THE USE OF CLOUD COMPUTING IN HIGHER EDUCATION: REALITY, EXPECTATION AND CHALLENGES

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Abstract

Helping students to find learning materials at anytime and anywhere may contribute to enhance and develop their learning level. This paper is seeking to find the ability of using cloud computing in learning with a sample of 29 female students in the college of Education at Al-Baha University. The study attempted to discover the reality of using the clouds as a learning tool and the barriers and the obstacles that may be faced applying this technique in higher education and exploring the potential solutions. The study is conducted during the first semester of the academic year 2015. Students were asked to register with one of the clouds providers such as Dropbox, iCloud, Google Drive, OneDrive, etc. Students concentrated on three skills while using the clouds which were Uploading, Sharing and Viewing the files. The data was collected by the closed-ended questions at the end of the study period, and the results were analysed using SPSS program. Findings showed that, although students faced difficulties in using clouds at the beginning because of poor infrastructure and no prior experience, but they had the ability to use the main functions of the clouds with peers such as viewing, editing and sharing documents with others.

Keywords: Cloud Computing. Higher Education. Barriers and Obstacles. Reality. Expectations. Cloud Functions. Security and privacy.

Introduction:

The relationship between technology and education is closely linked. This relation can be seen clearly among different institutions of higher education. With the emergence of Web 2.0 applications in 1999 by Darcy DiNucci, some of these applications of learning and teaching are applied as key tools in the academic environment. Social networks such as Facebook, Twitter, LinkedIn, Google+ etc., are driving new ways of teaching interaction, dialogue, exchange and collaboration. Also they are contributing in delivering the ideas and knowledge to the learners and facilitating understanding complex and unclear information in the educational field. However, these apps do not meet the growing demand of saving the huge amount of information used in learning, healthcare or business. Hence, the idea of providing such platform with the ability to save any size and type of data was developed gradually from 1982 till 2015 under the name of Cloud Computing.

When we need to save and review any documents and files such as text, photos, tables, and diagrams it is very important to look into two characteristics of "Accessibility and Security". Security has remained a constant issue for Open Systems and internet, when looking into security, cloud really suffers. Lack of security is the only hurdle in wide adoption of cloud computing (Kumar and Laxmi, 2013). In this context, the following is a brief review of the idea and types of clouds.

Idea of Cloud Computing: The idea behind cloud computing has been around for more than 50 years when John McCarthy wrote on 1960s “computation may someday be organized as a public utility" (Nicoletti, 2013). The term “cloud computing” was most probably derived from the diagrams of clouds used to represent the Internet in textbooks. One of the first milestones in cloud computing history was the arrival of Salesforce.com in 1999, which pioneered the concept of delivering enterprise applications via a simple website. Amazon was next on the bandwagon, launching Amazon Web Service in 2002. Amazon’s Elastic Compute cloud (EC2) was introduced as a commercial web service that allowed small companies and individuals to rent computers to run their own computer applications. It also provided its Software as a Service (SaaS) -online video platform- to UK TV stations and newspapers (Sharma et al, 2014). Then came Google Docs in 2006 which really brought cloud computing to the forefront of public consciousness. While 2009 and 2014 saw the maximum number of companies entering this space. (Godbole and Kahate, 2013)

Definition of the key terms:

This section aims to help the reader to go through this study and to understand what the researcher means by some terms in this study compared to its meaning as it stated in literature.

The Reality: in general reality means that the quality or state of being actual or true. With regard to the present study the reality means the actual and current status of using cloud computing among students at Al-Baha University.

***Expectations*:** The term expectation has been defined by Gorard et al, 2012, which refers to what an individual beliefs about what might happen in the future, like the expectation of staying close with your best friends your whole life. However, the previous definition of the concept expectation is very close in the meaning of what the researcher aims. The expectations in the present study is what we think, expect and hope of the use of cloud computing as a learning tool after the students use it in this study.

***Challenges**:* Challenges can be defined as all barriers and obstacles that may face students during their use of clouds as a learning tool. These challenges are linked with the term infrastructures as shown in the figure below.

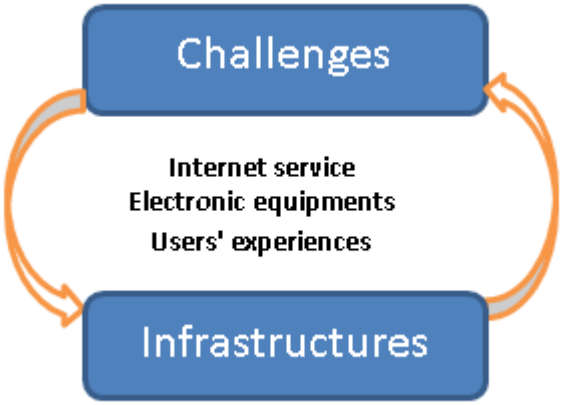

Figure 1: The main components of the clouds' Infrastructures and challenges

Types of Cloud Computing as a network and as Services:

Depending on the relationship between the provider and the consumer, a cloud can be classified to more than one type of clouds. Several aspects can determine the type of clouds such as type of users, type of data and the aim of establishing this service. However, in general there are two main types and sub-types for each type of clouds as shown in the following diagram.

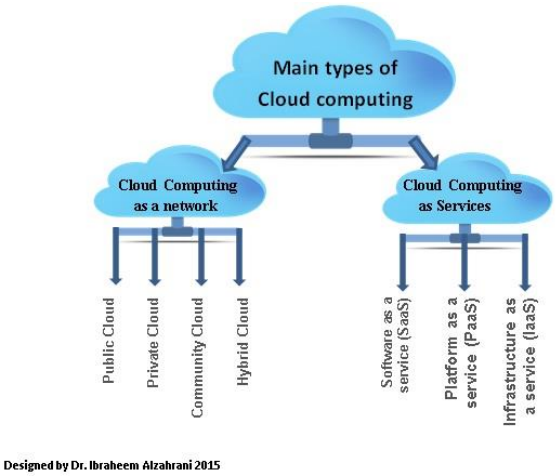

Figure 2: The main types of cloud computing

What is important here is to know the main difference between these types which is the purpose behind creating the cloud. However, identifying the aim of establishing the cloud would help us to decide which one of the previous types we have to use.

This study aims to use public cloud as tool under the study. A public cloud is the cloud infrastructure made available to the general public or a large industry group and is owned by an organization selling cloud services and is made available free to the general public over the Internet (Srinivasan, 2014).

Cloud computing in literature (Overview):

Cloud computing have been used in research in various disciplines, however, the majority of use is still in the education field. By reviewing the literature it can be seen that clouds is used in many researches as a method to explore the future of learning and the ability to make clouds a platform for storing big data and information and to make it available and easily accessible for the learners. Also it is used in research to find out its impact on the level of learning achievement among students. Other studies investigated what the cloud computing infrastructure will provide in the educational arena, especially in the universities. The new cloud computing technology will be widely applied for our education system, and promote and push the current education level. More and more people have education opportunity, and enjoy and share new technology and happiness through education by cloud computing technology (Xue Xu, 2015).

Study Questions:

In order to answer the main question: To what extent cloud computing can be used as learning tool in higher education? The following sub-questions will help us to answer the question under study.

1- What is the reality and expectations of applying cloud computing as a learning technique in higher education?
2- What are the challenges hindering the use of cloud computing in higher education from students' point of view?

The study objectives:

By looking to the history of Al-Baha University (ABU), ABU is one of the emerging universities in the KSA. It was established through a Royal Decree in 2006. This leads us to the point that the university is still in the development stage and is in the need to enhance the learning process through providing the new technique of teaching and learning. Thus, the researcher believes that the study aims to achieve the following objectives:

1- To find out the reality and the expectation of applying cloud computing in learning in Al-Baha University.
2- To identify the obstacles and barriers that may be hindering the use of cloud computing.
3- To find solutions and recommendations that would help the teacher to use cloud computing in learning in higher education.
4- Knowing the infrastructure needs in clouds used in higher education.

Study methodology:

The nature of methodology for a study differs according to whether it is quantitative or qualitative study, but in general it includes descriptions in terms of how data is collected and analysed. Descriptions of study methodologies provide critical information about the study (Krishnaswamy et al., 2009) and the techniques employed to carry it out. Study methodology also explains the manner in which data is accumulated for a particular project. The following sections address the quantitative approach of the study and the reasons behind the selection of these approaches. These sections also provide a brief explanation of the instruments used to collect the quantitative data.

Quantitative approach:

Usually a quantitative approach is used when the data is measured in numbers. Burns and Grove (2001) stated that a quantitative approach is a systematic process in which numerical data are used to obtain information about the phenomenon under study. Another definition provided by Franz (2003, p. 248) is that "quantitative study is a quantitative method to explore factors of interest. Quantitative study seeks to describe, identify, explain, or predict relationships". Furthermore, Dillon et al. (1994) believed that quantitative study is a technique involving relatively large numbers of respondents who provide descriptive information that cannot easily be obtained from the population as a whole.

One of the main objectives of the quantitative approach is to determine the relationships and patterns that can be translated into numbers in more than to words. The present study gathered quantitative data through a type of questionnaire designed as closed–ended questions. The questionnaire was composed of 3-point scale questions (Appendix 1).

Data collection process:

The process of collecting the data can be considered the heart and the key aspect of the current study because of its importance to the success of the study. In order to collect the appropriate data according to the study aims, the researcher selected the questionnaire as the instrument of data collection. This option was selected due to several considerations:

1- The familiarity of the participants to the questionnaire as tool to collect the data.
2- The researcher believes that questionnaire is the best way to collect the data that he needs, due to the structure of the questionnaire designed in 3-point likert scale.

The time of collection has been identified to be after the use of clouds in the learning process (i.e. the end of the semester of the academic year 2015).

Research strategy:

Designing the research strategy is one of the most important phases that lead to success of research implementation. The term 'study strategy' has been defined by Singh (2007, p. 188) as "a generalized plan for a problem which includes structure, desired solution in terms objectives of research and an outline of planned devices necessary to implement the strategy". The research strategy is a part of a larger development scheme of research approach. With respect to the present study, this strategy can be summarized in the following stages:

1- By the first week of the study implementation, students have been asked to build their own account on clouds with any provider of cloud computing they prefer. The objective was to give them full freedom to choose any of the cloud computing engines such as Google Drive, Dropbox, OneDrive, iCloud.etc.
2- During the past three months, students used cloud computing as a tool to upload multiple types of files such text, images, tables, etc. and to share this files with peers.
3- Several meeting were held among students in the class during the study period in order to discuss any issue faced by them during using clouds.
4- At the end of the study period, students were asked to participate in answering several questions represented in the study instrument through closed-ended questionnaire.
5- The data have been collected and analyzed in order to know the result and the recommendations are written in the light of the results obtained.

Findings of study:

The present study sought to answer the main question. ***To what extent cloud computing can be sued as a learning tool in higher education*****?** However, the answer of this question generated resulted in the following two sub-questions:

1- What is the reality and expectations of applying cloud computing as a learning technique in higher education?
2- What are the challenges hindering the use of cloud computing in higher education from students' point of view?

All of the 29 female students participated in answering all questions. By looking to the data collection method (questionnaire) appendix (1), we can see that, the questionnaire has been divided into 4 parts which represents in total two types of questions (3-point likert scale contains of 7 questions) and (open question contains of three questions).

In order to measure the reality of using cloud computing in students' academic life, the researcher asked students about their previous experiences about clouds in terms of level of knowledge and ideas about how the clouds work and how to use the clouds in learning. The answers obtained for this question is given in the following table.

Statements	I have no experience	I have somewhat experience	I have medium experience	I have good experience
Responses	8	11	9	1
Percentage	27.5%	37.9%	31%	3.4%

Table1: frequency of students answer to the first question.

Before analysing the data in table 1 we have to identify the meaning of each statement mentioned in the table above.

Experience in using clouds mean that, students have no idea about clouds in terms of the meaning of the clouds, what the clouds contains of, how to use it in learning, what the basic requirements to use it, and what clouds looks like as a learning technology.

The table shows that 27% of students don't have any idea at all about the cloud computing and they may don't know what does it mean because they never use it before or learnt about it. 37% of student which represents one third of the students' number have somewhat experience about clouds. Having somewhat experience leads us to that, students still not eligible enough to use cloud in learning. 31% of students which represents 9 students of 29 have medium experience of using clouds in learning. Finally, only one student has a good experience in dealing with clouds computing. As a result of question one, these results were not a surprise, all of these results collected from the participants before using the clouds, for this reason we can see that having experience about this technique in learning can be categorised as a (weak experience).

Analysing the data collected from the participants for question two shows that. Question two sought to identify to what degree students are satisfied to use clouds in learning. The data collected for this question came as a result of students' use of clouds in their learning during the first semester of 2015. By looking to table 2, it can be seen that

To what extent you convinced by the usefulness of this technique in your study	Extremely useful	Somewhat Useful	Neutral (usefulness not clear)	Not very useful
Responses	18	4	4	3
Percentage	56%	13.7%	13.7%	10.3%
How do you evaluate your achievements in studying the cloud computing	Excellent	Very good	Good	Weak
Responses	22	6	0	1
Percentage	57.8%	20.6%	0%	3.4%
In total: How do you evaluate yourself in using the clouds after using it	Excellent	Very good	Good	Weak
Responses	25	3	0	1
Percentage	86.2%	10.3%	0%	3.4%

Table 2: Students' responses to question 2.

The results above pointed out that, almost half of students' number using clouds as a learning tool in terms of uploading their learning materials, sharing the documents such as the tables, diagrams photos and visual and audio files. This per cent represent the majority of students while the minority of the total number of students evaluated themselves that they did not benefit from cloud computing well.

The third question sought to find out the main barriers and obstacles that may face students during using clouds in learning. However, to answer this question, students asked to select a problem or obstacles that faced them during the period of using clouds in learning. By reviewing the literature the researcher found that there are four main obstacles: The Internet and Computer, previous experience, Trust and finally Storage. For this reason, the researcher designed the third question in the light of the reviewing of the literature, thus, the question contains of these choices as in table 3.

What are the main problems faced you during using cloud computing	The internet and computer	Previous experience	Trust	Storage
Responses	14	10	3	2
Percentage	48.2%	34.4%	10.3%	6.8%

Table 3. The main challenges and obstacles facing students during using cloud computing

Nearly half of the sample members suffer from the problems related to the computers and the lack of availability of the internet service. Computer and internet problems can be summarised as a weakness the internet speed and/or interrupting the service, freezing, or slow start-ups, slowdowns, pop-ups, computer crashes, and data lose, viruses and so on. Although the privacy and security are represent an important issue among the clouds' users, but, in this research the participants selected the term trust - which represents the privacy and security- as a 10.3% a problem and challenge to use clouds computing in learning. The rationale behind this percent is that students used clouds only for the education purpose and they don't have any important documents or files uploaded to clouds. Return to table 3, the same result found in the fourth choice "Storage". Analysing students' responses in choice 3 and 4 shows that students don't think securing the data and storage space is very important for them for several reasons:

1- This the first time that students using cloud computing in learning.
2- Students' experiences and knowledge of clouds were very weak and they don't realise the importance of using clouds in learning.

Conclusion and recommendations:

Cloud computing can be considered as a new learning tool among the learners in the Saudi universities. This study sought to find out the reality, expectation and challenges of using this technique in learning through investigating 29 female students. The main aim of conducting the present study is to identifying whether this technique will help both students and teacher in higher education or not. The results of this study revealed that the majority of students have the desire to learn via cloud computing if they can overcome on the barriers and the obstacles that may face applying this technique (requirements of use and infrastructure). Regarding to students' experiences about clouds, the results revealed that most of students haven't enough experience to deal with clouds in terms of uploading and sharing the documents and multiple files. The lack of students' experiences directly effects on students' desire to learn via clouds and consuming the effort and time of the teacher when he or she using the clouds in learning. The most challenges facing students during using clouds in is that the level of equipping the classroom was very weak and not suitable to use, also the internet service is not available in most of time which makes students postpone their work until they back home or accessing the internet with others.

The present study recommending students, teachers and decision makers in Al-Baha University to take into account the importance of using cloud computing in teaching and learning. Also the teachers have to concentrate their efforts on providing students with the information and experiences about clouds in terms of how to use it and what are their uses.

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I would like to welcome you and thank you for your participation in answering this questionnaire. Your answers will be treated in strict confidence in accordance with the Data Protection Act, and used for the research purposes only. Your participation is voluntary. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time. Your decision whether or not to participate will not affect your course of study.
Please read each statement and indicate the extent to which you agree or disagree. Tick your responses.

Name (additional):…….
The previous experiences about cloud computing.
How would you rate your previous experience about cloud computing.

I have good experience	I have medium experience	I have no experience

How do you evaluate your knowledge of cloud computing after use it?

To what extent you convinced by the usefulness of this technique in your study	Extremely useful	Somewhat Useful	Neutral (usefulness not clear)	Not very useful
How do you evaluate your achievements in studying the cloud computing	Excellent	Very good	Good	Weak
In total: How do you evaluate yourself in using the clouds after using it	Excellent	Very good	Good	Weak

Challenges and obstacles.

What are the main problems faced you during using cloud computing	The internet and computer	Previous experience	Trust	Storage

Finally: Which of the following providers you have an account, and why? Google, one sky, Amazon, etc.
……Would you like to add any comments?
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……
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