cloud Computing is an IT attempt to help library perform its function with speed, accuracy and virtual experience.

According to Breeding (2012), cloud infrastructure brings the opportunity for library to shift away from the need to own and operate their own servers to power their core automation application and to, instead, shift to gaining similar functionality through web-based services.

In spite of this, Romero (2012) lamented that although the use of the cloud in the business environment has already transformed the concept of data storage and resources management; its use in the field of libraries is somewhat less widespread.

With Cloud Computing, one pays for what one uses instead of paying for excess capacity never consumed. Although there may be some minimum base charge, what is used is referred to as pay- as-you-go. In addition, personnel costs related to technology can be greatly reduced through increased reliance on cloud computing. Again, rather than purchase permanent licenses, many organizations can achieve substantial saving by shifting to soft-ware-as-service or other license. This is because software-as-a-service, for one, usually involves a set monthly or annual subscription fee rather than a large up-front investment for license purchase.

Furthermore, Cloud computing also improves performance of highly used services. The approach has been noted for its agility and device-location independence. While cloud infrastructure resources, giving an opportunity to grow IT infrastructure during

times of peak demand, it also allows for users to access systems using a web browser regardless of their location or what device they use. (Okwoli, 2016).

Cloud computing also supports widely distributed users. This is often referred to as multitenancy. This advantages enables sharing of resources and cost across a large pool of users thus allowing for centralization of infrastructure, peak loading capacity, utilization, and efficiency. Again since libraries, like most organizations, have low tolerance for interruptions of service, cloud –based services have been designed to offer a much higher level of reliability than most organizations, can accomplish within their own data centres in addition to sophisticated security and software updates offering by provider.

In essence, cloud computing offers simpler sharing, standardized IT, latest functionality, less in-house IT, low monthly payment, pay when used, easy/fast deployment.

## 2.2 Cloud Computing in Education Institutions

Cloud Computing Technology has attracted significant attention recently in the realms of academia, industry, government, and the military. It has been widely adopted in recent years to solve storage and computational problems in different domains. Educational institutions can benefit from using cloud infrastructure in order to increase computing performance, storage capacity, universal accessibility and cost reduction. It can help the institutions in terms of fixed and maintenance cost reduction in ICT investment of hardware, software and computer services. Pocatilu et al (2009, quoted in Mircea & Loana, 2011) pointed out cloud computing offers many benefits to e-learning solutions by providing the infrastructure, platform, and educational services directly through cloud providers and by using virtualization, centralized data storage and facilities for data access monitoring.

Mircea & Loana (2011) however warned that the use of cloud computing in higher education must be analyzed both from the benefits point of view as well as from that of the risks and limitations. After the analysis, one or more models of cloud computing may be chosen to be used. Although there are benefits and risks to cloud computing, the benefits can be enhanced and the risks greatly reduced if educational institutions take care and vigilance in selecting cloud computing providers and in monitoring the relationship to ensure that the provider is adequately protecting the data.

### 2.3 Information Services Provided through Cloud Computing in Libraries.

Cloud computing provides Libraries with a cost effective infrastructure or environment. It has attracted significant attention in the realms of academia, industry, governing, military and the library to solve storage and computerization problem. Yang (2012) opined that starting from 2011, more and more library vendors began to deliver Integrated Library System (ILS) and discovery tools as cloud solutions. While many vendors offer options to host the classic ILS as cloud solution, some are developing a new generation of ILS especially for the cloud she stressed further. Analysis of literature on library and cloud computing reveals that libraries can use this technology to build digital library/repositories, search library data, host website, search scholarly content, store file, build computing power, and automate library.

#### 2.3.1 Building of Digital Library/Repositories

It has been observed that cloud computing is not all together a new technology but an adaption of existing technologies and paradigms. Seen in this light, digital library is not an offshoot of cloud computing but cloud computing provides an opportunity for libraries to use a cost effective platform to build a functional and efficient digital library. Dhanevandin & Tamizhcheven (2014) provided the following as the characteristic of digital library: Digital object that include video, audio, and multimedia, Numeric components, Access from user's desk, Remote to rare and expensive material.

For these authors, digital library is only a step away from virtual library. It has its deficiencies which cloud computing can provide remedy for. Kumar et al (2012) highlighted the problems of digital library that is housed in the server and maintain by Library locally.

#### 2.3.2 Search Library Data

Digital library build on cloud infrastructure provides a unified search service this enables users to search a pool of library data through any device with Internet connectivity. Cloud computing provides an integrated library resources opined Kumar et al (2012). Kaushik and Kumar (2013) suggested that Online Computer Library Center (OCLC) is one of the best examples for using cloud computing for sharing libraries data for years. OCLC, they stressed further, offers various services, pertaining to circulation, cataloguing, acquisition and other library related services on cloud platform through the web share management system. Web share management system facilitates an open and collaborative platform that allows each library to share their resources,

services, ideas, and problems with the library community on the cloud.

#### 2.3.3 Website Hosting

Breeding (2012) noted that many libraries rely on institutional or commercial hosting services for their websites. Thus, library's web presence is not provided directly by the library itself but by its parent organization. With cloud computing, libraries have the forum to host their own website on a third party service provider's services. This takes the responsibilities of hosting and maintaining their own servers. Google sites serves as an example for hosting websites outside of the library's servers and allows for multiple editors to access the site from varied locations.

#### 2.3.4. Searching Scholarly Content

Cloud based research platform facilitates the discovery and sharing of scholarly content. Kaushik and Kumar (ibid) cited Knimbus as a knowledge cloud which is dedicated to knowledge discovery and collaborative space for researchers and scholars. It was started in 2010 by entrepreneurs Rahul Agarwalla and Tarun Arora to address the challenges faced by researchers in searching across and accessing multiple information sources. Currently, Knimbus makes use of over 600 academic institutions and R & D labs by scholars, researchers and scientists as well as over 50,000 researchers. According to Yang (2012), the cloud based new generation of ILS allows many libraries to share useful data. For instance, sharing of full-text journal titles from electronic databases where many libraries subscribe to the same databases. In acquisitions section, all the data bases are listed in a pull down menu. A library can highlight a database for purchase and activate the journal list by clicking on the button.

#### 2.3.5 File storage

Data storage in cloud is necessitated by the inherent fragility of all physical storage devices. A USB flash drive can be misplaced, a laptop or desktop cloud crash, or even be hacked; there are also incidences of hardware failures, software malfunctions, and malware attacks and so on. File storage capacity provided in the cloud is virtually limitless in addition to a much higher level of reliability than most organizations can accomplish within their own data center (Breeding (2012; cited in Gbaje & Aliyu 2014). Turner (2009) also noted that backups are much easier to create and risk associated with hardware failure is minimized with Cloud Computing.

### 2.3.6 Building Community Power

Cloud computing technology offers great opportunity for libraries to build networks among the library patrons and information science professionals as well as other interested people, including information seekers by using social networking tools. The most famous social networking services are Twitter and Facebook. They play a key role in building community power. Such cooperative effort of libraries will promote time saving, efficiencies, wider recognition, and cooperative intelligence for better decision –making. It also provides a platform for innovation and sharing of intellectual conversations, ideas and knowledge

### 2.3.7 Library Automation

Library automation refers to the transition from traditional library which sources, organized and provided library services and resources in hard copies to computerization of library resources. Automated library, according to Dhanevanden et al (2014), computerizes catalogue, circulation, acquisition, etc and makes the functions of library to be fully automated. Kaushik & Kumar (2013) observed that for library automation purpose, Polaris provides variant cloud based services such as acquisition, cataloging, process system, digital contents and provision for inclusion of cutting edge technologies used in libraries. It also supports various standards such as MARCZI, XML, 239.50, Unicode and so on.

In addition, cloud computing allows for pooled resources that customers draw from usually in remote data Centre. Services can be scaled larger or smaller; and use of a service is measured and customers are billed accordingly. Different services can be provided by cloud computing company over the Internet. According to Han (2012) three main service models of cloud computing includes Infrastructure as a service. The IaaS model provides just the hardware and network; the customer (Library) installs or develops its own operating systems, software and applications. The hardware and other basic services are provided through virtual machine accessible through a Wide Area Network or the Internet. Under this model, the IaaS service provider owns the equipment and is responsible for housing, running and maintaining it, and the client library typically pays on a per-use basis.

Some writing on adoption of cloud computing in libraries appears to favour IaaS over other service models. Liu & Cai (2012), for one, explained that in this service model, the server administration and maintenance responsibilities are moved from local personnel to the hosting vendor, while the management of the application remains in the

traditional way, that is, systems librarians are still able to access the back end of the system for local customization as if they were managing the system locally. Breeding (2012) defined IaaS as subscribing to computing and storage capabilities on an as-need basis. It allows a library to gain access to computing resources – such as Linux or Windows scaled to the demands and duration of a project. With IaaS, libraries will not see the physical hardware involved but will perform much of the system administration tasks as they would for local servers. Operating an application through IaaS saves the library from the purchase of its own hardware but retains the tasks associated with installing and maintaining software application. A library might use IaaS to operate its integrated library service (ILS) rather than purchase local hardware. Examples of IaaS, according to Kaushik and Kumar (2013), are Amazon Web services, Rackspace, Savis, HP, IBM, Sun and Google Base.

### 2.4 Overview of Open and Distance Learning (ODL)

Open distance learning (ODL) is a promising and practical strategy to address the challenge of widening access thus increasing participation in higher education. It is increasingly being seen as an educational delivery model which is cost-effective without sacrificing quality (Pityana, 2009). Distance education learning is technology driven. Technology means not just bandwidth but hardware platforms, software, processes and applications including mobile telephony, necessary for effective student and academic management and learner support.

Adoption of cloud computing in library provides an answer to most of the information access problems of the distance learners. Today, ODE institutions bring education at the doorsteps of the learners through networks. The Internet also plays a vital role in acting as a powerful tool to the learners. Digitization of scholarly materials is one of the many initiatives undertaken by institutions across the globe, which facilitates wide access and availability of such materials.

The ODE institutions can initiate a consortium that will plan, co-ordinate and implement a national level with the help of cloud computing in library for the benefit of distance learners. Each individual member institution of the association should share its learning resources. This way, a wide range of collection of learning materials can be developed. This should be made available to the learners and accessible through the Intranet and the Internet. A digital rights management system can be

interlinked with the library to address the copyrights and other related issues.

Apart from providing wider access and free flow of information to distance learners and to all those involved in open distance education, the proposed digital library provides several advantages which include Networking and sharing of resources can be done easily; it provides cost effective solutions to libraries; more information can be provided at the press of a button. The user do not have to travel long distance and his/her time and resources will be saved; information can be updated continuously much more easily; Collaboration and exchange of ideas is possible and improved preservation of resources.

### 3. METHODOLOGY

#### 3.1 Research Design

This study adopted the qualitative methodology approach. The target population of this study consists of five (5) members of National Open University of Nigeria Library which includes the University Librarian and the four (4) staff of the Information Technology (IT) unit of the National Open University of Nigeria Headquarters Abuja Library who are responsible for the administration of cloud computing technology. The IT staff consist of 24 staff but those that are directly in charge of the administration of cloud computing are just four, hence the use of only them for effective result.

Thus, purposive sampling technique was used to select the four staff. According to Crossman (2012), "a purposive sampling is very useful for situations where you need to reach the targeted sample quickly and the sampling is not proportional in nature".

The instruments used to collect data for this study were direct observations, semi-structured and unstructured interviews with the focus group, in addition to the use of digital recorder to record the interview process. The semi-structured interview involves the researcher personally interviewing staff of the Information Technology (IT) unit, based on a structured set of questions that have been prepared before the interview. This enabled the researcher to explain or elaborate on any question that is not well understood by the respondents.

#### 3.2 Reliability of the Instrument.

In order to ensure the guided interview was capable of eliciting the required data and information used for the study, it was validated by research experts and colleagues.

#### 3.3. Method of Data Analysis

The data collected from the research instruments was first organized for analysis and transcribed into different types, depending on the source of information. The data was then tabulated and discussed descriptively.

### 4. DATA PRESENTATION, ANALYSIS AND INTERPRETATION

#### 4.1. Response Rate

The entire five target respondents comprising of four staff in the Information Technology unit and the University Librarian of NOUN library, participated in the semi-structured and structured interviews. Table 1 shows the response rate.

A hundred percent response rate was achieved for the structured and semi-structured focus group interviews. This high response rate was achieved because of the fact that the population was very small. And the researcher had to formally seek for permission from the University Librarian, who instructed the staff of the Information Technology unit to give the researcher all the necessary support and cooperation in the data collection exercise.

#### 4.2. Information on Cloud and its Impact on Open and Distance Learning in NOUN

This section focuses on the core aspect of the research reported in this paper, which is the impact of cloud computing on Open and Distance Learning in NOUN.

The respondents reveal that cloud computing is used for web-mail services in NOUN library. It is also used to store personal photos, online application and storage of personal video, as well as pay to store computer file online and back-up. The responses were a collective agreement of the University Librarian and the Four (4) IT staff interviewed. The finding agrees with Goldner (2013) which states that library community can apply the concept of cloud computing to amplify the power of cooperation and build a significant, unified presence on the web. It implies that data sharing in NOUN library will be highly efficient.

Combining systems into a cloud environment reduces the carbon footprints, making libraries greener. As a follow-up to the above findings, the researcher also tries to find out if NOUN Library feels safe storing data online, and the respondents, further agreed with the option YES that they feel safe storing data online.

In the literature review, the cloud and its impact on open and distance library is to stand as a backup for library data. To ascertain this, the researcher tries to find out if NOUN library thinks that a copy of its online files can be kept by the online services provider even when it is being deleted and the respondents responded with the option YES.

The next research question was formulated in order to find out the information services provided using cloud computing in NOUN library. In line with this, the researcher investigated information services provided using cloud computing in NOUN library with some possible options in Table 3.

#### **4.3. Information services provided using cloud computing in NOUN Library.**

The respondents indicated that the above information services are provided using cloud computing in NOUN Library. And it was a collective agreement between the University Librarian and the relevant IT staff of the Library. It implies that NOUN library uses these services to create effective platform to build a functional and efficient digital library.

#### **4.4. Findings**

The Findings of this study show that NOUN librarians are engaged in various cloud computing activities. They show strong willingness to adopt cloud computing technology in the libraries. Irrespective of computer literacy and age, they are using various devices to harness the cloud computing tools. The reasons why NOUN library go cloud computing, according to the respondents, is to disclose their vast collections on the web, amplify the power of cooperation with other developed library, build a significant, unified presence on the web, save time, save cost, simplify work flow, makes work more effective and efficient, thereby removing local storage, maintenance and backup. NOUN library also see cloud computing as the latest technology trend. And more important NOUN library went cloud computing in order to meet the information needs of its students who are spread across the nation as it is indicated during the interview. It implies that information services will be highly effective and efficient.

#### **4.5. Discussion of the Findings**

The summary of the findings of the descriptive analysis discussed below was derived from the analysis of the responses from the guided interview of the focus groups.

The major findings under descriptive analysis are as follows:

The information services provided using cloud computing in NOUN library are- digital library/ repositories, searching library data, searching scholarly content, file sharing, building community power and library automation.

National Open University of Nigeria (NOUN) library go cloud computing is to disclose their vast collections on the web, amplify the power of cooperation with other developed library, build a significant, unified presence on the web, save time, save cost, simplify work flow, makes work more effective and efficient, local storage, maintenance and backup is removed, NOUN library also see cloud computing as also the latest trends. And more importantly, NOUN library went cloud computing in order to meet the information needs of its students who are spread across the nation.

### **5. CONCLUSION AND RECOMMENDATIONS**

National Open University of Nigeria Library has the opportunity to improve their services and relevance in today's information society. Cloud computing is one avenue for this move into the future. It can bring several benefits for libraries and give them a different future. The analysis of this study shows that National Open University of Nigeria Librarians are engaged in various cloud computing activities. They show strong willingness to adopt cloud computing technology in the libraries. Irrespective of computer literacy & age they are using various devices to harness the cloud computing tools, and in order to meet the information needs of its students who are spread across the nation. It implies that information services will be highly effective and efficient.

Recommendations include:

- (i) The University Librarian in collaboration with National Open University of Nigeria Information Technology staff should introduce the cloud-based video service, and cloud-based software, such as Ning, Survey Monkey, Wufoo, Stumbleupon, My goya and Ms online, to its information services as these will equally boost the Library services delivery.
- (ii) National Open University of Nigeria Library must know that cloud computing service is truly an open, service oriented architecture which can truly change the future of NOUN libraries. This will allow libraries to shift the use of internal

technical expertise from maintaining software and servers towards innovative uses of cloud services in their local environment.

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**Table 1: Response rate**

S/N	National Open University of Nigeria Library	Category of Staff	Sample Size	Response rate
1.		University Librarian	1	1
		Staff of Information Technology unit	4	4
Total			5	5

**Table 2. Awareness of the impact of cloud in NOUN by the Respondents**

Extent of the adoption of cloud computing	Low Quality	Moderate	High quality
Web-mail services	X	√	X
Store personal photos	X	√	X
On line application	X	√	X
Store personal video	X	√	X
Pay to store computer file online	X	√	X
Back-up hard drive to an online site	X	x	√

Key: √ = Applicable

x = Not Applicable

**Table 3: Information Services Provided using Cloud Computing**

<b>Information services provided using cloud computing in NOUN</b>	<b>Indications</b>
<b>Library</b>	
Building digital library	√
Searching scholarly content	√
File storage	√
Building community Power	√
Library Automation	√

Key: √ = Available

x = Not Available