

## **Student's Awareness of Cloud Computing and its Applications: Case Study at the Faculty of Administrative Sciences and Economics at Ishik University, KRG-Iraq**

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### **Abstract**

Cloud computing has become one of the major trends in the modern era. With the vast application of cloud computing and the simplicity and ease of use that related to it. Universities can use this technology to provide students and staff with tools which make the learning process easier and more productive. This paper will focus on the student side of the process, their awareness towards cloud computing and how frequently they use it. It also shed light on the student's opinion about the university administration support to integrate that new technology. The study used an online survey to collect insights for a sample of students from the faculty of administrative science and economics at Ishik University, KRG-Iraq. The findings indicated that an increase needed in the awareness and familiarity with cloud computing amongst students and that the presentation of new applications and services to the teaching process will serves as the perfect recipe for increased adoption to take advantage of their mobility and interaction.

*Keywords:* Cloud Computing, Learning, applications, Cloud services, Service Models, Deployment Models.

### **Introduction**

No one can deny that majority of students has online presence and can interact with the cloud. But do they know what is the cloud? In the simplest terms, cloud computing means storing and accessing data and programs over the Internet instead of your computer's hard drive. In other words, the cloud is just a metaphor for the Internet. In this paper we will discuss the main points about cloud computing such as its characteristics, service and be beneficial to the education sector and review whether the students are aware of it and ready to interact with its applications / services.

### **Cloud Computing Definition**

The term "Cloud" has historically been used in the telecommunication industry as an abstraction of the network in system diagrams. It then became the symbol of the most popular computer network: Internet. This meaning also applies to Cloud computing, which refers to an Internet-centric way of doing computing. Internet plays a fundamental role in Cloud computing since it represents either the medium or the platform through which many Cloud computing services are delivered and made accessible. According to the official NIST (National Institute of Standards and Technology) definition "Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

### Five Essential Characteristics [4]

Cloud computing has five essential characteristics, which are shown in Figure 1. It's important to note that the word essential means that if any of these characteristics is missing, then it is not cloud computing:

**On-demand self-service.** A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service's provider.

**Broad network access.** Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, laptops, and personal digital assistants [PDAs]).

**Elastic resource pooling.** The provider's computing resources are pooled to serve multiple consumers using a multitenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify the location at a higher level of abstraction (e.g., country, state, or data center). Examples of resources include storage, processing, memory, and network bandwidth.

**Rapid elasticity.** Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.

**Measured service.** Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service.

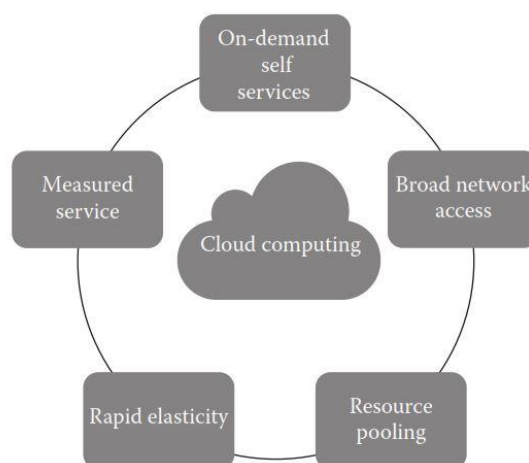


Figure 1. Cloud Computing Essential Characteristics

### Cloud Computing Service Models

There are three main cloud computing service which are shown in figure 2; Software as a service (SaaS), Platform as a service (PaaS) and Infrastructure as a Service (IaaS).

**Software as a Service (SaaS).** A SaaS proposition is aimed to deliver end-user applications and makes them available to end-users. The applications are accessible from various client devices through either web browser (e.g. web-based email), a native application or a program interface. These services are often meant to replace conventional applications (typically installed on the user's local systems). Examples of SaaS applications are: Gmail, Office365, PulseOn and Salesforce.

**Cloud Platform as a Service (PaaS).** The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure, but has control over the deployed applications and possibly application hosting environment configurations. Examples of PaaS providers are: Heroku, Google AppEngine, Amdatu and Force.com.

**Cloud Infrastructure as a Service (IaaS).** The capability provided to the consumer is to make use of processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications. Examples of SaaS applications are: Gmail, Office365, PulseOn and Salesforce.

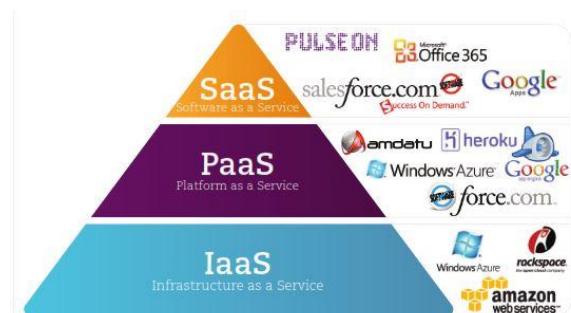


Figure 2. Cloud Computing Service Models

### Cloud Computing Deployment models

Cloud services are typically made available via a private cloud, community cloud, public cloud or hybrid cloud shown in figure 3.

**Public Cloud.** Public cloud is deployment approach that allows organizations or users to use the cloud resources. Therefore, public cloud uses WWW networks as infrastructure to communicate between customers and cloud resources. The main advantage of this approach is globalizing the business markets which give the organization the opportunities to maximize their consumers and publish their products widely.

**Private cloud.** Service is for organization usage. Compared to public cloud, private cloud has a higher security because it is only accessible by the trusted users in the organization or granted third parties. An example of using private cloud in an organization is to share customer data to their other branches. This type of cloud service is less risky, higher security, higher energy efficiency, more reliable, cost reduction and lower complexity.

**Community cloud.** Multitenant, private cloud infrastructure that supports a specific community, consisting of two or more organizations. It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

**Hybrid cloud.** The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound

together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

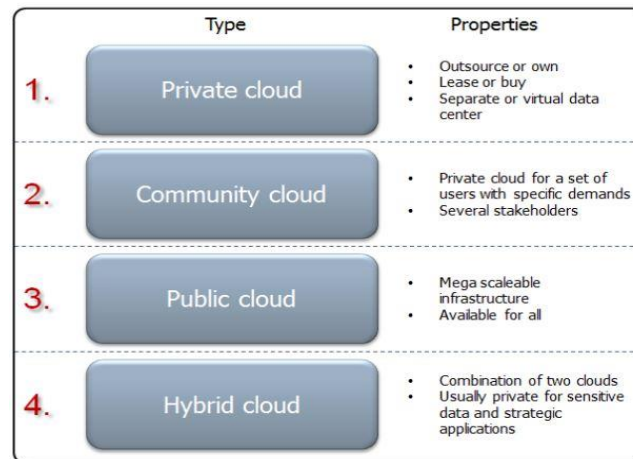


Figure 3. Cloud Computing Deployment models

### Benefits for Education

Educational institutions have been quick to realize the advantages of cloud technology and have been eagerly adopting it for several reasons, including:

- 1- Ability for the students to access data anywhere, anytime, to enroll in online classes and to participate in group activities.
- 2- The value of combining business automation processes to streamline subscription, class enrollments and assignment tracking, thus reducing expenses significantly.
- 3- Ability for the institutional body to leverage the storage cloud to store the daily 2.5 quintillion bytes of data securely and without the need to cater to a complicated infrastructure.
- 4- The benefit of process billing and charging for education and non-education related activities.

While these are probably most obvious in a mature and developed market, cloud computing technology also offers benefits to students from developing countries. Access is now instantly available and in many instances free thanks to the proliferation of websites dispensing educational material and cloud knowledge-sharing communities. A simple internet connection can go a long way.

### Some Services Available to Educational Institutions

- 1- Microsoft for Education: Microsoft is one of the companies whose services have been reforming education for more than two decades. The Microsoft's cloud is currently available to the educational institutions in the following forms: Office 365 for Education (formerly Microsoft live@edu), Business Productivity Online Suite (BPOS), Exchange Hosted Services, Microsoft Dynamics CRM Online and Office Web Apps.
- 2- Google Apps for Education: Google Apps for Education is a widely used platform for outsourcing free web-based email, calendar and documents for collaborative study. Google has initiated two important campaigns for introducing improvements in the education sector. 72 of the top 100 U.S. Universities used Google Apps for Education in 2012, while Chromebooks entered 2000 schools in 2013.

- 3- AWS in Education: Amazon's AWS cloud is an education-friendly set of services that provides cost-efficient solutions to universities, community colleges, vocational schools and K-12 schools and districts. AWS users have at their disposal computing and storage resources that contribute to a creation of flexible IT infrastructure in these institutions. The global community of AWS education services has reached the number of 2,400 schools in 2013.

## Methodology

### Research Population

The research population is the students of the faculty of administrative science and economics (Business department, Accounting Department, Banking and Finance Department and International relations and diplomacy department). The researcher used a cloud service for his survey ([www.kwiksurveys.com](http://www.kwiksurveys.com)) and distributed the survey among the sample by using many methods including social media, e-mail and private messages. The research population is identified in terms by the method of the population selection and its size, as follows:

Table 1

Research Population

Population	Number of Respondents	Percentage
Business	62	91
Accounting	4	6
Banking & Finance	2	3
Total	68	100

And the sample consisted of 49% females and 51% males as showing in the figure 4

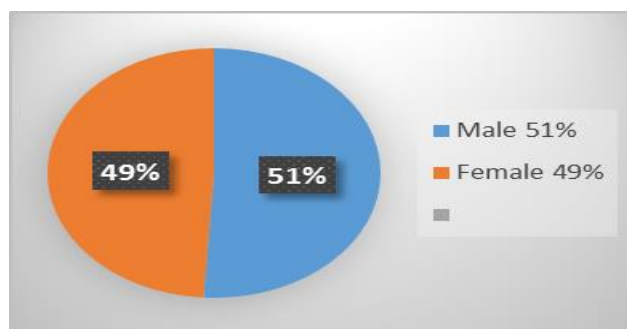


Figure 4. The gender

### Questionnaire design and data collection

The questionnaire is composed of six parts as follows:

- First part: Personal data which consist of (3) items.
- Second part: use of computers and devices for accessing the internet which consist of (3) items
- Third part: Cloud computing Awareness which consist of (2) items
- Fourth part: use of cloud computing application which consist of (1) items
- Fifth part: students opinion about collaboration when using cloud which consist of (5) items
- Sixth part: students opinion about university administration support which consist of (6) items

## Results and Analysis

In the following part we will discuss the findings about each of the six parts in our survey

- **Part 1: Personal Data**

Here, in this section the personal data are characterized as the following:

- **Department**

Figure (5) shows the department distribution among the population.

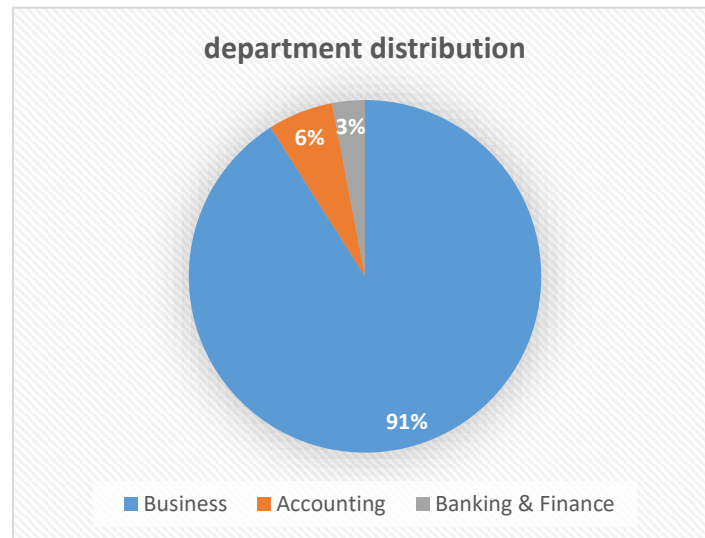


Figure 5. The department distribution among the population.

The statistics show that the responders are in Business at (91%) of the population, Accounting department (6%) and Banking and Finance at (3%) of the population.

- **Level**

Table 2 and figure 6 shows the level distribution among the population.

Table 2

Population Distribution According to level

Level	Frequency	Percent
1	5	7
2	10	15
3	14	3
4	39	57
Total	68	100

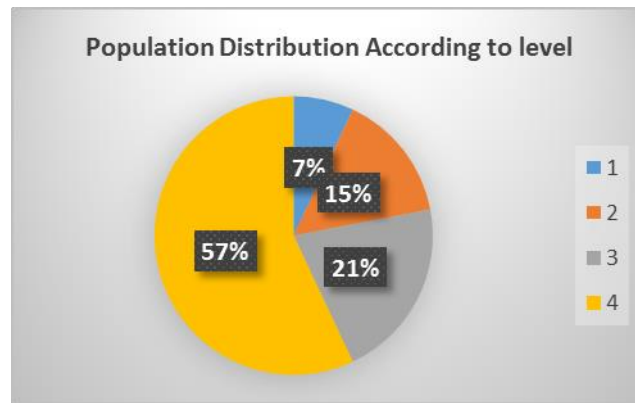


Figure 6. Population Distribution According to level

The statistics show that the majority of responders at level four with (57%) of the population, level three with (21%) of the population, level two with (15%) of the population, level one with (7%) of the population.

- **Part 2: Use of computers and devices for accessing internet**

The Table and figure below show the use of computers and devices for accessing internet. Respondents could select multiple answers, and distribution in tables show that the respondents mostly use smart phone with (82%) and laptop with (35%).

Table 3

Percent use of Computers and devices for accessing internet.

	Frequency	Percent
Desktop at home	7	10
Desktop at college	4	6
Laptop	24	35
Smartphone	56	82
Tablet	4	6

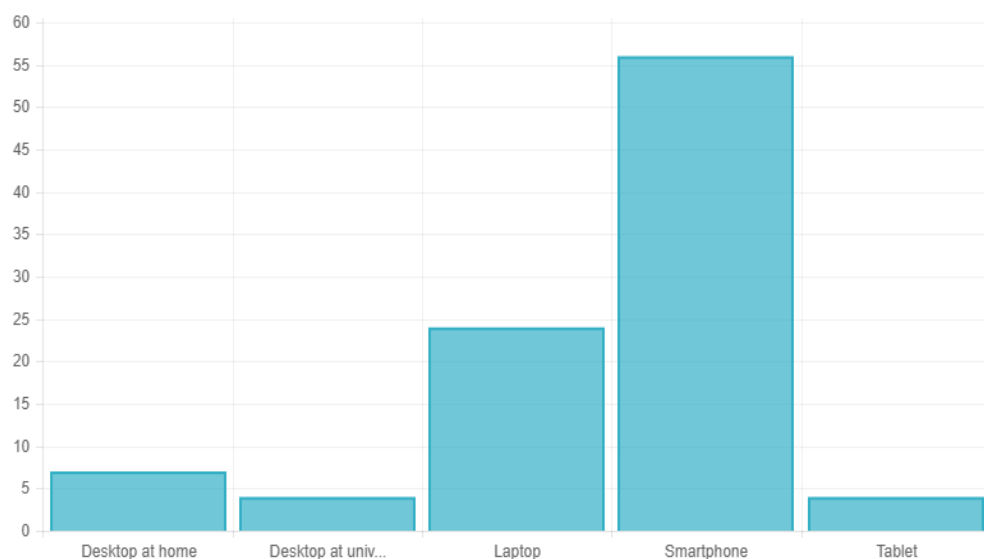


Figure 7. Percent use of Computers and devices for accessing internet

When they asked about the availability of Mobile internet subscription shown in figure 8 the respondents reported that they have internet subscriptions with (91%) and they don't have with (9%).

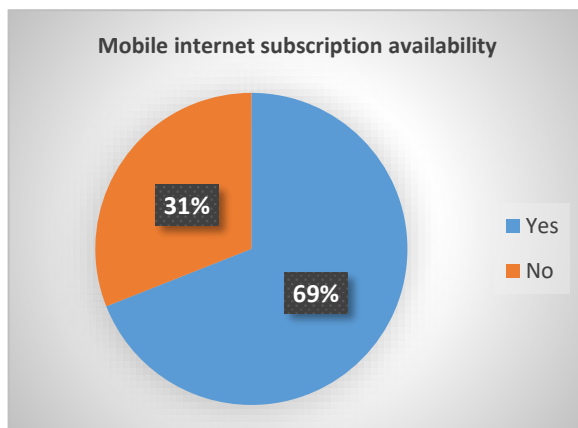


Figure 8. Percent of Mobile internet subscription availability.

Respondents also reported the frequency of Internet access shown in table 4 and figure 9, and responses were grouped into three categories: Weekends or few times a week (6%), several times a day (24%), all of the time or whenever I get an opportunity (71%).

Table 4

Frequency time for accessing the internet

	Frequency	Percent
Weekend	4	6
Daily	16	24
All the time	48	71

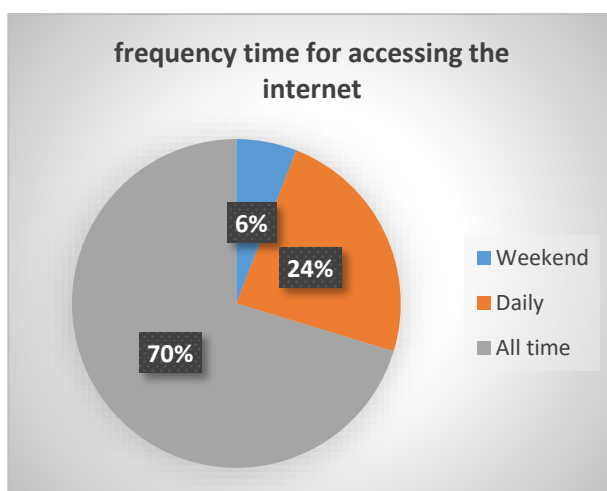


Figure 9. Use frequency time for accessing the internet

• **Part 3: Cloud Computing Awareness**

The below table 5 and figure 10 show that how many participants know about cloud computing. it shows that 46 participants (68%) are familiar with the concept of cloud computing and 22 participants (32%) are not.



Table 5

## Cloud Computing Awareness

	Frequency	Percent
Yes	46	68
No	22	32

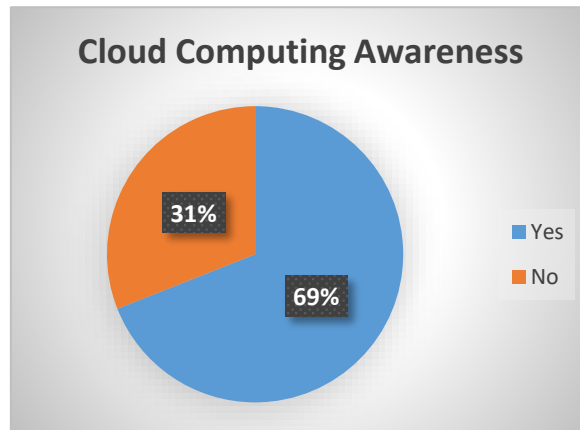


Figure 10. Percent of Cloud Computing Awareness

The table and figure below shows that 47 respondents (69%) reported that they have already used Cloud Computing services / applications, while 21 respondents (31%) reported they haven't.

Table 6

## Frequency of Cloud Computing usage

	Frequency	Percent
Yes	47	69
No	21	31

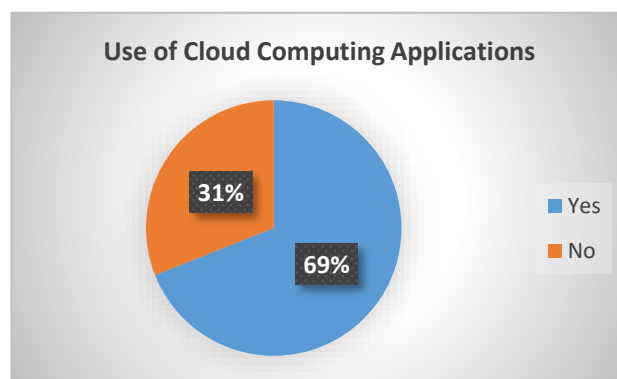


Figure 11. Use of Cloud Computing usage

- Part 4: Use of Cloud Computing Application**

The below table 12 show that Google Drive is the most popular application used by most of the participants with (60%) and one respondent specified "Mega" as a cloud service he/she is familiar with.

Table 7  
Use of Cloud Computing Applications

	Frequency	Percent
One Drive	9	13
Google Drive	41	60
Dropbox	23	34
ICloud	32	47
Box	1	1
Office 360	5	7
Adobe Creative Cloud	2	3
Amazon AWS	3	4
None	8	3
Others Please Specify	1	1

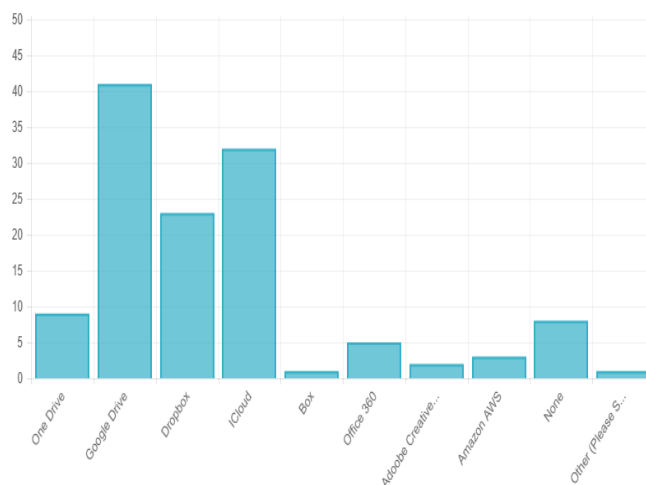


Figure 12. Use of Cloud Computing Applications

• Part 5: Students Opinion about collaboration when using cloud

Table 8  
Students Opinion about collaboration when using cloud

	1	2	3	4	5	Mean	Std
The university administration always searches for new technologies and its benefits							
#	3	7	18	31	9	3.15	1.03
%	4	10	26	46	13		
The university administration always concern to provide instructors with train for any new technology to keep pace with development							
#	2	6	26	28	6	3.44	0.88
%	3	9	38	41	9		
The university administration put flexible plan enough to accommodate any changes required by the adoption of cloud computing technology							
#	1	8	23	30	6	3.48	0.85
%	1	12	34	44	9		
University administration supports new technologies that serve the educational process, and also serves students at the university							
#	1	8	29	22	8	3.42	0.88
%	1	12	43	32	12		
University administration is seeking to maintain a competitive advantage through technology adoption and use within the marginal operations							
#	4	7	27	25	5	3.29	0.95
%	6	10	40	37	7		
There is support from the university administration in the field of information							
#	2	4	25	26	8	3.49	0.95
%	3	6	38	40	12		

After studying the results of the previous part (Students Opinion about collaboration when using cloud) we got that 3.59 (agree) based on five Likert Scale.

- **Part 6: Students opinion about university administrator support**

After studied the results showing in the table 9 related to the 6<sup>th</sup> part (students opinion about university administrator support) we got that 3.37 (neutral) based on five Likert Scale.

Table 9

Students opinion about university administrator support

	1	2	3	4	5	Mean	Std
<b>I like that my assignment will be shared with my lecturer</b>							
#	1	2	18	31	16	3.89	0.835
%	1	3	26	46	24		
<b>I like that my lecturer will be able to see my progress</b>							
#	3	3	20	27	15	3.69	1.045
%	4	4	29	40	22		
<b>I don't want the lecturer to see my assignment until its finished</b>							
#	6	8	24	22	8	3.26	1.101
%	9	12	35	32	12		
<b>I will enjoy accessing my assignment through web browser</b>							
#	2	9	21	24	12	3.52	1.024
%	3	13	31	35	18		
<b>I like that my lecturer can put feedback directly into my assignment</b>							
#	3	5	17	32	11	3.61	1.028
%	4	7	25	47	16		

### Conclusion

The purpose of this research work is to evaluate the student's awareness and uses regarding cloud computing services and application. For this purpose, a survey was conducted through questionnaires to evaluate the objectives from students of Faculty of Administrative Sciences and Economics at Ishik University, KRG-Iraq. Findings are showing that 69% of the students are familiar with cloud computing. We also found that most of the students use smart phone (82%) and have mobile internet subscription (69%) indicating their mobility. The students also reported positive reaction towards collaboration when using cloud, and reported a natural response towards university administrator support for technology adoption. An increase in the awareness and familiarity with cloud computing amongst students and the presentation of new applications and services to the teaching process will serves as the perfect recipe for increased adoption to take advantage of their mobility and interaction.

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