An Empirical Study to Understanding Students' Continuance Intention Use of Multimedia Online Learning

Taqwa Hariguna
Department of Information System, College of AMIKOM Purwokerto
Indonesia
taqwa@amikompurwokerto.ac.id

ABSTRACT: *The objective of the study was to assess the students' continuance intention toward multimedia online learning such as their perceived usefulness, ease-of-use, and flow experience. The samples were 523 students who used off-campus/online learning resources and examined the content online learning resources and its multimedia aspects. An Extended of Technology Acceptance Model (TAM) was used to predict the students continuance intention. The results indicate that students' intention is influenced positively by their perceived usefulness, ease-of-use, and their flow experience. It is recommended that multimedia online learning designers should be more specific in determining target users to receive and foster more positive continuance intention.*

Keyword: Multimedia Online Learning, TAM, Continuance Intention

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1. Introduction

Online learning is one of new learning paradigms and has been the most prospective and expeditious growth currently [1] [2] [3][4]. With its rapid growth, online leaning providers have produced and designed many competing learning templete models such as Moodle, Edmodo, blackboard system, etc. In order to proactively achive the learning goals and design interventions (teachertraining, user orientation, students assessment and evaluation, etc), it is essential for online learning designers and managers to understand how to attract the attention of the users that may be less inclined to adopt and use online learning systems.

Since the students are the end users of online learning system, the lesson designers need an attractive media to deliver the content of the lesson given by the mentor or the lecturer. The attention of the students on the lessons, for example, can be kept by providing menu and tools for communication channel, discussion forum, message boards, and chat rooms. To make it effective and useful for the learners, the contents of the lesson prescribed by the mentors or the lecturers should be interpreted by multimedia specialist in attractive, economical, and communicative way. By having so, multimedia does not only function as

a means of communication but also increases students' learning motivation, attention and lead to the success of the students [5].

The degree to which a person believes that using a particular system would enhance student activity performance is called perceived usefulness [6]. Within couple years ago, many studies had revealed that perceived usefulness as well as ease-of-use (the degree to which a person believes that using a particular system would be free of effort) are critical factors in IT/IS adoption. Perceived usefulness in the TAM model originally referred to job related productivity, performance, and effectiveness [6]. Besides, perceived usefulness is an example of an extrinsic motive.

Other findings confirmed that there is also intrinsic motive called flow experience (Flow Theory). [7] noted that flow experience was associated with positive subjective experience and exploratory behavior. This state of flow often exists in different kinds of interaction involving in the context of online learning or Internet surfing.

In addition, flow experience, characteristics, and experiences of individual students may also affect the behavior of multimedia online learning. [8] considered personal differences (individual differences) as an important factor in consumers' acceptance of new information technology products or services.

Referring to the findings of previous studies above, the modification and expansion of TAM by considering individual differences need to be done. The assessment of students' activity in using multimedia online learning and proposed TAM [9] hopefully can explain much better the students' continuance intentions in using multimedia online learning resources.

2. Hypotheses and Research Model

2.1 Technology Acceptance Model (TAM)

Among a number of theoretical models employed in explaining individual's acceptance, adoption, and the use of information technologies/systems, TAM is the most popular one because it can predict user's behaviour or perceptions, and determine both its usefulness and ease of use as key factors [10] [11].

TAM was derived or generated from Theory of Reasoned Action (TRA). According to TAM, the user adoption of IT/IS is influenced by his/her perceived usefulness and ease of use. Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance user activity performance while Perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort.

In conjunction with TAM effectiveness, an empirical study was carried out by some scholars to investigate the relationship between student behavior, multimedia learning content and multimedia learning system [12] [13] [14]. Their findings suggest that an appropriate between characteristics of the student and multimedia technology result in greater enjoyment while the experience influence may moderate effects of the behavior. Other empirical studies have confirmed that there are some other key factors in TAM model such as consumer's age, gender, and experience [15] [16].

[17] in particular, mentioned that perceived usefulness and perceived ease of use positively affect consumers' intention in using the Internet. It is meant that an intuitive user interface can make their work easier and hence perform the job more efficiently. Many researches also have demonstrated that perceived ease of use will likely enhance perceived usefulness [18] [15]. Such relationship has further been supported by the extended TAM [8] [6] [19] [20] [21] [10] [22]. Thus, the following hypothesis are proposed:

H1: Student perceived ease of use (SPE) has a positive effect on student continuance intention (SCI).

H2: Student perceived usefulness (SPU) has a positive effect on student continuance intention (SCI).

H3: Student perceived ease of use (SPE) has a positive effect on Student perceived usefulness (SPU).

2.2 Flow Experience

The concept of flow experience first proposed by [23] was used as a benchmark for determining an experience in accessing

information systems. Flow experience, is also a representative of a person's perception and experience of the use of information systems. This will provide encouragement to someone who is involved in the system to limit ourselves to any existing activities. [24] said that the flow experience was developed and can be measured and analyzed so that the flow experience affected customer satisfaction and behavior of someone in the future.

In an online activity, internet users will gain different experience. This will have an impact that internet users should be in control of their own environment as well to get a good experience anyway [25].

In another study, it was explained that a sense of comfort and concentration were the two most important factors in the flow experience [26]. In another research [7] explained that the ease of flow experience was an important factor which was positive for the user's e-mail. [25] also showed that flow experience and perception of convenience for the user had a strong relationship. Therefore, we hypothesize:

H4: Student perceived ease of use (SPE) has a positive effect on student flow experience (SFE).

In another study, flow experience can be used to analyze and predict the sustainability and one's intention to carry out online activities [25]. Therefore, we hypothesize:

H5: Student flow experience (SFE) has a positive effect on student continuance intention (SCI).

From the explanation above, we synthesized the related construct and proposed the research model for explaining and predicting the student continuance intention towards multimedia online learning adoption (as shown in Figure 1).

Figure 1. Hypotheses Development and Research Model

Note: Student perceived usefulness (SPU), Student perceived ease of use (SPE), Student flow experience (SFE), Student continues intention (SCI).

3. Research Method

3.1 Instrument Design

Empirical data were collected through questionnaires. They are divided into two parts personal information of the users; age, education, occupation, experiences of using multimedia online learning and frequency of usage, and theoretical constructs of the proposed model to measure users perception regarding the continued use of multimedia online learning. The questionnaires with seven-point Likert scales were distributed to 523 students from January 20, 2016 to April 15, 2016.

The scale items of constructs and sources are: Continuance intention: four items adapted from [27] [28]. Perceived ease of use and usefulness: both of four items slightly modified from [29] and [30] Flow experience: four items adopted from [25].

3.2 Sampling Method

The research used purposive sampling method as there were 523 valid sample taken from online learning students. Respondents must have a qualification that have participated or are participating in multimedia online learning to facilitate improved external validity. (as shown in Table 1).

Characteristics of the subjects	Number	%
Gender		
Male	321	61.38
Female	202	38.62
Age		
Under 20 years	120	22.94
20-25 years of age	300	57.36
27-33 years old	103	19.69
Education		
High school	120	22.94
Under graduate students	300	57.36
Graduate students	103	19.69
Experiences		
6 Months	120	22.94
1 Year	300	57.36
More than 1 year	103	19.69

Table 1. Present the Demographics of the Respondents

4. Results

4.1 Outer Model

In PLS, the relationship between indicators and latent construction is referred to as outer models [31]. To test the reliability on any existing construction (items construct) it needs Cronbach α and composite reliability with a construction value is 0.7 or higher, which means that the existing construction is acceptable and reliable. Table 2 shows that Factor Loads and reliability test are in accordance with indicators that have been specified. To test the construct validity, in this study we use two ways: a test of convergent validity and discriminant validity test. As theory proposed by [32] which stated that a construction can be expressed convergent validity if the value factor loads on each indicator has a value greater than 0.5, and the value of average variance extracted (AVE) is greater than 0.5, and the value composite reliability is greater than 0.7. Table 2 shows that all construction are in accordance with the theory proposed by [32].

Furthermore, to test the discriminant validity then used the formulation that the square root of the AVE should be greater than

the correlation coefficient of construction [33]. In Table 3 and Table 4, each of the existing construction is in accordance with the test criteria of validity.

Construct	Measurement Item	Factor Loading/Coefficient	Cranach's Alpha	AVE	Composite Reliability
SCI	SCI1	0.860	0.922	0.762	0.941
	SCI2	0.862			
	SCI3	0.932			
	SCI4	0.821			
	SCI5	0.887			
SFE	SFE1	0.862	0.917	0.750	0.938
	SFE2	0.854			
	SFE3	0.825			
	SFE4	0.904			
	SFE5	0.884			
SPE	SPE1	0.886	0.945	0.819	0.958
	SPE2	0.920			
	SPE3	0.913			
	SPE4	0.876			
	SPE5	0.930			
SPU	SPU1	0.863	0.915	0.746	0.936
	SPU2	0.848			
	SPU3	0.820			
	SPU4	0.903			
	SPU5	0.882			

Table 2. Reliability Analysis and Convergent Validity

Note: Student perceived usefulness (SPU), Student perceived ease of use (SPE), Student flow experience (SFE), Student continues intention (SCI).

4.2 Common Method Variance Testing

In each study using a questionnaire survey method, The main problem found by the researchers is a matter of common method

	SCI	SFE	SPE	SPU
SCI	0.873			
SFE	0.813	0.866		
SPE	0.805	0.877	0.905	
SPU	0.812	0.807	0.816	0.864

Table 3. Correlation matrix

variance (CMV). This thing happened in result by several people who responded to the questionnaire were less serious. Based on the advice of [34], in this study we designed a questionnaire that has gone through a rigorous process, which we designed a questionnaire based on the advice of experts in the field of information systems and learning system, then we used the then we used the reference of a journal that has good credibility, and the last thing to do was a pre-test to modify the semantics of the questionnaire. Besides Harman's single-factor test we used test for the presence of CMV [35]. The basic assumption of Harman's single-factor test was that CMV was confirmed when a single factor can explain most of the covariance of the variables that exist. From the test results suggested that these factors failed to explain 50% of the variance that existed, this means that the existing questionnaire did not indicate a CMV.

4.3 Inner Model

Determining the structure of the path between the PLS is called inner construction model. To examine the results of the significance of hypotheses, the reference value used is the t-value, and the results of hypothesis can be seen in Table 3 and Figure 2. From these displays, five hypotheses formulated in the research were answered.

Hypothesis	Path coefficient	Standardized path	t-value	Supported
H1	SPE -> SCI	0.447***	4.520	Yes
H2	SPE -> SPU	0.868***	13.279	Yes
H3	SPE -> SFE	0.765***	11.398	Yes
H4	SPU -> SCI	0.509***	1.260	Yes
H5	SFE -> SCI	0.607***	1.811	Yes

Table 4. Summary of hypotheses testing results

Note1: **p-value < 0.01; ***p-value < 0.001.

Note2: Student perceived usefulness (SPU), Student perceived ease of use (SPE), Student flow experience (SFE), Student continues intention (SCI).

4.4 Mediating Effects

Path analysis shows only the direct effects of the variables. To assess the indirect or mediating effects, the four paths shown in Table 5 were tested using the Sobel Test, Aroian Test and Goodman Test. Test results in Table 5 were all significant, demonstrating that student flow experience (SFE) and student perceived usefulness (SPU) mediated the effects of other variables as expected.

Figure 2. Inner Model and Path Coefficient

Note1: **p-value < 0.01; ***p-value < 0.001.

Note2: Student perceived usefulness (SPU), Student perceived ease of use (SPE), Student flow experience (SFE), Student continues intention (SCI).

Constructs	Construct relationships	T-value of path coefficients	Sobel test s z-value	Aroian test	Goodman test
SPE-SPU-SCI	SPE -> SPU	13.279	1.254**	1.251**	1.258**
	SPU -> SCI	1.260			
SPE-SFE-SCI	SPE -> SFE	11.398	1.789**	1.782**	1.795**
	SFE -> SCI	0.811			

Table 5. Mediation Effects Testing

Note1: **p-value < 0.01; ***p-value < 0.001.

Note2: Student perceived usefulness (SPU), Student perceived ease of use (SPE), Student flow experience (SFE), Student continues intention (SCI).

5. Discussion, Conclusion and Future Work

5.1 Discussion

Student perceived ease of use effects on the student continuance intention (H1)

The results show that student perceived ease of use (SPE) significantly influence student continuance intention toward multimedia online learning (SCI). [16] found that perceived ease of use is an important factor in the early stages of a system s use. The importance of ease of use can affect the student understanding the contents of the web. Consequently, students will increase motivation to the study activity.

Student perceived usefulness effects on continuance intention (H2)

The results show that student perceived usefulness directly affects student continuance intention. This is in liau with findings mentioned by [10] and [22] that perceived usefulness is more important than perceived ease of use in predicting the acceptance

of new technologies. In order to enhance the usefulness of the multimedia online learning, it will be important that the provider of online learning have an accurate grasp of user needs and design the multimedia content accordingly.

Student perceived ease of use effects on perceived usefulness (H3)

This research has confirmed that student perceived ease of use positively affects on student perceived usefulness, consistent with the findings of most studies of the extended TAM model. Student ease of use also have a direct effect on student continuance intention of multimedia online learning. This finding is consistent with previous study of hedonic information systems [20]. Thus, online learning providers are advised to design multimedia interface, contents and interaction that is very easy to use and follow, especially for the new students.

Student perceived ease of use effects on flow experience (H4)

From the analysis explained that student perceived ease of use had a positive effect on student flow experience. In other words, a multimedia online learning that can be used easily had an impact on students in the control of its activities quickly and easily as well to be learned. It is a part of the flow experience. Student flow experience is the theory that describes the relationship between human activity and the computer, which is a process where someone explores information system in detail. This experience will have an impact on one's satisfaction and feelings of a person to conduct further exploration on the information system [25].

The importance of student perceived ease of use was discussed previously through its indirect effect via student perceived usefulness. It has a similar indirect effect via flow experience as discussed below.

Student flow experience effects on student continuance intention (H5)

From the research we concluded that the student flow experience had a positive effect on continuance intention of multimedia online learning. In a previous study [7] suggested that the flow experience was the feeling that was generated from human-computer interaction. During this period students will learn and interact through online multimedia system, it will generate a new experience for students. Therefore, student flow experience has a direct impact on the behavior of students towards multimedia online learning and also specifies the intention to continue using. In another study [25] identified that the flow experience had been an important predictor of the online system.

6. Conclusion

It is critical to understand factors that determine student continuance intention in multimedia online learning. This study has found that positive student perceived usefulness, student ease of use and student flow experience all have a positive effect on student continuance intention. The greater of those indicators correspond with the higher continuance intention. This research found positive effect on student perceived usefulness, and student perceived ease of use on student flow experience. Significant results of student perceived usefulness and student flow experience were obtained in most relationships as expected. Significant results were found in all the relationships as expected. Since the researchers used an online questionnaire, there may some bias of the answers given by the students who did not often use the multimedia content.

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