Contents lists available at GrowingScience

International Journal of Data and Network Science

homepage: www.GrowingScience.com/ijds

Understanding the role of digital information in enhancing education in UAE: An investigation of the factors that drive continuous adoption

Khadija Alhumaid[a*] and Mouna AAssali[a]

[a]*Student Services, Rabdan Academy, Abu Dhabi, United Arab Emirates*

C H R O N I C L E

Article history:
Received: December 2, 2022
Received in revised format: January 29, 2023
Accepted: March 21, 2023
Available online: March 21, 2023

Keywords:
Digital information
Higher education
Learning satisfaction and the tutor quality

A B S T R A C T

Digital information has had a significant impact on higher education, transforming the way students learn and interact with course materials, professors, and their peers. Education systems that place a high priority on learning satisfaction and tutor quality frequently ignore the problem of limited access to digital information and technology. In this study, we provide an integrated model that examines how the TAM constructs of digital information in education (DIE) are affected by digital information flow, technological readiness, learning satisfaction, and tutor quality. We provide information on the results of a project evaluation that examined how digital information is used in higher education. We gathered information from a survey of 594 college students to validate our model and hypothesis. Our research suggests that external factors that improve users' technological readiness and learning satisfaction may have an impact on how valuable they perceive DIE to be. A user's traits, particularly their level of technological preparedness, have a significant impact on how simple technology is to use. The user's perceived usefulness of the technology may also be further enhanced in some cultures by the tutor's perceived excellence. External elements like the flow of information may have a significant impact on the intention to use technology.

1. Introduction

We analyze teachers' perspectives on digital learning at the college level of education in this essay. We look into the potential relationships between the following variables and the intention to use digital learning in special education: (1) the smooth flow of digital information and the level of technological readiness, in relation to "perceived ease of use" of digital learning; (2) the caliber of teachers and the satisfaction of students with their learning, in relation to how useful digital learning is perceived to be; (3) the intention to use digital learning about how useful and easy it is perceived. Technology advancements have made it feasible to find solutions for problems like collaboration, information access, and communication. Attending school utilizing a specific learning technique, however, has grown more difficult in recent years. In higher education, the use of digital technologies to improve learning has gained (Dudhat et al., 2021; He et al., 2021; Leshchenko et al., 2021). The success of the digital revolution in education has prompted a plethora of research emphasizing the significance of technology self-efficacy. While the majority of these studies have focused on technological literacy, several have also looked at how digital technologies affect students' access to high-quality material and their ability to study. Through their promotion of research possibilities, outcomes, and student performance, these studies have increased the use of digital technology and information in education. In earlier research (Börnert-Ringleb et al., 2021; Çetin, 2021; He et al., 2021; Jeffrey et al., 2011; Qureshi et al., 2021; Siddiq et al., 2016), the employment of digital technology in formal educational contexts was the main

* Corresponding author.
E-mail address: kalhumaid@ra.ac.ae (K. Alhumaid)

ISSN 2561-8156 (Online) - ISSN 2561-8148 (Print)

doi: 10.5267/j.ijdns.2023.3.019

topic of discussion. As digital informal learning is receiving more attention, little study has been done on the variables that affect it, including experience, TAM, instructor participation, and student viewpoints. Digital learning in traditional schools has challenges, according to earlier studies, but its future in higher education is still uncertain.

2. Literature Review

Much research has been done on the effects of digital technology in educational settings. Inquiries on user literacy and adaptability to the rapid changes in information and communication technologies in the educational setting have been conducted (Qureshi et al., 2021; Siddiq et al., 2016). The growth of digital information literacy has been one of the main areas of concentration. Traditional teaching and learning methods are being replaced by new ones as a result of the upheaval that digital technologies have brought about in many industries, including education. As technology advances and becomes more pervasive, people need to be computer literate to fully participate in society and the workforce. The cornerstone for lifelong learning is thought to be digital information literacy, as even rudimentary exposure to digital information can support this capacity. To help pupils improve their digital communication and information abilities, teachers are extremely important. Focusing on the sorts of technology used to accomplish various educational goals, such as accessing, assessing, sharing, and communicating digital information, is crucial since the amount of competency in these skills can be influenced by the teachers' literacy skills. Studies have demonstrated that teachers' opinions and support have a big impact on how pupils use digital material, thus their efforts to encourage its use should be acknowledged. Teachers have a significant impact on how much weight is given to the digital world of information for educational purposes (Jeffrey et al., 2011; Moreno-Morilla et al., 2021; Qureshi et al., 2021; Siddiq et al., 2016).

The objectives of the earlier study have varied, and some researchers have adopted a new methodology to assess the variables that affect how pupils use digital information (Sayaf et al., 2021). This approach focuses on examining the relationship between "student happiness and sustainability and computer self-efficacy, computer anxiety, perceived enjoyment, and acceptance of digital learning". Researchers have been challenged by security concerns related to digital educational resources, which has led them to investigate safety concerns and find remedies for threats they perceive (Aydin & Erol, 2021; Wahyuningsih et al., 2021). The adoption of digital information has also been the subject of some studies, including ones that looked at the application of digital storytelling and its effects on digital literacy. These studies have generally investigated different facets of digital information and how it affects students (Börnert-Ringleb et al., 2021; Çetin, 2021). The effects of earlier study findings on the use of digital technology in educational settings have been the subject of numerous studies. This research has concentrated on several variables, including "computer self-efficacy, computer anxiety, perceived enjoyment, and the TAM notions of perceived utility and usability". The results show that instructors' and students' levels of digital literacy have increased despite the difficulties encountered during the introduction of new digital technology, emphasizing the usefulness of digital technology in the classroom (Çetin, 2021; Sayaf et al., 2021). According to studies, the main barriers to digital learning are student self-regulation and parental support at the organizational level, whereas "self-efficacy and perceived support" have a big impact there. Courses for education teachers and students are advised, together with digital learning interventions, to address the issue of self-efficacy (Börnert-Ringleb et al., 2021). The use of digital technology in education is also hampered by issues with student attendance, infrastructure, enthusiasm, and commitment, as well as digital issues. It is advised to create multimedia content that enables bidirectional engagement to increase inter-institutional cooperation to get around these challenges (Aydin & Erol, 2021; Börnert-Ringleb et al., 2021). Recent research has revealed that TAM is a critical paradigm for determining the acceptance of digital information in the educational setting, despite the use of multiple models to examine the subject. Unlike earlier research, this one focuses on outside variables like tutor quality and learning satisfaction rather than the uptake of digital information. These factors have not before been looked at in research on the effects of digital information. The study also attempts to investigate the connection between digital information flow, technology readiness, and TAM components.

3. Theoretical Framework

3.1 Digital Flow Information

Digital information, which represents the flowing continuum used to depict the different degrees of the value of technology, affects how effectively technology is accepted (Almaiah et al., 2022). Research has demonstrated a connection between the perceived trust in the information received and the information's digital flow. Students are more likely to utilize the digital flow of information frequently and continue doing so if they believe it to be trustworthy, which encourages continued usage of digital technology's information flow. Innovation modifies learners' views based on their experiences and the sorts of information offered, which has a negative effect on the digital flow of information (Labrecque et al., 2013; Peltier et al., 2020). It is therefore plausible to hypothesize that:

H_1: *The use of digital information has a beneficial influence and significant impact on the perceived ease of use.*

3.2 Technology Readiness

Technology readiness (TR) has an impact on the psychological state of users' behavioral intention to use technology, which results from positive thoughts and barriers limiting users' intention to utilize technology (TR). One important component is suggested to be TR, which relates to customers' mental readiness to adopt new technology. TR includes four dimensions:

innovativeness, optimism, discomfort, and insecurity (Liljander et al., 2006). Threat levels and feelings of unease are linked to readiness. According to studies, people feel exposed when using technology and prefer offline tools because they are more secure and practical. Users may be reluctant to use technology because of their poor openness to it due to security and privacy concerns (Parasuraman, 2000; Parasuraman & Colby, 2001). TR has a major impact on people's tendency to use new technologies to achieve their goals, making it a vital factor that can either promote or inhibit the adoption of technology. TR is a mental condition brought on by users and mental inhibitors who collectively assess their propensity to utilize new technologies (Liljander et al., 2006; Parasuraman et al., 2004, 2005).

H2: *Technology Readiness has a beneficial influence and significant impact on the perceived ease of use.*

3.3 Learning Satisfaction

There are various variables to take into account while examining learning pleasure, such as the caliber of learning, the nature of exchanges, instructor feedback, and peer relationships. According to studies, engagement, and learning quality, both directly affect satisfaction levels. Also, because they have a major impact on learning outcomes and course satisfaction, the effectiveness of peer interactions and tutoring can have an impact on satisfaction levels (Dhawan, 2020; Eichelberger & Ngo, 2018; Kuo et al., 2014). Other elements like teacher quality and online learning preparedness have been connected to learning satisfaction. A higher preparedness level and better tutoring quality equate to greater pleasure (Hsu et al., 2019; Joosten & Cusatis, 2020).

H3: *Learning Satisfaction has a beneficial influence and significant impact on the perceived usefulness.*

3.4 Tutor Quality

As e-learning has become more popular, the role of the tutor has changed (Almaiah et al., 2022). The tutor now serves in several additional capacities in addition to imparting knowledge to a group of students. When students think their tutor is of high quality, they can serve as a facilitator, mentor, problem solver, and help with software or hardware problems (Almaiah et al., 2022). A high-quality tutor can inspire students to participate in cutting-edge e-learning settings and feel at ease using digital resources (Almaiah et al., 2022). In addition to other duties, the tutor's function has developed to include leading specialized online or in-person classes, managing online forums, and offering electronic feedback for online tasks (Kear et al., 2014; Teo et al., 2011). High-quality tutors are associated with students' perceptions of their usefulness, which in turn affects their intention to use digital material, according to earlier studies. As a result, it is assumed that:

H4: *Tutor quality has a beneficial influence and significant impact on the perceived usefulness.*

3.5 TAM Model

The TAM model focuses on technology acceptance, which incorporates perceived ease of use and perceived usefulness. A collection of attitudes and convictions concerning the acceptability of technology was established by a researcher (Davis, 1989a). Experience is a crucial cognitive construct that encompasses pleasure and fulfillment (Agarwal & Karahanna, 2000; Saadé & Bahli, 2005). Extensive experience consumers prioritize on-time experience and value technology use, which highly affects perceived usefulness and ease of use, according to the earlier study. Technology is easy to use for seasoned users, making for a comfortable and enjoyable environment (Csikszentmihalyi, 1990). The main areas of focus are perceived experience, perceived usefulness, and perceived ease of use. Hence, the following hypotheses are proposed:

H5: *The perceived ease of use has a beneficial influence and significant impact on the intention to use DIE.*
H6: *The perceived usefulness has a beneficial influence and significant impact on the intention to use DIE.*

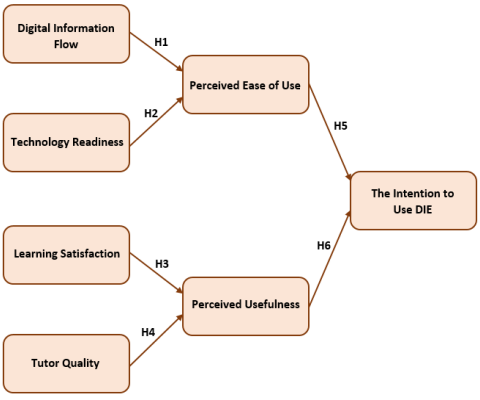

Fig. 1. Research Model.

4. Research Methodology

4.1 Data collection

The research team delivered 700 online surveys at random to university students in the UAE between January 2 and March 10, 2023, to gather data. An 85% response rate was achieved from them, with 594 respondents completing the questionnaires. However, 106 surveys were disregarded because the results were lacking. The study's sample size (306 responders out of a population of 1500) was suitable under Krejcie and Morgan's recommendations (Krejcie & Morgan, 1970). The previous theories of digital information constituted the foundation for the hypothesis. Based on the sample size of 594 employed in the structural equation modelling (SEM) analysis to verify the hypotheses, the team used SmartPLS Version 3.2.7 to assess the measurement model and carry out advanced treatment utilizing the final path model.

4.2 Students' personal information / Demographic Data

To evaluate the demographic data, IBM SPSS Statistics version 23 was used. 54% of the students that were interviewed were female, and 46% were male. The majority of participants had a college degree and were well educated, with 61%, 35%, and 4% of the students holding master's or PhD degrees, respectively. In contrast to the majority of respondents, who were over the age of 29, only 7% of respondents were between the ages of 18 and 29. A "purposive sampling strategy" can be used, according to (Almaiah et al., 2022), when respondents are eager to volunteer, as was the case with this sample. The students represented a range of ages, educational levels, and universities.

4.3 Study Instrument

A survey instrument was suggested to validate the study's hypothesis, and it was supplemented with an extra 20 items to measure the seven questionnaire constructs. To make their findings more useful, the researchers changed the questions from earlier experiments. Table 1 provides a history of these structures' genesis.

Table 1
Measurement Items

Constructs	Items	Instrument	Sources
Intention to Use Digital Information	INT1	I intend to use DIE, which offers access to digital information, in the future to improve my education and learn more about the digital world.	(Wang et al., 2009)
	INT1	I want to use DIE as a helping tool to facilitate my search for digital material while completing my studies.	
Perceived Ease of Use	PEOU1	Making use of DIE is a simple and clear approach.	(Davis, 1989b)
	PEOU2	DIE makes finding, assessing, and choosing digital materials easier.	
	PEOU3	Using DIE makes managing and regulating digital information an easy operation.	
Perceived Usefulness	PU1	My class participation has improved since including DIE in my daily schedule.	(Davis, 1989b)
	PU2	DIE is an excellent tool that helps me comprehend the practical disciplines I've chosen to take.	
	PU3	I can combine my academic studies with actual, hands-on practice by using DIE.	
Technology Readiness	TEC1	I'm ready to use DIE as a tool for finding, choosing, and assessing digital information.	(Parasuraman, 2000)
	TEC2	I'm willing to adopt new technologies, especially those that make it simple to access digital data.	
	TEC3	I'm open to utilizing new technologies that let me combine my practical experience with theoretical information.	
Digital Information Flow	DGT1	DIE's value comes from its capacity to make information sharing between users easier.	(Vargo & Lusch, 2008)
	DGT2	DIE can stimulate the development of fresh, practical technology.	
	DGT3	It is simple for groups to exchange information when using DIE.	
Learning Satisfaction	LRN1	I am happy with DIE because it offers valuable information that satisfies my demands.	(Donkor, 2011; Reigeluth, 1983)
	LRN2	My high degree of satisfaction with DIE is significantly influenced by its utility.	
	LRN3	DIE has been a useful tool for me in developing new abilities throughout my learning process.	
Tutor Quality	TUR1	My tutor uses DIE to clarify course content and aid in my comprehension of the curriculum.	(Teo et al., 2011)
	TUR2	With the use of DIE, my tutor has been a key factor in helping me improve my learning abilities.	
	TUR3	My tutor gives precise instructions on how to use DIE properly, including the steps to take.	

4.4 Common method bias (CMB)

To guarantee that the collected data did not contain CMB, the study team performed Harman's single-factor analysis employing seven components (Podsakoff et al., 2003). The newly generated factor only explained 23.59% of the variance once the ten components were loaded into a single factor, which is less than the threshold value of 50% (Podsakoff et al., 2003). Thus, the collected data was not concerned with the CMB.

4.5 Pilot study of the questionnaire

To measure the reliability of the questionnaire items, 70 students from the predefined demographic were randomly chosen for the pilot study. 10% of the total sample, 700 students utilized for analysis was chosen as the sample size for the pilot study. IBM SPSS Statistics version 23 was used to conduct Cronbach's alpha test, which provided accurate results for the measurement items. Table 2 shows Cronbach's alpha values for the five measurement scales; taking into account the trend in social science research, a reliability coefficient of 0.70 is considered satisfactory (Nunnally & Bernstein, 1978).

Table 2
Cronbach's Alpha values for the pilot study (Cronbach's Alpha ≥ 0.70).

Construct	Cronbach's Alpha
DGT	0.787
INT	0.739
LRN	0.789
PEOU	0.735
PU	0.884
TEC	0.727
TUR	0.802

4.6 Survey Structure

Three sections make up the questionnaire survey provided to the students.

- Respondent's data are the main focus of the first portion,
- Two items in the second section evaluate respondents' "intentions to use digital information".
- "Learning Satisfaction, Perceived Ease of Use, Perceived Usefulness, Technological Readiness, and Tutor Quality" are the four categories that the third section's 18 questions that make up it covers.

A five-point Likert scale with answers ranging from strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agreed (5).

5. Findings and Discussion

5.1 Data Analysis

The use of PLS-SEM in this study has several justifications. A two-stage assessment approach that used both the structural model and the measurement model to evaluate the collected data was used (Hair et al., 2017). With the use of the SmartPLS V.3.2.7 program, the data for this paper were analyzed using the Partial Least Squares-Structural Equation Modeling (PLS-SEM) tool (Ringle et al., 2015). There are various justifications for the usage of PLS-SEM in this investigation.

One of the reasons this approach was chosen for this study is that PLS-SEM examines the full model rather than taking it apart (Goodhue et al., 2012). Moreover, PLS-SEM is recognized to function at its peak when relevant prior research or studies have been carried out (Urbach & Ahlemann, 2010). The effectiveness with which PLS-SEM can be applied to exploratory studies with complex models is another benefit (Hair Jr et al., 2016). Last but not least, PLS-SEM offers concurrent analysis for structural models and measurement models, allowing accurate calculations to be made (Barclay et al., 1995).

5.2 Convergent validity

According to Hair et al. (2017), it's crucial to take into account a measuring model's construct validity and reliability to evaluate the measurement model. Convergent and discriminant validity are components of validity, whereas composite reliability (CR) and Cronbach's alpha (CA) are components of construct reliability. Table 3 displays the construct reliability assessment CA values, which ranged from 0.815 to 0.892, exceeding the threshold of 0.7. Good construct reliability was also indicated by CR values that ranged from 0.808 to 0.862, which were much higher than the required threshold of 0.7 (Nunnally & Bernstein, 1994). Testing the Average Variance Extracted (AVE) and factor loading is necessary to determine convergent validity (Hair et al., 2017). According to Table 3, the suggested value of 0.7 was less than all factor loading values. The AVE values were greater than the threshold value of 0.5, ranging from 0.604 to 0.728, showing acceptable convergent validity.

These findings successfully enable the evaluation of convergent validity for each component. As shown by Table 3's results, which reveal strong construct reliability and convergent validity based on CA, CR, factor loading, and AVE values, Hair et al (Hair et al., 2017) emphasize the significance of evaluating constructs reliability and validity in measuring models.

5.3 Discriminant validity

Evaluating the Fornell-Larker factor and the Heterotrait-Monotrait Ratio (HTMT) is necessary for measuring discriminant validity (Hair et al., 2017). Table 4's requirements are supported by the Fornell-Larker factor, as each AVE value exceeds the correlation it has with other constructs when the square roots are added (Fornell & Larcker, 1981).

Based on the findings shown in Table 5, which provides the HTMT ratio values, discriminant validity can be evaluated. The HTMT ratio is confirmed by the fact that all values for each construct are higher than the permissible cutoff value of 0.85 (Henseler et al., 2015). The data analysis shows that the validity and reliability of the measurement model are not troublesome, allowing for a trouble-free evaluation. The gathered information can therefore be applied to more thorough testing of the structural model.

Table 3
Convergent validity results which assures acceptable values (Factor loading, Cronbach's Alpha, composite reliability, Dijkstra-Henseler's rho ≥ 0.70 & AVE > 0.5).

Constructs	Items	Factor Loading	Cronbach's Alpha	CR	AVE
Digital Information Flow	DGT1	0.756	0.851	0.834	0.645
	DGT2	0.858			
	DGT3	0.720			
Intention to Use Digital Information	INT1	0.744	0.824	0.820	0.682
	INT2	0.895			
	INT3	0.794			
Learning Satisfaction	LRN1	0.885	0.869	0.859	0.710
	LRN2	0.820			
	LRN3	0.751			
Perceived Ease of Use	PEOU1	0.800	0.832	0.844	0.728
	PEOU2	0.838			
	PEOU3	0.750			
Perceived Usefulness	PU1	0.825	0.870	0.855	0.711
	PU2	0.821			
	PU3	0.848			
Technology Readiness	TEC1	0.827	0.892	0.862	0.621
	TEC2	0.909			
	TEC3	0.803			
Tutor Quality	TUR1	0.739	0.815	0.808	0.604
	TUR2	0.843			
	TUR3	0.866			

Table 4
Fornell-Larcker Scale

	DGT	INT	LRN	PEOU	PU	TEC	TUR
DGT	**0.811**						
INT	0.246	**0.809**					
LRN	0.125	0.235	**0.815**				
PEOU	0.686	0.348	0.549	**0.895**			
PU	0.662	0.320	0.634	0.689	**0.838**		
TEC	0.644	0.325	0.507	0.695	0.293	**0.803**	
TUR	0.525	0.248	0.215	0.165	0.337	0.367	**0.869**

Table 5
Heterotrait-Monotrait Ratio (HTMT)

	DGT	INT	LRN	PEOU	PU	TEC	TUR
DGT							
INT	0.209						
LRN	0.587	0.224					
PEOU	0.395	0.259	0.107				
PU	0.316	0.492	0.555	0.268			
TEC	0.423	0.618	0.613	0.330	0.675		
TUR	0.522	0.496	0.616	0.309	0.561	0.730	

5.4 Hypotheses testing using PLS-SEM

The nine hypotheses were jointly tested using the structural equation modelling (SEM) approach (Aburayya & Salloum, n.d.; Al-Maroof & Salloum, 2020; Alghizzawi et al., 2020; Davis et al., 1992; Salloum & Shaalan, 2018). The study assessed each path's applicability and characterized each path's variance (R^2 value) in the study model. Table 7 and Figure 2 show the standardized path coefficients and path significance.

According to the R^2 values, the empirical data supported hypothesis H1, H2, H3, H4, H5, and H6. The R^2 values for perceived usefulness, perceived ease of use, and intention to use digital information all fell within the range of 0.695 to 0.745 based on the data in Table 6. This shows that these models are quite good at predicting results (Liu et al., 2005).

The results show that Digital Information Flow (DGT) and Technology Readiness (TEC) has significant effects on Perceived Ease of Use (PEOU) (β= 0.706, P<0.001), and (β= 0.602, P<0.001); hence H1 and H2 are supported. The results also showed that Perceived Usefulness (PU) significantly influenced Learning Satisfaction (LRN) (β= 0.739, P<0.01), and Tutor Quality (TUR) (β= 0.653, P<0.01), supporting hypotheses H3 and H4. Finally, the relationships between Perceived Ease of Use (PEOU), and Perceived Usefulness (PU) has significant effects on intention to use DIE (INT) (β= 0.447, P<0.05), and (β= 0.695, P<0.0015) respectively; hence H5, and H6 are supported.

Table 6
R^2 of the endogenous latent variables

Construct	R^2	Results
INT	0.695	High
PEOU	0.720	High
PU	0.745	High

Table 7
Hypotheses-testing of the research model (significant at p** < = 0.01, p* < 0.05)

H	Relationship	Path	*t*-value	*p*-value	Direction	Decision
H1	DGT → PEOU	0.706	16.915	0.000	Positive	Supported**
H2	TEC → PEOU	0.602	11.062	0.000	Positive	Supported**
H3	LRN → PU	0.739	10.838	0.001	Positive	Supported**
H4	TUR → PU	0.653	8.315	0.006	Positive	Supported**
H5	PEOU → INT	0.447	5.375	0.023	Positive	Supported*
H6	PU → INT	0.695	12.282	0.000	Positive	Supported**

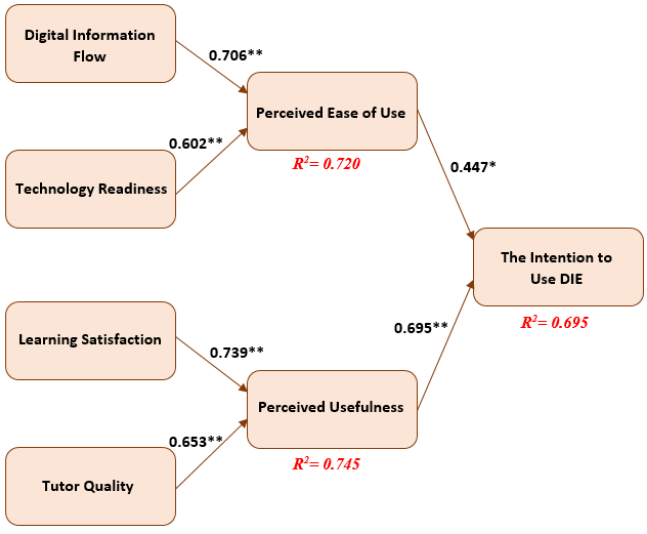

Fig. 2. Path coefficient of the model (significant at p** < = 0.01, p* < 0.05)

6. Discussion of Results

The development of technology has had an impact on universities, which has had an impact on the educational system. To increase opportunities for e-research, e-teaching, and e-learning, sophisticated technology platforms are needed. Multimedia apps are used to encourage imaginative interactions among technology users. The continued use of digital information in

education has been evaluated using a conceptual model, with technological readiness and the flow of digital information serving as the main determinants. One of the most important factors in the model is perceived ease of use, and perceived ease of use has a direct impact on users' intentions to use DIE. Based on previously suggested linkages, the results of the current analysis are congruent with existing literature.

.

However, a better sense of usefulness and a greater readiness to utilize digital information can result from having a high-quality tutor. Several studies have shown that this feeling of usefulness is related to tutor quality and learning satisfaction. The tutor's job in a virtual learning environment shifts from imparting knowledge to promoting learning and solving issues. These elements can be used to assess the level of perceived usefulness of digital learning resources in the classroom. These elements may combine to evaluate the application of DIE (Monardo et al., 2021; Sapta et al., 2021; Teo et al., 2011).

The integrated model's focal point is the TAM, which assesses a person's readiness to use technology by connecting perceived ease of use and perceived usefulness to their continued intention to use DIE. Past studies have stressed the significance of technology acceptance and how PEOU and PU can be paired with external factors to assess a technology's efficacy based on its particular properties. Hence, the current findings are consistent with these past studies and emphasize the importance of technological adoption in determining technology effectiveness.

6.1 Theoretical and Practical implications

It would be good to include other external elements with the TAM constructs to increase the theoretical importance of adoption and acceptance research. By concentrating on individual differences like tutor quality and learner satisfaction, this study goes beyond earlier empirical studies. Deep-learning analysis, as opposed to the conventional SEM analysis used in earlier studies, enhances the examination of individual differences. This work sets the ground for further study and makes a substantial contribution to the literature on technological adoption. The suggested methodology also improves the study's findings' predictive power.

6.2 Managerial Implications

The study's conclusions may have a favorable influence on future methods of instruction in universities and other educational institutions. According to the study, customers' perceptions of the value of technology are influenced by both the particulars of the technology itself and their tastes and needs. This might encourage administrative employees to adopt a more creative mindset, transforming the learning environment through the use of digital educational tools, and offering a greater variety and quality of digital educational experiences. Developers can concentrate on the usability and efficacy of their technology, similar to how users perceive ease of use and perceived usefulness, to build effective digital products. Instructors and proponents of technology should encourage students to use online resources for learning as a supplement rather than as the only source of information. Future studies should take into account gender-based individual differences in personal choices, values, and academic success. Students who have a positive view of the learning environment will be more inclined to use technology, which will accelerate the development of digital education over time.

7. Conclusion, limitations and Future Studies

Education has been greatly impacted by the digital revolution. To enhance learning, “digital technologies” have sparked a lot of interest in higher education (Almaiah et al., 2022). Technology can now be used to solve issues with cooperation, business, information access, and communication. It has become more challenging in recent years to get an education via alternative learning methods (Almaiah et al., 2022). So, educational institutions have a responsibility to reconsider the value of “digital information technology” as a tool for educational instructional portions (Almaiah et al., 2022). To contribute to society and do their occupations effectively, people need to be literate in “digital information”. Professionals in education are crucial to improving digital literacy. The foundation for the ability to pursue lifelong learning as a result of exposure to “digital information” is regarded to be digital literacy. There are some flaws in the current study. First of all, the sample is limited to a group of university students who have selected a variety of majors. Although the study does not address gender inequities among university students, future research may focus on the individual differences among individuals. Second, just a few external factors that might be directly related to the TAM constructs are included in the conceptual model. Third, even though the survey was distributed online and through the internet and social media, surveys may be distributed differently in the future, especially if the pandemic's harmful impacts begin to subside. Fourth, this analysis focuses only on educational settings where the DIE will significantly alter the conditions for teaching and learning (Kabát, 2016; Louro, 2009). Future studies might focus on monetary or medical institutions.

References

Aburayya, A., & Salloum, S. A. (n.d.). *The Effects of Subjective Norm on the Intention to Use Social Media Networks: An Exploratory Study Using PLS-SEM and Machine Learning Approach*.

Agarwal, R., & Karahanna, E. (2000). Cognitive absorption and beliefs about information technology usage. *MIS Quarterly*,

24(4), 665–694.
Al-Maroof, R. S., & Salloum, S. A. (2020). An Integrated model of continuous intention to use of google classroom. In *Recent advances in intelligent systems and smart applications* (pp. 311-335). Cham: Springer International Publishing.
Alghizzawi, M., Habes, M., & Salloum, S. A. (2020). The Relationship Between Digital Media and Marketing Medical Tourism Destinations in Jordan: Facebook Perspective. In *Advances in Intelligent Systems and Computing* (Vol. 1058). https://doi.org/10.1007/978-3-030-31129-2_40
Almaiah, M.A., Alhumaid, K., Aldhuhoori, A., Alnazzawi, N., Aburayya, A., Alfaisal, R., Salloum, S.A., Lutfi, A., Al Mulhem, A., Alkhdour, T., Awad, A.B., Shehab, R. (2022). Factors Affecting the Adoption of Digital Information Technologies in Higher Education: An Empirical Study. *Electronics*, *11*(3572). https://doi.org/10.3390/electronics11213572
Almaiah, M. A., Alfaisal, R., Salloum, S. A., Hajjej, F., Thabit, S., El-Qirem, F. A., Lutfi, A., Alrawad, M., Al Mulhem, A., & Alkhdour, T. (2022). Examining the Impact of Artificial Intelligence and Social and Computer Anxiety in E-Learning Settings: Students' Perceptions at the University Level. *Electronics*, *11*(22), 3662.
Aydin, E., & Erol, S. (2021). The views of Turkish language teachers on distance education and digital literacy during covid-19 pandemic. *International Journal of Education and Literacy Studies*, *9*(1), 60–71.
Barclay, D., Higgins, C., & Thompson, R. (1995). *The Partial Least Squares (pls) Approach to Casual Modeling: Personal Computer Adoption Ans Use as an Illustration*.
Börnert-Ringleb, M., Casale, G., & Hillenbrand, C. (2021). What predicts teachers' use of digital learning in Germany? Examining the obstacles and conditions of digital learning in special education. *European Journal of Special Needs Education*, *36*(1), 80–97. https://doi.org/10.1080/08856257.2021.1872847
Çetin, E. (2021). Digital storytelling in teacher education and its effect on the digital literacy of pre-service teachers. *Thinking Skills and Creativity*, *39*, 100760.
Csikszentmihalyi, M. (1990). Literacy and intrinsic motivation. *Daedalus*, 115–140.
Davis, F. D. (1989a). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 319–340.
Davis, F. D. (1989b). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008
Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, *22*(14), 1111–1132.
Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, *49*(1), 5–22.
Donkor, F. (2011). Assessment of learner acceptance and satisfaction with video-based instructional materials for teaching practical skills at a distance. *International Review of Research in Open and Distributed Learning*, *12*(5), 74–92.
Dudhat, A., Santoso, N. P. L., Santoso, S., & Setiawati, R. (2021). Blockchain in Indonesia University: A Design Viewboard of Digital Technology Education. *Aptisi Transactions on Technopreneurship (ATT)*, *3*(1), 68–80.
Eichelberger, A., & Ngo, H. T. P. (2018). College students' perception of an online course in special education. *International Journal for Educational Media and Technology*, *12*(2).
Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models With Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39–50. https://doi.org/10.2307/3151312
Goodhue, D. L., Lewis, W., & Thompson, R. (2012). Does PLS have adavantages for small sample size or non-normal data? *MIS Quaterly*.
Hair, J., Hollingsworth, C. L., Randolph, A. B., & Chong, A. Y. L. (2017). An updated and expanded assessment of PLS-SEM in information systems research. *Industrial Management & Data Systems*, *117*(3), 442–458. https://doi.org/10.1108/IMDS-04-2016-0130
Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.
He, T., Huang, Q., Yu, X., & Li, S. (2021). Exploring students' digital informal learning: the roles of digital competence and DTPB factors. *Behaviour & Information Technology*, *40*(13), 1406–1416.
Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135.
Hsu, H.-C. K., Wang, C. V., & Levesque-Bristol, C. (2019). Reexamining the impact of self-determination theory on learning outcomes in the online learning environment. *Education and Information Technologies*, *24*(3), 2159–2174.
Jeffrey, L., Hegarty, B., Kelly, O., Penman, M., Coburn, D., & McDonald, J. (2011). Developing digital information literacy in higher education: Obstacles and supports. *Journal of Information Technology Education: Research*, *10*(1), 383–413.
Joosten, T., & Cusatis, R. (2020). Online learning readiness. *American Journal of Distance Education*, *34*(3), 180–193.
Kabát, M. (2016). Teaching Metaverse. What and how to (not) teach using the medium of virtual reality. *Edutainment*, *1*(1).
Kear, K., Donelan, H., & Williams, J. (2014). Using wikis for online group projects: Student and tutor perspectives. *International Review of Research in Open and Distributed Learning*, *15*(4), 70–90.
Krejcie, R. V, & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, *30*(3), 607–610.
Kuo, Y.-C., Walker, A. E., Schroder, K. E. E., & Belland, B. R. (2014). Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. *The Internet and Higher Education*, *20*, 35–50.

Labrecque, L. I., Vor Dem Esche, J., Mathwick, C., Novak, T. P., & Hofacker, C. F. (2013). Consumer power: Evolution in the digital age. *Journal of Interactive Marketing*, *27*(4), 257–269.

Leshchenko, M. P., Kolomiiets, A. M., Iatsyshyn, A. V, Kovalenko, V. V, Dakal, A. V, & Radchenko, O. O. (2021). Development of informational and research competence of postgraduate and doctoral students in conditions of digital transformation of science and education. *Journal of Physics: Conference Series*, *1840*(1), 12057.

Liljander, V., Gillberg, F., Gummerus, J., & Van Riel, A. (2006). Technology readiness and the evaluation and adoption of self-service technologies. *Journal of Retailing and Consumer Services*, *13*(3), 177–191.

Liu, S.-H., Liao, H.-L., & Peng, C.-J. (2005). Applying the technology acceptance model and flow theory to online e-learning users' acceptance behavior. *E-Learning*, *4*(H6), H8.

Louro, L. C. (2009). METAVERSE-The Learning in the Immersive Worlds. *SLACTIONS 2009*, 142.

Monardo, G., Pavese, C., Giorgi, I., Godi, M., & Colombo, R. (2021). Evaluation of patient motivation and satisfaction during technology-assisted rehabilitation: an experiential review. *Games for Health Journal*, *10*(1), 13–27.

Moreno-Morilla, C., Guzmán-Simón, F., & García-Jiménez, E. (2021). Digital and information literacy inside and outside Spanish primary education schools. *Learning, Culture and Social Interaction*, *28*, 100455.

Nunnally, J. C., & Bernstein, I. H. (1978). *Psychometric theory*.

Nunnally, J. C., & Bernstein, I. H. (1994). Psychometric theory. In *McGraw-Hill, New York*. https://doi.org/10.1037/018882

Parasuraman, A. (2000). Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, *2*(4), 307–320.

Parasuraman, A., & Colby, C. L. (2001). *Techno-ready marketing: How and why your customers adopt technology*. Free Press New York.

Parasuraman, A., Edvardsson, B., & Gustafsson, A. (2004). The impact of national culture on technology readiness, adoption and use. *QUIS 9, June 15-18, Karlstad, Sweden*.

Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). E-S-QUAL a multiple-item scale for assessing electronic service quality. *Journal of Service Research*, *7*(3), 213–233. https://doi.org/10.1177/1094670504271156

Peltier, J. W., Dahl, A. J., & Swan, E. L. (2020). Digital information flows across a B2C/C2C continuum and technological innovations in service ecosystems: A service-dominant logic perspective. *Journal of Business Research*, *121*, 724–734.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879.

Qureshi, M. I., Khan, N., Raza, H., Imran, A., & Ismail, F. (2021). Digital Technologies in Education 4.0. Does it Enhance the Effectiveness of Learning? A Systematic Literature Review. *International Journal of Interactive Mobile Technologies*, *15*(4).

Reigeluth, C. M. (1983). *Instructional design theories and models: An overview of their current status*. Routledge.

Ringle, C. M., Wende, S., & Becker, J.-M. (2015). *SmartPLS 3. Bönningstedt: SmartPLS*.

Saadé, R., & Bahli, B. (2005). The impact of cognitive absorption on perceived usefulness and perceived ease of use in on-line learning: an extension of the technology acceptance model. *Information & Management*, *42*(2), 317–327.

Salloum, S. A., & Shaalan, K. (2018). Adoption of E-Book for University Students. *International Conference on Advanced Intelligent Systems and Informatics*, 481–494.

Sapta, I., MUAFI, M., & SETINI, N. M. (2021). The role of technology, organizational culture, and job satisfaction in improving employee performance during the Covid-19 pandemic. *The Journal of Asian Finance, Economics and Business*, *8*(1), 495–505.

Sayaf, A. M., Alamri, M. M., Alqahtani, M. A., & Al-Rahmi, W. M. (2021). Information and communications technology used in higher education: An empirical study on digital learning as sustainability. *Sustainability*, *13*(13), 7074.

Siddiq, F., Scherer, R., & Tondeur, J. (2016). Teachers' emphasis on developing students' digital information and communication skills (TEDDICS): A new construct in 21st century education. *Computers & Education*, *92*, 1–14.

Teo, T., Luan, W. S., Thammetar, T., & Chattiwat, W. (2011). Assessing e-learning acceptance by university students in Thailand. *Australasian Journal of Educational Technology*, *27*(8).

Urbach, N., & Ahlemann, F. (2010). Structural equation modeling in information systems research using partial least squares. *Journal of Information Technology Theory and Application*, *11*(2), 5–40. https://doi.org/10.1037/0021-9010.90.4.710

Vargo, S. L., & Lusch, R. F. (2008). Service-dominant logic: continuing the evolution. *Journal of the Academy of Marketing Science*, *36*(1), 1–10.

Wahyuningsih, T., Oganda, F. P., & Anggraeni, M. (2021). Design and Implementation of Digital Education Resources Blockchain-Based Authentication System. *Blockchain Frontier Technology*, *1*(01), 74–86.

Wang, Y., Wu, M., & Wang, H. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology*, *40*(1), 92–118.