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How Security Affects Students' Use of Cloud Storage Services at Zawia University

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ABSTRACT

The researchers look at how security factors impact students' decision to use cloud storage services. Cloud storage is popular because it's easy to use, but it's important to know what makes students want to use it. This is crucial for companies that provide these services. We used a framework to study these security factors and find out what students worry about when using cloud storage. We did this by reading lots of research and doing surveys. We found the majority of students care about the risks and costs. They worry about the safety of their data and how much it might cost them. Also, things like keeping data private, making sure it's always available, and keeping it intact can stop students from using cloud storage. Finally, trust in the company that provides the service is important. Students need to believe the company is reliable and safe. Understanding these things can help companies make cloud storage better and address students' concerns.

Keywords: Cloud Storage Services, behavioral intention, Security Factors, Zawia University

كيفية تأثيرعوامل الأمان على إستخدام الطلاب لخدمات التخزين السحابي في جامعة الزاوية

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الملخص:

الباحثون ينظرون إلى كيفية تأثير عوامل الأمان على قرار الطلاب باستخدام خدمات التخزين السحابي. يعتبر التخزين السحابي شائعًا لأنه سهل الاستخدام، ولكن من المهم أن نعرف ما الذي يجعل الطلاب يرغبون في استخدامه. هذا أمر حيوي للشركات التي تقدم هذه الخدمات. لقد استخدمنا إطارًا لدراسة عوامل الأمان واكتشاف ما يقلق الطلاب عند استخدام خدمات التخزين السحابي. قمنا بذلك من خلال قراءة الكثير من الأبحاث وإجراء استطلاعات. اكتشفنا أن الغالبية

العظمى من الطلاب يهتمون بالمخاطر والتكاليف. حيث يشعرون بالقلق بشأن سلامة بياناتهم وكم قد يكلفهم الأمر. أمور مثل الحفاظ على خصوصية البيانات والتأكد من توفرها دائمًا والحفاظ عليها بشكل سليم يمكن أن تمنع الطلاب من استخدام التخزين السحابي. أخيرًا، تعتبر الثقة في الشركة التي تقدم الخدمة أمرًا هامًا. الطلاب يهتمون بموثوقية وأمان الشركة التي تقدم لهم هذه الخدمة. فمثل هذه الأمور يمكن أن تساعد الشركات في جعل خدمات التخزين السحابي أفضل والتقليل من مخاوف الطلاب.

الكلمات المفتاحية: خدمات التخزين السحابي، النية السلوكية، العوامل الأمنية، طلاب جامعة الزاوية

Introduction:

Cloud storage services have become more and more popular as technology has advanced. These services allow people and businesses to store and access their data easily. The internet played a big role in this, and now we have something called Cloud Storage Services (CSS), which is a modern way to store data. Imagine a "cloud" as a huge pool of computer resources, including data storage. Cloud services are like virtual resources for things like data storage, software, and more. Big companies like Amazon and Google run most of these services. You've probably heard of services like Dropbox, Google Drive, Apple iCloud, and Microsoft SkyDrive. They let you store your data and share it with others. You can access your data from different devices through the internet. To keep your data safe, you usually need a password.

But there are things that affect how much people use cloud storage services. We need to understand these factors to make these services better and get more people to use them. Here are some important factors that can influence whether people use cloud storage services:

Safety in the Cloud: When we talk about safety in the cloud, we mean keeping your data and the computers that store it safe. This is different from keeping data safe in traditional computer systems. In the cloud, you're giving your data to a company to take care of, and you might not fully trust them. There are also risks from people both inside and outside the company, and they could use these weaknesses to harm your data. These risks can affect things like the privacy of your data, making sure it's not tampered with, and being able to access it when you need it. Some companies might even hide data breaches

or delete your data without you knowing. So, safety is a big concern when using cloud storage services.

Security and Privacy Worries: People are concerned about the safety and privacy of their data in the cloud. They want to make sure their data is kept safe from people who shouldn't access it, and they don't want their data to be lost or stolen. To ease these worries, the companies that provide these cloud services should use strong security measures and explain how they protect people's privacy.

Trust in the Service Provider: Trust in the company that offers the cloud storage service is very important for users. People need to believe that the company is reliable and does things with their data in an honest way. This trust is built on things like the company's reputation, how dependable the service is, and how transparent they are about handling data.

Tech-Savvy People May Use Cloud Storage More: People who are comfortable with technology are more likely to use cloud storage. This study helps us understand the important things that influence whether people use cloud storage services. By paying attention to these factors, the companies providing these services can better meet people's needs, build stronger relationships, and make cloud storage services even more popular in the digital world.

Methodology:

In this study, we found out what makes students at Zawia University decided to use cloud storage services. We asked 150 students who were currently at Zawia University in 2022 about their thoughts on this topic.

We used a specific way of doing research called "quantitative research." This means we collected and analyzed numbers and data to understand the topic better. We want to understand the factors that affect students' intentions to use cloud services.

To do this, we created a questionnaire, which is a set of questions we ask people to answer. The questionnaire had two parts. The first part had questions about the students' personal information, like their age and gender.

The second part had four sections with a total of 18 questions. The first section asked about the students' intentions to use cloud

storage services, the second section asked about data integrity, the third section asked about data confidentiality, and the fourth section asked about data availability. We used a 5-point scale to rate the answers: 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, and 5 = strongly agree.

Research Hypotheses:

Based on the findings from previous research by Venkatesh and others, along with studies by Moryson and Moeser and Yamin and Ishak, we have come up with the following ideas:

H1: If there are risks to the integrity of data in cloud storage, it will make people less likely to want to use it.

H2: If there are risks to the confidentiality of data in cloud storage, it will make people less likely to want to use it.

H3: If there are risks to the availability of data in cloud storage, it will make people less likely to want to use it.

Results and Discussion

Demographic Questions

The results in Table 6.1 show that most of the people in our study, 145 out of 150 (about 97%), have used cloud storage before. Among those who use cloud storage, about 53% of them use only one cloud storage service. About 21% use two, 21% use three, and only 4% use more than three cloud storage services. The most popular cloud storage applications are Dropbox (used by 32%), Google Drive (used by 30%), OneDrive (used by 22%), and 16% use other apps.

Additionally, more than half of the participants, 53%, use public cloud storage. About 39% of the participants have been using cloud storage for more than two years, and nearly half, 48%, use cloud storage once a week.

Table 1: **Demographic characteristics (N=150)**

Item	Total Number of response	N (%)
Which cloud storage are you using	260 of Multiple Response	
Dropbox		83 (31.9%)
GoogleDrive		77 (29.6%)

OneDrive		58(22.30%)
Anothr apps		%);1.6 (142
Experience in using cloud storage	150	
<1year		46 (30.7%)
1-2years		46 (30.7%)
>2years		58 (38.7%)
Type of cloud storage using	150	
Public		79 (52.7%)
Private		13 (8.7%)
Both		22 (14.7%)
Don’t know		36 (24.0%)

Reliability

We wanted to make sure that the questions in our questionnaire consistently measured the same thing. To do this, we used a measure called Cronbach's alpha. This measure gives a number between 0 and 1, with higher numbers meaning better consistency. A value of 0.70 or higher is considered good.

Before the main study, we did a smaller test with 10 students to see if our questionnaire was clear and easy to complete. All the students found it clear and could finish it in about 10 to 15 minutes. This test showed that the questions about behavioral intention to use cloud storage services had good consistency, with a Cronbach's alpha of 0.846.

Factor Analysis

Factor analysis is a way to make a big set of questions into smaller groups, making it easier to understand. We used this method to group similar questions together and see if they fit our four factors we were interested in.

In our study, we found four groups naturally. These groups were: behavioral intention to use (BI), data integrity (Int), data confidentiality (Con), and data availability (Ava). We looked at how well the questions in each group matched with that group. The results

in Table 6.2 show that there was a good match between the questions and their groups. This helps us understand our data better, as the factor loadings ranged from 0.639 to 0.876. This means our groups make sense and help us analyze our data.

Table 2: result of the factor analysis

Items	Factor 1 (BI)	Factor 2 (Int)	Factor 3 (Con)	Factor 4 (Ava)
Using cloud storage services is a good idea	0.806			
Working with cloud storage services is useful	0.806			
I like working with cloud storage services	0.630			
Working with cloud storage services is interesting	0.684			
I intend to use cloud storage services in the coming days	0.754			
I predict I will use cloud storage services in the coming days	0.837			
I plan to use cloud storage services in the coming days	0.825			
I am afraid that my information can be modified (altered or corrupted) when they are kept in cloud storage services.		0.865		
I would be concerned that in the cloud storage services my information is not sufficiently protected against modifications.		0.800		
In the cloud storage services, accuracy of information can hardly be guaranteed.		0.804		
In the cloud storage services, my information can be accessed by unauthorized people.			0.822	
In the cloud storage services, my information is not protected sufficiently.			0.876	
In the cloud storage services, authorized access to my information can hardly be guaranteed.			0.807	
Data stored in the cloud storage services will not be available at any time at any place.				0.639
The data availability would depend on the availability of internet connection.				0.672
The capacity (band width) of cloud storage will affect the availability of my data				0.647

I should ensure that a backup exist to tolerate hardware failure.				0.792
All servers should be continuously available for reliable cloud storage services.				0.659

Behavioural intention to use cloud storage services

When it comes to people's thoughts about using cloud storage services, more than half (52%) of the respondents agreed that using these services is a good and useful idea. However, only about 43% of the respondents agreed that they like using cloud storage services and find it interesting to work with them. (See Table 6.3 for more details.)

Table 3: Descriptive result of Behavioural intention to use cloud storage service.

Items	Strongly disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly agree N (%)	Mean ± SD
Using cloud storage services is a good idea	0(0%)	2(1.3%)	38(25.3%)	78(52%)	32(21.3%)	3.93 ± 0.720
Working with cloud storage services is useful	0(0%)	4(2.7%)	40(26.7%)	75(50%)	31(20.7%)	3.89 ± 0.756
I like working with cloud storage services	0(0%)	4(2.7%)	55(36.7%)	65(43.3%)	26(17.3%)	3.75 ± 0.768
I intend to use cloud storage services in the coming days	0(0%)	6(4%)	41(27.3%)	67(44.7)	36(24%)	3.89 ± 0.815
I predict I will use cloud storage services in the coming days	0(0%)	8(5.3%)	42(28%)	70(46.7)	30(20%)	3.81 ± 0.814
I plan to use cloud storage services in the coming days	0(0%)	4(2.7%)	42(28%)	71(47.3%)	33(22%)	3.89 ± 0.773

Integrity

When it comes to data integrity, here's what the respondents said:

- Most of them, about 44%, agree with the statement that they are worried their information could be changed or corrupted when it's stored in cloud storage services.
- Almost half, around 47%, are concerned that their information might not be well protected from changes in cloud storage services.
- More than one-third, about 44%, agree that it's hard to make sure their information is accurate when using cloud storage services. (See Table 6.4 for more details.)

Table 4: Descriptive result of Integrity

Items	Strongly disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly agree N (%)	Mean ± SD
I am afraid that my information can be modified (altered or corrupted) when they are kept in cloud storage services.	4(2.7%)	16(10.7%)	45(30%)	66(44%)	19(12.7%)	3.53 ± 0.939
I would be concerned that in the cloud storage services my information is not sufficiently protected against modifications.	3(2%)	13(8.7%)	52(34.7%)	70(46.7%)	12(8%)	3.50 ± 0.841
In the cloud storage services, accuracy of information can hardly be guaranteed.	2(1.3%)	11(7.3%)	56(37.3)	66(44%)	15(10%)	3.54 ± 0.824

Confidentiality

When it comes to keeping information private, here's what the respondents said:

- A majority of them, about 41.3%, agree that their information can be seen by people who shouldn't see it when using cloud storage services.
- Only 34.7% of the respondents agree that their information is well protected.
- Additionally, 40.7% of the respondents agree that it's not easy to make sure that only authorized people can access their information when using cloud storage services. (See Table 6.5 for more details.)

Table 5: Descriptive result of Confidentiality

Items	Strongly disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly agree N (%)	Mean ± SD
In the cloud storage services, my information can be accessed by unauthorized people.	6(4%)	30(20%)	45(30%)	62(41.%)	7(4.7%)	3.23 ± 0.956
In the cloud storage services, my information is not protected sufficiently .	6(4%)	31(20.7)	49(32.7%)	52(34.7)	12(8%)	3.22 ± 0.996
In the cloud storage services, authorized access to my information can hardly be guaranteed.	3(2%)	25(16.7%)	53(35.3)	61(40.7)	8(5.3%)	3.31 ± 0.882

Availability

When it comes to having access to your data, here's what the respondents said:

- Just over one-third (34.7%) agreed that data stored in cloud storage services might not be available all the time, from any place.
- Nearly half (48.7%) of the respondents agreed that having access to data in cloud storage services depends on having an internet connection.
- More than half (52%) of the respondents agreed that the speed of their internet connection can affect whether they can get to their data.

- Also, around 51.3% of the respondents agreed that they need to make sure they have a backup of their data in case the computer system has a problem, and the servers that hold their data should always be available for reliable cloud storage services. (See Table 6 for more details.)

Table 6: Descriptive result of Availability

Items	Strongly disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly agree N (%)	Mean ± SD
Data stored in the cloud storage services will not be available at any time at any place.	13(8.7%)	28(18%)	52(34.7%)	48(32%)	9(6%)	3.08 ± 1.046
The data availability would depend on the availability of internet connection.	0(0%)	9(6%)	38(25.3%)	73(48.7%)	30(20%)	3.83 ± 0.817
The capacity (band width) of cloud storage will affect the availability of our data	3(2%)	9(6%)	41(27.3%)	78(52%)	19(12.7%)	3.67 ± 0.847
I should ensure that a backup exist to tolerate hardware failure.	2(1.3%)	4(2.7%)	44(29.3%)	77(51.3%)	23(15.3%)	3.77 ± 0.789
All servers should be continuously available for reliable cloud storage services.	1(0.7%)	1(0.7%)	41(27.3%)	77(51.3%)	30(20%)	± 0.743

Hypothesis Testing

Table 7.1 shows that one hypothesis was accepted in this study which are (H2), while, (H1, H3) were rejected.

Table 7: Result of Hypothesis Testing

	Hypothesis	Result
H1	Integrity → Behavior Intention to Use	Rejected
H2	Confidentiality → Behavior Intention to Use	Accepted
H3	Avalibility → Behavior Intention to Use	Rejected

Conclusion and Discussion

In this paper, we found that the confidentiality of data significantly affects people's intention to use cloud storage services. This means that when people are concerned about keeping their data private, they are less likely to have a positive attitude towards using cloud services.

Data confidentiality can make people more sensitive about using cloud services and less likely to feel good about using them. Our study shows that worries about data confidentiality, like how well your data is protected, can stop people from using cloud storage services.

Surprisingly, data integrity and data availability don't directly impact people's intention to use cloud services. It seems like integrity and availability affect intention directly and don't go through attitude. In simpler terms, people's concerns about the accuracy and availability of their data don't seem to have a direct impact on whether they choose to use cloud services or not.

Recommendations

This paper's main recommendation is about data confidentiality, which is all about keeping your data private. We found that concerns about data confidentiality can make people less likely to use cloud storage services. It means that service providers, the companies that offer cloud storage, need to understand how users feel about their data privacy. To make cloud storage more popular, it's important for them to improve the confidentiality of users' data and make sure it's well-protected.

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