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Effect of User Satisfaction between Cloud Learning Applications & University Education Agility

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Abstract: University agility has been a critical issue for higher education institutions, little research has focused on university agility and user satisfaction. Drawing on technology acceptance, process, and expectation theories, this paper investigates the mediating role of user satisfaction between cloud learning applications and university education agility. Variance-based structure in the northern region, results show that user satisfaction mediates the link between cloud learning applications and university agility. Implications for practice are discussed.

Keywords: Cloud Learning Applications, University education Agility, User Satisfaction, Jordanian private universities.

1 Introduction

As one of the foundational pillars of society, higher education institutions have a significant impact on shaping the next generation and laying the groundwork for sustainable growth (Roos et al, 2020), with the emergence of internet technology in the early nineties, which affected all areas of life, including educational institutions, E-learning concept was introduced, and education management changed from what it had been in the past. (Vashisht, 2020), with the development of the Internet, online teaching is used as a new form of teaching on all levels, building an online educational resource system, introducing high-quality digital educational resources, and developing online educational courses. The online education platform will contribute significantly to developing education and overcoming many of the obstacles that face education (Shao, 2020).

E-learning apps are widely used because they enable us to learn anytime, from anywhere, and on any device (such as a desktop computer, laptop, iPad, smartphone, etc.). We can do this at home, in schools or colleges, while traveling, or even in a park (Kulkarni et al, 2020), As a direct result of the fusion of technology and education, electronic learning has emerged as a potent instrument for education, especially when leveraging cutting-edge technologies like cloud computing. (Al-Fraihat et al, 2020), with the increasing developments in technology, improvements were made in all areas, like commerce, health, and education. As a result, the use of e-learning in education increased quickly, especially with the advent of cloud computing, as a powerful tool of learning, especially in higher education institutions (McGill & Klobas, 2009; Fraihat et al, 2020), because of its ease of use, and effectiveness in providing useful feedback to learners and high performance (Freeze et al, 2019).

Cloud computing has developed greatly in the recent period, which allows access to applications via the web browser of the user's device) Sivan & Sellappa,2020), using a common set of reconfigurable computing resources that can be quickly provided and released with the least amount of administrative work and service provider interaction is called "the cloud computing" model (Hussain et al, 2017), The use of cloud computing technologies (and the creation of platforms for managing university education) can increase resource utilization, conserve university funds, and raise the caliber of instruction. Additionally, it can bring novel application domains closer to research domains and real-world issues (Dong et al., 2012), due to how easy it is to keep students' interest and save time on duties including using technology to enhance education with the arrival of cloud technology (Vaquero, 2011). Security, performance, high costs (when compared to in-

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house implementation), difficult integration with existing applications inside the facility, limited customization options, and difficulties with the organizational aspects of adopting cloud computing are just a few of the potential risks and difficulties that could come with it (Feuerlicht et al., 2011). To adopt and analyze cloud computing, the company and its senior management should try to reach potential changes in organizational culture, processes, and working relationships. They should also consider the level of support for top management and, finally, experts who have the knowledge and expertise required to implement cloud computing services (Gangwar et al, 2015).

Organizational flexibility refers to the ability of a company to remain resilient in the face of new developments, the ability to bring about sustainable, effective, and timely organizational change, and to redistribute its resources efficiently and effectively (Teece et al,2016) A company's capacity for innovation is essential for enabling it to use digital platforms to rethink its operational procedures and become nimble (Ravichandran, 2018) Agility improves an organization's capacity to provide high-quality products and services, which is important as firms are under increasing pressure to find innovative ways to compete effectively in the dynamic global economy; Consequently, it becomes a crucial component of the organization's productivity (Mehdibeigi et al, 2016). Agility is a critical factor for organizations to survive in an unstable and turbulent environment (Aburub, 2015). Agility is understood as the company's ability to respond quickly to environmental changes and opportunities as it has been identified through three dimensions: Customer Response (i.e. the ability to assess customer needs and preferences and respond quickly to product and service offerings) Operational Agility (with the company's ability to simplify operations and improve the speed of product development and chain Supply and logistics operations (strategic agility) with the ability of the company to identify and enter new markets and redefine the scope of its business (Ravichandran, 2018). Other researchers visualized it through three dimensions (sensing, decision-making, and velocity of movement) (Parl et al, 2017).

Indicators of user satisfaction are crucial for determining whether an information system is operating effectively. User satisfaction is defined as the general attitude that users exhibit as a result of their experiences with the behavior of modern systems. It also refers to how well users believe that their needs and the activities of the organization are aligned. According to studies, the degree of user happiness is correlated with the volume of user interaction with the system (McLellan et al., 2012), and is a vital factor in determining the effectiveness of the information system, as well as one of the most significant combinations for assessing the success of information technology (Mekadmi & Louati, 2018), Support for end users, accurate, complete, and appropriate information, as well as addressing user needs, are additional factors that contribute to user happiness (Athmay et al, 2016). The purpose of our study is to develop a model to increase the agility of education in private Jordanian universities, especially with the exacerbation problem of the spread of Coronavirus all over the world, including Jordan, as it required all universities to try to conduct the educational process remotely, and this experiment is considered the first of its kind in Jordan.

2 Theoretical Framework & Hypotheses Development

2.1 Cloud Learning Applications and University Education Agility

Educational institutions use a variety of technologies to provide an interactive learning environment for e-learning, online learning, and learning at any time. To leverage various platforms, businesses must incur significant expenses and labor. The usage of numerous platforms might cause users to become more perplexed and complicated about how to utilize them, necessitating the establishment of regulatory facilities within

educational institutions (Sultana, 2020). These resources can be thought of as organizational agility, achieving success in a dynamic and swiftly evolving collegiate landscape involves effectively implementing competitive principles such as swiftness, adaptability, ingenuity, and excellence through the integration of reconfiguration resources and best practices for a knowledge environment to provide customer services as college students in a rapidly changing environment (Yusuf et al., 1999). It was developed by Nafei, (2016). A model includes three dimensions, such as sensing agility, decision-making agility, and acting agility, and concluded that agility, three dimensions, has a significant impact on organizational success.

Numerous techniques have also been created to describe organizational agility, such as the model developed by Zhang and Sharifi (2000). This was founded on a technique that aids businesses in becoming more agile, as this approach has three phases: identifying the organization's needs in terms of agility and its level of agility now; and identifying the practices and utilities; ascertaining the agility capabilities needed for the organization to become agile.

Lew et al, 2019 a theoretical model was developed to investigate the usability elements that predict the continued use of a cloud-based e-learning program. To analyze the intention to continue using the cloud e-learning program, five usability factors—computer self-efficiency, enjoyment, perceived ease of use, perceived benefit, and user perception—were discovered. The study concluded that while perceived ease of use, perceived benefit, and user perception were unimportant, computer self-efficiency and enjoyment as intrinsic motivation substantially predicted the structure of constant use of a cloud e-learning program (Lew et al, 2019). Also, the theory of technology acceptance is useful in explaining the behavior of using information technology, which confirms that beliefs can influence situations, leading to intent to use, and finally,

actual use behavior, which will help us in visualizing the causal relationship to understand the behavior of adopting information technology, including the cloud e-learning (Hayashi et al, 2020). The web services used by the cloud computing environment have also greatly influenced the design and delivery of e-learning resources. In the workflow model offered by the university, fog cloud services can be used to represent educational software components, as configuring and calling these services provides greater flexibility in designing and providing learning (Mikroyannidis, 2012).

Resources can be made available on demand flexibly and affordably through the use of cloud computing in educational institutions. Similarly, by using cloud computing, we can address the issues of storage, computation, processing, and access to highly sought-after resources for mobile learning (Sagenmüller 2016; Chandra and Borah 2012; Isaiah 2014; Abualoush et al., 2022). The ability to distribute computing and storage resources as services has made cloud computing a desirable technology for teaching and learning in educational institutions. The use of cloud computing in e-learning can result in an improved learning process that shares the cloud's scalability, flexibility, accessibility, and sharing properties (Lew et al.,2019), Cloud computing leads to the convergence of two major IT trends: IT efficiency and business agility for organizations (Marston et al., 2011). In this study, we focus on studying the effect of cloud learning applications on educational agility in Jordanian Universities Thus, the following hypothesis is proposed:

H1: Cloud learning applications have a positive impact on university education agility.

2.2 Cloud Learning Application & User Satisfaction

User satisfaction is one of the scales used to evaluate the success of electronic systems, especially learning applications. The degree to which a user feels that a learning application meets his information needs is characterized as user satisfaction, showing that these apps are maximizing their satisfaction (Montesdioca & Maçada, 2015). The success of a country has frequently been gauged by user happiness. However, user pleasure has frequently been utilized in place of the effectiveness and performance of electronic systems, particularly e-learning programs (Delone and Mclean, 1992), where users must be self-efficient and influence information systems for an e-learning program in information technology (IT) to be successful. These elements influence the degree of online learners' happiness and their desire to keep using the e-learning system (Hayashi et al, 2020).

The use of information technology has been the foundation for numerous ideas about overall pleasure and satisfaction with information technology in particular. These theories emphasize the interactions between the user, the task, and the technology. Information technology and user happiness are both considered to be markers of how the user interacts with the task and the technology, respectively (Wang et al., 2020; Parkes, 2013; Obeidat et al., 2022). The concept of equality theory also includes the impression of unfairness and unhappiness in workplaces. When a person discovers that their ratio of outcomes to inputs is unequal compared to their peers' ratio of outcomes to inputs, they begin to feel a sense of unfairness or inequity. Equality theory is used in the field of electronic applications such as learning applications, information sharing, software piracy, technology adoption, and user satisfaction with electronic applications and systems. Information (Montesdioca & Macada, 2015; Hess & Hightower, 2002). The degree to which users believe the information system satisfies their demands and the effectiveness of the interaction between the information system and its users are measured by the user hypothesis (Ives, Olson, and Baroudi, 1983). Thus, the following hypothesis is proposed:

H2: Cloud learning application has a positive impact on user satisfaction.

2.3 User satisfaction & university education agility

Organizations are changing and reengineering their work, through the use of agile technologies. In addition, IT researchers have indicated that by altering job characteristics, agile techniques may affect the motivation level, job satisfaction, and job routine of members of the agile organization (Pedrycz et al., 2011). To strike a good balance between worker satisfaction, welfare, and productivity on the one hand, and the efficacy and efficiency of work on the other, organizations in general and educational institutions in particular, are looking for nimble methods. Researchers have used the socio-technical system theory as this theory is used in the context of technology adoption in organizations in addition it focuses on the social impacts of technology (Coenen & Lopez, 2010; Geels, 2004). Two subsystems make up this theory: The subsystem of society: This approach comprises two areas of analysis: the first area relates to individuals and their behavior, attitudes, and talents, while the second area relates to the organizational context and covers leadership, strategy, structure, policy, and procedures for the organization (Bolton & Foxon, 2015).

Technical subsystem: It also includes two sides to analyze the work system. Technology operation, including the use of equipment, software, and information systems, is the first aspect. The second consideration is the technical procedures utilized to coordinate business operations within the organization (Chang & Lu, 2017). Socio-technical systems theory introduces the methods of interaction among the various components of the work system, such as technology, the policy and culture of the organization, and human aspects through the sharing of resources, knowledge, and information (Rindova, & Antoaneta, 2007). Thus, the following hypothesis is proposed:

H3: User satisfaction has a positive impact on university education agility.

2.4 User satisfaction, cloud learning applications, and university education agility

A wide range of factors (political, economic, social, and even health-related) have forced universities to be agile if they are to respond quickly to this changing environment and changes, and higher education is currently facing great challenges because of advanced technology that has altered how universities operate. To ensure that information services can be nimble in response to these new changes, it is necessary to ensure that they do so in the practice of teaching, learning, and research (Gunsberg et al, 2018).

To identify the variables that influence user behavior and pleasure, several academics in the field of e-learning systems have suggested numerous theoretical models. Both the system's and the information's quality are important because of how they affect people and an organization. As mobile e-learning is prone to technical issues, the system's quality refers to the desired qualities of the electronic system and is necessary for its impact on user satisfaction and individual performance. As a result, the system's quality is a fundamental prerequisite for user satisfaction, and the information the system provides is measured by the quality of its content, which includes features like accuracy, relevance, and updating. These features are crucial to user satisfaction and are essential to the success of e-learning in institutions like universities (Lee & Jeon, 2020; Navimipour et al, 2015). The researcher also suggested that the use of technology can facilitate and enhance the agility of universities. These agility techniques can be used to improve operations. These technologies can enable agility by improving decision, and communication, and introducing electronic integration (Aburub, 2015, Seethamraju & Sundar, 2013). Thus, the following hypothesis is proposed:

H4: User satisfaction mediates the relationship between cloud learning applications and university education agility.

3 Methodologies

A quantitative methodology is used in this paper to determine how the study's variables are related to one another, where data was collected from Jordanian private universities in the northern region, where data was collected from (270) respondents according to Sekaran & Bougie (2015) table for sample size. including the teaching staff at the four universities, where the electronic questionnaire was used to collect data, only 213 were returned resulting in valid for analysis.

3.1 Research instruments

Cloud learning applications. Ten scale items were created by (Lew et al., 2019; Asadi et al., 2020; Kayali & Alaaraj, 2020; Aljawarneh et al., 2022) were used to measure cloud learning applications. University education agility. A total of 10 scale items were taken (Aljawarneh et al.,2021) were used to measure University education agility. User satisfaction. 8 scale items in all were taken from (Lee et al., 2020; Aljawarneh et al.,2021). On a five-point Likert scale with (1) not at all agree and (5) fully agree, participants were asked to express how much they were satisfied with the overall user experience.

3.2 Demographics information

This section presents results derived from a sample of 213, respondents, 75.4% were male and 24.6% female. The respondents fell in the following age brackets: 27.3%, less than 39 years, 32.9%, between 40-49 years, 23.8 % between 50-59 years, 16.1%, more than 60 years. In terms of Academic ranking, 15 % of the participants were Teachers, 20.9% of the participants were professors, 38.0% of the participants were assistant professors and 26.1% of the participants were Associate professors.

4 Data analysis and results

Using Smart PLS-4 software and structural equation modeling (SEM) approach, we were successful in estimating and verifying the interactive relationship among the model variables. Based on the ambiguity of item scores, covariance-based SEM (CB-SEM) is used. Ridingon et al. (2017). The goal of PLS-SEM, on the other hand, is to optimize the prediction of endogenous components rather than the model fit. It operates on fixed latent scores (Hair et al., 2019). Small sample sizes, second-order models that are extremely challenging and sophisticated, and data normality are all possible with PLS-SEM. Table 2 shows the = loadings items of different scales and f2 in the model and shows the significance R2 of each variable within the internal model. Figure 3 displays the significance levels for each scale item in the outer model as well as the significance levels for the associations between the variables in the internal model. Table (1) show The Mean and standard deviations (SD).

Table 1 Mean & Stander division (SD).

Measures	Mean	SD
Cloud learning applications	3.26	.787
University Education Agility	3.80	.781
User Satisfaction	3.96	.815

The majority of the outside model loadings shown in table 2 were above the 0.7 cutoff, and their corresponding B-values were crucial in table 4. along with the values for average variance extracted (AVE) >.50, composite reliability (CR) >.70, and Cronbach's alpha (α) >.70, all of which are shown in Table 2. Additionally, Table 3 demonstrates that the Fornell-Larcker requirement was met since each variable's AVE square is bigger than its inter-correlations.

Table 2 Reliability & convergent validity

Construct Name	Item	Weights	α	CR	rho	AVE	R^2
Cloud learning applications	CLA1	0.732					
	CLA10	0.837					
	CLA2	0.800					
	CLA3	0.832					
	CLA4	0.821	0.948	0.942	0.936	0.683	-
	CLA5	0.809					
	CLA6	0.876					
	CLA7	0.873					
	CLA8	0.847					
	CLA9	0.831					
University Education Agility	UA1	0.791					
	UA10	0.796					
	UA2	0.824					
	UA3	0.779					
	UA4	0.749					
	UA5	0.748	0.935	0.936	0.945	0.632	0.689
	UA6	0.843					
	UA7	0.808					
	UA8	0.807					
	UA9	0.803					
User Satisfaction	US1	0.751					
	US2	0.767					
	US3	0.744					
	US4	0.728					
	US5	0.785	0.896	0.898	0.916	0.578	0.382

	US6	0.770					
	US7	0.753					
	US8	0.781					

Table 3 Divergent validity based on the Fornell–Larcker approach.

Measures	1	2	3
Cloud learning applications	**0.827**		
University Education Agility	0.674	**0.795**	
User Satisfaction	0.618	0.760	**0.798**

The parts that came before this one established the validity and reliability of the models. Table 4 provides the estimation coefficients for the structural model. The direct effect of cloud learning applications on the agility of university education has been witnessed, and it is favorable and considerable (β = .292, ρ = .000), the direct impact of cloud learning applications on user satisfaction is positive and significant (β = .618, ρ = .000), also the direct effect of user satisfaction on university education agility positive and significant (β = -0.618, ρ = .000. The mediating impact of user satisfaction on the association between cloud learning applications and university education agility was a significant (β = .382, ρ= .000). See Table 4. Moreover. According to Table 2, the variation that the model's R2 is 689, which translates to 68.9% for university education agility. Falk and Miller (1992) established a standard for R2 values and concluded that the least number that ought to be advised is 0.10. In our investigation, the R2 indicated a significant influence.

Table 4 Direct and interactional effects

Relationships	β	T	ρ
Cloud learning applications -> University Education Agility	0.292	4.305	0.000
Cloud learning applications -> User Satisfaction	0.618	12.595	0.000
User Satisfaction -> University Learning Agility	0.618	8.647	0.000
Cloud learning applications -> User Satisfaction -> University Education Agility	0.382	8.256	0.000
Note: β, beta value; ρ, ρ-value; T, T-value			

5 Conclusions

The goals of the study were to identify the effects of cloud learning applications on university education agility by the mediating effect of user satisfaction. cloud learning applications can be introducing electronic integration and provide digital options to enhance the flexibility of universities. Also, it can produce an enhanced learning process that shares the characteristics of the cloud in scalability, flexibility, accessibility, and sharing. On the other hand, the findings indicated that the agility of university education is significantly improved by cloud learning apps. This shows that the more universities focus on cloud learning applications, the more they can achieve university education agility. This result is in line with the previous studies (Alharthi et al., 2015;

Mathew, 2012; Mircea and Andreescu,2011). The findings of past research such as Tashkandi and Al-Jabri,2015; Liu et al., 2015 show that the agility of university education is improved by cloud learning technologies. There was a noticeable impact of cloud learning applications on user satisfaction. Another significant effect was observed regarding the impact of user satisfaction on university education agility. In terms of user satisfaction, there was a significant effect related to user satisfaction on the association between cloud learning applications and university education agility.

6 Implications

The role of higher education institutions is particularly important to adapt to technology development, especially with the new requirements for the internet era. this research clarifies the role of cloud learning applications in accessing educational resources anytime and anywhere for enhancing user satisfaction by tailoring the educational content and pace to the specific needs and preferences of each learner, also online education platforms will contribute significantly to developing education and overcoming many of the obstacles that face the education. Moreover, this study researcher tray to illustrate the role of cloud learning applications on university education agility it can help students develop valuable digital skills, which are increasingly essential in today's interconnected world. Also, that leads to improved efficiency, competitiveness, and streamlined administrative processes. Universities with an agile stance prioritize a student-centered approach, offering personalized learning paths, flexible scheduling, and comprehensive support services that boost student satisfaction and retention.

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