Perception and Usage of Cloud Storage for E-learning among University of Samarra Staff During The Period of COVID-19 Pandemic: A Pilot Study

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ABSTRACT

Cloud storage is one of the proliferated technology that supports various enterprises. It has been demonstrated as a highly efficient tool in E-learning. However, cloud storage faced several problems like size limitation and negative data repetition. Similarly, the first usage of E-learning has storage issues recorded in University of Samarra (UOS) during the COVID-19 pandemic which forced lots of universities globally to take urgent measures. Many users have complained about facing difficulty to store the cloud storage data. UOS staff faced hardness in data management resulting from over-sized, duplicated files that overwhelmed the storage capacity. This research aims at investigating the staff's perception concerning the usage of cloud storage by surveying the UOS staff's opinions. A pilot study was conducted on 37 staff who work on E-learning data management by a self-administrated questionnaire using five-point Likert scales. The questionnaire was divided into three sections: cloud storage awareness, current issues, and proposed solutions. As a result, the staff are rather aware of data management as storing and retrieving. The management process was constrained by big, duplicated image files which improperly replaced the text files. The study resulted in high acceptance of utilizing more cloud capabilities and readiness for more training to improve the proficiency of using UOS cloud storage. This study believes that the result will be of considerable benefit for the UOS staff in terms of making cloud storage more reliable and functioning. It could be also a useful guideline utilized by universities in such conditions.

Keywords: Cloud storage usage perception, Cloud-based E-learning, Cloud storage file duplication, Limitation capacity in cloud storage.

I INTRODUCTION

With the beginning of this century, many changes transformed education in a significant way that put teaching and learning in a new shape. Since then, education has been affected by methods, means, and technology (Irgashevich, 2020). The latter forced itself to be the modern solution for education problems, especially during crises such as SARS (Severe Acute Respiratory Syndrome), down to the current pandemic coronavirus COVID-19 (Hoq, 2020). Globally, E-learning plays an important role among education fields, standing on the rapid technology of the internet and developed cloudy storage stations. According to Falkowski-Gilski and Uhl (2020), huge data demands more and more storage components. Besides, the growing number of portable computer devices (i.e., laptops, tablets, mobiles) consume enormous physical capacities to store information unless aided by cloud storage technology, which comes as one of the innovative solutions for this problem. The power of the cloud storage concept is that it provides synchronized, sharable, paperless, collaborative work, and safe data housing for many types of organizations, companies, and users. Moreover, data backup is one of the important cloud storage operations, used to keep a copy in a private place with automatic control set by the own user (Riahi, 2015).

Cloud storage tends to be the best solution for storage limitations. Furthermore, it has elastic purchase options such as capacity-on-demand and other known characteristics, like the capability of using it anytime anywhere, and using multiple devices at once. It also offers monthly and yearly payment method that contains more than one plan for booking a desired capacity (Boza et al. 2017). Cloud storage technology is known as one of the newest developed scientific applications, especially in the information technology domain. It is considered as the essential mainstay for E-learning systems.

Cloud storage is known as cloud computing which is one of the cloud technology implementations that provide virtual computing services utilized by many business fields. So that, several enterprises and institutions whose main priorities are saving time, cost, and effort can make use of the features provided by the cloud storage technology. Side by side, E-learning has a growing relationship with cloud storage since they considerably depend on the internet service. Researchers Mohamed, Shaikha Saleh, Nedaa Baker Al Barghuthi, and Huwida Said (2018) find that most E-learning materials are cloud

storage shared sources, establishing new virtual learning spaces, for example, virtual classrooms, schools, and universities as a modern learning style.

Although very useful, cloud storage has countless challenges. Firstly, the users may face lateness, high cost and it demands more effort, contrary to the expected results of its features (Riahi, 2015). Besides, many cases of limited capacity have been overwhelmed by enormous data sizes and wasteful booked size, resulting in duplicated files (He, Qinlu, Bian, Shao, & Zhang, 2020). These cases cause Internet band suffocation, and, consequently, users become unable to access their data store, submit or retrieve information, a case that makes a work setback. So, it is not surprising that users could forget or lose their data. Selvi (2018) investigates the case of data duplication as the same data is stored many times, wasting a great deal of capacity. It is listed as one of the important cloud storage problems, that comes up with different technical issues. Furthermore, due to the operation managed by users, insufficient usage perception can be there as well.

In Iraq, after recording the first COVID-19 case on February 25, 2020, by the Ministry of Health (Ministry of Health, 2020), the central government rapidly embarked on taking alternative solutions for classic education as one of the series of actions to prevent the virus spread. The government lockdown all the educational institutions and forced the (Stay Home) condition against most outdoor life activities (Jebril, 2020). In sequence, they deactivated the universities, schools, and postponed institutions' works for several months. Accordingly, there were two options for the government to save the educational process; to apply E-learning in such an insufficient time, or to postpone the study indefinitely.

Thus, the decision was made by the government, and electronic exams have been conducted (Elizabeth Noor Coutts et al. 2020). It was the first time for fully applying the E-learning method in education. As quick fixes, some facilities have been allowed to enable students to carry out their exams in this emergent situation. One of these facilities was converting the written students' answers into image files, which were captured by a student's mobile device for submission. Instructions have been issued by the Iraqi government emergency team called (crisis cell) and (E-learning team) - related to the Iraqi Ministry of Higher Education and Scientific Research (MHESR), resuming the rest of education year is to be carried out by applying fully E-learning system for all institutions as a mandatory order. So, it is normal that some problems can happen when using

E-learning by students and university staff since the new education system was hastily compelled.

Likewise, UOS, one of the Iraqi universities, ranked as a youthful university, which consists of 8205 students distributed to more than 10 colleges over 25 departments (University of Samarra, 2020). It has faced a similar situation during the last academic year and was forced to use the E-learning system for the first time, too. UOS, assigned four staff members, academicians and non-academicians, to be the authorized team for each department of UOS colleges. The main mission of the authorized teams is to design, access and manage the E-learning system, taking into consideration the differences among the colleges and departments to prepare a suitable E-learning system for each one. Once E-learning begins, UOS intensive courses about the new system have been presented, and lots of assisted processes aided the students utilizing new condition chance with the education changes (University of Samarra, 2020).

However, many are complaining that they are unable to open the UOS E-learning system. The university underwent many resubmission cases and observed countless number of duplicated answers, resulting in a huge number of images that overwhelmed the UOS cloud storage capacity. These cases required too long time to manage the storage, and upgrading capacity demands more cost and more effort. More importantly, the authorized staff who were assigned to manage storage got stressed and felt boring every time they access these bloated data. Yet, the situation is worse. The results in some submission cases require using other applications to treat these resubmissions, which lead to inattentiveness and forgetfulness in such cases. Therefore, this study is proposed to investigate the perception of using the cloud storage among the UOS staff, related to its E-learning during the COVID-19 pandemic. It is intended to improve the cloud storage usage. This paper discusses the pilot study outcomes.

II   RESEARCH METHODOLOGY
The research methodology adopted in this study is a quantitative approach, as many universities around the world began using the E-learning under the COVID-19 pandemic. A pilot test was chosen to validate data collection by utilizing a survey questionnaire. The methodology was picked on the grounds that it is a valuable methodology and looks to quantify the assessment, used by (Hoq, 2020). The study's fundamental activities included are three, which began with instrument configuration, then followed by the process of data collection and analysis. The further elaboration about this study is mentioned next.

According to the research methodology, the study discussed the cloud storage perception and features and tried to investigate its current problems related to the E-learning usage. This step requires gathering new limitations during the COVID-19 pandemic, in order to sum up the most important issues for building the main research instrument. According to the research methodology, a survey questionnaire is developed by a self-administrated tool to investigate the UOS staff perception during the period of the COVID-19 pandemic, to collect the research data. The survey tool was appropriate as it returns with many benefits on research, it effectively decreases the cost, and it is easy to analyze (Hoq, 2020). Furthermore, it gives the respondents enough time to respond and confidentially deals with collecting the data. The survey content was developed by adapting from Mohamed, Ku-Mahamud, Ramli and Abdullah (2017). The total survey questions are twenty-seven (27) ones, divided into three partitions: the first part is about the respondents' demographic information. The second part consists of questions regarding the general concept for the UOS staff of the cloud storage usage in the e-learning. Then, to focus on the COVID-19 pandemic effect, the third part was created to investigate the current usage problems of the cloud storage uses in the UOS E-learning system. The scale used for these questions is the five-point Likert scale. The instrument scale is mentioned by (Sabi et al., 2016).

Regarding the data collection, as a preliminary step, general research data was collected by interviewing the UOS staff to explore the primary information about the cloud storage that supports the UOS E-learning. The selected staff involves academicians and non-academicians of the UOS for the interview. The interview questions simply discussed the causes of the observed study problems, which primarily result in identifying three main subjects in this research: usage perception, the COVID-19 effects and proposing solutions. Overall, 37 respondents were randomly selected in this study which is considered an acceptable respondents number for pilot research as mentioned by (Abd Latif, Abdullah, & Jan 2016). The whole data collection process involves printed instruments distributed to the research sample as it is quite readable, comfort and easy to respond.

III   RESULTS

The result of this study analyzes the obtained data utilizing the descriptive analysis by using the Statistical Package for Social Science software SPSS. SPSS instrument is commonly used in the field of scientific research for analyzing, examining and extracting the results of survey inputs. Thus, the collected data analyzed by this tool is variable, so that

the order of the results is presented as follows: Table 1 shows the respondents' demographic information including the frequented numbers and percentages of four position kinds, classified into two main groups: academicians and non-academicians staff groups. The academicians' group represent (78%) signifying the majority respondents' percentage that is almost (65%) of the four positions. while the non-academicians' group percentage is (21%). It is worth mentioning that all the staff are permanent employees.

Table 1. Respondents' Demography.

	Position	Frequency	Percentage
Academicians	Management and Teaching	5	13.5%
Academicians	Teaching Only	24	64.9%
Non-academicians	IT Technical	2	5.4%
Non-academicians	Other Employees	6	16.2%
	Total	**37**	**100.0%**

Table 2 indicates the respondents' answers on when they use cloud storage question, choosing one to five times. According to the table, the daily usage represents the most frequented numbers, namely (43.3%), while the teaching position of staff occupies (27.1%) among all users. However, (10.8%) illustrates the technical and other employee positions of the non-academicians' group who still do not use the cloud storage daily.

Table 2. Respondents' Cloud Storage Usage.

Times of Usage	Academicians		Non-academicians		Total
	Management	Teaching	Technical	Other	
Daily	2 (5.4%)	10 (27.1%)	2 (5.4%)	2 (5.4%)	16 (43.3%)
Weekly	1 (2.7%)	5 (13.5%)	0 (0.0%)	0 (0.0%)	6 (16.2%)
Monthly	0 (0.0%)	5 (13.5%)	0 (0.0%)	1 (2.7%)	6 (16.2%)
Yearly	2 (5.4%)	1 (2.7%)	0 (0.0%)	0 (0.0%)	3 (8.1%)
COVID-19 Period	0 (0.0%)	3 (8.1%)	0 (0.0%)	3 (8.1%)	6 (16.2%)
Staff Types Total	5 (13.5%)	24 (64.9%)	2 (5.4%)	6 (16.2%)	37 100.0%
Academicians and Non-academicians Total	(78.4%)		(21.6%)		100.0%

Next, respondents give reasons for using cloud storage by answering the questions about their willingness to use the cloud storage in the future. In Figure 1, the result shows that the majority of the respondents (32%) use the cloud storage mainly to store and retrieve information. Besides, the minority

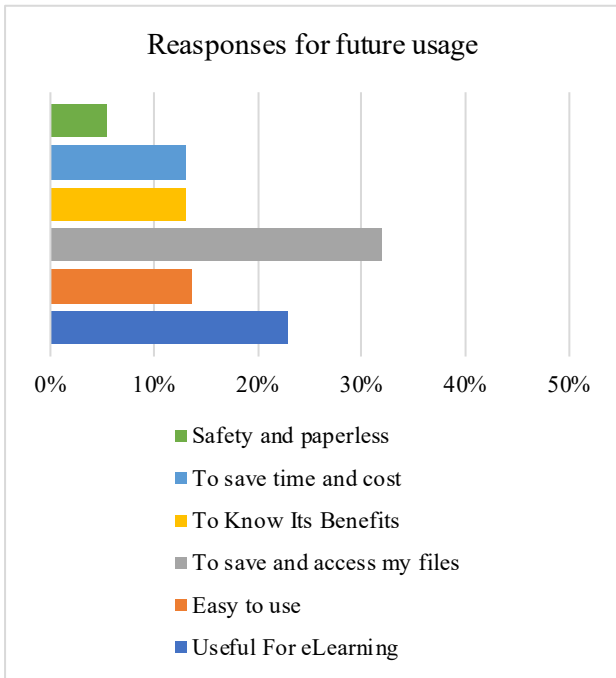(5.4%) answer the safety and paperless features for future usage.

Figure 1. Responses of the Future Usage

Then, a question was asked to the respondents if they know that the UOS cloud storage related to E-learning has limited storage. Figure 2 shows that (73%) of the respondents are aware of that, while (27%) still do not know.
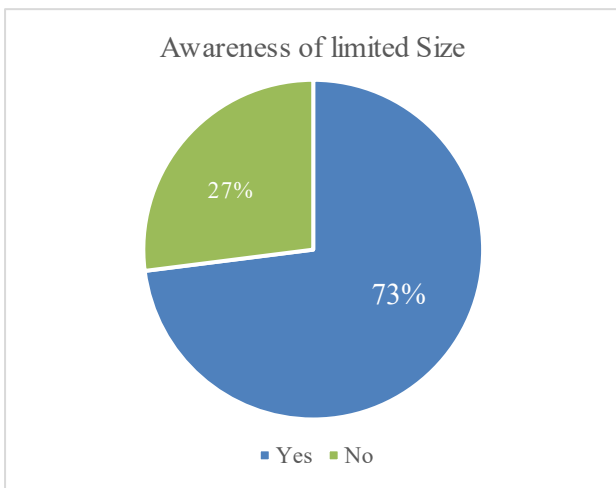

Figure 2. Awareness of Limited size of Cloud Storage

Therewith, the question of which file type stored in the cloud storage coming from the university E-learning system was asked to the respondents. The majority of respondents mentioned that the file type is the image file which consists of 70.3%, while the other types of files represent 29.7% Figure 2 illustrates the above-mentioned results.
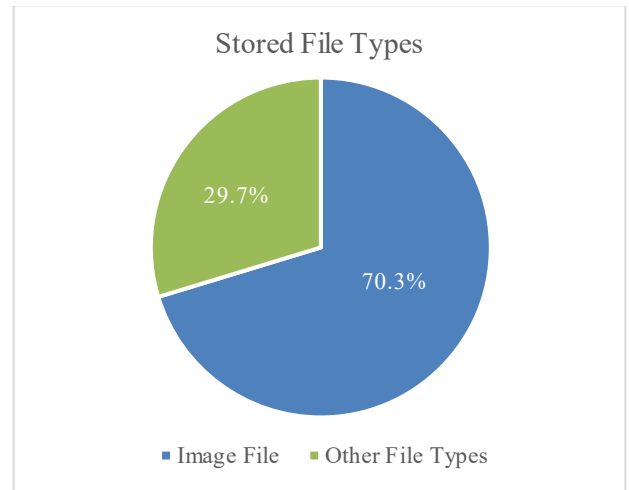

Figure 3. Stored File Types

Also, UOS E-learning receives submissions of answers (i.e., exams, reports and assignments). During the COVID-19 period, the subject is different. Thus, the result in Figure 3 presents that 54% of the respondents agreed that there are many late submission cases as a statement reviewed in the survey, demonstrating the major responses. Hence, one-tenth (5.4%) of the latter percentage shows disagreement, as they do not face any lateness case of students' E-learning submissions.
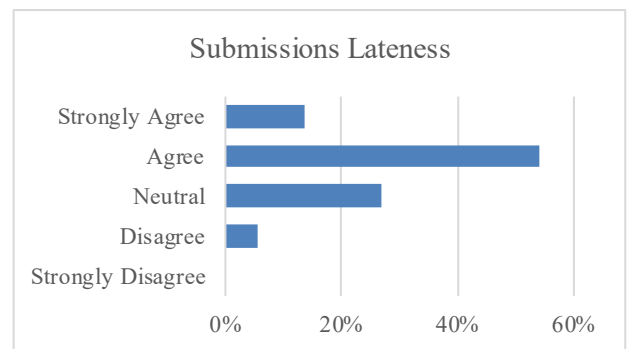

Figure 4. Submissions Lateness

In this study, the main objective is to investigate the UOS staff's perception of cloud storage usage. In that regard, respondents were required to give their opinions about the cloud storage usage awareness, current usage issues and proposed solutions. Thus, table 3 shows 14 questions classified into three groups to clarifying the three research cores. Firstly, in cloud storage awareness core, the possibility of storing many file types has been emphasized by lots of respondents as it comes the highest agreed opinions among nine statements with mean (4.10) and standard deviation (0. 7372). On the other hand, there are mean (3.37) and standard deviation (0.8929) describing the UOS staff response contrast of the neutrality and agreement about knowing the UOS cloud size limits. This contrast interprets that reason

for the limitedness of cloud storage does not come from insufficient capacity, but from big image data. Secondly, the core of the current issues presents an investigation of the new troubles of cloud storage. The UOS staff significantly agree that there are many image file duplication cases during the last UOS final exams, within mean (4.02) and standard deviation (0.7259). Based on that, UOS staff think the UOS cloud storage is been abused by storing lots of image files. Finally, most of the UOS staff believe that there is a need for more training on cloud storage usage for UOS staff, presented by mean (4.54) and standard deviation (0.7300).

Table 3. UOS staff's perception about cloud storage.

No.		Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Deviation
1		Using UOS E-learning-based cloud storage during the Covid-19 period is useful.	-	-	9 24.3%	18 48.6%	10 27.1%	4.02	0.7259
2		Cloud storage shares information resources, which makes the UOS E-learning process easier.	-	1 2.7%	6 16.2%	22 59.5%	8 21.6%	4.00	0.7071
3		Cloud storage gives me more control over my storage activities.	-	1 2.7%	4 10.8%	23 62.2%	9 24.3%	4.08	0.6822
4	Cloud Storage Awareness	Cloud storage addresses learning needs related to E-learning.	-	-	9 24.3%	20 54.1%	8 21.6%	3.97	0.6866
5		Cloud storage saves me time during my university work.	-	3 8.1%	7 18.9%	20 54.1%	7 18.9%	3.83	0.8337
6		Cloud storage reduces university employees' effort by electronically sharing work.	-	1 2.7%	5 13.5%	24 64.9%	7 18.9%	4.00	0.6666
7		Cloud storage saves cost as it saves purchasing more storage equipment in UOS E-learning.	-	2 5.4%	5 13.5%	20 54.1%	10 27.1%	4.02	0.7988
8		Cloud storage stores many types of files (i.e., Word, PowerPoint, Pdf).	-	-	8 21.6%	17 45.9%	12 32.4%	4.10	0.7372
9		Cloud storage has a limited size to use.	2 5.4%	1 2.7%	18 48.6%	13 35.1%	3 8.1%	3.37	0.8929
10	Current Issues	Many late submissions cases are been noted while working on cloud storage in the last university final exams.	-	2 5.4%	10 27.1%	20 54.1%	5 13.5%	3.75	0.7603
11		Too many cases of image file duplications are observed during cloud storage works in the last UOS final exams.	-	-	9 24.3%	18 48.6%	10 27.1%	4.02	0.7259
12		UOS cloud storage is been abused by storing lots of image files that represent the exams' responses.	1 2.7%	1 2.7%	11 29.7%	17 45.9%	7 18.9%	3.75	0.8945
13	Solutions	UOS should use all the capabilities of cloud storage.	-	1 2.7%	4 10.8%	19 51.4%	13 35.1%	4.18	0.7392
14		The need for more training for UOS staff to improve the cloud storage usage.	-	1 2.7%	2 5.4%	10 27.0%	24 64.9%	4.54	0.7300

As a whole, the results underline the necessity of correcting the work path and improving the UOS cloud storage usage for the E-learning that could be made by the UOS management, for example,

utilizing several text file types (i.e., MS office files, Pdf, and google docs). This process will save capacities, solve the submission lateness problem then it may boost the internet connection, as

suggested by (Harnik, Pinkas, & Shulman-Peleg, 2010). Also, results include utilizing all the cloud storage capabilities demanded by UOS staff, which needs more training to improve the UOS cloud storage usage, toward a successful university E-learning system. All the mentioned outcomes have significant indications that would lead to correct usage perception.

IV   DISCUSSION

In the findings, the study reveals many issues in cloud storage usage subject. To some extent, the UOS staff have good knowledge about the cloud storage using in the E-learning. They also show a very positive attitude about the cloud perception points, which defines that there is a relationship between cloud storage and E-learning since the two topics work connectively as well as they use the same technology structure. The cloud storage features awareness has also been highly agreed by the staff, utilized in the relevant E-learning. As the result, the staff emphasize using all the UOS cloud storage capabilities through their experiential usage in UOS E-learning and mostly believe that there will be further improvement in the near future through new training. However, there are still existing problems in cloud storage usage, specifically the insufficiency of the UOS cloud storage capacity, too many duplicated files and overwhelming the cloud storage with the misused file type. Similarly, using algorithms to decrease files repetition, Selvi (2018) suggests a solution for the cloud capacity wasting as a cloud usage problem. Also, researchers He et al. (2020) find out a useful framework for decreasing data duplication in cloud storage by using Hadoop technology, while the current research tries to treat the causes of such misusage. On the other hand, researchers Kaseb et al. (2019) resulted in developing a model utilizing such duplicated data in the cloud technology for availability, reliability and reducing the cost of data recovery.

As restrictions, this study faced some limitations such as the general institutions' ban, that has slowed the process of collecting the data. Extraordinary pandemic conditions forced this study to investigate in only one institution with the first time of applying the E-learning among a limited number of respondents, which draws attention that the research outcomes may not be generalized. Therefore, this research must be applied in such an application due to the study result may not apply to a big number of respondents.

V   CONCLUSION

The study dialogue highlights the UOS staff opinions, identifying the usage perception deficits. The staff shows a high desire for receiving more training in the near future and utilizing further cloud

characteristics, which gives hope of accomplishing fruitful outcomes of UOS E-learning application. Moreover, extraordinary COVID-19 pandemic condition needs investigation on such E-learning system based on cloud storage technology due to the impact of negative usage. This study focuses on the staff usage perception since it was under an emergent situation, and it found out that management misusages are the research issue. After improving staff management work, the study looks forward to suggesting investigating the student perception usage as future work by the UOS management. This pilot research outcomes would be utilized as a guideline for the UOS management. The next step in this study will be conducting the real data collection.

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