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Game-based Learning Sustainability During Social Distance: The Role of Gamification Quality

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Abstract: Online learning is an obligation in teaching and learning activities during the Coronavirus disease (COVID-19). Game-based learning is a solution in improving student learning outcomes. This research aims to determine the level of acceptance of gamification in terms of Gamification quality (GQ), instructor characteristic (IC), and technology anxiety (TA). The target respondents were students taking information systems courses based on enterprises resources planning (ERP) Gamification. The sample used is a census. That is, the entire population is taken as a sample. A total of 93 students filled out the online questionnaire. Then, data analysis using Structural Equation Model - Partial Least Square (SEM-PLS). Student satisfaction (SS) and perceived ease of use (PEOUG) are the most influences. PEOUG is also the construct that has the most significant relationship impact, especially with the perceived usefulness (PUG). Meanwhile, two constructs do not significantly impact TA on PUG and PUG on Intention to use gamification (INTG). The obligation of students requires students to ignore the impact and function of gamification. The results of this research also show that technology acceptance model (TAM), the constructs IC, TA, and GQ have a positive effect on PEOUG. Then PUG and PEOUG can positively affect SS.

Keywords: *Behaviour intention, gamification quality, instructor characteristic, student satisfaction, technology anxiety.*

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Introduction

Students are the essential element in a higher education institution. The impact is not only for universities but also for the country's future development. So, it is appropriate to evaluate each student's way of learning. Student satisfaction in higher education plays a vital role in deciding whether students can accept the technology used in teaching and learning. Because students' satisfaction will impact the use of learning media in the future, this research's context is whether using the Gamification method can increase student satisfaction. Enterprise resources planning (ERP) gamification can allow lecturers to explore learning methods more effectively and efficiently because it can be done online.

Especially during the Coronavirus disease (COVID-19) situation as it is currently happening. Face-to-face learning no longer exists or even experiences restrictions when social restrictions occur, making students and lecturers adapt to online learning. This policy is perfect for the community in its current condition because it aims to stop the spread of COVID-19 through the education sector. Regulations from the Indonesian government also support this policy through Circular Number 4 of 2020 concerning the Implementation of Education Policies in an Emergency Situation for the Spread of COVID-19 which contains policies on education in emergency conditions to reduce the spread of COVID-19.

In recent years, technology has developed so rapidly that the demands for an integrated system have become very high. This fact indicates that ERP has become an inseparable part of business organizations (Alaskari et al., 2021). ERP is an integrated management information system that can assist management in making decisions. This technology allows companies to get information very quickly and precisely. Modern ERP technology can generate different information in each generated process to allow users to get new information for decision making (Kilic et al., 2015). ERP can also manage all aspects of business units to improve business process efficiency (Chofreh et al., 2018; Shirazi, 2018). In addition, ERP can increase sales growth distribution system efficiency, improve customer service, and reduce

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operational expenses (Aboabdo et al., 2019; Esteves, 2009). In education, ERP is also studied in accounting majors. One of ERP learning for Education is MonsoonSIM. MonsoonSIM is a cloud computing-based ERP learning that allows lecturers and students to simulate how a company operates using ERP.

Gamification as a fun learning method is one of the effective methods to improve student learning outcomes (Aparicio et al., 2019; Poondej & Lerdpornkulrat, 2019). Students will use ERP-gamification continuously when the quality of gamification is compatible with user needs (Aparicio et al., 2019). However, problems arise because implementation requires a reasonably significant investment and takes longer. So, the university responded to this fact by adopting an ERP-based curriculum (Dalveren, 2014). Furthermore, even in some literature, research on ERP, especially on learning technology, is still little done (Choi et al., 2007; Dalveren, 2014; Hawking & McCarthy, 2001). The increasingly intense use of technology makes students familiar with technology from an early age. Students who are familiar with technology tend to have low anxiety. And vice versa. When students are not familiar, they tend to have high anxiety. This anxiety is a natural thing for someone to have when using technology. When technology comes, of course, it causes anxiety for users. Do users benefit, or are they at a loss? A person's high or low anxiety will affect the perception of the ease or usefulness of technology adoption.

The more anxious the user when using technology, the lower the user has perceived ease of use. This means that even accessible technology will find it difficult for users with high levels of technology anxiety. The COVID-19 pandemic period allows students to be higher in terms of anxiety. The presence of COVID-19 as a pandemic also has a negative impact, especially on a person's mental condition, including students. The emergence of these adverse effects is due to various things such as social restrictions, economic impacts, death threats, and the level of viral infection that causes higher anxiety conditions (Khawar et al., 2021; Marjanovic et al., 2007; Wolor et al., 2021).

Online learning is undoubtedly the most appropriate way to overcome the obstacles to learning that are hampered because of COVID-19. The existence of this pandemic makes online learning mandatory to be carried out following the policies of the Ministry of Education and Culture. Nevertheless, the program raises some problems. The Ministry of Education noted three main factors causing COVID-19 for education: dropping out of school, violence and external risks, and decreased learning achievement. This fact is even supported by a survey reported by SMR where 92% of students perceive online learning as having many problems: inadequate internet infrastructure (25%) and lack of teacher guidance (38%). Even 78% of students said they wanted to return to face-to-face learning (Hemansyah, 2020). These results are because students (56%) have difficulty understanding the material taught online, especially courses related to practicum.

Previous research has shown that when students are satisfied with the technology, they will continue to use it (Muñoz-Carril et al., 2021). Students who use technology efficiently will have confidence that technology can be helpful in the learning and teaching process. In the technology acceptance model (TAM) technology adoption model, that convenience and usability are crucial factors in influencing the adoption of technology use in the field of education (Altalhi, 2021; Godoe & Johansen, 2012; Wan et al., 2020; Wu & Gao, 2011). The valuable and flexible online learning function can positively increase the intention to use online learning (Al-Maroof & Salloum, 2021; Ngabiyanto et al., 2021). In the COVID-19 pandemic, several model developments from previous research regarding the excellent use of online learning as a learning medium (Abbasi et al., 2020; Musyaffi, Rosnidah, et al., 2021; Shi et al., 2020). Based on identifying the problems above, the focus of this research is to find out how to adopt game-based learning using ERP MonsoonSIM. In addition, this research is also a development of the TAM model with several variables following the actual conditions, namely structural characteristics, gamification quality, and technology anxiety.

Literature Review

Previous research has carried out the adoption of online learning technology by adopting several models such as TAM. TAM has been researched in various fields, even in Education Technology (Cakır & Solak, 2015; Ramírez-Correa et al., 2015). Davis (1989) developed this TAM to measure technology adoption. Factors that support technology adoption include perceived usefulness and Perceived Ease of Use. In educational technology, TAM can measure the extent to which students and lecturers can accept learning by utilizing technology, especially regarding the quality of education. One of the educational technologies is gamification. Gamification is game-based learning that allows students to learn with elements found in games. In the world of accounting education, an example of gamification is MonsoonSIM. MonsoonSIM is game-based learning that aims to understand accounting learning based on ERP. The use of MonsoonSIM, like ERP, allows students and lecturers to learn how ERP works fun, namely gamification. Many conveniences and benefits are generated using ERP. Students are like entering the game world. Some menus are easy to understand and integrated between purchasing, sales, human resources to marketing and manufacturing modules.

Perceived ease of use is a person's level of effort to understand technology. The less effort to understand technology, the more likely he will find it easy to use technology. Instructor characteristics and system quality also influence this facility. System quality shows the level of superiority of the output of a technology (Ullah et al., 2021). Meanwhile, the instructor characteristic shows a high level of knowledge and motivation with the scope of technical knowledge timely response, innovativeness, and confidence that encourages students to learn educational technology (Alrousan et al.,

2021). So, this instructor characteristic plays a critical role for students in adopting educational technology (Ahmed, 2010). while other research supports that instructor characteristics can positively support an increase in perceived usefulness and ease of use (Hadullo et al., 2017).

In the context of this research, what is meant by system quality is gamification quality according to the research focus. The qualities in gamification include content structure, response time, visual consistency, user support, and better navigation tools (Abdullah et al., 2016; Ullah et al., 2021). When the technology used has a brief appearance, is easy for users to use, and can feel its function, the user feels that the technology is easy to use (Burda & Teuteberg, 2015). Besides that, Monsoosim also has key features that make it easy for students to use, improving process access, easy menus, easy access, and attractive menus (Ramkumar et al., 2019).

H_1: Instructor Characteristic has a positive and significant impact on Perceived Ease to Use of ERP Gamification

H_2: Gamification Quality has a positive and significant impact on Perceived Ease to Use of ERP Gamification

Technology Anxiety is a person's fear of how to start using information technology that users have used based on previous experience (Cambre & Cook, 1995; Kamal et al., 2020). In online learning, students are faced with online learning, which requires students to quickly understand the use of technology so that learning activities are not left behind (Chyr et al., 2017; Huang et al., 2021). New technology generates anxiety in a person. This is because threats will come and may occur, such as security or comfort. Anxiety is an innate behavior of a person. When there is a new technology, it is natural to be anxious.

Nevertheless, the problem is that anxiety is low or high. The higher a person's anxiety, the lower the perception of the convenience and benefits of technology (Chyr et al., 2017; Huang et al., 2021). Igbaria et al. (1996) said that technology anxiety harms perceived usefulness, enjoyment, and computer usage. So, this makes the use of technology less than optimal.

H_3: Technology Anxiety has a negative and significant impact on Perceived Ease to Use of ERP Gamification

H_4: Technology Anxiety has a negative and significant impact on Perceived Usefulness of ERP Gamification

MonsoonSIM as game-based learning can make it easier for students to operate optimally to increase the functions and benefits of the technology. The easier it is for the technologist, the tendency of a person to feel more about the functions and benefits of the monsoon gamification becomes more and more (Lin et al., 2017). Users' ease of using ERP Gamification as a learning medium will allow students to accept the method (Abdekhoda et al., 2020). The impact of learning will be more fun and can improve student understanding. Learning methods using ERP Gamification can make it easier for students to access online learning anywhere and anytime. In addition, the gamification method is also based on games that are familiar to students. The form of learning models close to technology like that can make students learn fun and interact with other students (Salimon et al., 2021; Tîrziu & Vrabie, 2015). That method results in high student satisfaction (Muñoz-Carril et al., 2021). In the previous literature review, PEG was the dominant factor in user satisfaction (Ashfaq et al., 2020; Rafique et al., 2021). If the characteristics of the technology cause a level of anxiety, then ease is a supporting factor in the sustainability of using the technology. So based on the previous literature, it is confirmed that perceived ease of use gamification (PEOUG) has a significant impact on the sustainability of students adopting technology as a learning medium (Omotayo & Haliru, 2020; Rafique et al., 2021; Thong et al., 2006).

H_5: Perceived Ease to Use of ERP Gamification has a positive and significant impact on Student Satisfaction

H_6: Perceived Ease to Use of ERP Gamification has a positive and significant impact on Intention to Use Gamification

H_7: Perceived Ease to Use of ERP Gamification has a positive and significant impact on Perceived Usefulness of ERP Gamification

Perceived Usefulness of ERP Gamification (PU) is one in TAM which has a significant role in determining user acceptance of the technology used. Perceived usefulness is the level of a person's perception of trust in a system that can improve his work (Joo & Choi, 2016; Musyaffi, Rosnidah, et al., 2021). In the context of online learning systems, perceived usefulness is the dominant factor because it can have various benefits that support learning, thereby creating a desire for students to continue to use online learning systems (Al-Maroof & Salloum, 2021; Ngabiyanto et al., 2021). In previous studies, users who felt that technology was supportive in their learning activities tended to be satisfied with the platform (Ashfaq et al., 2020; Cheung & Vogel, 2013). PU is also a dominant factor in encouraging students to increase the adoption of learning technology (Ashfaq et al., 2020; Lin et al., 2017; Rafique et al., 2021). Students feel that the benefits of technology that support learning are significant because gorging can make learning easier to absorb. In addition, the benefits of technology can also affect the feelings and intentions of users after experiencing the use of the technology (Bhattacherjee, 2001). this shows that PU has a significant positive impact on Intention to use gamification (INTG) and student satisfaction (SS) of Gamification.

H_8: Perceived Usefulness of ERP Gamification has a positive and significant impact on Intention to Use Gamification

H_9: Perceived Usefulness of ERP Gamification has a positive and significant impact on Student Satisfaction of ERP Gamification

In accepting the learning method, students have negative or positive emotions depending on the method. Student satisfaction shows positive and negative emotions when using educational technology (Alrousan et al., 2021). In previous studies, student satisfaction has been carried out where this construct plays a crucial role in adopting educational technology, especially in online learning (Pham et al., 2019). Students satisfied with the benefits and ease of using ERP Gamification will perceive that this technology can help them carry out teaching and learning so that students tend to continue to use ERP Gamification. Students satisfied with the benefits and ease of using ERP Gamification will perceive that this technology can help them carry out teaching and learning. Students tend to continue to use ERP Gamification. Student satisfaction has a more substantial impact on the continuance intention of ERP Gamification. The more satisfied the performance of the technology causes technology adoption to increase (Alassafi, 2021; Muñoz-Carril et al., 2021). The main factor why students feel satisfied is because learning using gamification is fun and can be easily used. In addition, students also indirectly study and analyze market and company conditions. Students can improve learner understanding of management information systems and other courses related to accounting such as cost accounting, management accounting, financial accounting, auditing, and others. The more satisfied students use educational technology in learning activities, the adoption of the use of this technology increases (Ashfaq et al., 2020; Gao & Waechter, 2015; Lin et al., 2017).

H_{10}: Student Satisfaction of ERP Gamification has a positive and significant impact on Intention to Use Gamification

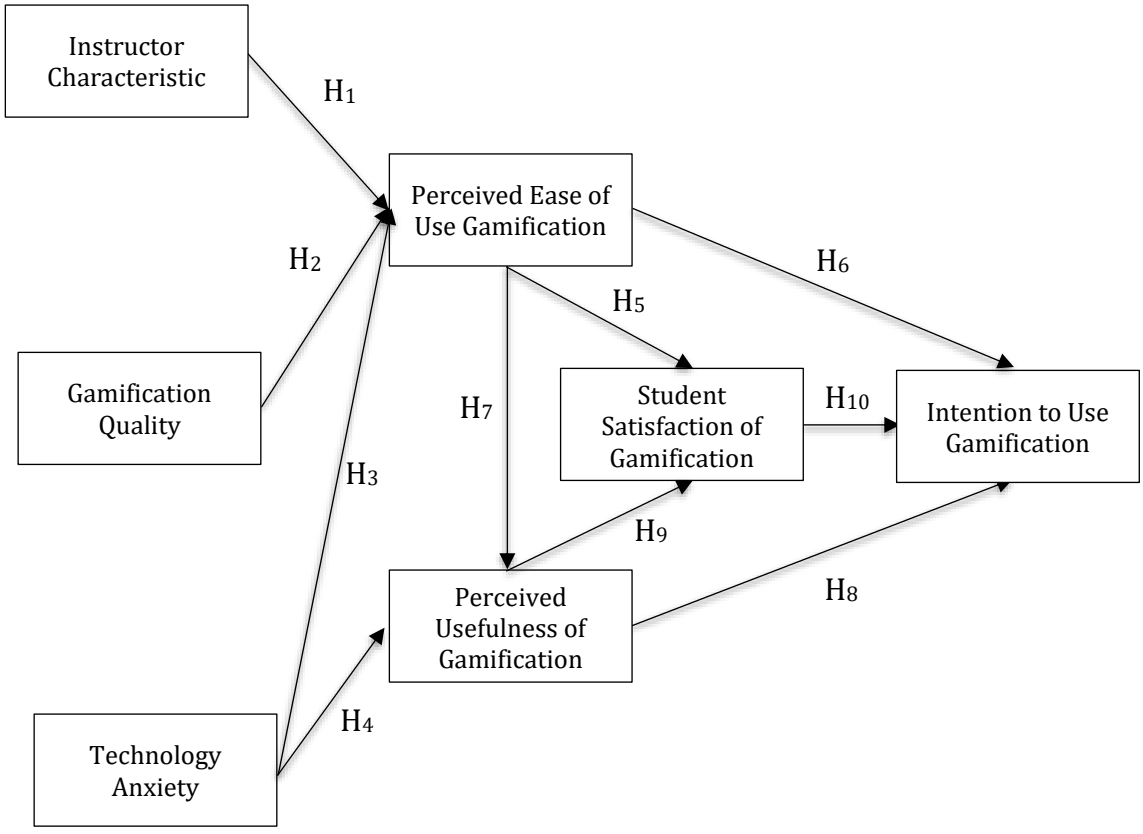

Figure 1. Research Model

Methodology

Research Design

To produce credible research results, it is necessary to design a methodology to connect research objectives and accurate results. In determining the research methodology, one must pay attention to the availability of possible resources such as the researcher's knowledge, time, and skills (Khalifeh et al., 2020). This study aimed to determine the adoption of game-based learning technology using MonsoonSIM by looking at the factors that influence the TAM model and student satisfaction, especially on gamification quality, instructor characteristics, and technology anxiety. This research targets users of online learning, namely ERP gamification in the form of MonsoonSIM in 3 classes in the management information system course, Jakarta State University, Indonesia. The sample is used using the census method, where the entire population is used as a sample. Thus, the number of samples in this study was 93

respondents divided into three classes. Every meeting held in the Management Information System course uses theory and practicum. During one semester, they do practicum using online gamification. After the course ends one semester, students are asked to fill out an online questionnaire through the Microsoft form. Respondents were asked to fill out a questionnaire with five answer choices using a Likert scale approach.

The five answer choices range from strongly disagree (1) to Strongly Agree (5). The questionnaire in this study has been adopted from previous research by adjusting to the conditions in the field. The Gamification Quality consists of 3 questions (Ojo, 2017). Characteristic Instructions consist of 5 questions (Alrousan et al., 2021). Technology Anxiety consists of 4 questions (Alrousan et al., 2021). perceived ease of use consists of 4 questions, and perceived usefulness consists of 4 questions (Venkatesh & Bala, 2008). student satisfaction consists of 4 questions (Kim et al., 2007), and the intention to use gamification consists of 4 questions (Musyaffi, Johari, et al., 2021; Singh & Srivastava, 2018).

Analyzing of Data

After the data was collected, the data was analyzed using structural eqution model-partial least square (SEM-PLS) method and processed using the SmartPLS 3.0 software. Before analyzing with PLS, the author compiles the raw data from Microsoft form to Microsoft excel. After that, the author reviews the existing data to ensure that all available data is free from errors. The next step is to perform data processing with the help of SmartPLS 3.0. After processing the data, the authors perform data analysis in stages, namely the first to test the validity and reliability with a measurement model. Second, testing the model with a structural model. The last is to test the hypothesis.

Findings

Before answering whether the proposed hypothesis is by the results statistically, so previously carried out several evaluations, namely the first, the measurement model. Measurement evaluation aims to analyze the validity and reliability—second Structural model. The structural evaluation aims to assess how high the level of fit of the model that has been built is. Moreover, the third hypothesis evaluation aims to test whether the hypothesis is appropriate or not.

Measurement Model

The first step in analyzing using PLS is to evaluate the measurement model. There are several steps in carrying out the measurement model, namely by evaluating the value of the outer loading. After that, the validity and reliability were tested through Cronbach's alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE). SmartPLS result data regarding outer loading, CR, AVE, and CA are as follows:

Table 2. Evaluation of Outer Loading, CR, AVE, and CA

Construct	Outer Loading	Cronbach's alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Instructor Characteristic (IC)		0.914	0.936	0.744
IC1	0.841			
IC2	0.891			
IC3	0.908			
IC4	0.836			
IC5	0.835			
Gamification Quality (GQ)		0.687	0.814	0.594
GQ1	0.748			
GQ2	0.793			
GQ3	0.770			
Technology Anxiety (TA)		0.913	0.939	0.793
TA1	0.889			
TA2	0.813			
TA3	0.926			
TA4	0.930			
Perceived Ease of Use Gamification (PEOUG)		0.869	0.911	0.719
PEOUG1	0.838			
PEOUG2	0.847			
PEOUG3	0.823			
PEOUG4	0.882			

Table 2. Continued

Construct	Outer Loading	Cronbach's alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Perceived Usefulness of Gamification (PUG)		0.869	0.911	0.721
PUG1	0.888			
PUG2	0.897			
PUG3	0.775			
PUG4	0.830			
Student Satisfaction (SS)		0.803	0.872	0.630
SS1	0.791			
SS2	0.830			
SS3	0.730			
SS4	0.820			
Intention to Use Gamification		0.839	0.892	0.675
INTG1	0.863			
INTG2	0.798			
INTG3	0.825			
INTG4	0.798			

A valid outer loading criterion is when it has a construct above 0.7. Table 2 above shows the extreme value for each construct that exceeds 0.7. The most incredible value in the Technology Anxiety construct is the TA4 item, with a value of 0.93. while the smallest outer loading value is the Gamification Quality construct on the GQ1 questionnaire item with a value of 0.748. Based on this explanation, it can be concluded that all outer loadings in each construct item have a value of more than 0.7. more significant than the recommended minimum value. The result means that each item in this construct has good validity to be continued to the next step. Then another way is to evaluate the AVE. AVE is said to be valid if it has a value above 0.5. Based on Table 2 above, most constructs are above 0.5, with the most considerable value in the Technology Anxiety construct (0.793) and the smallest value in the Gamification Quality construct (0.594). It means that all constructs in this research have good validity. The next step is to evaluate the reliability by evaluating the CA and CR values with the recommended values above 0.7.

The largest CA value is in the Instructor Characteristic construct (0.914), and the smallest value is the gamification Quality construct (0.687). This value is smaller than the recommended value but still close to 0.7. according to Hair et al. (2019), if a model is in the form of development, it can be valued in the range of 0.6 to 0.7. Thus, the gamification quality construct is still acceptable. Then the most considerable CR value is in the Technology Anxiety construct (0.939). At the same time, the smallest CR value is in the Gamification Quality construct (0.814). Thus, it can be concluded that all constructs in this study have good reliability.

In addition to evaluating the CA, CR, AVE, or extreme loading values, there is another way to strengthen this research model, namely Cross Loading. the value of cross-loading can be seen in full through the following Table 3:

Table 3. Cross Loading

	GQ1	IC	INTG	PEOUG	PUG	SS	TA
GQ1	0.748	0.396	0.266	0.277	0.305	0.327	-0.292
GQ2	0.793	0.321	0.491	0.482	0.459	0.480	-0.182
GQ3	0.770	0.274	0.247	0.281	0.241	0.326	-0.335
IC1	0.401	0.841	0.467	0.549	0.417	0.514	-0.209
IC2	0.321	0.891	0.512	0.533	0.301	0.629	-0.127
IC3	0.333	0.908	0.569	0.610	0.413	0.606	-0.156
IC4	0.342	0.836	0.456	0.517	0.375	0.546	-0.170
IC5	0.428	0.835	0.535	0.576	0.402	0.562	-0.182
INTG1	0.409	0.477	0.863	0.550	0.345	0.590	-0.123
INTG2	0.266	0.426	0.798	0.506	0.349	0.555	-0.100
INTG3	0.543	0.466	0.825	0.510	0.386	0.572	-0.150
INTG4	0.332	0.563	0.798	0.540	0.317	0.635	-0.100
PEOUG1	0.371	0.616	0.589	0.838	0.500	0.655	-0.182
PEOUG2	0.447	0.496	0.516	0.847	0.525	0.583	-0.261
PEOUG3	0.416	0.505	0.522	0.823	0.654	0.591	-0.349
PEOUG4	0.399	0.574	0.546	0.882	0.522	0.587	-0.285

Table 3. Continued

	GQ1	IC	INTG	PEOUG	PUG	SS	TA
PUG1	0.441	0.399	0.329	0.566	0.888	0.517	-0.255
PUG2	0.334	0.408	0.404	0.564	0.897	0.525	-0.262
PUG3	0.410	0.339	0.384	0.543	0.775	0.518	-0.308
PUG4	0.388	0.358	0.315	0.530	0.830	0.434	-0.232
SS1	0.430	0.599	0.568	0.539	0.432	0.791	-0.059
SS2	0.398	0.478	0.561	0.576	0.504	0.830	-0.103
SS3	0.318	0.487	0.518	0.549	0.414	0.730	-0.019
SS4	0.474	0.541	0.627	0.599	0.517	0.820	-0.134
TA1	-0.320	-0.160	-0.115	-0.205	-0.250	-0.022	0.889
TA2	-0.265	-0.162	-0.091	-0.254	-0.273	-0.049	0.813
TA3	-0.300	-0.217	-0.167	-0.357	-0.301	-0.180	0.926
TA4	-0.282	-0.149	-0.127	-0.288	-0.283	-0.084	0.930

Cross Loading shows the relationship between one construct with another construct. To see how the relationship each construct, we can look at the value of the indicator item in the top column. This value must have the highest value among the items in the other constructs. Items GQ1, GQ2, and GQ3 (0.748, 0.793, 0.770) in the Gamification Quality construct have the most significant value among other constructs. Then on items IC1, IC2, IC3, IC4, and IC5 (0.841, 0.891, 0.908, 0.836, 0.835), the Instructor Characteristic construct has the most considerable value compared to other constructs. Meanwhile for TA1, TA2, TA3 and TA4 items (0.889, 0.813, 0.926, 0.930). The items in the Student Satisfaction construct are SS1 (0.791), SS2 (0.830), SS3 (0.730), SS4 (0.820), with the highest scores among items in other constructs. Items PUG1, PUG2, PUG3, and PUG4 (0.888, 0.897, 0.775, 0.830) on the Perceived Usefulness construct have the most significant value compared to other constructs regarding PUG1 to PUG4. Then the items PEOUG1 to PEOUG4 (0.838, 0.847, 0.823, 0.882) in the Perceived ease of use Gamification construct have a more excellent cross-loading value and the same items in other constructs. Then finally, INTG1, INTG2, INTG3, and INTG4 (0.863, 0.798, 0.825, 0.798) in the intention to use the Gamification construct have the most significant construct value compared to other constructs in the INTG1-INTG4 item. Thus, it can be concluded that all constructs and items in this study have good discriminant validity and conduct tests through cross-loading tests. Then, the next step is to evaluate the Fornell-Larcker value. The following Table 4 shows the results of SmartPLS.

Table 4. Fornell-Larcker Criterion

	GQ	IC	INTG	PEOUG	PUG	SS	TA
Gamification Quality	**0.771**						
Instructor Characteristic	0.423	**0.863**					
Intention to Use Gamification	0.471	0.591	**0.821**				
Perceived Ease to Use Gamification	0.481	0.648	0.642	**0.848**			
Perceived Usefulness	0.463	0.444	0.424	0.650	**0.849**		
Student Satisfaction	0.513	0.663	0.718	0.714	0.590	**0.794**	
Technology Anxiety	-0.326	-0.196	-0.143	-0.318	-0.313	-0.102	**0.891**

In conducting the Fornell-Larcker evaluation, the right way is to compare it with the value of the AVE in each construct. Each construct in GQ (0.771), IC (0.863), INTG (0.821), PEOUG (0.848), PUG (0.849), SS (0.794) and TA (0.891) has the highest value among the construct items below it. So, it can be concluded that in the Fornell-Larcker test, all existing constructs have a good measure of validity.

Structural Model

After conducting various tests of the measurement model, the next step is to evaluate the structural model. One of the items that will evaluate is R Square. This value tests how the impact is jointly between the dependent construct and the independent construct. According to Hair, there are several categories to measure the level of R square, namely weak (0.25), moderate (0.5), and substantial (0.75) (Hair et al., 2019). After conducting various tests of the measurement model, the next step is to evaluate the structural model. One of the items that will evaluate is R Square. This value tests how the impact is jointly between the dependent construct and the independent construct. There are several categories to measure the level of R square, namely weak (0.25), moderate (0.5), and substantial (0.75) (Hair et al., 2019).

Table 5. R Square

	R Square	R Square Adjusted	Criteria
Intention to Use Gamification	0.556	0.541	Moderate
Perceived Ease to Use Gamification	0.490	0.473	Moderate
Perceived Usefulness	0.435	0.423	Moderate
Student Satisfaction	0.537	0.527	Moderate

After explaining the magnitude of the influence together according to Table 5 above, next, is to evaluate the effect size. Similar to R square, the effect size category range has three categories, namely medium effect (0.15), small effect (0.02), and significant effect (0.35) (Aaronson et al., 1998). After analyzing Table 6, the conclusion is that three constructs have an extensive effect size relationship, namely Instructor characteristic (0.451) and Perceived Ease of use gamification (0.587 and 0.407) on Perceived usefulness and student satisfaction. Meanwhile, one construct is in the medium effect category, namely Student Satisfaction (0.325). The remaining five constructs have a negligible effect category, namely the gamification quality construct (0.065), Perceived ease of use gamification on intention to use gamification (0.092), perceived usefulness (0.015) on student satisfaction, and technology anxiety (0.037 and 0.022) on PUG and SS.

Table 6. f Square

	INTG	PEOUG	PUG	SS
Gamification Quality (GQ)		0.065		
Instructor Characteristic (IC)		**0.451**		
Intention to use Gamification (INTG)				
Perceived Ease of Use Gamification (PEOUG)	0.092		**0.597**	**0.407**
Perceived Usefulness (PUG)	**0.015**			0.060
Student Satisfaction (SS)	**0.325**			
Technology Anxiety (TA)		0.037	0.022	

Hypothesis Testing

The final stage in the PLS-SEM method is to evaluate the hypothesis. The researcher's hypothesis will be compared with the results statistically. To determine whether a hypothesis is accepted or rejected is to compare it with the p-value with an error rate (0.05). Other than that, another way is to compare the t statistic with the t table. Table 7 below is the output of SmartPLS, especially regarding hypothesis decisions.

Table 7. Hypotheses Evaluation

	Hypotheses	Original Sample (O)	t-statistics (|O/STDEV|)	p-values	Decision
H_1	Instructor Characteristic -> Perceived Ease to Use Gamification	0,530	7,304	**0,000**	**Yes**
H_2	Gamification Quality -> Perceived Ease to Use Gamification	0,209	2,307	**0,011**	**Yes**
H_3	Technology Anxiety -> Perceived Ease to Use Gamification	-0,146	1,700	**0,045**	**Yes**
H_4	Technology Anxiety -> Perceived Usefulness	-0,118	0,927	**0,177**	**No**
H_5	Perceived Ease to Use Gamification -> Student Satisfaction	0,571	6,185	**0,000**	**Yes**
H_6	Perceived Ease to Use Gamification -> Intention to use Gamification	0,315	2,916	**0,002**	**Yes**
H_7	Perceived Ease to Use Gamification -> Perceived Usefulness	0,613	6,381	**0,000**	**Yes**
H_8	Perceived Usefulness -> Intention to use Gamification	-0,110	1,031	**0,151**	**No**
H_9	Perceived Usefulness -> Student Satisfaction	0,219	1,924	**0,027**	**Yes**
H_{10}	Student Satisfaction -> Intention to use Gamification	0,558	5,732	**0,000**	**Yes**

Based on the results of SmartPLS according to Table 7 above, there are eight influential hypotheses (H1, H2, H3, H5, H6, H7, H9, and H10) and two hypotheses that have no effect (H4 and H8). to determine the results of the hypothesis following the previous explanation is by comparing the p-value with an error rate of 5%. The first hypothesis to the third hypothesis shows that there is a relationship between the constructs of instructor characteristic (p-value = 0.000, < 0.05), gamification quality (p-value = 0.011, < 0.05) and technology anxiety (p-value = 0.045, < 0.05) with perceived ease of use. In the fifth and ninth hypotheses regarding the relationship with the student satisfaction construct, it shows a significant positive impact on the constructs of perceived ease of use (p-value = 0.000, < 0.05) and perceived usefulness (p-value = 0.027, < 0.05). Furthermore, the sixth and tenth hypotheses regarding the relationship with intention to use gamification show a positive impact, namely from the constructs of perceived ease of use (p-value = 0.002, < 0.05) and student satisfaction (p-value = 0.000, < 0.05). Meanwhile, the fourth hypothesis regarding the relationship between technology anxiety (p-value = 0.177, > 0.05) and perceived usefulness does not have a significant positive relationship. Likewise, with the 8th hypothesis, there is no significant positive relationship between the perceived usefulness construct (p-value = 0.151, > 0.05) and the intention to use gamification.

Discussion

This research shows that increasing the adoption and satisfaction of online learning using gamification is influenced by several factors that strengthen the acceptance model, namely perceived ease of use. Previous research said that the PEOU construct was the most influencing factor in acceptance in both the education sector and other sectors such as the business sector or the public sector. (Alassafi, 2021; Alqahtani & Rajkhan, 2020; Alrousan et al., 2021; Chyr et al., 2017; Kamal et al., 2020; Musyaffi, Rosnidah, et al., 2021). One of the conveniences that users feel in using Moonsonsim Gamification ERP is that its accessibility can be accessed anytime and anywhere. MonsoonSIM is a cloud computing technology so that students do not need to install it in their respective places to access the learning media. In monsonsim, it turns out that it does not only contain learning in management information system course material. However, it also includes other lessons such as cost accounting and management accounting. Because the course contains how to calculate the cost of goods and the impact on buying and selling decisions, students can also study and analyze financial reports for buying and selling decisions. The many features make learning in accounting fun.

So that by using ERP Gamification – MonsoonSIM, students indirectly participate in studying other courses. So that understanding of the course will increase. Thus, students also feel satisfied with MonsoonSIM; the result is that in the learning session, students are very enthusiastic. And tend to use mononyms voluntarily (Muñoz-Carril et al., 2021).

Empirical data shows the R^2 value of Student Satisfaction is 53.7% and intention to use gamification is 55.6%, indicating that the developed model has a high capability to explain the constructs built between SS and INTG. The most significant relationship lies in the 7th hypothesis, namely perceived ease to use and perceived usefulness (0.613 or 61.3 percent). This relationship has the same results as previous research. When students feel that the menus are easy to use, can be accessed anywhere, and are easy to use, the result can increase the essential benefits of ERP MonsoonSIM (Lin et al., 2017). So, the impact can increase student satisfaction (Alqahtani & Rajkhan, 2020; Alrousan et al., 2021; Ashfaq et al., 2020; Cheung & Vogel, 2013; Pham et al., 2019). ERP Gamification's online learning features that are easy to use and help students improve understanding are essential for gamification. These features lead to student satisfaction in using ERP Gamification. Like previous research, PUG and PEOUG significantly positively affect student satisfaction (Alrousan et al., 2021). Students who indicate effortless use of technology show that they find it easy to use the technology. The easier the technology, the students will feel that it will be helpful to feel satisfied with the technology (Muñoz-Carril et al., 2021).

While the constructs that affect PEOUG are GQ (0.209 or 20.9 percent), TA (-0.146 or -14.6 percent), and IC (0.530 or 53 percent). The better quality of gamification, the easier it is to use MonsoonSIM gamification. One of the good things that are felt is that MonsoonSIM can produce artificial intelligence models adapted to one another's choices and decisions. This positive side causes MonsoonSIM to be the preferred learning method for students. This result is also consistent with other research findings that instructor characteristics directly impact perceived ease of use by 53 percent (Alhabeeb & Rowley, 2017; Hadullo et al., 2017). Following learning, instructors or lecturers at universities will increase perceptions of ease of use. The research (Tarus et al., 2015) also supports this research where factors that influence the adoption of online learning, such as instructor technical skills and computer literacy, are the main inhibitors in higher education. Besides, Research (Alhabeeb & Rowley, 2017) also agreed that instructor characteristics strongly influence the success factor in implementing online learning in universities. Other research also found that instructor characteristic is crucial in the successful implementation of e-learning in universities (Alqahtani & Rajkhan, 2020).

Then the statistical results on the second hypothesis show a significant positive impact between GQ and PEOUG. Students feel that MonsoonSIM has a practical learning design, especially in its gamification aspect, which resembles its operational activities. Using this monsoon, students seem to be business actors such as purchasing managers, sales, HRD, accounting, and others according to their roles in the group. Students can also learn the critical role of internal control so that group members do not act alone. In addition, MonsoonSIM learning also has company outputs in infographics that can facilitate decision-making. These factors make students happy to accept monsoon gamification as

the learning media used. This finding is also supported by the research results by other researchers where gamification quality has a considerable impact, especially in the context of online learning (Al-Busaidi, 2013; Burda & Teuteberg, 2015; Mtebe & Raphael, 2018; Ullah et al., 2021).

The data results on the third hypothesis show a negative influence between technology anxiety and perceived ease of use. Meanwhile, there is no significant negative relationship with perceived usefulness in the fourth hypothesis. The previous literature stated that high anxiety could cause a decrease in the level of convenience for users (Chang & Im, 2014; Guo et al., 2013). Research results in Tsai et al. (2020), for example, show that the use of technology perceived negatively will increase anxiety so that technology use decreases.

Conclusion

This research contributes to theory, especially in the technology acceptance model. The results of this study prove that the TAM model especially perceived ease of use is the most significant factor in increasing a person's intention to continue using learning using ERP Gamification. However, some critical notes in the contribution of this research are that perceived usefulness does not have a positive contribution. The factor is the student's obligation to take and learn ERP Gamification in university courses. Some critical features in gamification are not considered necessary by students because of the obligation to learn. The contribution of this research to the TAM model is that the role of Gamification Quality, Instructor characteristics, and Technology anxiety plays a crucial role in making students have a positive perception that it is easy to use gamification. However, technology anxiety has no impact on perceived usefulness. The obligation factor to use technology applications such as MonsoonSIM in management information systems courses causes students to be obliged to learn and use the technology. Meanwhile, in other contributions, student satisfaction is proven to reinforce the TAM model both on perceived ease of use and perceived usefulness and on intention to use gamification.

Recommendations

This study contributes to the TAM model regarding technology adoption in education by describing instructor characteristics, gamification quality, and technology anxiety. Further research can also redevelop the factors that can influence the adoption of online learning, especially in ERP Gamification, such as student attitude problems and social restrictions. Then further researchers can also integrate this model with several suitable models for the adoption of online learning, such as task technology-fit, information success model, and social-cognitive.

For learning and education, the findings of this study offer important information for users of educational technology for future decision-making. For example, the development of learning methods according to student needs. So that some factors that have no effect, such as perceived usefulness, can be overcome by adjusting these needs. Then, the results of this study also become a roadmap for practical learning concepts. This means that as instructors, lecturers must provide quality instructions and promising learning innovations so that student performance increases.

Limitations

The sample of this research is limited to students who take management information systems courses using ERP Gamification. In other words, students are required to take and follow these courses. Thus there is an element of coercion in using ERP Gamification as a learning medium. Because the teaching lecturer chose to use the ERP Gamification media to determine student grades, other researchers should re-examine and compare how ERP gamification is taught in other courses that can choose this learning. Another limitation is that this study was conducted online for one entire semester. That is, observations and student conditions cannot be conditioned equally. It is different when done in the practicum room, where students are together in the same space and conditions—not disturbed by other external factors that can hinder the learning process. In online learning, students often learn by doing other things to not concentrate fully on learning. This research also does not examine how gamification methods can contribute to student outcomes such as student achievement.

Authorship Contribution Statement

Ayatulloh Michael Musyaffi: Conceptualization, Design, Editing/Reviewing, Analysis, writing. Wiwit Apit Sulistyowati: Conceptualization, Analysis, Editing/Reviewing. Christian Wiradendi Wolor: Editing/reviewing, writing, Conceptualization. Aji Sasmi: Writing, analysis, Drafting Manuscript.

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