



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

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Key words: Multimedia online learning, TAM, continuance intention, usefulness, determining, aspects

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Abstract: The objective of the study was to assess the student's 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 student's 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.

INTRODUCTION

Online learning is one of new learning paradigms and has been the most prospective and expeditious growth currently (Chang *et al.*, 2011; Zhao *et al.*, 2016; Wang *et al.*, 2016; Yousafzai, 2016). With its rapid growth, online learning providers have produced and designed many competing learning template models such as Moodle, Edmodo, blackboard system, etc. In order to proactively achieve the learning goals and design interventions (teacher training, 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 student's learning motivation, attention and lead to the success of the students (Schweppe and Rummer, 2016).

The degree to which a person believes that using a particular system would enhance student activity performance is called perceive usefulness (Davis, 1989). 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 (Davis, 1989). Besides, perceived usefulness is an example of an extrinsic motive.

Other findings confirmed that there is also intrinsic motive called flow experience (Flow theory). Trevino noted that flow experience was associated with positive

subjective experience and exploratory behavior. This motive is the subject and determinant factor of user's intention in the context of electronic services (Hung *et al.*, 2011). This state of flow often exists in different kinds of interaction involving in the context of online learning or internet suffering.

In addition, flow experience, characteristics and experiences of individual students may also affect the behavior of multimedia online learning. Agarwal and Prasad (1999) considered personal differences (individual differences) as an important factor in consumer's 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 student's activity in using multimedia online learning and proposed TAM (Parasuraman, 2000) hopefully can explain much better the student's continuance intentions in using multimedia online learning resources.

Hypothesis and research model

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 (Venkatesh, 2000).

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 (Altas, 2015; Amadiou *et al.*, 2015; Angeli and Tsaggari, 2016). 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 (Venkatesh and Davis, 2000; Venkatesh *et al.*, 2003).

Teo *et al.* (1999) in particular, mentioned that perceived usefulness and perceived ease of use positively affect consumer's 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

(Taylor and Todd, 1995; Venkatesh and Davis, 2000). Such relationship has further been supported by the extended TAM (Agarwal and Prasad, 1999; Davis, 1989; Davis *et al.*, 1989; Van der Heijden, 2003; Venkatesh and Davis, 1996; Venkatesh, 2000; Wixom and Todd, 2005). Thus, the following hypothesis are proposed:

- H₁: Student Perceived Ease of use (SPE) has a positive effect on Student Continuance Intention (SCI)
- H₁: 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 Perceive Usefulness (SPU)

Flow experience: The concept of flow experience first proposed by Hoffman and Novak (1996) 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. Csikszentmihalyi (2004) 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 (Hsu and Lu, 2004).

In another study, it was explained that a sense of comfort and concentration were the 2 most important factors in the flow experience (Ghani *et al.*, 1991). In another research Webster *et al.* (1994) explained that the ease of flow experience was an important factor which was positive for the user's e-mail. Hsu and Lu (2004) 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 Experiencee (SFE)

In another study, flow experience can be used to analyze and predict the sustainability and one's intention to carry out online activities (Hsu and Lu, 2004). 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 (Fig. 1).

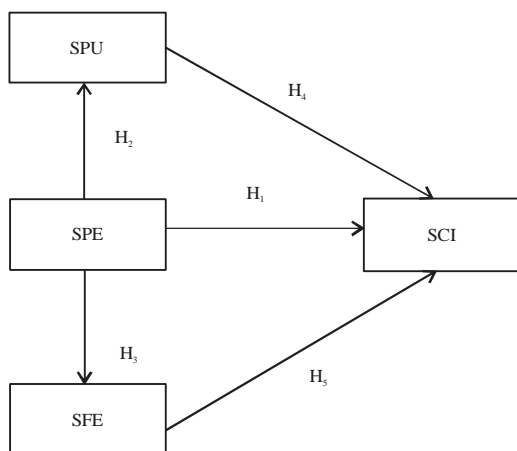


Fig. 1: Hypothesis development and research mode; Student Perceived Usefulness (SPU) Student Perceived Ease of use (SPE) Student Flow Experience (SFE) Student Continues Intention (SCI)

Table 1: present the demographics of the respondents

Characteristics of the subjects	No.	Percentage
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
>1 year	103	19.69

MATERIALS AND METHODS

Instrument design: Empirical data were collected through questionnaires. They are divided into 2 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 user's 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: 4 items adapted from Bhattacharjee (2001a, b). Perceived ease of use and usefulness: both of four items slightly modified from Pavlou (2003) and Chen *et al.* (2009). Flow experience: four items adopted from Hsu and Lu (2004).

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 (Table 1).

RESULTS AND DISCUSSION

Outer model: In PLS, the relationship between indicators and latent construction is referred to as outer models. To test the reliability on any existing construction (items construct) it needs Cronbach a 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 2 ways: a test of convergent validity and discriminant validity test. As theory proposed by Fornell and Larcker (1981) which stated that a construction can be expressed convergent validity if the value factor loads on each indicator has a value >0.5 and the value of Average Variance Extracted (AVE) is >0.5 and the value composite reliability is >0.7. Table 2 shows that all construction are in accordance with the theory proposed by Fornell and Larcker (1981).

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. Table 3 and 4, each of the existing construction is in accordance with the test criteria of validity.

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 Variance (CMV). This thing happened in result by several people who responded to the questionnaire were less serious. Based on the advice of Podsakoff *et al.* (2003) 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 reference of a journal that has good credibility and 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 (Podsakoff and Organ, 1986). 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.

Table 2: Reliability analysis and convergent 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			

Student Perceived Usefulness (SPU); Student Perceived Ease of use (SPE); Student Flow Experience (SFE); Student Continues Intention (SCI)

Table 3: Correlation matrix

Variables	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

Student Perceived Usefulness (SPU); Student Perceived Ease of use (SPE); Student Flow Experience (SFE); Student Continues Intention (SCI)

Table 4: Summary of hypothesis testing results

Hypothesis	Path	Standardized path coefficient	t-value	Supported
H ₁	SPE->SCI	0.447***	4.520	Yes
H ₂	SPE->SPU	0.868***	13.279	Yes
H ₃	SPE->SFE	0.765***	11.398	Yes
H ₄	SPU->SCI	0.509***	1.260	Yes
H ₅	SFE->SCI	0.607***	1.811	Yes

p-value<0.01; *p-value<0.001; Student Perceived Usefulness (SPU); Student Perceived Ease of use (SPE); Student Flow Experience (SFE); Student Continues Intention (SCI)

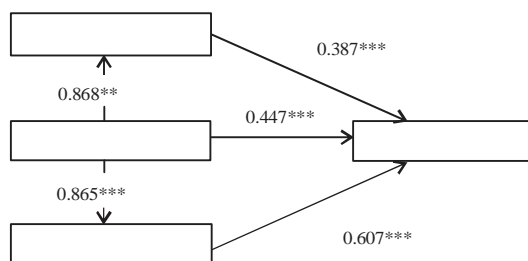


Fig. 2: Inner model and path coefficient (**p<0.01; ***p<0.001; Student Perceived Usefulness (SPU), Student Perceived Ease of use (SPE), Student Flow Experience (SFE), Student Continues Intention (SCI))

Inner model: Determining the structure of the path between the PLS is called inner construction model. To

examine the results of the significance of hypothesis, the reference value used is the t-value and the results of hypothesis can be seen in Table 3 and Fig. 2. From these displays, 5 hypothesis formulated in the research were answered.

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.

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

Table 5: Mediation effects testing

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	1.811			

p-value <0.01; *p-value <0.001; Student Perceived Usefulness (SPU); Student Perceived Ease of use (SPE); Student Flow Experience (SFE) Student Continues Intention (SCI)

multimedia online learning (SCI). Venkatesh *et al.* (2003) 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 liaw with findings mentioned by Venkatesh (2000) and Wixom and Todd (2005) 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 (Van der Heijden, 2003). 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 (Hsu and Lu, 2004).

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 Webster *et al.* (1994) 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 Hsu and Lu (2004) identified that the flow experience had been an important predictor of the online system.

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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