



# The Reality of Using Cloud-Computing Applications in the Educational Process in Yemeni Universities: College of Oil and Minerals – University of Shabwa as a Model

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## **Abstract**

*This study examines the reality of using cloud applications and cloud services among students and faculty members at the College of Oil and Minerals as an example of the reality in all the universities of Yemen. It probes the usability of cloud services, attitudes of the study's samples toward these services, and the obstacles that limit the use of cloud services in the educational process. The researcher opted for a descriptive approach with random sampling to conduct this study on students and the faculty of the College of Oil. It is found that cloud computing helps in the educational process through the collective participation of students in the performance of work as well as the use of cloud storage in education and training of the teachers in addition to appraising their awareness about the use of cloud computing applications. Finally, a set of recommendations are proposed to reduce the hindrances in the application of cloud services.*

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## **1. Introduction**

The Internet remains one of the most important and great inventions of the modern era. It has led to the emergence of many programs, applications and means of communication that enabled humanity at different ages, cultures and spatial locations to conduct their life affairs from the simple and necessary daily transactions to government transactions and even their quest to seek knowledge from any place and time and for different educational stages.

Scientific and technical developments accelerated worldwide, and this led to a change in the lifestyle of the individual and society in all economic, social, political and educational aspects. This rapid development also helped bring about fundamental changes in people's concepts and ideas and the way they live with them. There has become almost total reliance on technology in all different areas of life, and this is reflected in the goals of education which are no longer limited to providing students with knowledge and communicating information to them, but rather providing students with self-learning skills and the ability to employ modern technologies to solve life problems facing them (Tashkandi & Al-Jabri, 2015).

This rapid progress has led to finding new horizons for improving and developing education, hence the importance of e-learning, spreading its culture, using its tools and applications and training teachers and learners to interact with it in use and production (Behrend, Wiebe, London & Johnson, 2011). Cloud computing technology has emerged as one of the computing methods in which computer resources are provided as services, and users are allowed to access them via the Internet without the need to possess knowledge, experience or even the infrastructure that supports these services. The demand for information and communication technology has become very high by individuals and institutions because of the many services and advantages it provides to them through applications and software. The benefit of using it was reflected in the various fields of life; whether political, social or economic (Behrend et al., 2011).

One of the most important modern technologies produced by the networking and communications revolution, which has been widely used in the recent period, is the cloud computing technology. It provides many and very distinct services through software, applications and storage via the Internet (Miller-Idriss & Hanauer, 2011).

Cloud computing is one of the modern software through which many services are provided to users and they can access them via the Internet without the need to have technical skills that support these services. The term cloud computing reflects a perception and concept of software, applications and services that rely on the Internet to work on and access them, and it is managed by the service provider company and the beneficiary gets it for free or for a sum of money paid monthly or annually according to his needs and the duration of use (Foster, Zhao, Raicu & Lu, 2019).

The history of cloud computing goes back to John McCarthy who presented its idea and saw that it is possible to organize cloud computing to become a public service that can be used. Moreover, his idea continued in its theoretical framework until the engineer Kariston Peaceflea transferred it to actual application at the beginning of the Third Millennium. Then this concept expanded and Microsoft, which was a pioneer in the field, and other companies such as Apple, Hp, and IBM, multiplied the uses on the Internet. Google was considered the most active company in this field and was able to launch many new services through this modern technology, so it became the most competitive company as it surprised competitors in this field by launching an integrated operating system for computers in 2009 that works in accordance with the concept of cloud computing (Rao, Saluia, Sharma, Mittal & Sharma, 2012)

Cloud computing is the idea of the future that will revolutionize the world in all different fields, most notably the economic, technological and educational fields. It is a new and modern way to replace the use of available technical resources with other resources on the Internet that help store data and build educational or other content. Thus, data and information can be saved and shared with others, which helps in collective and collaborative work without the need for material technical resources, and all you need is an internet connection (Breeding, 2012)

And due to the large number of technical problems that educational institutions face in terms of technical infrastructure, maintenance problems and malfunctions; in addition to the exorbitant costs that they need in training, providing hardware, software and continuous updating. In addition, the divergence of universities and educational institutions as well as the increase in living costs and mobility make the need to use modern technologies such as cloud computing technology become a necessity to overcome all these problems. In addition, to the urgent need to keep pace with technological developments that improve the quality of performance (Agrawal, 2022).

Cloud storage is one of the most important services provided by cloud computing to make cloud backups. Cloud storage is a great way to organize files and have information stored online without cluttering up your computer space, and it is accessible when connected to the Internet. Students can use it to store documents and synchronize files across computers, tablets and smartphones. In addition, a student can write a lecture or lesson plan on his computer at home, put it in a cloud folder and access it from any computer connected to the Internet. The cloud storage service is a smooth, fast and free service (Vilajkat, 2017).

Benefits of cloud computing in varying degrees are contingent upon their level of deployment and extent of service models. However, there is a lack of awareness and interest in using them by students and faculty members of the Faculty of Oil and Minerals and in all departments of Shabwa University. If they become further entrenched and engaged in cloud computing configurations, they will be able to realize greater advantages, such as increasing access to scarce IT expertise and talent, promoting further IT standardization, the transparent matching of IT costs, demand and funding and increasing interoperability between disjoint technologies within and between institutions.

Therefore, there is an urgent need to ensue this study on the reality of using cloud-computing applications in the educational process from the perspective of faculty members and students in Yemeni universities (Faculty of Oil and Minerals - University of Shabwa model)

## 1.2 The Study Problem

Cloud computing services are important for Shabwa University students and researchers to facilitate study, learning, scientific research, project completion, file archiving, sharing and other features and benefits to save time, effort and ease of tasks. The most important technologies that can be effectively integrated are cloud storage technologies in the field of education techniques. This technology opens wide horizons in the educational process and helps both students and faculty within the institution to learn and communicate effectively. The focus of this study will be on the introduction of this technique and its weak points, in addition to the most important applications and software provided by it. The study problem was chosen through:

First, it is noted that cloud computing services did not receive much awareness, attention and use by many students and faculty; which made many students lose important files. There is also difficulty and lack of knowledge on how to share and upload files or complete tasks and assignments that require using such services. Moreover, delays in the completion of projects and transfer files between the members of the group by other slow means are due to the lack of knowledge of how to share and cooperate and co-edit at the same time by all members of the group using cloud computing services and applications that allow to save a lot of time and effort.

Second, an electronic survey was distributed to a group of students and faculty to measure the extent of awareness and use of cloud computing services. It helped the researcher investigate whether cloud applications or cloud storage as well as potential of cloud computing services benefit the students in learning and scientific research or not. Its results are as follows:

- 14% of the respondents have no access to cloud computing services at all.
- 94% of the sample members were exposed to the loss of electronic files by damage, by failure of traditional storage units/computers, by loss of gadgets or by other reasons.
- 51% of the respondents use cloud storage to save files.
- 10% of the sample respondents do not use cloud-computing services to execute projects in a collaborative and participatory manner.
- 19% of the study sample have no knowledge of what cloud-computing services provide for learning and scientific research.

Among the survey questions, there was an open question about the challenges facing the use of faculty and students of cloud computing services in the course of study, learning and scientific research. The answers spotted light on some challenges such as:

- Lack of speed in file transfer if global network connectivity is poor.
- Lack of knowledge of cloud services.
- Lack of sufficient skills in cloud computing services.
- Mistrust in the cloud storage services and the fear of hacking files.

The field of educational technologies is one of the most important fields that are witnessing rapid development. From this standpoint, the demand for integrating technology into education has increased because of its importance in reducing the burden on the educational institution and building a generation capable of dealing with modern developments. One of the most important of these technologies that can be effectively integrated is the cloud storage technology, which has become one of the most important modern topics for discussion in the field of educational technologies (Tashkandi & Al-Jabri, 2015).

This technology opens wide horizons in the educational process and helps both students and faculty members within the educational institution to learn and communicate in an effective manner. The focus of this study will be on defining this technology and its strengths and

weaknesses, in addition to the most important applications and software that it provides. This will be through studying the reality of its use by postgraduate students to suggest the best ways to activate its use among faculty members and students.

### 1.3 Research Questions

The problem of the study was determined in the following questions:

- What is the reality of cloud services use by students and faculty members at the College of Oil and Minerals?
- To what extent are students and members of the faculty of oil and minerals aware of the importance and advantages of using cloud services in the educational process?
- What are the obstacles to using cloud storage services in the educational process from the perspective of students and faculty members at the College of Oil and Minerals?

### 1.4 Importance of the study:

There are many reasons why cloud computing is a necessity in the educational process. It can revolutionize the performance of educational institutions, individuals and departments with its excellent software, applications and services as well as large storage space that stores data securely and at the lowest cost. The importance of this study can be summarized as follows:

- This study may help to enrich the educational system at the University of Shabwa by utilizing its content in training to employ cloud storage services.
- This study may lead to increase the use of students and faculty's use of cloud storage effectively in education.
- The study is consistent with the direction of educational institutions to adopt cloud computing in its infrastructure, teaching and learning.
- Raising the attention of the management board at the university to the need to expand on cloud computing topics in different educational stages and the need for practical application.

### 1.5 Terminology of study:

Pireva (2018) defined cloud storage as the process of storing each individual's files in a practical cloud that has many advantages. Where you can view your files from any mobile phone, tablet or any computer connected to the Internet. The cloud can also provide backups for files so that they will never be lost if your phone is stolen or lost, or if your computer crashes, you choose the service that is performed for you. This task is one of the services currently available through One Drive, Drop box, Google Drive or Box.

Pireva (2018) defined cloud storage also as a technology that relies on transferring the processing and storage space of the computer to the so-called cloud, which is a server device that is accessed via the Internet.

Procedurally, cloud storage is defined as huge computers that save files in various formats that contain texts, graphics, pictures, drawings, video clips, or presentations, on the Internet without the need to store them in the traditional way in computer memory or hard disks; with the ability of accessing these files anytime and anywhere when we are connected to the Internet.

## 2. Literature review

### 2.1 The theoretical framework of the study

#### The first axis: Cloud computing

There is no doubt that our present era is progressing, growing and accelerating at the technological level, especially with the spread and availability of the Internet and various websites. This development has reflected positively on the lives of individuals, institutions and educational and non-educational organizations. The use of these new technologies has helped, both individually and institutionally, to better organize and facilitate business and tasks; save time, effort and cost; increase productivity and help to gain knowledge in new ways. One of the most important modern technologies produced by the network and communications revolution is cloud-computing technology. It offers many services and is unique through software, applications and storage over the Internet (Lakatos, 2013).

Cloud computing is one of the most modern software programs that provide many services to users and can be accessed through the Internet without the need to have technical skills to support these services. The term cloud computing reflects a perception and understanding of the software, applications and services that rely on the Internet to work on and access to it. It is managed by the service provider and is obtained by the beneficiary free of charge or for a monthly or yearly payment according to its needs and duration of use (Chaudhary, Somani & Buyya, 2017).

## 2.2 Definition of cloud computing:

Cloud Computing is a technology based on the transfer of processing and storage space of the computer to the so-called cloud, which is a server that can be accessed through the Internet connection, and thus turns IT programs from products to services. The cloud consists of advanced data centres which provide large storage areas for the beneficiaries, and it offers some applications as a service to the beneficiaries. It is dependent on the possibilities provided by the applications of the second generation of the Internet (Pireva, 2018).

- The National Centre for Standards and Technology (NIST) defines cloud computing as a model to provide convenient and continuous access at any time to the network to share a wide range of computerized resources that can be distributed and provided with minimal effort or interaction with the service provider (Mell, 2011).

## 2.3 Essential Characteristics of Cloud Computing

The following five characteristics, as defined by NIST, are considered inherent in cloud computing services (Mell, 2011).

- On-Demand Self-Service: Customers can automatically provision computing capabilities and resources on their own when needed without necessitating any human intervention.
- Broad Network Access: Access and capabilities are available over the network through standard devices such as cell phones, laptops, PDAs, etc.
- Resource Pooling: Resources such as network bandwidth, virtual machines, memory, processing power, storage capacity, etc. are pooled together to serve multiple customers using a multi-tenant model. That is, virtual and physical resources are dynamically assigned and reassigned based on need and customers' demands.
- Rapid Elasticity: Depending on demand, resources and capabilities can be quickly and automatically deployed and scaled at any quantity and at any time.
- Measured Service: Customer usage of the vendor's resources and services are automatically monitored, controlled and reported offering a high level of transparency for the customer and vendor.
- It is interesting to note that some vendors claim cloud computing as a service, but fail to include one or more of the characteristics listed above. For example, cloud computing vendors which fail to provide transparency (e.g., a detailed report of consumption per service) of your services consumed are not offering true cloud computing services.

NIST also describes three service models:

Cloud Software as a Service;

Cloud Platform as a Service; and

Cloud Infrastructure as a Service (Mell, 2011).

### **The cloud-computing model is based on basic levels:**

1. Provision of software as a service (SAAS)
2. Provision of Service-Oriented Platforms (PAAS)
3. Provision of infrastructure as a service (IMMS)

### **Cloud computing characteristics:**

According to Carter, Greenberg and Walker (2017), there are several characteristics of cloud computing:

- Self-service that allows the user to create, modify and save files in the cloud without interference from the service provider.
- Accessing to services and applications in the cloud through any laptop, mobile phone or tablet at anytime and anywhere.
- Flexibility and speed in meeting the needs of the beneficiary.
- Reducing maintenance costs for hardware and software and constantly update them.

Cloud storage is defined as very large computers that contain huge storage spaces, as users upload and save their files on them. Also, the subscriber to the cloud storage service can use the programs in cloud computing such as Word, Excel and other programs that make him not obliged to carry his personal device with him wherever he goes, but only enters his account with the cloud storage company and accesses all his files that he has stored before as well as doing new business (Hakak et al., 2019)

There are two types of cloud storage services:

**The first type:** in companies that provide the service, they provide it free of charge to the beneficiaries, but often the services are limited.

**The second type:** in which the companies that provide the cloud storage service provide services to the beneficiary by subscribing to the service in exchange for a certain amount that he pays on a monthly or annual basis; depending on the space he needs and the duration of use.

There is no doubt that not all files stored on the cloud can be viewed by anyone unless the user shares them with another person, or gives his login data to another person. The company that provides the cloud storage service gives the user a storage space that no one can access or view as it is considered like a private mobile device

### **Cloud computing services models:**

Cloud computing offers a number of services that are categorized based on user needs (Breeding, 2012)

#### **A. Infrastructure as a Service (Saal):**

This model is a logistics tool on which organizations rely to get the resources needed to store information, hardware, servers and other network components. It is a space where the service provider has the resources and is responsible for the recruitment and operation and where companies can increase or reduce the resources used according to the needs or requirements of the application.

#### **B. Software as a service model (SaaS):**

This model helps the user to access all applications and software without the need for installation and maintenance as well as accessing the Internet and take advantage of them away from the burdens of management software and complex devices. SaaS is called the added applications that run on the server of the service provider where it ensures access to work on the application and ensures the protection of user's privacy.

#### **C. PaaS platform model:**

This is the third model of cloud computing models that provides a comprehensive platform for all the applications needed by the user either to develop software or basic applications in the programming process; in addition to the costs of subscription to services provided.

## **2.4 Types of cloud computing:**

There are four types of cloud computing as mentioned by Vilajkat (2017):

### **1. Public Cloud:**

It is a commercial service provided by the service provider to all beneficiaries for a certain amount of money. It saves the beneficiary's time, effort and the cost of hardware and equipment.

**2. Private Cloud:** This is a service provided to certain parties and which can be accessed with local networks or the Internet. It is provided to the recipient with higher standards of safety and confidentiality as well as quality in the services provided.

**3 - Hybrid Cloud:** This cloud combines the features and specifications of both the public cloud and private as it enables the recipient to have a private cloud through which services are provided to beneficiaries while benefiting from the cloud solutions in general in terms of security and confidentiality of uploaded files.

**4- Community Clouds:** This cloud environment has emerged because of collective collaboration among a number of organizations with the same orientation and support for a particular group to achieve common goals such as information security, access to performance and ease of access to data.

## **2.5 Previous studies**

- 1- Pireva's (2018) study was conducted at Applied Sciences in New Zealand that explored students' perceptions of evaluating a cloud-based learning environment. The study focused on examining teacher and student behaviour in participatory work, changing perceptions, student achievement, and confidence in working on the cloud. This study provides a clear insight into students' perceptions of evaluating a cloud-based learning environment. It is hoped that it will help officials in educational institutions to take advantage of the study data to better prepare students, manage future expectations well, and emphasize the positive aspects of a cloud-based learning environment. This study concluded that education through the cloud helps students learn better and helps the teacher to evaluate students better and guide them in sound ways, which are better than traditional methods.
- 2- A study by Mata-López and Tobón (2018) aimed to explain the importance of using cloud-computing technology in universities by presenting a proposed model for using cloud-computing technology in the Technical University of Turkey, which includes a number of branches and colleges in different regions. The researchers concluded through this study that the use of cloud computing technology in higher education is very important to overcome material problems such as the high costs of devices as well as the problems of development and maintenance in addition to the problems of spacing distances for the colleges affiliated to the university. The main objective of this proposal was to provide a good environment for effective management, in terms of providing software and storing data and documents.
- 3- The study of Biasutti, Makrakis, Concina and Frate (2018) aimed to propose a model for an e-learning environment which integrates both cloud computing technology and Web 2 applications, as this proposed system includes a number of various services and applications, and the cloud computing work system Windows Azure (windows Azure). Which includes three different levels, the first level includes the basic technologies of the system such as sheet(css), Rest, Rss, Ajax, Javascript that run Web 2 applications. The second level of the system consists of Web 2 services and technologies, which include tools Wikis, blogs, and social networks, are compatible with the cloud computing operating system. The third level includes the use of cloud computing technology to design and develop applications that run on Web 2. One of the most important findings of this study is the need to activate the use of Web 2 applications that are compatible with Cloud computing to design and develop e-learning environment systems.

- 4- Study of Sivan and Zukarnain (2021) aimed to find out the possibility of employing cloud computing technology in developing self-learning skills, spreading the spirit of sharing among learners and stimulating their motivation with various Internet applications. In this study, the researchers used the semi-experimental approach to achieve the scientific objective of this study. This study concluded that it is necessary to activate the cloud computing technology in e-learning as it helps both the student and the faculty member to share files and data with each other and helps greatly in solving many problems that stand in the way of colleges and universities to achieve their goals. The researcher recommended the necessity of integrating e-learning with traditional education on a larger scale and providing the necessary infrastructure in addition to intensifying training programs and spreading awareness of the importance of e-learning.
- 5- Bagish and Samah (2014) carried out a study to educate engineering students about the use of cloud computing and its importance to meet the challenges and achieve the principle of teamwork and cooperation among students at the university. The researcher also mentioned the interest of the university in providing students and faculty members with free or low-cost tools they can work on. The study recommended the need to apply cloud computing in universities and to raise awareness among students and faculty of the importance of adopting cloud computing and how to work properly.

A review of previous studies on the advantages of cloud computing in (higher) education has drawn a number of advantages as follows:

1. The student is able to communicate easily with the faculty member through the cloud; in addition to the ease of communication with each other.
2. Helping students to keep up with all the latest technological developments that save time and help them to acquire new knowledge.
3. Helping students in the preservation of all their work, achievements and projects with the ability to access these resources whenever they want.
4. Helping students and faculty members to use applications and software without the need to install on the devices.
5. Enabling students to obtain feedback on all their activities.
6. Both the students and the faculty member can access the cloud at anytime and anywhere if they connected to the Internet.
7. Students and faculty members receive all updates and new releases from the service provider continuously.

#### **The relationship of the current study with previous studies:**

- 1- This study is similar to previous studies in that it represents one of the recent trends in reaching knowledge of the impact of using the cloud storage service, which is considered one of the cloud computing services, and which can be used in developing the skills of postgraduate students.
- 2- The current study is similar to some previous studies in using the descriptive analytical approach.
- 3- The current study is similar to the majority of previous studies in the use of statistical treatments of means and standard deviations as well as testing the differences between the means.
- 4- Most of the previous studies used the questionnaire as a tool for collecting information, and it is similar to the current study since the researcher used the same tool to collect data from students.



### **Aspects of benefit from previous studies:**

By looking at previous studies and reviewing their content and findings, the researcher benefited from them in a number of ways:

- 1- Reaching a general and comprehensive perception of the reality of students' use of cloud computing services in general; and cloud storage in particular.
- 2- Through the previous studies, the researcher was briefed on the statistical treatment methods used in order to be utilized on the processing of the data of the current study.
- 3- Previous studies also helped the researcher to choose the appropriate approach for this study; which is the descriptive analytical approach.

## **2.6 Obstacles to the use of cloud computing technology at the University of Shabwa - College of Oil and Minerals**

### **I-Internet Connection:**

Pireva (2018) noted that the most important challenges facing the work of cloud computing services are communications. Cloud computing requires high-quality Internet connectivity. If there is no Internet connection, the user cannot do it, and if the Internet speed is slow, it may impede the cloud.

### **II- Security and privacy:**

Security threats are one of the most important challenging faces cloud computing. Cloud service providers must provide high-quality encryption software and technologies to maintain user data from tampering, piracy and loss. Although service providers claim the data to be safe, they may not be as high as one percent (Millard, 2013).

### **III-The quality:**

The service provider may not provide the required services at the required level as it may not provide all that the beneficiary needs in the image and the ideal speed in processing the data.

### **IV-The service:**

The user, whether a student or a faculty member, may not find all the services needed on the cloud. In addition, some of the applications in the cloud have not yet reached the level of traditional applications such as Microsoft applications on the desktop. For example, if the user uses the Word program on the cloud and compares it to the traditional Microsoft Word function, the difference is very large in the possibilities (Kinyanjui, 2017).

## **2.7 Cloud Storage Features:**

Vilajkat (2017) listed the following features of cloud storage

### **1- Archiving files:**

One of the services provided by the cloud storage provider for the beneficiaries is the ability to retrieve files that were previously uploaded to the cloud and modify or delete them. It also enables the user to retrieve files that he has deleted from the cloud by mistake or otherwise.

### **2- Integration with other applications:**

Companies that offer cloud storage service integrate their services with applications on the computer or software or mobile phone. For example, Drop Box offers a service that enables the user to automatically store images and other types of files.

### **3- Preservation of information and data:**

One of the most important features of the cloud storage service is that it offers different solutions to a number of problems such as file sharing and synchronization. In addition, it provides services related to ensuring the preservation of information such

as securing a way to store backups to reduce the risk of information loss when the personal mobile device is lost.

There are important points of Cloud Storage Features that are considered by the service providers to preserve the information and data as follows:

**- Confidentiality:**

One of the most important privileges that the service providers have to pay attention to is to maintain the confidentiality of the files and the information contained in the data and not disclosed to any person or other entity.

**- User Account Security:**

The service provider assures users that no changes or modifications will be made to files uploaded to the cloud.

**- Availability:**

This feature ensures access to files at anytime and anywhere if you connect to the Internet. The user can also retrieve files that he deleted by mistake.

## 2.8 Comparison between famous providers of cloud storage service:

Company	Services
Dropbox	It is one of the best sites on the web that offers the cloud storage service. It offers a storage size of 2 GB and can be increased to 16 GB after inviting friends to participate in the service or by sharing a link in other forums. Drop Box enables users to upload files from the Internet browser with a maximum size of 300 MB. Users can purchase 50 GB of storage space for \$ 9.99 per month or 100 GB of space for \$ 19.99 per month.
Google Drive	Google Drive is a cloud storage service provided by Google for users with free space up to 5 GB. It allows the user of the service to share files and modify them collectively as well as integrating with various Google apps like Google plus, Gmail, Google docs, etc. Users can purchase 100GB of storage for \$ 4.99 and 1000 GB for \$ 49.99
One Drive	It's a cloud storage service provided by Microsoft. Its most important feature is that the user can get 15 GB of free storage space. It allows users to create files and share them with others with the possibility of editing them collectively. Users can subscribe to the service monthly for \$ 2 to increase the service space to 50 GB.
Box	As a specialized cloud storage location, it offers 5GB of storage space. It is compatible with Google Docs and Quick office. Users can purchase 25 GB of storage for \$ 9.99 per month and 50 GB for \$ 19.99.
Icloud	This service is provided by Apple and is available to users with iOS devices. Users can share files with others. It allows users to upload different files like pictures, videos, texts and others. It provides users with free storage of 5 GB with the possibility to increase the space by 20 GB for \$ 40 a year, or 50 GB for \$ 100 a year.

## 2.9 Advantages of activating the cloud storage service in education:

When activating cloud storage service in the educational environment, we will get many advantages the most important of which are:

- The use of this service in the educational process stimulates motivation among learners and increases the positive interaction between them.
- Communication and exchange of files between students and teachers help to increase the awareness and enrichment of information for educational content.
- This service enables the beneficiary to get feedback on his performance through the cloud and according to his response to the educational situation.
- Activation of the service in the educational environment helps to reduce the paper work as the learner stores all his files and what he does on the cloud and can refer to it at any time and from any place.

- The integration of the cloud storage service with other applications helps the beneficiary to work in one environment on the cloud and the immediate storage of its work.
- The learner can upload all files in different formats; whether audio, written, video clips or others.

### 3. Methodology

The current study is based on the analytical descriptive approach in order to identify: the reality of the use of applications of cloud storage service by students and faculty members in the Faculty of Oil and Minerals - University of Shabwa, their awareness of the importance of its use in education and the barriers that hinder this use.

#### 3.2 Study sample:

The study sample includes a random sample drawn from all students and faculty members of the College of Oil and Minerals. The sample includes 100 students and faculty members.

#### 3.3 Study tool:

The study tool is a questionnaire consisting of a number of questions dealing with different aspects of the subject of the study. It was divided into three axes as follows:

- The first axis measures the reality of the use of students and faculty to implement cloud storage in education.
- The second axis measures the awareness of students and faculty of the importance of using cloud storage service in the educational process.
- The third axis measures the constraints of using cloud storage applications in education.

In the preparation of the axes, the researcher adopted closed questions that identify the possible responses to each question. Each paragraph of the questionnaire corresponds to a list with the following expressions: Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree.

124 questionnaires were distributed to the study sample. 116 copies of the questionnaire were retrieved. 100 copies were valid for analysis, and the remaining 16 were missing or not valid.

#### 3.4 Statistical Methods:

The Statistical Package for Social Sciences (SPSS) was used to calculate the frequencies, percentages, arithmetic averages and standard deviations of the data in the questionnaire and the answers to the questions contained therein.

#### 3.5 The limits of the study:

**Objective:** This study focused on the reality of the use of cloud computing applications in the educational process from the perspective of faculty members and students in Yemeni universities (Faculty of Oil and Minerals - University of Shabwa model)

**Spatial boundaries:** Shabwa Governorate - Republic of Yemen - Faculty of Oil and Minerals - University of Shabwa

**Human Boundaries:** The study was limited to students and faculty members of the Faculty of Oil and Minerals.

**Time limits:** 18-20 / 03/2018

#### 3.6 Details of the Research instrument

**Part 1:** This section deals with the independent variables of the study which allows us to identify the characteristics of the sample and to determine the extent to which these characteristics affect the results of the study. These variables are (educational level)

### Part Two: Study Questions:

The researcher used in this part a set of objective questions that were carefully selected to achieve the purpose of the study. The standard measure used in the study is Likert five-level scale. This scale is commonly used in measuring scientific trends in educational, psychological and social research. It has high degree of stability and honesty. The values in the scale are as follows:

Strongly agree	agree	neutral	Disagree	Strongly disagree
4.2 : 5	3.40 : 4.19	2.6 : 3.39	1.80 : 2.59	1 : 1.79

### The questions in the questionnaire were divided into three axes:

- The first axis: the reality of using cloud storage. It included (11) statements.
- The second axis: the awareness of students and faculty members of the importance of cloud computing services. It included (9) statements.
- The third axis: the obstacles that limit the use of cloud computing in education and scientific research. It included (11) statements.

### Internal consistency of statements:

The validity of the internal consistency in each axis of the study tool was verified by finding the extent of the correlation of each statement with the total degree of the axis as well as comparing the total score of each axis with the total score of the study statements using Pearson correlation coefficient in order to ensure that there is no overlap between them.

Table 1

*Correlation coefficients between the score of each of the statements of the first axis to the total degree of the axis*

First Axis Statements	Correlation coefficient	First Axis Statements	Correlation coefficient
1	0.559**	7	0.592**
2	0.641**	8	0.625**
3	0.664**	9	0.618**
4	0.725**	10	0.653**
5	0.596**	11	0.753**
6	0.635**		

\*\* There is a statistical significance at the level (0.01).

Table 1 shows that the correlation coefficients of the use of students and faculty members of cloud computing services ranged between (0,559-0,753); all of which are high correlation coefficients that indicate the strength of coherence and internal consistency of the terms of this axis.

Table 2

*Correlation coefficients between the degrees of each of the statement of the second axis with the total degree of the axis*

Statement	Correlation coefficient	Statements	Correlation coefficient
1	0.544**	6	0.599**
2	0.594**	7	0.798**
3	0.730**	8	.687**
4	0.801**	9	0.628**
5	0.634**		

\*\* There is a statistical significance at the level (0.01).

Table 2 shows that the correlation coefficients of students and faculty members' awareness of the importance of the cloud computing services ranged between 0.544 to 0.801 which are high correlation coefficients. This indicates the strength of the coherence and internal consistency of the terms of this axis.

Table 3

*Correlation coefficients between the score of each of the third axis statements in the overall degree of the axis*

Statement	Correlation coefficient	Statement	Correlation coefficient
1	0.449**	7	0.609**
2	0.513**	8	0.774**
3	0.621**	9	0.816**
4	0.692**	10	0.657**
5	0.655**	11	.559**
6	0.565**		

\*\* There is a statistical significance at the level (0.01).

It is clear from table 3 that the correlation coefficients that limit students' use of cloud applications in education and scientific research ranged between 0.449 - 0.816. All of these are high correlation coefficients which indicate the strength of coherence and internal consistency of the terms of this axis.

Table 4

*Correlation coefficients between each axis with the total score of the statements*

Axis	Correlation coefficient
First	0.699**
Second	0.659**
Third	0.531**

\*\* There is a statistical significance at the level (0.01).

It is clear from table 4 that when calculating the correlation coefficients of Pearson for each axis of the study with the total number of statements, we find that the values ranged between (0,531-0,699). These are high correlation coefficients that indicate the strength of coherence and internal consistency of all study axes.

### **Stability of the study instrument:**

Cronbach's Alpha is the tool used for assessing the reliability of scales

Table 5

*Stability coefficient (Alpha Cronbach) for all axes*

Axis No	Axis	Stability coefficient
1	The reality of the using cloud services	%85,5
2	The awareness of the importance and advantages of cloud services	%83,8
3	Constraints that limit the use of cloud services in education and scientific research	%85,0
Total stability coefficient		%81.6

The stability coefficients as shown in table 5 reflect the liability of the tool with a high stability coefficient and the ability of the tool in general to achieve the objectives of the study. It is clear from this table that the coefficient of constant use of cloud services by the study sample was 85.5. The stability coefficient of awareness of the importance and advantages of the cloud storage services was at 83.8%, whereas the stability coefficient for the constraints on using cloud services in education and scientific research was 85.0%. All of these indications give evidence that the results can be consistent. In practice, these figures are ( $\text{Alpha} \geq 60.0$ ) which is acceptable in research in educational and administrative sciences.

#### 4. Results and discussion

Results for personal and functional variables of the study sample:

The researcher calculated the frequencies and percentages of the personal and functional variables of the study. The results were as follows:

Table 6

*Distribution of the study sample according to the variable of the study level*

	frequency	percentage
Students	82	%82
Faculty Members	18	%18
Total	100	%100

The results of Table 6 indicate that:

- 82% of the sample of the study were students
- 18% of the sample were faculty members.

#### Results related to answering the study questions:

Presentation of the results related to the answer to the first question: what is the reality of cloud services use by students and faculty members at the College of Oil and Minerals?

In order to answer this question, the researcher calculated the frequencies, percentages, arithmetic averages and standard deviation of respondents' responses on the first axis (the reality of the use of cloud computing applications in the educational process from the perspective of faculty members and students in Yemeni universities)

Table 7

*Frequencies, percentages, arithmetical averages and standard deviations of the first axis (the use of students and faculty members of cloud services)*

No	Statement	Frequent and percentages	Approval scores					Arithmetic Mean	standard deviation	Order
			Strongly Agree	Agree	Neutral	Disagree	Strongly disagree			
1	Cloud services help to develop collaboration and teamwork skills.	R	48	37	15	0	0	4.33	0.7	7
		%	48.00	37.00	15.00	0.00	0.00			
2	Storage helps save costs compared to traditional storage.	R	52	40	8	0	0	4.44	0.6	2
		%	52.00	40.00	8.00	0.00	0.00			
3	Cloud services help students to acquire technical skills.	R	50	38	12	0	0	4.38	0.7	5
		%	50.00	38.00	12.00	0.00	0.00			

4	Cloud services let me share required files with faculty quickly and easily.	R	48	37	13	2	0	4.31	0.8	8
		%	48.00	37.00	13.00	2.00	0.00			
5	I use cloud storage to transfer and send large files that cannot be sent by regular mail.	R	53	35	9	3	0	4.38	0.8	5
		%	53.00	35.00	9.00	3.00	0.00			
6	I use cloud storage to access my content anytime and anywhere.	R	65	26	9	0	0	4.56	0.7	1
		%	65.00	26.00	9.00	0.00	0.00			
7	Cloud services help me edit files easily.	R	30	47	19	4	0	4.03	0.8	10
		%	30.00	47.00	19.00	4.00	0.00			
8	Cloud storage service are used to upload the required educational files.	R	44	46	7	3	0	4.31	0.7	8
		%	44.00	46.00	7.00	3.00	0.00			
9	Cloud storage services are used to edit files in common with others at the same time from different locations.	R	30	48	15	7	0	4.01	0.9	11
		%	30.00	48.00	15.00	7.00	0.00			
10	Cloud storage help to back up files and data.	R	55	35	7	3	0	4.42	0.8	3
		%	55.00	35.00	7.00	3.00	0.00			
11	Cloud services help me share my files easily with other students.	R	49	42	8	1	0	4.39	0.7	4
		%	49.00	42.00	8.00	1.00	0.00			
The general arithmetic mean of the axis statements								4.32	0.17	

Table 7 shows that the statements of the first axis (the reality of the using of cloud applications in the educational process from the perspective of faculty members and students - Faculty of Oil and Minerals - University of Shabwa) ranged between 4.1 to 4.56 on the scale of five points. The arithmetic mean of the statements of this axis was 4.32 with a standard deviation 0.17 which means that the use of students and faculty members of cloud services is averagely “strongly agree”; indicating that the response levels are very high for this axis.

Results related to answering the second question: to what extent are students and members of the faculty of oil and minerals aware of the importance and advantages of using cloud services in the educational process?

Table 8

*Frequency, percentages, arithmetical averages and standard deviations of the second axis (trends of students and faculty members towards the use of cloud storage in the educational process)*

No	Statement	Frequency and Percentage	Approval scores					Arithmetic Mean	standard deviation	Order
			Strongly Agree	Agree	Neutral	Disagree	Strongly disagree			
1	Cloud services contribute to the development of students' technical skills.	R	46	44	10	0	0	4.36	0.7	3
		%	46.00	44.00	10.00	0.00	0.00			
2	Knowledge and information are shared through cloud applications in a better way	R	35	49	12	2	2	4.13	0.8	4
		%	35.00	49.00	12.00	2.00	2.00			

3	Using cloud services in education saves time and effort	R	51	40	5	4	0	4.38	0.8	1
		%	51.00	40.00	5.00	4.00	0.00			
4	File sharing through cloud applications is better.	R	44	30	20	4	2	4.10	1.0	5
		%	44.00	30.00	20.00	4.00	2.00			
5	I can handle the cloud services well.	R	34	45	14	5	0	4.10	0.8	5
		%	34.00	45.00	14.00	5.00	0.00			
6	Educators recognize the importance of using cloud services.	R	21	17	33	22	6	3.25	1.2	9
		%	21.00	17.00	33.00	22.00	6.00			
7	I recommend employment of cloud applications to accomplish tasks.	R	33	43	20	3	0	4.07	0.8	8
		%	33.00	43.00	20.00	3.00	0.00			
8	The cloud applications help to activate collaborative teamwork with others at the same time and in a single file.	R	35	40	21	1	1	4.09	0.8	7
		%	35.00	40.00	21.00	1.00	1.00			
9	Cloud services contribute to transfer and send large files that cannot be sent by regular mail.	R	50	39	7	3	0	4.37	0.8	2
		%	50.00	39.00	7.00	3.00	0.00			
The general arithmetic mean of the axis statements								4.10	0.34	

Table 8 shows that the statements of the second axis (the extent of awareness of students and faculty members of the importance and advantages of using the cloud storage service in the educational process) ranged from 3.25 to 4.38 according to the five-pints-scale. The arithmetic mean of the statements of this axis is 4.10 with a standard deviation of 0.34 which indicated that the attitudes of students and faculty towards using the cloud services in the educational process are (agree); meaning that the response levels are high for this axis.

Results related to answering the third question: what are the obstacles to using cloud storage services in the educational process from the perspectives of students and faculty members at the College of Oil and Minerals?

Table 9

*Frequency, percentage, arithmetical means and standard deviations of the third axis (constraints on the use of cloud storage in the educational process from the perspective of students and faculty members*

No	Statement	Frequency percentage	Approval scores					arithmic mean	standard deviation	Order
			Strongly Agree	Agree	Neutral	Disagree	Strongly disagree			
1	I have difficulty accessing my files in clouds because of the difficulty of connecting to the Internet.	R	11	40	26	18	3	3.39	1.0	7
		%	11.00	40.00	26.00	18.00	3.00			
2	I have not got enough training to use cloud storage services	R	20	34	29	12	4	3.55	1.1	4
		%	20.00	34.00	29.00	12.00	4.00			
3	I was not encouraged to use cloud storage services in previous grades.	R	34	34	18	13	0	3.90	1.0	2
		%	34.00	34.00	18.00	13.00	0.00			



4	I rely on traditional storage units (Hard Disk, CD, Flash Memory)	R	19	33	24	18	5	3.43	1.1	6
		%	19.00	33.00	24.00	18.00	5.00			
5	I actually have not applied cloud storage in the previous stages.	R	20	27	11	29	12	3.14	1.4	9
		%	20.00	27.00	11.00	29.00	12.00			
6	I am afraid of hacking my files in clouds.	R	13	37	25	21	3	3.36	1.1	8
		%	13.00	37.00	25.00	21.00	3.00			
7	I am worried that files will not be accessed if the cloud is not functioning properly.	R	24	45	16	10	3	3.79	1.0	3
		%	24.00	45.00	16.00	10.00	3.00			
8	I do not have the skills to use cloud applications.	R	6	19	20	38	16	2.61	1.2	10
		%	6.00	19.00	20.00	38.00	16.00			
9	I do not know how to employ cloud services in education and research.	R	6	22	14	40	17	2.60	1.2	11
		%	6.00	22.00	14.00	40.00	17.00			
10	There is remarkable lack of hardware in the learning environment to deal with cloud storage.	R	17	43	19	13	7	3.51	1.1	5
		%	17.00	43.00	19.00	13.00	7.00			
11	There is lack of advertising programs for the importance of using cloud services.	R	39	36	13	8	3	4.01	1.1	1
		%	39.00	36.00	13.00	8.00	3.00			
The general arithmetic mean of the axis statements								3.39	0.46	

Table 9 shows that the deviations in the use of cloud services in the educational process from the point of view of students and faculty members ranged from 2.60 to 4.01 according to the five-point-scale. The arithmetic mean of the statements of this axis is 3.39 with a standard deviation 0.46. According to this mean, the axis of the constraints of using cloud services in the educational process from the point of view of students and faculty members is neutral; meaning that the response levels are average for this axis.

## 5. Conclusions and recommendations

The following is a highlight of the most important conclusions of the study:

First, results related to the characteristics of the sample of the study showed the following:

- 82% of the study sample were students while 18% were faculty members.

Second, results related to answering the study's questions:

- Results related to answering the first question: what is the reality of cloud services use by students and faculty members at the College of Oil and Minerals?

- The arithmetic mean of students and faculty members implemented cloud services was "strongly agree" (4.32) which confirms that the degree of response of the study sample members on this axis is very high.

The results also indicate that there is a convergence of the views of the study sample on the reality of using cloud storage and cloud services by students and faculty members; the responses were in two degrees (strongly agree *and* agree).

Results of the second question: to what extent are students and members of the faculty of oil and minerals aware of the importance and advantages of using cloud services in the educational process?

- The arithmetic mean of study sample' awareness of the importance and advantages of using the cloud services in the educational process is 4.10. That is (agree) which confirms that the degree of response of the sample members on this axis is high.

The results also indicate that there is a convergence of the views of the study community on this axis where the responses were in two degrees (strongly agree *and* agree).

- Results related to the answer to the third question: what are the obstacles to using cloud storage services in the educational process from the perspectives of students and faculty members at the College of Oil and Minerals?

- The arithmetic mean of the attitudes of students and faculty toward using the cloud services in the educational process was neutral at 3.39. This confirms that the degree of response of the sample members on this axis is neutral.

The results also indicate that there is a convergence of the views of the study sample about the obstacles of using cloud services in the educational process from the point of view of students and faculty members. The answers were in two degrees (agree *and* neutral). The main obstacles that limit the use of cloud services in the educational process from the point of view of students and faculty are: there is a remarkable lack of programs to spread the awareness on the importance of using cloud services among the study sample, they were not encouraged to use cloud services in the previous school stages, there is a worry about not accessing files in the event of failure of the cloud, the sample members did not receive sufficient training programs to use cloud services and the lack of hardware required in the learning environment to handle the cloud services.

## Recommendations:

Salient recommendations of this study are:

1. There is great need of employing cloud-computing technology as an educational strategy to help cooperative education through the participation of members of the sample in the performance of teamwork.
2. There is a need of developing courses in public education based on building the skills of students learning on the Internet environments.
3. Some concrete measures should be taken to implement cloud storage and cloud services in the educational process because of its importance in the development of students' technical skills.
4. There is need of great attention to provide the infrastructure and technologies necessary to activate the use of cloud storage service.
5. Intensive training programs for students and faculty members should be developed to employ cloud applications and services in education and scientific research.
6. Academic leadership should train students of public education on the use of applications of cloud computing education.
7. Training and awareness programs in public as well as educational institutions should be organized to increase the awareness of how to use the cloud services.

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# واقع استخدام تطبيقات السحابة الإلكترونية في العملية التعليمية في الجامعات اليمنية: كلية النفط والمعادن – جامعة شبوة كنموذج

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## الملخص

تتناول هذه الدراسة واقع استخدام التطبيقات السحابية والخدمات السحابية بين طلاب وأعضاء هيئة التدريس بكلية النفط والمعادن كمثال للواقع في جميع الجامعات اليمنية. كما تهدف الدراسة إلى تحقيق الأهداف التالية: التعرف على واقع استخدام التخزين السحابية والخدمات السحابية الأخرى ومواقف الطلاب وأعضاء هيئة التدريس تجاه الخدمات السحابية وتنفيذها في العملية التعليمية وكذلك التركيز على المعوقات التي تحد من استخدام الخدمات السحابية في العملية التعليمية. لتحقيق هذه الأهداف تم استخدام المنهج الوصفي. تم أخذ عينة عشوائية من طلاب وأساتذة كلية النفط، ووجدت الدراسة أن أهم معوقات استخدام الخدمات السحابية في العملية التعليمية، من وجهة نظر عينة الدراسة، هي: برامج توعوية حول أهمية استخدام الخدمات السحابية لتشجيع الطلاب على استخدام التخزين السحابية، واهتمام المستخدمين بعدم الوصول إلى ملفاتهم في حالة عدم تقديم الخدمة السحابية، ونقص الأجهزة في البيئة التعليمية للتعامل مع الخدمات السحابية. هناك مجموعة من التوصيات التي يمكن أن تساعد في تقليل الصعوبات والعقبات التي تعيق تطبيق الخدمات السحابية؛ بما في ذلك استخدام تقنية الحوسبة السحابية كاستراتيجية تعليمية تساعد على التعليم التعاوني من خلال المشاركة الجماعية للطلاب في أداء العمل، والحاجة إلى استخدام خدمة التخزين السحابية في العملية التعليمية والحاجة إلى تدريب الطلاب وأعضاء هيئة التدريس في التعليم العام وزيادة وعيهم بالخدمات السحابية بشأن استخدام تطبيقات الحوسبة السحابية المطورة للأغراض التعليمية.

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## الكلمات المفتاحية

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