The Empirical Study of the Prospects of Cloud Technology and Students Academic Achievement in Colleges of Education in Imo State

BY

AMAH, Kanu Ogbonnaya, *Ph.D*
Department of Curriculum and Instruction
Alvan Ikoku Federal College of Education, Owerri,
Owerri, Imo State

AND

IWUJI, Florence Ijeoma, *Ph.D*
Department of Curriculum and Instruction
Alvan Ikoku Federal College of Education
Owerri, Imo State

ABSTRACT

The study sought to investigate the prospects of cloud technology and student's academic achievement in colleges of education in Imo State. Correlational survey design was adopted for the study in Imo State. The population of the study comprised of all Management staff, Lecturer and Student in Imo State. Non proportionate stratified sampling technique was used to select 10 Management, 60 Lecturer, 200 Student from the study area and these gave the sample size of 270 respondents. The Main Instrument used in this study was a questionnaire titled "Prospects of Cloud Technology and Students Academic Achievement in Colleges of Education Questionnaire'' (PCTSAACEQ)". Face and content validation of the instrument was carried out by expert in test, measurement and evaluation from Imo State University to ensure that the instrument has the accuracy of study under consideration. Cronbach Alpha technique was used to determine the reliability of the instrument. The reliability coefficient obtained was 0.86 and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical techniques such as percentage analysis and simple regression. The test for significance was done at 0.05 alpha levels. The study concluded that the cloud technology is a set of active network services, providing scalability, quality of service, an inexpensive computing infrastructure which can be accessed in a simple and pervasive way. One of the recommendations made was that colleges should incorporate cloud computing technology in their everyday activity most especially the laboratory activities in order to help foster effective and comprehensive performance.

KEYWORDS: Cloud Technology, functionalities of cloud technology, Academic Achievement, Colleges of Education and Imo State

Introduction

In recent years, cloud computing exposes a significant potential for providing the excellent educational facilities to the students with greater flexibility in a cost-effective manner.

Cloud computing refers to ‘‘a sharing computing technology that provides accessible computing resources, including storage, computing control, and application, delivered by using the internet as service’’ (Arpaci 2016; Batista et al.2016). The adoption of cloud services can effectively enhance the capacity of educational institutions to deliver facilities or to meet students learning requests, without putting the resources into building IT infrastructure, for example, purchasing equipment, software, training of students, and the hardware (Batistaet al. 2016). G-Drive, Google Apps (G-mail, Google Docs, and Microsoft Cloud Service), Dropbox, I-Cloud, and Sky drive are different types of cloud computing services which can be easily integrated into educational settings (Thomas 2011; Arpaci 2017). These services give an opportunity to students and teachers to access, store, share, revise, and retrieve files from multiple locations and devices to complete their tasks quickly. Cloud computing allows the students to share and study materials by offering a collaborative-learning environment, enable universal access to study the documents, and also give an opportunity to interact with their classmates and teachers over the internet (Arpaci 2017). Thereby, such activities may affect student academic performance. For educational institutions, it is very crucial to encourage the collaborative-learning-environment to enhance student performance which creates the significant knowledge paradigm. Thomas (2011) highlighted that cloud is an innovative tool, which turned the educational institutions to practice the information technology for advancing teaching and learning ideas. The distinctive advantage of cloud computing has provided the ability to transfer the knowledge from one place to another place at any time, accessibility and management of data storage from everywhere, enabled the students to meet their urgent needs of studies (Carr 2003).

Statement of Problem

One of the main problems in our modern era is the low ratio awareness of cloud technology platforms that can help to share information and store it online easily. Cloud technology influences students directly and indirectly towards their academic performance but only a few are aware of the great impact. How to attract students towards it and share the knowledge and learning of such IT phenomena is a constraint in today’s society. The center of focus of this paper is to find out cloud computing challenges and it use in cell phones and other devices to attaining positive results on academic performance.

Objectives of the Study

1. To find out the functionalities of cloud technology mostly used for teaching students

2. To examine the channels of cloud technology used in teaching students

3. To determine the effect of cloud technology on student academic performance

Research Questions

1. What are the functionalities of cloud technology mostly used for teaching students?

2. What are the various channels of cloud technology used in teaching students?

3. What is the effect of cloud technology on students’ academic performance?

Hypothesis

$H0_1$: There is no significant influence of cloud technology on students' academic performance

Concept of Cloud Technology

The concept of Cloud Computing came into existence since 1950 with implementation of mainframe computers, accessible via thin/static clients. After then, cloud computing has been evolved from static clients to dynamic ones from software to services. Cearley (2009) defines cloud technology as a model where technological capabilities are scalable and elastic, and they are provided as a service to end-users over the Internet. Cloud computing can be defined as a model for enabling ubiquitous, convenient and on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort from the user side and minimal service provider interaction.

Cloud computing is considered the evolution of a variety of technologies that have come together to change an organizations' approach for building their IT infrastructure. Armbrust (2010) states that actually, there is nothing new in any of the technologies that are used in the cloud computing where most of these technologies have been known for ages. It is all about making them all accessible to the masses under the name of cloud computing. Cloud is not simply the latest term for the Internet, though the Internet is a necessary foundation for the cloud, the cloud is something more than the Internet. The cloud is where you go to use technology when you need it, for as long as you need it. You do not install anything on your desktop, and you do not pay for the technology when you are not using it. The cloud can be both software and infrastructure. According to Buyya (2008), the cloud technology is a distributed and parallel system consisting of a collection of virtualized and interconnected computers that are managed dynamically and posing as one or more unified resources. It can be an application you access through the Web or a server like Gmail and it can be also an IT infrastructure that can be used as per user's request. Whether a service is software or hardware, the following is a simple test to determine whether that service is a cloud service: If you can walk into any place and sit down at any computer without preference for operating system or browser and access a service, that service is cloud-based. Generally, there are three measures used to decide whether a particular service is a cloud service or not:

- The service is accessible via a web browser or web services API.
- Zero capital expenditure is necessary to get started.
- You pay only for what you use.

Components of Cloud Technology

The term "cloud", as utilized in this paper, seems to have its roots in system charts that spoke to the web, or different pieces of it, as schematic mists. "Cloud computing" was instituted for what happens when applications and administrations are moved into the web "cloud". In Cloud computing architecture, there are two main modules known as Front end and Back End. Front End comprises customer part of the framework that speaks to the clients who are getting to the Cloud Components through an interface or through the application, for example, internet browser or versatile application over the Internet. Back End speaks to the cloud itself. It comprises of the assets required to convey the cloud computing administrations, for example, virtual machines,

stockpiling account, organize, security instrument, administrations and so on. Back End part is under the supplier's control and it's the essential duty of back-end segment to deal with the traffic control, give worked in security system, and convention. Both of part of distributed computing is associated by means of system, normally Internet. In a cloud computing design, all applications are controlled, overseen, and served by a cloud server. Its information is imitated and protected remotely as a major aspect of the cloud design. There are sure administrations and arrangement models working in the background making cloud computing achievable and open to the end clients.

Below are the components of cloud computing technology

Client Infrastructure: Client Infrastructure is a Front end component. It provides GUI (Graphical User Interface) to interact with the cloud.

Application: The application may be any software or platform that a client wants to access.

Storage: Storage is one of the most important components of cloud computing. It provides a huge amount of storage capacity in the cloud to store and manage data.

Infrastructure: It provides services on the host level**,** application level**,** and network level. Cloud infrastructure includes hardware and software components such as servers, storage, network devices, virtualization software, and other storage resources that are needed to support the cloud computing model.

Security: Security is an in-built back end component of cloud computing. It implements a security mechanism in the back end.

Characteristics of Cloud Technology

We can summarize the essential characteristics of the Cloud as below:

- On-demand self-service: A service consumer can automatically make use of the computing capabilities, such as server processing time and network storage without requiring human interaction with each service's provider. Users of clouds can "unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider" (NIST, 2011).
- Broad network access: Cloud capabilities (HW and SW) are available over the network and accessed through various platforms (e.g., mobile phones, laptops, and tablets).
- Resource pooling: The provider's computing resources (HW and SW) are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to users' demand. Multi-tenancy is the most important feature of the cloud-based application. It is characterized by the location independence feature in which the customer has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, network bandwidth, and virtual machines.

- Rapid elasticity: Capabilities can be rapidly and elastically provisioned; it can be quickly scaled out, and quickly scaled in. For the user, the capabilities available for provisioning appear to be unlimited and can be purchased in any quantity at any time.
- Measured Service: Cloud systems automatically control and optimize resources by leveraging a metering capability in which resources' usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service. The advantage here is that you are paying for exactly what you are using.

Challenges of Cloud Technology

The following are the given overview of several major outstanding issues and challenges of cloud technology.

- **Loss of IT-control**

If significant parts of the IT infrastructure and services are moved to the cloud, a loss of control occurs to a certain degree. Cloud providers have the technical control over, for example, updates or new releases of software. Depending on the business model or implementation, they may decide whether or how they let users implement their own software and applications. To spur the deployment of cloud computing, however, cloud computing providers need to make sure to build trust so that customers have confidence in the cloud services offered. In addition, further issues are raised if data is moved to cross-border servers.

The following are some of the notable challenges associated with cloud computing, and although some of these may cause a slowdown when delivering more services in the cloud, most also can provide opportunities, if resolved with due care and attention in the planning stages.

• ***Security and Privacy*** — Perhaps two of the more "hot button" issues surrounding cloud computing relate to storing and securing data, and monitoring the use of the cloud by the service providers. These issues are generally attributed to slowing the deployment of cloud services. These challenges can be addressed, for example, by storing the information internal to the organization, but allowing it to be used in the cloud. For this to occur, though, the security mechanisms between organization and the cloud need to be robust and a Hybrid cloud could support such a deployment.

• ***Lack of Standards*** — Clouds have documented interfaces; however, no standards are associated with these, and thus it is unlikely that most clouds will be interoperable. The Open Grid Forum is developing an Open Cloud Computing Interface to resolve this issue and the Open Cloud Consortium is working on cloud computing standards and practices. The findings of these groups will need to mature, but it is not known whether they will address the needs of the people deploying the services and the specific interfaces these services need. However, keeping up to date on the latest standards as they evolve will allow them to be leveraged, if applicable.

• ***Continuously Evolving*** — User requirements are continuously evolving, as are the requirements for interfaces, networking, and storage. This means that a "cloud," especially a public one, does not remain static and is also continuously evolving.

• ***Compliance Concerns*** — The Sarbanes-Oxley Act (SOX) in the US and Data Protection directives in the EU are just two among many compliance issues affecting cloud computing, based on the type of data and application for which the cloud is being used. The EU has a legislative backing for data protection across all member states, but in the US data protection is different and can vary from state to state. As with security and privacy mentioned previously, these typically result in Hybrid cloud deployment with one cloud storing the data internal to the organization.

According to Behera, Panigrahy and Sahoo (2018) cloud computing is the use of remote servers over a network. These servers can provide functionality like storage, processing, security, analytics and many more. All these technologies require heavy computing power, storage, and IT infrastructure.

Functionalities of Cloud Technology

As stated by Behera, Panigrahy and Sahoo (2018) the functionalities of cloud technology are as follows:

Storage: Cloud storage allows you to save data and files in an off-site location that you access either through the public internet or through a dedicated private network connection. Data that you transfer off-site for storage becomes the responsibility of a third-party cloud provider. The provider hosts, secures, manages, and maintains the servers and associated infrastructure and ensures you have access to the data whenever you need it.

Cloud storage delivers a cost-effective, scalable alternative to storing files on on-premise hard drives or storage networks. Computer hard drives can only store a finite amount of data. When users run out of storage, they need to transfer files to an external storage device. Traditionally, organizations built and maintained storage area networks (SANs) to archive data and files. SANs are expensive to maintain, however, because as stored data grows, companies have to invest in adding servers and infrastructure to accommodate increased demand.

Cloud storage services provide elasticity, which means you can scale capacity as your data volumes increase or dial down capacity if necessary. By storing data in a cloud, your organization save by paying for storage technology and capacity as a service, rather than investing in the capital costs of building and maintaining in-house storage networks. You pay for only exactly the capacity you use. While your costs might increase over time to account for higher data volumes, you do not have to overprovision storage networks in anticipation of increased data volume.

Processing: Cloud computing is type of system that uses sharing resource, it cannot use local sever or personal devices for application, it uses single network to share resources. Main feature of the cloud services is that user's data are usually process on machines that users do not know.

Cloud security: Cloud security, also known as cloud computing security, consists of a set of policies, controls, procedures and technologies that work together to protect cloud-based systems, data, and infrastructure. From authenticating access to filtering traffic, cloud security can be configured to the exact needs of the business.

Cloud storage security is a serious concern, especially if your organization handles sensitive data like credit card information and medical records. You want assurances that your data is protected from cyber threats with the most up-to-date methods available. You will want layered security solutions that include endpoint protection, content and email filtering and threat analysis, as well as best practices that comprise regular updates and patches. Moreover, you need well-defined access and authentication policies.

Backup: Data backup is as important as security. Businesses need to back up their data so they can access copies of files and applications— and prevent interruptions to business—if data is lost due to cyberattack, natural disaster, or human error. Cloud-based data backup and recovery services have been popular from the early days of cloud-based solutions. Much like cloud storage itself, you access the service through the public internet or a private connection. Cloud backup and recovery services free organizations from the tasks involved in regularly replicating critical business data to make it readily available should you ever need it in the wake of data loss caused by a natural disaster, cyber-attack or unintentional user error.

Cloud backup offers the same advantages to businesses as storage—cost-effectiveness, scalability, and easy access. One of the most attractive features of cloud backup is automation. Asking users to continually back up their own data produces mixed results since some users always put it off or forget to do it. This creates a situation where data loss is inevitable. With automated backups, you can decide how often to back up your data, be it daily, hourly or whenever new data is introduced to your network.

Pricing: As mentioned, cloud storage helps companies cut costs by eliminating in-house storage infrastructure. But cloud storage pricing models vary. Some cloud storage providers charge monthly the cost per gigabyte, while others charge fees based on stored capacity. Fees vary widely; you may pay USD 1.99 or USD 10 for 100 GB of storage monthly, based on the provider you choose. Additional fees for transferring data from your network to the fees based on storage cloud are usually included in the overall service price.

Providers may charge additional fees on top of the basic cost of storage and data transfer. For instance, you may incur an extra fee every time you access data in the cloud to make changes or deletions, or to move data from one place to another. The more of these actions you perform on a monthly basis, the higher your costs will be. Even if the provider includes some base level of activity in the overall price, you will incur extra charges if you exceed the allowable limit.

Providers may also factor the number of users accessing the data, how often users access data, and how far the data has to travel into their charges. They may charge differently based on the types of data stored and whether the data requires added levels of security for privacy purposes and regulatory compliance.

Cloud analytics: Cloud analytics is the use of remote public or private computing resources — known as the cloud—to analyze data on demand. Cloud computing analytics helps streamline the business intelligence process of gathering, integrating, analyzing, and presenting insights to enhance business decision making.

Cloud analytics works by allowing businesses to use the advanced data analytics tools available on cloud analytics platforms to analyze vast quantities of data. Businesses can then report and

store those findings for repeat use. Cloud analytics offerings are typically offered as a subscription or pay on a volume of data or query basis. Cloud analytics has proven to be a faster way to gain business-critical insight for decision making. Advantages of cloud analytics include helping businesses more efficiently process and report data findings, enhance collaboration, and provide decision-makers faster access to business intelligence.

Classes of teams in Cloud Technology

Cloud service provider: Cloud service provider" is probably one of the most visible concepts when related to "cloud technology". In all possibilities, we would all have encountered this word, without actually knowing its meaning and significance. A "cloud service provider" or CSP is an organization that hosts all the services such as networking, software, servers, infrastructure and more. Jayanthi (2021), in addition they also employ and manage the staff, and provide security for the services they provide. This relieves the client organizations of their individual responsibility of setting their infrastructure and managing them. Some of the popular examples of cloud service providers are 'Amazon Web services', Microsoft Azure, Salesforce, Google Cloud platform and more.

Cloud Customer: The "cloud customer" is the organization that is seeking some or more cloud services from the cloud service provider.

Cloud broker: As more and more organization migrate their necessities to the cloud, "cloud computing" itself becomes more complicated and gradually undergoes many changes. It then becomes a cumbersome task for any customer to choose an appropriate cloud service provider. This is where a "cloud broker" comes into play. A "cloud broker" is an organization that mediates between the "cloud service provider" and "cloud customer". The "Cloud broker" enables the customer organization to choose the correct vendor according to their business needs. They also help the customer to negotiate the terms and conditions, pricing and other details with the cloud service provider

Cloud Access Security Broker: As cloud adoptions increase in number, security becomes more than a necessity. 'Cloud access security brokers' or CASBs is the answer to improved security for cloud services. CASBs are organizations that are present on-premise or on the cloud and act as the intermediary between cloud service providers and cloud customers. According to McAfee website, "CASBs enforce security, compliance and governance for cloud applications".

CASBs are relatively a new concept which began in 2011 and was initially touted to only improve security for shadow IT services but has evolved into other services as well (like encrypting and tokenizing sensitive data which is to be uploaded, preventing misuse of cloud data from insiders and outsiders) As CASBs become more ubiquitous in the enterprise security stack, Gartner predicts that CASBs will govern over 60% of cloud services by the year 2022.

Regulators: Regulators such as the 'Federal Trade Commission' (FTC) and 'Securities and Exchange Commission' (SEC) ensure that companies stay in compliance with regulatory

frameworks such as HIPAA (Health Information Portability and Accountability Act), SOX (Sarbenes- Oxley Act) and GLBA (Gramm Leach Bliley Act) and other frameworks.

Roles of Google in Cloud Technology

Google Cloud is one of the top cloud solutions currently on the market, servicing millions of users across the globe. As cloud deployments continue to grow in popularity and more businesses turn to the cloud for vital workflows, knowing how to manage and operate Google Cloud environments is a critical skill. Google Cloud role is a serverless, event-driven computing service within Google Cloud Platform. Developers can use it to create and implement programmatic functions within Google's public cloud, without having to provision the underlying cloud infrastructure -- such as servers, storage and other resources (Stephen 2018). Google Cloud Functions allows small code segments to perform specific, limited tasks, which are typically related to triggering responses to real-world and software-driven events. When an event triggers an associated function, the function is loaded into a provisioned cloud environment and executed. All infrastructure resources are provisioned and recovered automatically by Google Cloud Platform (GCP)

- ***Virtual Private Cloud*:** GCP Virtual Private Cloud (VPC) provides networking functionality to the GCP resources
- ***Project:*** A project organizes all GCP resources. A project consists of a set of users; a set of APIs; and billing, authentication, and monitoring settings for those APIs.
- ***Shared VPC (XPN):*** Shared VPC allows an organization to connect resources from multiple projects to a common VPC network. When using a shared VPC, one project is designated as a host project and one or more other service projects can be attached to the host project. Shared VPC is also referred to as XPN.
- ***Service Account*:** A service account is a special Google account that belongs to your application or a virtual machine (VM), instead of to an individual end user. Your application uses the service account to call the Google API of a service, so that the users are not directly involved.

Cloud Technology Cheat Sheet

Google Cloud Cheat Sheets: Google Cloud GCP cheat sheets are created to give summary of the most important Google Cloud services that one needs to know in order to pass the different Google Cloud Platform or GCP certification exams such as the Google Certified Associate

Apple iCloud Cheat Sheet: iCloud is Apple's cloud file storage and services platform. The service permits users to leverage secure and highly reliable cloud computing features and capabilities to store and share a wide variety of files, locate lost equipment, and synchronize information across multiple devices (Eckel, 2020). Apple's iCloud includes multiple features and components such as: iCloud Drive, iCloud Storage Plans (additional file storage), iCloud Photo Library (cloud-based photo storage), Family Sharing (account and resource sharing), Safari and iCloud Keychain services.

Channels of Cloud Technology

- ***YouTube*:** You tube is an essential piece of the education process when searching for a cloud solution provider, or simply looking to improve the effectiveness of your current cloud solution (Edwards, 2015).
- ***Amazon Web Service:*** Amazon Web Services' official AWS Cloud channel is the go-to resource for any AWS queries. The channel is broken down into several categories: network and computing, storage and CDN, database, analytics, app services, and deployment and management. Each category has its own set of subcategories for relevant tutorials, webinars, and product demos, making it easy to find the exact video to help answer your questions.
- ***Google Cloud Platform:*** Google's official cloud platform channel is a great resource for exploring Google's cloud offerings. This platform channel is divided into four sections: How-to's, Cloud events, Customer Corner, and Cloud Devbytes.
- ***IBM Cloud Computing:*** IBM Cloud Computing official YouTube page is highly active and conveniently categorized to help you find exactly what you need, from product features and specifications to in-depth technical how-to's.
- ***Microsoft Azure:*** Azure's official YouTube page provides product demos, news and announcements, speeches from Microsoft events, and webinars.
- ***Sales-force Video***: Sales-force maintains a highly active official YouTube page with nearly 600 videos, conveniently broken into sub-channels for every aspect of Sales-force's business. There is a lot of marketing material here, but Sales-force uploads new how-to's and product demos nearly every week.

Effect of Cloud Technology on Students' Academic Achievements

Cloud computing is continually changing the notions of learning and business drastically. Therefore, academicians and business community are adopting innovative communication systems to remain update from internal and external development. From business perspective, Priyadarshinee et al. (2017) discovered that by using two staged SEM-ANN approach that cloud computing adoption substantially improves the firm performance of manufacturing and services industry. Cloud computing has drastically changed the traditional way reviewed transparent process and informed how students learning could be improved of teaching to a peer- (Thomas, 2011). Thomas (2011) explained that cloud computing provides the opportunities to the students and educators to interact with each other at anytime from anywhere and work on same documents to make amendments for improving the documents collaboratively. Ercan (2010) suggested that cloud-based applications provided by service providers assist the universities in operating their information system effectively and enabling their students to perform their academic tasks timely from anywhere over the internet. Another study by Bora and Ahmed (2013) studied e-learning through cloud computing adoption and found that e-learning reduces the hardware cost for educational institutions and improves the student performance. Furthermore, they stated that students and teachers could get benefits by sharing study materials over the internet through multiple locations. Goyal and Krishnamurthy (2018) theoretically found that cloud computing enhances student's engagement which, in turn, improves student performance. Moreover, they mentioned that cloud-based educational environment enhances students' satisfaction and perceived learning Educational institutions are the gateway to careers, modern education, economic well-being and realization of dreams for the individuals (Brady-Amoon 2009). Another study, Lim et al. (2015) studied the adoption of cloud computing

technologies in Swedish schools and found that Swedish school's principals supported the use of clouds application for students' learning and stated that cloud applications enhance the student participation and satisfaction.

The Application of Cloud Computing in Education Informatization

Because cloud computing allows students to instantly access and store homework- and test-related materials on remote servers, their backpacks are lighter and they can work from wherever there's an internet connection. They can also collaborate with classmates on group assignments without having to be in the same room. The cloud helps ensure that students, teachers, faculty, parents, and staff have on-demand access to critical information using any device from anywhere. Both public and private institutions can use the cloud to deliver better services, even as they work with fewer resources. Schools, colleges, and universities can greatly benefit from adopting cloud computing. They can reduce costs (and when funding is constantly being cut, this is huge), promote a better learning environment for students, and create a better working environment for educators.

Method

Correlational survey design was adopted for the study. The area of study was Imo State. The population of the study comprised of all Management, Lecturers and Students in Imo state. Non proportionate stratified sampling technique was used to select 10 Managements, 60 Lecturers, 200 Students from the study area and these gave the sample size of 270 respondents. The Main Instrument used in this study was a questionnaire titled "Prospects of Cloud Technology and Students Academic Achievement in Colleges of Education Questionnaire'' (PCTSAACEQ)". Face and content validation of the instrument was carried out by an expert in test, measurement and evaluation from Imo State University to ensure that the instrument has the accuracy of study under consideration. Cronbach Alpha technique was used to determine the reliability of the instrument. The reliability coefficient obtained was 0.86 and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical techniques such as percentage analysis and simple regression. The test for significance was done at 0.05 alpha levels.

Results

Research Questions 1: The research question sought to find out the functionalities of cloud technology mostly used for teaching students. To answer the research question, percentage analysis was performed on the data, (see table 1).

Table 1: Percentage analysis of the functionalities of cloud technology mostly used for teaching students

EXTENTS	FREQUENCY	PERCENTAGE
Storage	93	34.44**
Processing	45	16.67
Cloud security	56	20.74
Backup	28	10.37

Pricing	34	12.59
Cloud analytics	14	5.19*
TOTAL	**270**	**100%**

**** The highest percentage frequency**
*** The least percentage frequency**
SOURCE: Field survey

The above table 1 presents the percentage analysis of the functionalities of cloud technology mostly used for teaching students. From the result of the data analysis, it was observed that the functionality tagged "storage" 93(34.44%) was rated the most important functionality with the highest percentage value affirmed by the respondents, while "cloud analytics" 14(5.19%) was rated the least percentage least percentage of functionalities of cloud technology mostly used for teaching students.

Research Questions 2

The research question sought to examine the channels of cloud technology used in teaching students. To answer the research question, percentage analysis was performed on the data, (see table 2).

Table 2: Percentage analysis of the various channels of cloud technology used in teaching students

EXTENTS	FREQUENCY	PERCENTAGE
YouTube	42	15.56
Amazon Web Service	47	17.41
Google Cloud Platform	60	22.22**
IBM Cloud Computing	53	19.63
Microsoft Azure	32	11.85*
Sales-force Video	36	13.33
TOTAL	**270**	**100%**

**** The highest percentage frequency**
*** The least percentage frequency**
SOURCE: Field survey

The above table 2 presents the percentage analysis of the various channels of cloud technology used in teaching students. From the result of the data analysis, it was observed that the channel tagged "google cloud platform" 60(22.22%) was rated the highest channel of cloud technology affirmed by the respondents, while "Microsoft Azure" 32(11.85%) was rated the least percentage of the various channels of cloud technology used in teaching students.

Hypothesis Testing

Hypothesis One

The null hypothesis states that there is no significant influence of cloud technology on students' academic performance. In order to test the hypothesis, regression analysis was performed on the data, (see table 3).

TABLE 3: Regression Analysis of the influence of cloud technology on students' academic performance

Model	R	R-Square	Adjusted R Square	Std. error of the Estimate	R Square Change
1	0.78	0.61	0.61	1.16	0.61

***Significant at 0.05 level; df= 268; N= 270; critical R-value = 0.139**

The above table shows that the calculated R-value 0.78 was greater than the critical R-value of 0.139 at 0.5 alpha levels with 268 degree of freedom. The R-Square value of 0.61 predicts 61% of the influence of cloud technology on students' academic performance. This rate of percentage is highly positive and therefore means that there is significant influence of cloud technology on students' academic performance. It was also deemed necessary to find out the influence of the variance of each class of independent variable as responded by each respondent (see table 4)

Table 4: Analysis of variance of the influence of cloud technology on students' academic performance

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	568.38	1	568.38	425.24	$.000^{b}$
Residual	358.22	268	1.34		
Total	926.60	269			

a. Dependent Variable: Students Academic Performance
b. Predictors: (Constant), Cloud Technology

The above table 4 presents the calculated F-value as (425.24) and the critical f-value as ($.000^{b}$). Being that the critical f-value ($.000^{b}$) is below the probability level of 0.05, the result therefore means that there is significant influence exerted by the independent variables cloud technology on the dependent variable which is students' academic performance. The result therefore is cognate to the research findings Thomas (2011) who noted that cloud computing provides opportunities to students and educators to interact with each other at anytime from anywhere and work on same documents to make amendments for improving the documents collaboratively. Also, cloud-based applications provided by service providers assist the universities in operating their information system effectively and enabling their students to perform their academic tasks timely from anywhere over the internet (Ercan, 2010). The significance of the result caused the null hypotheses to be rejected while the alternative was accepted.

Conclusion

The study concluded that the cloud technology is a set of active network services, providing scalability, quality of service, an inexpensive computing infrastructure which can be accessed in

a simple and pervasive way. Also explicate that cloud computing provides the opportunities to the students and educators to interact with each other at anytime from anywhere and work on same documents to make amendments for improving the documents collaboratively

Recommendations

1. Colleges should incorporate cloud computing technology in their everyday activity most especially the laboratory activities in order to help foster effective and comprehensive performance.

2. The application of cloud technology should not be neglected because it is indeed of greater significance to student and staffs.

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