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STUDENTS' INTENTION TO ACCEPT GAMIFICATION ON WEB-BASED INTERACTIVE MULTIMEDIA USING AN ACTIVE KNOWLEDGE-SHARING LEARNING MODEL

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Abstract

The innovation of computer-based learning media allows students to learn more efficiently and effectively. The implementation of gamification can enhance its effect on students' learning outcomes. Meanwhile, the use of a learning model can support learning for a specific subject. It is essential to determine the success of learning media adoption in the classroom. This study proposes the student's acceptance of gamification on web-based interactive multimedia. The multimedia is designed using an active knowledge-sharing learning model for learning the algorithm and programming, especially in understanding flowcharts, logic, functions, and procedures. The students in the 11th grade of the software engineering program in the vocational school in Bandung are used as the sample of this study. A model testing on the perceived usefulness and perceived ease of use are tested empirically toward the intention to use web-based interactive multimedia. Based on students' responses through Technology Acceptance Model (TAM) questioners, it showed that perceived ease of use affects perceived usefulness, perceived usefulness affects attitude towards usage, and attitude towards usage affects behavioural intention to use, significantly.

Keywords: Active knowledge sharing, Gamification, Interactive multimedia, TAM.

1. Introduction

In the field of education, the development of technology has affected the way teachers carry out the learning process in the classroom [1, 2]. The use of computer-based technology is commonly used in supporting the enhancement of learning outcomes [3, 4]. Along with the spread of websites, learning media has changed from computer-based applications to web-based learning media. According to researcher [5, 6], computer-based learning media can make learning more interactive, effective, efficient, and interesting, and enhance students' motivation and learning outcomes.

Even so, it is necessary to add something attractive to motivate learners to use the learning media and draw their attention to the learning subject. The implementation of gamification can optimize the engagement of the learning media and increase their attention, learning motivation, learning performance, and interest in the learning process, as well as enhance their skills [7, 8]. Gamification is a modification process of learning activities by using game elements in learning [9]. Researcher [8] mentioned several game elements that can be used in gamification, namely points, badges, levels, leaderboards, challenges, rewards, onboarding, and engagement loops. The principles of gamification are suggested to be used in learning if the idea of the game wants to be added to the learning process to engage and motivate students [10, 11].

The effectiveness of learning does not only depend on the learning media used in the classroom. It is also influenced by the right learning model that was selected [12-17]. Based on the learning principle of 21st-century learning, the learning approach must be used student-centred than teacher-centred [18]. Student-centred learning seeks to bring the classroom and students to life. In this approach, the teacher is regarded as guide to aid and lead students to achieve the goals [19, 20]. One of the learning models that uses a student-centred approach is active knowledge sharing. This learning model can help students to understand the knowledge better [21]. Through this model, students can exchange their knowledge with their friends so they can help each other to solve problems. The implementation of this learning model into web-based interactive multimedia that is equipped with gamification hopefully can help students to learn better.

Based on that, the adoption of gamification on web-based interactive multimedia using an active knowledge-sharing learning model by students needs to be analysed. The analysis of the technology adoption in this study uses using Technology Acceptance Model (TAM). This model can enhance our understanding of user behaviour in a system/technology that is used [22]. Figure 1 shows the TAM model according to researcher [23].

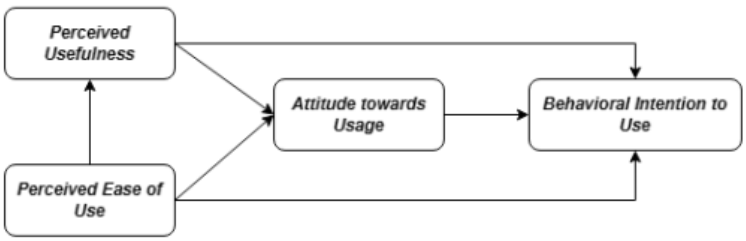

Fig. 1. Technology acceptance model.

2. Methods

The method used in this study was carried out using quantitative research in the form questionnaire-based survey. The questionnaire was arranged following the Technology Acceptance Model (TAM) that was adapted to the learning media context. 12 questions include perceived usefulness (3 items), perceived ease of use (3 items), attitude towards usage (3 items), and behavioural intention to use (3 items) as shown in Table 1. It uses a rating scale on a 5-point scale which is 1 for strongly disagree to 5 for strongly agree.

Table 1. Questionnaire used in this study.

	Indicator
Perceived Usefulness	
PU1	The learning media can enhance the understanding of learning material.
PU2	The learning media can enhance the effectiveness of learning.
PU3	The learning media can enhance learning outcomes.
Perceived Ease of Use	
PEU1	The learning media is easy to use.
PEU2	The use of the learning media is easy to understand.
PEU3	The learning media supports the learning objective.
Attitude towards Usage	
ATU1	The learning media help to make learning more interesting.
ATU2	The learning media make learning more fun.
ATU3	This learning media is more suitable to use as a learning tool.
Behavioural Intention to Use	
BIU1	I will use this learning media as a learning tool.
BIU2	I will often use this learning media.
BIU3	I will recommend this learning media to a friend.

The participants of this study were students in 11th grade at the engineering program in a vocational school (i.e. SMKN 13 Bandung) Indonesia. The sample for the survey was limited to students who use web-based interactive multimedia in the learning process. The examples of learning media interfaces are shown in Figs. 2 and 3. Thirty three respondents responded and completed the questionnaire.

Fig. 2. Implementation of points in the learning media.

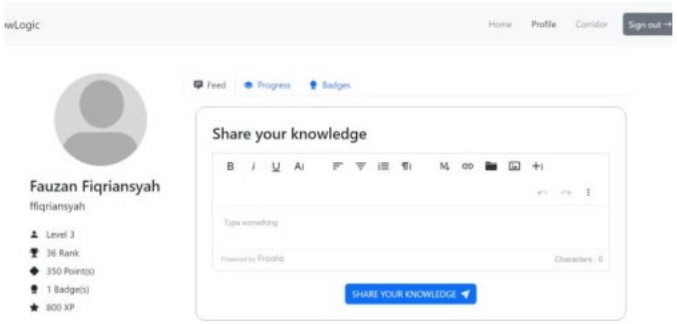

Fig. 3. Implementation of active knowledge sharing in the learning media.

Furthermore, the data that has been collected from the questionnaire will be analysed using SmartPLS4 software. The SmartPLS4 is used to perform convergent validity, discriminant validity, and reliability tests to find the correlation between a latent variable (TAM aspects) with its indicators. A latent variable is a variable that is measured through indicators used to describe the variable itself. A significance test was also performed to analyse its effect on the TAM aspects.

3. Results and Discussion

An analysis using SmartPLS4 was performed to determine the effect of each aspect based on the TAM model shown in Fig. 4. The first step in the analysis was the reflexive indicator test to see the correlation of the TAM aspect with its indicator. Next, the significance of the data was tested to find the effect of each aspect on the TAM model.

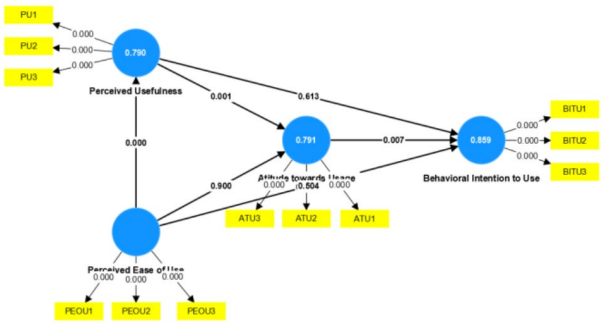

Fig. 4. The effect of each aspect on TAM.

3.1. The results of the reflexive indicator test

The reflexive indicator of the TAM model is measured with convergent validity, discriminant validity, and reliability. The convergent validity was tested using the loading factor in the indicator. The objective of this test is to determine the validity of each correlation between the indicator with its construct or latent variable. In this study, a construct is an attitude towards usage, behavioural intention to use, perceived ease of use, and perceived usefulness. Figure 5 shows the value of the loading factor that is calculated using SmartPLS4 software. All of the indicators already fulfil convergent validity because the value is already greater than 0.70 which means that indicators having the same construct are highly correlated.

	Atitude towards Usage	Behavioral Intention to Use	Perceived Ease of Use	Perceived Usefulness
ATU1	0.918			
ATU2	0.957			
ATU3	0.898			
BITU1		0.949		
BITU2		0.976		
BITU3		0.963		
PEOU1			0.897	
PEOU2			0.911	
PEOU3			0.917	
PU1				0.927
PU2				0.948
PU3				0.905

Fig. 5. The loading factor of TAM (taken from SmartPLS4).

The following step tests the discriminant validity that can be assessed based on the Cornell-larger criterion. It is also tested using SmartPLS4 software shown in Fig. 6. Its validity is good if the square root of the Average Variance Extracted (AVE) in the construct is higher than another construct variable. The square root of AVE on attitude towards usage in its construct is higher than another construct with a value of 0.924. The behavioural intention to use also has a higher square root of AVE in its construct than another construct with a value of 0.963. The square root of AVE on perceived ease of use in its construct is 0.908 which has a higher value than another construct. Then, perceived usefulness has 0.927 on the square root of AVE in its construct higher than in another construct. Based on the result, the value of discriminant validity meets good criteria. This signifies that the construct measures in this study are not highly connected.

	Atitude towards Usage	Behavioral Intention to Use	Perceived Ease of Use	Perceived Usefulness
Atitude towards Usage	0.924			
Behavioral Intention to Use	0.914	0.963		
Perceived Ease of Use	0.798	0.817	0.908	
Perceived Usefulness	0.889	0.874	0.889	0.927

Fig. 6. The results of Fornell-Larcker criterion (taken from SmartPLS4).

Therefore, Cronbach's alpha is tested using SmartPLS4 to find its reliability. The indicator is reliable if the value of Cronbach's alpha is greater than 0.70. Based on Fig. 7 each indicator already meets the criteria, so all of the indicators are reliable. This means that the indicators of the questionnaire offer consistent and steady results.

	Cronbach's alpha
Atitude towards Usage	0.914
Behavioral Intention to Use	0.960
Perceived Ease of Use	0.895
Perceived Usefulness	0.918

Fig. 7. The results of Cronbach's alpha (taken from SmartPLS4).

3.2. The results of the significance test

The effect toward aspect on the TAM model is determined using a significance test that is tested by p-values. The latent variable (X) has a significant effect on the latent variable (Y) if the p-value is less than 0.05. The outcome demonstrates the signification test is presented in Fig. 8.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Atitude towards Usage -> Behavioral Intention to Use	0.649	0.601	0.242	2.679	0.007
Perceived Ease of Use -> Atitude towards Usage	0.035	0.056	0.280	0.126	0.900
Perceived Ease of Use -> Behavioral Intention to Use	0.170	0.209	0.254	0.668	0.504
Perceived Ease of Use -> Perceived Usefulness	0.889	0.893	0.034	26.297	0.000
Perceived Usefulness -> Atitude towards Usage	0.858	0.840	0.249	3.444	0.001
Perceived Usefulness -> Behavioral Intention to Use	0.146	0.156	0.288	0.506	0.613

Fig. 8. The results of p-values (taken from SmartPLS4).

The p-values in Fig. 8 show that the attitude towards usage has an impact on behavioural intention to use. The other studies also indicate this significance affect [23-26]. Meanwhile, the perceived ease of use doesn't have contribution on attitude towards usage. It happens too with the perceived ease of use toward behavioural intention to use. On the contrary, the perceived ease of use is contributed to perceived usefulness. This also performed in another research that showed a positive relationship between them [23, 24, 27, 28]. Additionally, perceived usefulness is also influenced the attitude towards usage. Some of the study also demonstrate that perceived usefulness is determined students' attitude toward usage [25, 27, 29-33]. However, perceived usefulness does not have a significant effect on behavioural intention to use.

4. Conclusion

The objective of this project is to carry out the empirical study of web-based learning media acceptance based on the Technology Acceptance Model. It resulted from the validation of the TAM research model in the context of gamification on web-based interactive multimedia using an active knowledge-sharing model. The study's findings perceived ease of use has a significant impact on perceived usefulness. This indicates that students' intentions to use web-based learning media are primarily motivated due to its perceived usefulness. They will use it if they are convinced it will be beneficial to them.

Furthermore, the perceived usefulness of web-based learning media influences students' attitudes about using it. It implies that students like to use the learning media if they feel that the learning media can enhance their understanding, learning outcome, and learning effectiveness. Moreover, this research confirmed that attitude towards usage directly affects behavioural intention to use. This means that the students will use and recommend this web-based learning media if it can make learning more enjoyable and fascinating while also being appropriate for learning tools.

The conclusions of this study may provide some guidance for further research. According to the results, the students are likely to use web-based learning media if it is valuable for them. The web-based learning media must provide services that can help them learn more effectively and help them understand the learning material. It would also be beneficial if the web-based learning media was more attractive and pleasurable to use.

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