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Enhancing User Experiences with Cloud Computing via Improving Utilitarian and Hedonic Factors

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Abstract: This study provides insights into the initial and post-adoption of cloud computing services by integrating information technology adoption, social influence, trust, security, and information systems quality theories. Social influence, hedonicity, and automaticity are hedonic predictors of user satisfaction with cloud computing services. Perceived risks, trust in the provider, and system quality are utilitarian predictors of user satisfaction with cloud computing services. The Partial Least Squares (PLS) was employed to test eight hypotheses on the causal relationships between the variables. Six out of eight hypotheses were supported. Hedonic factors appear to have more influence than the utilitarian factor of increasing user satisfaction with cloud computing services in the school setting. The findings lead to both theoretical and practical implications for improving the initial and post-adoption of cloud computing services.

Keywords: cloud computing; perceived risk; user experiences; utilitarian factors; hedonic factors

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1. Introduction

In the process of creating new services and products, innovation is considered to be one of the most critical factors that play a major role in developing new markets, transforming industries, and promoting an organization's competitiveness [1–3]. Cloud computing has been regarded as one of the innovative technologies that are playing a major role in revolutionizing how we conduct activities in the modern world. Cloud computing has been described as a model which enables ubiquitous, on-demand, and convenient networks that allow the sharing of configurable computing resources, which include applications, services, networks, servers, and storage resources [4]. Cloud computing makes it easier to both provide and release these cloud computing resources with minimal service provider interaction or management effort. In accordance with Miller [5], cloud computing signifies a new trend in the development and distribution of IT infrastructure, software solutions, and platform solutions to organizations and individuals. Despite cloud computing being a novel technology, it has continuously gained huge popularity and attracted attention from developers and various users [6]. Having evolved from the grid, utility, and distributed computing, it has led to the proliferation of great mobile apps.

Hedonism is an important basis of user satisfaction with some information systems, such as m-business applications [7]. When developing information systems with a hedonic nature, developers need to carefully consider intrinsic motivators, like perceived enjoyment, because they have more influence than extrinsic motivators on the adoption decision of users [8]. Cloud computing has both utilitarian and hedonic natures, depending on its

intended purpose. Online streaming apps, like Netflix and Amazon Prime, leverage the prospect of cloud computing to its benefit. Cloud-based natural-language intelligent tools, such as Google Assistant, Siri, and Alexa, are chatbots utilizing the cloud computing competencies to deliver tailored, context-applicable customer experiences. Social media, like LinkedIn, Twitter, and Facebook, help people to connect via cloud computing. Users primarily use these cloud computing services for pleasure.

In contrast, Microsoft Office 365 and Salesforce are a software as a service (SAAS), which are utilized by individuals and businesses to improve their personal productivity. Hadoop, Cassandra, and HPCC are open source cloud tools that help automate the data collection process [9]. Cloud computing is not necessarily categorized as being either a hedonic or utilitarian system because it can be used for both functional and pleasure purposes. Google Drive and Dropbox can be used alone or in conjunction with other cloud computing services for both these purposes. When the boundary condition of cloud computing becomes blurred, it is vital to properly measure whether the adoption of these hybrid cloud systems can survive the validity tests of the well-established theories [10].

As more people embrace cloud computing, users and companies face service, security, and scalability challenges. Cloud-based services have top security concerns: data breaches, hijacking accounts, insider threat, malware injection, abuse of cloud services, denial of service attacks, insufficient due diligence, shared vulnerabilities, and data loss [11,12]. Users are susceptible to these potential security threats and have a high attrition rate. As cloud computing applications are becoming more available and competition between them becomes intense [13], users can easily switch from one application to another [14]. Therefore, research topics on reducing the attrition and increasing the continuance usage of cloud computing applications have become current, urgent, and relevant.

This study tries to understand the relative effect of hedonic and utilitarian factors on the decision of cloud computing adoption by individual users in the educational setting. Automaticity, perceived playfulness, and social influence are all hedonic and intrinsic factors adopted from the hedonism and social network theories. Service quality, trust in cloud computing providers, and perceived risks are utilitarian and extrinsic factors adopted from the success of information systems, as well as information security theories. Based on these four theories, we construct a framework to investigate whether these six factors can influence the satisfaction level of users with hybrid cloud computing services and to what extent. This understanding can offer insights into the relative importance of improving hedonic or utilitarian features of hybrid cloud computing services in increasing user satisfaction with their use in the educational setting.

2. Conceptual Formation

2.1. Hedonic Use of Cloud Computing Services

Cloud service providers (CSP) are emphasizing value-based service offerings because users often do not understand the service cost (or intrinsic value), but are more willing to pay if they have a high perceived value (or extrinsic value) of the received cloud services [15,16]. Hedonic values are an important extrinsic value and have a significant influence on an individual's perceived benefits [17]. Thus, the hedonic qualities of cloud computing could be perceived as being more important to general users than utilitarian qualities. Many types of research have shown the growing effect of hedonic use on the adoption of information systems, such as smartphones [18], Push to Talk [19,20], and the virtual world [21].

Social influence, the hedonic factor [22], and automaticity are three influential antecedents for the individual adoption of information systems with network externalities [23,24]. Many cloud computing services, such as Google Drive, Dropbox, Moodle, AWS, and Zoom, entail these three important attributes. For instance, Zoom is a scalable cloud-based video conferencing system that can be made available to students so that anyone can host a virtual meeting and include more participants. The virtual background feature embedded in each Zoom meeting enables students to not only conduct a formal

virtual meeting but also host any social event (e.g., birthday and farewell parties). Google Drive allows students and faculties to collaborate in creating, storing, and disseminating both work-related and social information. All this cloud computing is always available, convenient, and provides ubiquitous network access to a shared platform that comprises configurable computing resources. Automaticity is also an important feature as users can intuitively configure cloud computing resources to perform their tasks and have a gratifying experience. The sections below will center on the potential effect of these three hedonic influences on user satisfaction.

2.2. Utilitarian Use of Cloud Computing

User satisfaction with an information system depends not only on hedonic but also utilitarian outcomes. The utilitarian aspect stands for the intended purpose of using an information system to accomplish a predetermined goal, such as improved productivity, task performance, seeming simplicity, and seeming practicality [25]. By using music information-seeking services, users are happy when they can increase their music knowledge, enrich their listening experience or optimize future music acquisition by acquiring information about music [26]. Both seeming simplicity and seeming practicality are important utilitarian drives for improving user satisfaction with social media like Facebook. Smartwatch users are satisfied with utilitarian features, such as controllability and easy navigation of the traditional square shape [27]. Thus, utilitarian motivation is an essential element of improving user satisfaction with an information system. The following section will discuss the impact of three utilitarian motivations on user satisfaction with cloud computing: perceived risks, trust in the provider, and perceived service quality.

3. Development of the Hypotheses

3.1. The Impact of Social Influence on User Satisfaction with Cloud Computing Services

Social influence, with its various information systems, such as mobile instant messaging [28], ERP systems [29], mobile wallet service [30], and mobile computing [31], is an important driver for user satisfaction. The social contexts of individual users can result in a social influence that affects the satisfaction of users with an information system [32]. For instance, employees, community members, and professional members can use social media like Facebook for various purposes and have different gratifying experiences.

The worldwide presence of cloud services and related support are two major enablers of Google cloud computing applications [33]. These two enablers are embedded with a social influence factor that predisposes users to adopt cloud computing to socially connect with others [34]. Cloud computing enables team members to complete collaboration tasks quicker with better outcomes than traditional collaboration systems [35]. When deciding whether to adopt cloud computing to complete collaboration tasks, most team members need to be happy with the usefulness of the tool to complete their group tasks [23]. Therefore, the presence of social influence is evident in the process of adopting cloud computing that enables users to connect anytime and anywhere. Hence, we propose that:

Hypothesis 1 (H1). *Social influence has a positive effect on user satisfaction with cloud computing services.*

3.2. The Impact of Hedonism on User Satisfaction with Cloud Computing Services

Hedonism talks about users' pleasurable emotions or their happiness with the adopted information system [8]. The hedonic factor has a vital part in the decision of users to adopt an information system, such as m-business [36], smartwatches [37], and social media [25]. Some cloud computing applications are embedded with hedonic characteristics, such as cloud gaming services, Instagram, and Amazon Prime Movies. Users are engaged with cloud computing applications for purely a hedonic purpose. When users achieve their hedonic purpose via the adopted cloud computing services, they are more likely to express satisfaction and carry on using them. For instance, Instagram users express their satisfaction

with their likes and comments when they feel happy about using them to socially connect with others [38]. Some cloud applications are used primarily for utilitarian purposes, such as Salesforce, Dropbox, and Amazon Lumberyard (the mobile game development tool). Users can still be gratified by the accomplishment of their tasks with these cloud productivity tools.

Other cloud computing can also serve both utilitarian and hedonic purposes, depending on the nature of its use. For instance, Zoom is a cloud-based video conferencing tool that can be used for a formal meeting or an informal social gathering. In the former case, users might only use the utilitarian features of cloud computing, such as recording and sharing slides and business cases for group discussion. In the latter case, users can use emojis and change backgrounds to entertain each other during an informal chat session. Irrespective of the utilitarian outcomes, the intrinsic belief of perceived enjoyment can lead to user satisfaction [39] and continue to drive the users' adoption decision to continue using cloud computing. Hedonic motivations have a strong effect on the adoption objective of cloud-based e-learning systems [40], with many cloud medical services incorporating hedonic factors in their design to enhance user satisfaction, improve therapy compliance, and bring about a change in lifestyle [41]. Thus, we propose that:

Hypothesis 2 (H2). *Hedonism has a positive impact on user satisfaction with cloud computing services.*

3.3. The Impact of Automaticity on User Satisfaction with Cloud Computing Services

Automaticity stands for effortless, involuntary, and unconscious information processing process [42]. Unlike the intentional setting of goals, the automatic information process occurs without it needing to be monitored and encouraged. Such an automatic process can happen due to genetic prewriting or routinization by practice [43]. For instance, the Automaticity perspective argues that habits are automatic actions that are frequently performed without any reasoning process or intentions before they take place [44–46].

Information systems scholars have adopted automaticity to explain information system adoption behaviors. One study shows that past behavior that is shaped by frequent usage can help the users to form a positive attitude towards the continued usage of an information system [47]. The stronger and more frequent the habit is, or greater the automaticity of using the same information system to attain the goals, the more satisfied users are with the adopted system, and the more they will aim to keep using the system to carry out the same tasks [48]. Automaticity has a huge impact on the increased intention of users to adopt cloud-based e-learning systems [49]. Moreover, automaticity can also help users to become increasingly obsessed with the use of cloud-based social media and reduce their intention to quit using the computing resource [30]. Hence, we propose that:

Hypothesis 3 (H3). *Automaticity has a positive influence on user satisfaction with cloud computing services.*

3.4. The Impact of Perceived Risks on User Satisfaction with Cloud Services

The high scalability and flexibility of cloud computing pose many potential security risks, such as regulatory compliance, provider lock-in, disaster recovery, and information security [50]. Perceived risks can affect the intentions of individual and organizational users to adopt cloud computing [51]. To increase user satisfaction with cloud computing, its suppliers should develop directed approaches to lessen the apparent risks faced by users [52]. For instance, most cloud vendors are constantly making, testing, and implementing new functionalities. These minor improvements are usually unnoticeable but can sometimes upset users because some of these improvements still have bugs and this affects their ability to complete tasks. The high churn rate of cloud computing usage has resulted in the disappearance of many cloud computing services, such as Picasa and Hotmail. High churn rates can degrade the performance of cloud computing services because of increased maintenance overheads [Fouquet]. Moreover, most cloud applications do not provide IT

support [53]. Consequently, users have the perceived risks of finding ways on their own to migrate from old to new cloud applications. All these perceived risks can lead to the dissatisfaction of users with cloud computing services. Hence, we propose that:

Hypothesis 4 (H4). *Perceived risks have a positive influence on user satisfaction with cloud computing services.*

3.5. The Impact of Having Trust in Cloud Providers Has on User Satisfaction with Cloud Computing Services

Cloud computing services user satisfaction depends on the extent to which users can trust their cloud providers [54,55]. A cloud computing provider needs to build the trust of users by providing excellence in technical, business, and security areas [42]. Technical excellence includes scalability and reliability. Business excellence consists of operational flexibility, cost reduction, and on-demand pricing [33]. Security excellence includes security and privacy control, as well as accountability [47]. Amazon Web Services offer these three areas of benefits by providing scalable storage, increased business agility, secure networking infrastructure, etc. Excellence in these three areas can help to improve the perceived satisfaction level of users, such as the response time and service initiation time [56]. Consumers are more likely to express satisfaction with cloud computing services once they know they can trust their providers with quality technology, business support, and security control. Therefore, we propose that:

Hypothesis 5 (H5). *Trust in the provider has a positive effect on user satisfaction with cloud computing services.*

3.6. The Impact of Service Quality on User Satisfaction with Cloud Computing Services

Service quality is an indispensable part of cloud computing services because it can directly affect the system's performance and stability [57], thereby affecting user satisfaction. To reduce the cost of software services, cloud computing providers make the effort to commoditize information systems components. However, users have varying on-demand usage patterns. Some cloud computing cannot efficiently deal with the complexity of determining resource provision in complex environments [58]. When this happens, users may have trouble accessing cloud computing services promptly. As a result, poor service quality can lead to user dissatisfaction with cloud computing services [59]. On the other hand, improved service quality can increase user satisfaction with cloud computing services. Hence, we propose that:

Hypothesis 6 (H6). *Service quality has a positive influence on user satisfaction with cloud computing services.*

3.7. The Impact of User Satisfaction on the Intention to Use Cloud Computing Services

User satisfaction has been an effective evaluation of the adoption experiences of previous information systems, and it has a direct, positive influence on the adoption purpose [60]. When users are satisfied with the use of a novel information system, they tend to have a high continuance intention towards using the system [61]. The extant literature shows there is a strong correlation between user satisfaction and information systems adoption, including information systems domains like e-learning systems [40] social media [62], and clinical information systems [63]. A growing number of studies on the adoption of cloud computing services further affirm this strong connection between user satisfaction and adoption intention. For instance, user satisfaction can have a significant positive impact on the objective of users to adopt mobile cloud services [64] and cloud e-bookcase [65]. Hence, we propose that:

Hypothesis 7 (H7). *User satisfaction has a positive effect on the aim to use cloud computing services.*

3.8. The Impact the Intention to Use Has on Continuous Use of Cloud Computing Services

Cloud computing retention is an emerging issue as cloud computing services are lowering the entry and exit barriers for users. While the business strategy is effective at building a large user base, it also creates a high attrition rate. In addition, a wide variety of cloud computing services are readily available to users. The cost of switching between cloud computing services is minimal for users. Constant switching behaviors can lower user loyalty towards information systems, such as mobile cloud computing services [66]. Cloud computing services providers thus aim to construct an ecosystem where both the compatibility [67] and externality of cloud computing services are sufficient to lower the attrition rate of users [68]. Therefore, it is important to reverse the trend of the high attrition rate of cloud computing services by improving post-adoption behaviors. A previous study showed that prior behavior has a significant impact on IS continuance intention for an information system, such as Internet-based learning technologies [69]. Hence, we propose that:

Hypothesis 8 (H8). *Intention to use has a positive effect on the continuous use of cloud computing services.*

This conversation results in the progress of the following research model (Figure 1):

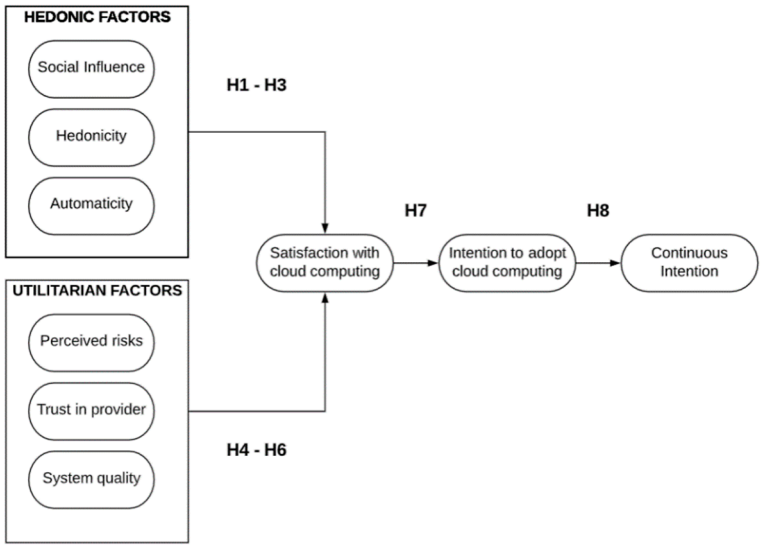

Figure 1. Research model.

4. Survey

To find out if the suggested hypotheses are true, our survey collected data from 190 participants at a large public university in Thailand. The participants willingly took part in the study. A total of 183 answers were used for the final study after seven were excluded as being invalid, incomplete responses. More than 98% of the participants were 18 to 22 years old. On average, the participants had used various types of cloud computing technologies for more than 25 h per week. The average experience of using various types of cloud computing technologies was 7 years and 100% of the participants planned to continue using various types of cloud computing technologies in the future. The participants' background showed they consistently used cloud computing services for both leisure and work-related activities.

Dependability and Authenticity of the Survey Instrument

We adopted the current items to find out the chief concepts of this study, as illustrated in Table 1. The questions for the concepts were put on a 5-point Likert scale, going from 1

"strongly disagree" to 5 "strongly agree". We rejected items with loadings of less than 0.7 to make sure of their indicator dependability [70].

Table 1. Construct of variables.

Construct	Survey Items	Source
Social Influence (SI)	• People who affect my behavior in my life are of the opinion that I should use Google Docs for my assignments. (0.826) • People who are significant in my life are of the opinion that I should use Google Docs for my class assignments. (0.893)	[23]
Automaticity (AUTO)	• I do not need to make much of an effort to think about using Google Docs for my class assignments. (0.796) • I use Google Docs to complete assignments without giving it much thought. (0.908) • I use Google Docs to complete assignments without having to consciously remember to do it. (0.813)	[44]
Hedonicity (HEDO)	• Using Google Docs to complete assignments is pleasurable. (0.898) • I really enjoy completing assignments via Google Docs. (0.905) • Completing class assignments via Google Docs interests me a lot. (0.896)	[36]
Perceived Risk (PR)	• There is a substantial risk with using Google Docs for completing class assignments. (0.886) • It is a risky decision to use Google Docs for completing class assignments. (0.899) • A decision to use Google Docs for archiving class assignments is risky. (0.871)	[42]
Trust in Provider (TIP)	• Overall, I believe Google, the provider of Google Docs, is trustworthy. (0.873) • Google, the provider of Google Docs, wishes to be recognized as one who keeps their word and promises. (0.903) • I trust Google, the provider of Google Docs, to think about me. (0.868)	[22]
Service Quality (SQ)	• Google Docs is user-friendly. (0.822) • Google Docs can be easily navigated. (0.847) • Google Docs can assist me to effectively deliver my assignments. (0.812)	[32]
Behavioral intention to use cloud computing (BI)	• I would use Google Docs to archive my assignments. (0.914) • I am very likely to archive my assignments using Google Docs. (0.938) • I intend to use Google Docs for archiving assignments in the future. (0.957)	[71]

We carried out further examinations to ensure both the cogency and dependability of the concepts. Cronbach's α coefficients for the measurement were more than the suitable cut-off value of 0.7 [72,73], signifying internal consistency reliability. Convergent validity was studied with composite reliability and average variance extracted (AVE) and all of the values for composite reliability outdid the suggested threshold of 0.7 [73] with the smallest AVE being 0.64, which is greater than the cut-off of 0.5 [2,74]. Moreover, we calculated the square root of the AVE for each construct. Our calculation shows that the value is greater than the correlations between the constructs and all other constructs (Table 2), indicating that the constructs have discriminant validity [72]. For example, the inter-correlation (0.1276) between PR and SAT is always less than the square root of AVE values for PR (0.8853) and SAT (0.9039). Every correlation between the variables of the proposed research model has high discriminant validity. Table 2 sums up the model quality indicators.

Table 2. Quality indicators and correlations with square root of AVE on the diagonal.

Construct	CA	CR	AVE	AUTO	CONT	HEDO	INT	PR	SAT	SI	SQ	TIP
AUTO	0.7958	0.8779	0.7063	**0.8404**								
CONT	0.8645	0.9161	0.7848	0.5235	**0.8859**							
HEDO	0.8823	0.9271	0.8092	0.5886	0.6735	**0.8996**						
INT	0.9301	0.9556	0.8776	0.4872	0.7054	0.7008	**0.9368**					
PR	0.8622	0.9158	0.7838	0.0879	0.0924	−0.0033	0.0696	**0.8853**				
SAT	0.7767	0.8993	0.817	0.4915	0.7296	0.7178	0.6527	0.1276	**0.9039**			
SI	0.8044	0.9101	0.835	0.3420	0.4220	0.4862	0.4819	0.0000	0.4530	**0.9138**		
SQ	0.7693	0.8665	0.684	0.5007	0.5658	0.6917	0.5730	0.0103	0.5915	0.3481	**0.8270**	
TIP	0.8575	0.9127	0.7771	0.3815	0.3539	0.4940	0.4136	−0.1872	0.3266	0.2744	0.5050	**0.8815**

A: Cronbach's α, CR: Composite Reliability, AVE: Average Variance Extracted, Square of AVE on the diagonal in bold.

5. Structural Model and Hypothesis Test Results

We used Structural Equation Modeling (SEM) with Partial Least Squares (PLS) to test the suggested hypotheses. SEM is a dependable method to test numerous causal relationships [27] and is not dependent on the issues regarding population, the scale of measurement, and residual distribution [73,75]. Partial least squares (PLS) regression was the statistical method used for data analysis. The main advantage of PLS regression is that it does not need data to be normally distributed, and it backs a smaller sample size for the study [76]. PLS regression is suitable here as the Jarque-Bera test of normality was carried out prior to data analysis, which showed that all key variables in the hypotheses were not normally distributed, thus enabling PLS to give more consistent outcomes than other covariance-based structural equation modeling methods. PLS regression analysis was carried out in WarpPLS 5.0. Table 3 reviews the outcomes of the hypothesis tests.

Social influence (SI) described 13.1% of the variance in user satisfaction with cloud computing services (SAT). SI had a positive effect on SAT at the 90% confidence level ($\beta = 0.131$; $t = 1.880$), supporting Hypothesis 1. Hypothesis 2 was supported at the 99% level ($\beta = 0.521$; $t = 6.610$), suggesting a positive impact of hedonicity (HEDO) on the SAT. Hypothesis 3 was rejected ($\beta = 0.061$; $t = 0.862$), suggesting that automaticity (AUTO) had no effect on SAT. Hypothesis 4 was supported at the 95% level ($\beta = 0.110$; $t = 2.113$), indicating a positive effect of perceived risks (PR) on the SAT. Hypothesis 5 was rejected ($\beta = -0.063$; $t = 1.078$), signifying that trust in the provider (TIP) did not affect SAT. Hypothesis 6 was supported at the 99% level ($\beta = 0.185$; $t = 2.441$), signifying a positive influence of service quality (SQ) on the SAT. These six variables together can explain 56.7% of the variance in user satisfaction with cloud computing services.

Table 3. Results of the hypothesis testing.

Hypothesized Path	Path Coefficient	*t*-Statistics	Hypothesis Test Results
H1: SI→SAT	0.131	1.880 *	Supported
H2: HEDO→SAT	0.521	6.610 ***	Supported
H3: AUTO→SAT	0.061	0.862	Rejected
H4: PR→SAT	0.110	2.113 **	Supported
H5: TIP→SAT	−0.083	1.078	Rejected
H6: SQ→SAT	0.185	2.441 **	Supported
H7: SAT→BI	0.653	12.515 ***	Supported
H8: BI→CON	0.705	17.202 ***	Supported

Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Hypothesis 7 was supported at the 99% level (β = 0.653; t = 12.515), signifying that SAT has a positive effect on behavioral intention to use cloud computing services (BI). SAT can explain 42.6% of the variance in BI. Hypothesis 8 was reinforced at the 99% level (β = 0.705; t = 17.202), signifying that BI has a positive effect on the continuance intention (CI) of using cloud computing services. BI explained 49.8% of the variance in CI.

6. Discussion, Key Findings, and Insights

The objective of this study is to provide insights into the initial and post-adoption of cloud computing services by integrating information technology adoption, social influence, trust, security, and information systems quality theories. Social influence, hedonicity, and automaticity are hedonic predictors of user satisfaction with cloud computing services. Perceived risks, trust in the provider, and system quality are all predictors of user satisfaction with cloud computing services. Our proposed model helps to explain and predict initial and repeated behaviors of cloud computing adoption.

Together, the hedonic and utilitarian factors have 56.7% of the variance in user satisfaction with cloud computing services. In comparison, hedonic factors appear to have more influence than the utilitarian factor on increasing user satisfaction with cloud computing services in a school setting. This corroborates the findings of a previous study on Smartwatch adoption [50]. We expand on the findings into cloud computing services. Among the hedonic factors, hedonicity (β = 0.521) has the biggest effect on user satisfaction with cloud computing services, followed by service quality (β = 0.185), social influence (β = 0.131), and perceived risk (β = 0.110). It appears that hedonicity heavily influences user satisfaction with cloud computing services like Google Drive in the school setting. Cloud computing service providers may want to incorporate more hedonic features into the design of their services so that they can further increase user satisfaction.

Improved service quality and social influence can enhance user satisfaction with cloud computing services. These two factors are sometimes hard to separate because the scalability and flexibility of cloud computing services allow users to complete and share group work from anywhere at any time. When asked, "What kinds of positive experiences have you had with the use of Google Docs to complete class assignments?" many students expressed many of the positive features of Google Docs that allowed them to complete class assignments in ways that are different from the traditional PC-based MS Word application. For instance, one student stated, "Google Docs allowed me to track work progress, co-work with my group members faster, and check who is making changes to the shared document." Another student expressed satisfaction with the convenience of helping others edit the work and tracking the work history to learn who has edited, written, or deleted anything. One student was satisfied with its ability to recover the original version of the group document when someone in the group had made a mistake. "Allocating and finishing the group work can be done faster and easier," according to another student.

Perceived risks can also have a positive influence on user satisfaction. Some users expressed concerns about using Google Docs to complete class assignments. One concern was about not being familiar with its use. For instance, some students expressed concerns that "work can be deleted by others", and "the deleted work cannot be recovered". Some students were confused about using some features, such as page-setting, ordering files properly, and editing shared work. Users who perceived it was a high risk to use cloud computing to complete class assignments tended to be more familiar with their features and feel satisfied with the use of Google Docs to complete class assignments.

Both automaticity and trusting the providers did not exhibit any significant influence on user satisfaction with cloud computing. The findings indicate that some training on the use of cloud computing services is required so that users can learn how to utilize the quality features to efficiently and effectively complete their class assignments.

By improving satisfaction with cloud computing, users will have a higher intention of continuing to use cloud computing services to perform their tasks.

7. Theoretical Inferences and Practical Implications

This study has numerous theoretical inferences. First, the research model integrates nine factors from five theories. Second, our proposed model extends the general theory of planned behavior by including two categories of variables pertinent to cloud computing: hedonicity and utility. Third, the sustainable development of an information system depends on its continuance usage [15,70,71]. Therefore, it is imperative to formulate effective strategies for promoting the continuance usage of information systems. The current literature shows that utilitarian and hedonic factors are critical to the continuance usage of various information systems, such as programming games and mobile apps [34,68]. This study's findings extend the importance of utilitarian and hedonic factors in the continuance usage of cloud computing applications [77]. Fourth, the findings of this study show that hedonic factors contribute to higher satisfaction with cloud computing in the school setting than utility factors do. Our study shows that social influence, hedonicity, and automaticity are essential hedonic predictors of user satisfaction with cloud computing services. Perceived risks, trust in the provider, and system quality are prerequisites of user satisfaction with cloud computing adoption. The first three hedonic factors are more critical than the three utility factors in increasing the adoption intention, thereby increasing the continuance intention of cloud computing services.

Previous IT adoption studies often included five to nine perceptual variables to assess their potential influence on IT adoption behaviors [78]. The study investigates nine variables related to hedonicity and utility and investigates their effect on the aim of users to adopt cloud computing services in school settings. The resulting research model presumably provides additional insights into the relative importance of hedonic and utility aspects on college students' intention to adopt cloud computing. More importantly, our research model is based on different theories, providing a comprehensive understanding of the relevant factors that can help predict a college's intention to adopt cloud computing services [79]. Our findings further affirm the assertions of the Theory of Planned Behaviors that behavioral intention to use cloud computing can help to increase the likelihood of continuous system usage. The results help to extend IT adoption theory to the context of cloud computing.

This study provides numerous practical inferences to the users of cloud computing services in higher education. When asked to share their positive experiences of using cloud computing services to complete group assignments, students' comments ranged from the ease of access, scalability, agility, greater reach, and minimal hardware requirements to easy collaboration. These positive experiences are associated with perceived service quality and social influence, enabling students to easily collaborate with others to complete group assignments with less effort than traditional computing resources.

Many universities are now embracing cloud computing as a cost-effective solution and need to constantly improve students' perception of the hedonic and utility features of

cloud computing services. When considering what cloud computing services they should outsource or lease, college administrators may want to evaluate these services' hedonic and utility features because they can help to increase user satisfaction and the intention of adopting cloud computing services. Hedonic features can include emoji, background customization, and a virtual conferencing room. Utility features could increase tracking and version control that can enhance the competence and success of completing assignments.

Hedonic features can be further enhanced with hedonic learning tasks. For instance, students can collaborate with other international students to use cloud computing to jointly develop group posters or reports. Cloud computing applications, like Google Docs, can be assimilated into the learning process to promote social interaction and collaboration [39]. Utility functions, such as perceived risks and service quality, are also important. A university should provide training workshops for students and faculties so that they can be aware of both the advantages and risks of cloud computing services and utilize related utilities to complete their learning tasks.

8. Limitation and Future Research Directions

The six factors used in the study were able to describe over 55% of the variance in user satisfaction with cloud computing services in the school setting. The approach of categorizing these six factors into hedonic and utility factors provides additional insights into the relative importance of hedonic and utility factors on user satisfaction. Although the explanatory power of our research model is high, there is still room for improvement. Scholars interested in improving the predictive power of cloud computing adoption can use our research model as the basis for identifying other pertinent factors that could help improve the understanding of cloud computing adoption behaviors.

This study did not examine the irrational adoption behaviors of cloud computing services. As cloud computing services are proliferating, users may use the trial-and-error approach when considering which cloud computing service to adopt. The extant literature shows that variables, such as consumer innovativeness [40], cognitive absorption [45], and entertainment features [80], could contribute to impulse adoption behaviors [81]. Future researchers may want to incorporate some of these potential variables into our proposed model and assess their potential influence on cloud computing adoption behaviors.

This study examines the behavioral aspect of cloud computing adoption in the school setting. Information shared by subjects in the study was mostly class assignments. This information is often not sensitive. The previous study had shown that the sensitivity of information shared by users via information systems can affect both initial and continuous adoption behaviors. Future studies may want to use an experimental approach to control the degree of information sensitivity and assess its impact on the intention of using cloud computing services to share confidential information.

Because of the field laboratory study, the students were asked only about their experiences of using Google Docs as the representative of cloud computing services. In real life, students use a blend of cloud computing applications, such as Dropbox for storage, Zoom for video conference meetings, and Grammarly for proofreading, when completing group assignments with others. Future research can replicate this study with different cloud computing services for a semester to better reflect the real-life scenario of adoption behaviors for a blend of cloud computing services. Future studies could also focus on the use of different types of cloud applications in different settings, such as retail, logistics, and financial services.

All of the subjects in this study were college students. These students used Google Docs for a group class assignment. The results obtained in this study best reflect the context and represent a student population in a classroom setting. More research can improve the generalizability of the study by collecting data from practitioners in the industry setting [82]. Diversified stakeholders may have other considerations when they are considering adopting cloud computing services. Utility factors could be more influential

than hedonic factors in the decisions of practitioners than is the case with the student subjects. Such empirical studies can further improve the generalizability of this study.

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