

MOOCs Continuance Intention in Malaysia: The Moderating Role of Internet Self-efficacy

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Abstract--- Previous researches have validated that students' intention to continue use MOOCs was mainly determined by Usefulness and Enjoyment. This paper takes a different approach from previous studies and postulates that relationship between Usefulness and Enjoyment on MOOCs Continuance Intention are moderated by Internet Self-efficacy. Partial Least Square Path Modelling (PLS-PM) approach has been employed to analyse the data collected. Using online survey data from 251 students registered with Malaysia MOOCs program, the results revealed that Internet Self-efficacy moderates the relationship between Enjoyment and MOOCs Continuance Intention. However, the moderating effect of Internet Self-efficacy showed insignificant result on the path between Usefulness and MOOCs Continuance Intention.

Keywords--- *Internet Self-efficacy, Continuance intention, MOOCs, e-learning, Usefulness, Enjoyment*

1. Introduction

The emergent popularity of Massive Open Online Courses (MOOCs) has led many to declare it as a disruptive technology and a serious threat to institutions of higher education [1]. Despite the momentum of MOOCs, the completion rates of these classes are dismal compared to traditional online education [2]. On average, less than ten percent of students that enrol in a MOOC complete the course [3], [4]. Similarly, a low completion rates also reported in Malaysia MOOCs [5]. These low rates do raise question regarding students willingness to use MOOCs platform on a continue basis. Hence, study on identifying the factors that enhance students to continue use MOOCs is crucial. Moreover, there is still lack of empirical evidence to support the critical factors that influence students to use MOOCs particularly in Malaysia study context.

On the academic front, a rich body of research has examined the effect of Usefulness and Enjoyment on e-learning Continuance Intention and has reported mix

results. [6] run a survey on MOOCs Continuance Intention among university students in China claimed a significant relationship between Usefulness and Continuance Intention. The study was supported by [7], [8] which also found Continuous Intention to use web-based resources, was positively affected by Usefulness. The findings validated the assumption that students will use e-learning for a long term if they perceived the system offer many benefits and can improve their learning performance. On a contrary, [9] reported that the relationship between Usefulness and Continuance Intention was not significant; while [10] suggested that Usefulness was a weak predictor of intention to use. This inconsistency may be due to the diversity of available application, contents, and tasks offered by the various e-learning web-based.

Prior studies reiterated that Enjoyment has indirect effect toward technology use behaviour. For example, [10], [11] construed that perceived web enjoyment indirectly affect behavioural intention that is through attitude. Their findings were supported by Theory of Planned Behaviour (TPB) and Theory of Reasoned Action (TRA) which hold that belief (Enjoyment) only indirectly influence intention to use through forming users' positive or negative feelings (attitude). However, other researchers have different opinion, suggesting that belief factor directly drive intention without the attitude construct [12], [13], [2]. According to [14] when using a technology can bring them fun and pleasure; users will be intrinsically motivated to adopt it and use it for a long term. Based on this argument, this study proposed that Enjoyment has direct effect towards MOOCs Continue Intention because when learners learn on an interactive and interesting MOOCs platform, they will get immersed to the activities and thus motivate them to stay longer [15].

The existing literature on use behaviour also suggests that antecedents to user satisfaction and adoption are also influenced by individual traits [16], [17]. An important individual trait that may influence user adoption is Self-efficacy which became a major component in Social Cognitive Theory [18]. This study took the understanding

of e-learning Continuance Intention one step further by testing the moderating effect of Internet Self-efficacy on factors that have been validated as the crucial determinants for e-learning adoption (Usefulness and Enjoyment). Concerning user adoption of information technology such as e-learning, high Internet Self-efficacy may ensure that users have high confidence in their Internet-related abilities, such as downloading files, posting in a bulletin board, emails, and searching information which in turn may allow them to achieve better performance and satisfaction and thus encourage them to use the e-learning on a continuous basis [19], [20]. It was therefore proposed in this study that the level of users' Internet Self-efficacy would affect the factors that determine students Continuance Intention with MOOCs in Malaysia study context.

2. Literature Review

Self-efficacy has its roots originated from the Social Cognitive Theory [21] where has been defined as one's confidence in his or her abilities to perform a task successfully. The theory suggested that individuals who have more confidence in their skills and abilities will exert more effort to perform a task, persists longer to overcome any difficulties than those who have less confidence in their abilities [22], [23]. Based on general concept of Self-efficacy, [24] defined the concept of Computer Self-efficacy as one's confidence about his or her abilities to perform a computer related task successfully. Meanwhile, as MOOCs is internet based, this study takes another perspective on Self-efficacy which can be related to Internet Self-efficacy. Internet Self-efficacy refers to self-assessment of the ability to organize and execute Internet-related activities that elicit desired results [25]. With the growth of online education, it is increasingly important to consider Internet Self-efficacy as a predictor of success in online education [20], [26]. Students may differ substantially in their Internet experiences capabilities [27]. Learners with low Internet Self-efficacy may be less likely to fully engage in online systems or content due to lack of confidence [28], [29], [30]. In turn, this can decrease students' intention to continue in online learning such as MOOCs.

Previous studies have found Internet Self-efficacy to have an influence on learner motivation [28], [31], [26], [32]. For example, learners with high Internet Self-efficacy are more likely to have good academic performance [33], [16] and information searching skills [34], [35], [32], and also shows positive attitudes toward Internet learning environments [36], [20], [28]. [32] suggested that high Internet Self-efficacy was found to facilitate the development of skills. [20], [29] found that

learners with high Internet Self-efficacy preferred online learning environments that allowed them to use the Internet to explore problems, communicate, and elaborate the knowledge through learning activities. On the contrary, Internet Self-efficacy was found to be correlated with the predictive of student satisfaction in a study involving online learners in Education [37]. Due to the importance of Internet Self-efficacy in web-based learning and the scarce research of Internet Self-efficacy on Continuance Intention, Internet Self-efficacy was proposed in this study as an important factor beyond interaction.

3. Research Model and Hypotheses Development

Self-efficacy theory and prior research on the relationship between user belief (such as Usefulness and Enjoyment) and user acceptance and continuous use provide sound theoretical background to this proposed model. In the e-learning acceptance, students are likely to accept or reject the technology because of many factors including Usefulness and Enjoyment. This study integrates Internet Self-efficacy as moderator to the direct effect of Usefulness and Enjoyment has on MOOCs Continuance Intention. The research model is presented in Figure 1.

The direct effect of Usefulness on Continuance Intention has been largely documented in prior studies [38]. Usefulness or perceived usefulness is defined as an individual's perception that the use of technology can improve performance [39]. In this study context, Usefulness refers to how students perceive using MOOCs system will provide benefits to them in learning process. [40] reiterated that MOOCs give benefits in terms of knowledge sharing and promote self-directed learning ability. The importance of Usefulness as a factor that determines behaviour intention to use like online learning has been noted in prior studies [41], [42], [43]. In addition, studies from [44] and [2] found that Usefulness has positive and direct effect on MOOCs use intention. It is reasonable to suggest that if individuals perceived the MOOCs system as useful, they will spend a lot of time using the MOOCs to acquire information and doing learning activities, thus their intention to continue use the system would be improved. This study thus proposes the Hypothesis 1 as per below:

H1: Usefulness is positively associated with MOOCs Continuance Intention.

Most studies have been conducted to investigate the role of Enjoyment as an intrinsic motivation factor on capturing the students' intention to use e-learning (e.g.

[45], [46], [47]. Intrinsic motivation representing a student's subjective feelings of joy, elation, pleasure and positive holistic experience play a critical role in explaining user acceptance and usage behaviour of web-based learning [47]. Studies from [2] and [14] construed that Enjoyment has positive effect on students' intention to continue use MOOCs. The key facets of Enjoyment includes entertainment, relaxation, excitement and fun give a critical motivation that leads people to use websites [48]. E-learning such as MOOCs often has many entertainments interactive functions such as watch video, electronic lecture notes and forum discussion motivate learners to use the system. Furthermore, interest to the topic covered is one important reason for participating in a MOOC [14]. When students have positive affect (enjoy) about the MOOCs, it can be argued that they will be more likely to use the MOOCs for long term. Hence, this study puts into account the crucial factor of Enjoyment in determine continuous intention to use MOOCs which leads to the second hypothesis of this study:

H2: Enjoyment is positively associated with MOOCs Continuance Intention.

Internet Self-efficacy makes a difference in how individuals feel, communicate, and motivate themselves to act in online system [29]. As a result, one's sense of self-efficacy is expected to play an influential role of behaviour towards technology adoption. In general, when individuals have a higher level of Self-efficacy perceptions, they also have more confidence in their actions [49], [37]. As MOOCs is internet based, Internet Self-efficacy is seems vital in accessing MOOCs system such as confidence in downloading files, posting in bulletin board and communicate with friends. Previous study uphold the fact that high self-efficacy have stronger effect than low self-efficacy user on the relationship between Usefulness and behavioural intention [50], [51], [52]. The more learners have confidence in their abilities to master or use of the e-learning system, the more they anticipated reaping the benefits from such technology. In addition, having higher self-efficacy helps translate the users' perceptions about the useful of e-learning system which leads into the actual use of the system for a long time.

H3: The relationship between Usefulness and MOOCs Continuance Intention is moderated by Internet Self-efficacy.

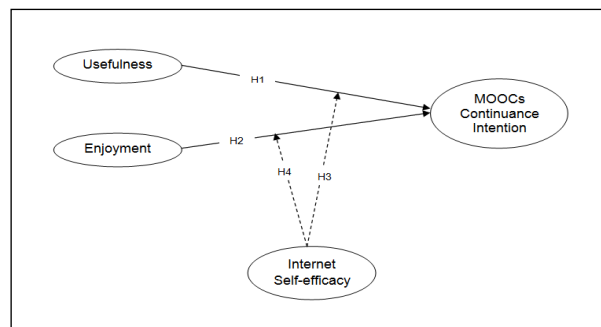


Figure 1: Research model

[24] pointed out that computer self-efficacy influences the person's practical use. For example, employees with high computer self-efficacy have more fun and less anxiety when using a computer, thereby significantly influencing their self-expectation and performance [53], [54]. This is because individuals will tend to enjoy behaviours they feel they are capable of performing and dislike those uncomfortable behaviours. Moreover, individual with high level of Self-efficacy will feel more comfortable with the technology and found it fun and less effort; thus likely formed a positive attitude to adopt and continue using the technology [55], [56]. For instance, self-efficacy with respect to internet technologies exerts a significant influence on pleasure [57]. This can be explained by the theory of "optimal flow" which suggested that having the skills and confidence enhances one's enjoyment of a task [58], [59]. Similarly, when students have confidence to participate in MOOCs environment, they may feel enjoyable and get entirely immersed in their learning activities; and thus increase their intention to further use MOOCs in the future. Consequently, Hypothesis 4 is proposed:

H4: The relationship between Enjoyment and MOOCs Continuance Intention is moderated by Internet Self-efficacy.

Hence, Internet Self-efficacy is proposed to play an important role in high technology adoption because user with greater self-efficacy with respect to online service would be expected to develop more positive attitudes toward it.

4. Methodology

4.1 Sample

A mail survey was used to investigate the factors influencing MOOCs Continuance Intention and test the moderating effect of Internet Self-efficacy on those identified factors. A total of 251 students that have been registered in Malaysia MOOCs program based in OpenLearning platform participated in this study.

4.2 Measurements

All the constructs and the corresponding measure items were adapted from various established sources. However, the items were given a minor modification to meet this study's background. Items to measure Usefulness was adapted from the measurement used by [39], while Enjoyment was adapted from [12] and [15]. Items to measure Internet Self-efficacy was adapted based on scales by [60] and items used by [61]. Continuance Intention in this study was measured based on the work by [38].

Table 1: Instruments of the study

Usefulness	
Use1	Using MOOCs improves my learning performance.
Use2	Using MOOCs enhances my learning effectiveness.
Use3	Using MOOCs gives me greater control over learning.
Use4	I find MOOCs to be useful in my learning
Enjoyment	
Joy1	I find using MOOCs to be enjoyable
Joy2	The actual process of using MOOCs is pleasant
Joy3	I have fun using MOOCs
Joy4	I enjoy using MOOCs as a learning assisted tool
Internet Self-efficacy	
Efy1	I feel confident in the MOOCs system finding information and downloading files.
Efy2	I feel confident in the MOOCs system attaching files to emails.
Efy3	I feel confident in the MOOCs system exchanging messages with other users in discussion forums
Efy4	I feel confident in MOOCs system posting messages on a bulletin board.
Efy5	I feel confident in MOOCs as I had used similar online learning packages before this one in my learning activities.
Continuance Intention	
Con1	I intend to continue using MOOCs for a long time
Con2	I would like to continue using MOOCs in my learning activities.
Con3	I will frequently use MOOCs in the future
Con4	I will strongly recommend others to use MOOCs

In path modelling or structural equation modelling, these questions items are at times referred to as indicators. To test the validity of the questionnaire items, two degree-

MOOCs-students and one lecturer were invited to take part in the pilot survey. Based on their feedback, the wording of several items was adjusted and improved. The complete instrument can be found in Table 1. A 5-point Likert scale ranged from 1 to 5 (strongly disagree to strongly agree) was employed in this study under the consideration of students' convenience of time and less effort in answering the questions.

5. Data Analysis and Results

5.1 Outer Model Validation

This study employed SmartPLS to verify the measurements and research model. This is important to determine the goodness of measures. Before testing the hypothesized relationships, the measurement of validity, including content validity and convergent validity were first assessed [62]. The results obtained after running the model presented in Table 2.

Table 2: AVE, CR, Cronbach's α , and outer loadings of measurement items

Measurement items	Composite Reliability	Cronbach's alpha	Outer loadings	AVE
Use1	0.939	0.913	0.902	0.794
Use2			0.924	
Use3			0.856	
Use4			0.881	
Joy1	0.940	0.915	0.881	0.797
Joy2			0.874	
Joy3			0.924	
Joy4			0.891	
Efy1	0.905	0.870	0.828	0.659
Efy2			0.766	
Efy3			0.892	
Efy4			0.877	
Efy5			0.676	
Con1	0.933	0.904	0.853	0.777
Con2			0.918	
Con3			0.893	
Con4			0.860	

Note: Use=Usefulness, Joy=Enjoyment, Efy=Internet Self-efficacy, Con=Continuance Intention.

Table 1 shows average variance extracted (AVE), composite reliability (CR), and Cronbach's alpha (α) of each construct. The results indicated that all the AVEs values were around 0.7 indicating sufficient convergent

validity. The smallest value of CR is 0.905 and the smallest value of Cronbach's α is 0.870, both exceeding the recommendation of 0.6. Consequently, all the constructs have a high degree of convergent and reliability [62]. Meanwhile, the value of outer loadings (which denotes the proportion of indicator variance that is explained by the latent variable and should be greater than 0.7) for each items are all greater than 0.7 except for Efy5. Thus, the item was deleted for further analysis.

5.2 Inner Model Validation

The direct effect of Usefulness and Enjoyment on MOOCs Continuance Intention both indicated a significant and positive ($\beta=0.263$, $p<0.05$); ($\beta=0.465$, $p<0.05$), thus *H1* and *H2* are supported. Regarding Internet Self-efficacy, its moderating effect on the path from Usefulness to Continuance Intention was not significant, thus rejected *H3*. However, its moderating effect on the path from Enjoyment to Continuance Intention is significant at $\alpha < 0.10$, thus supported *H4*.

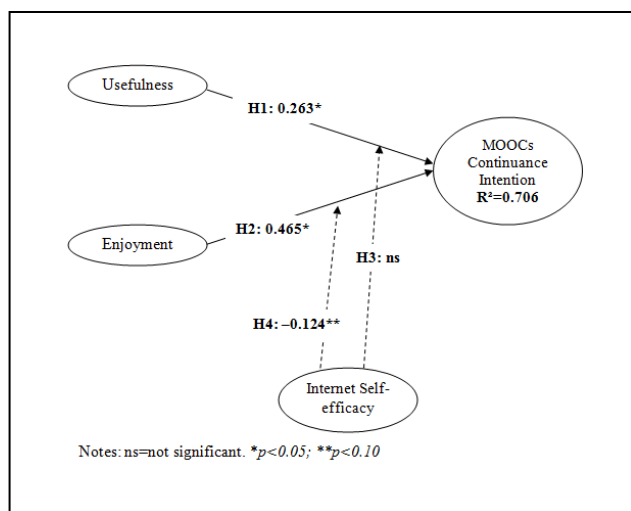


Figure 2: Research model with results

In addition, the result of PLS algorithm shows that estimated model fits the survey data very well in the study sample, with R^2 for MOOCs Continuance Intention equal to 0.706 indicating a substantial amount of variance explained by the proposed exogenous variable. This figure signifies that the structure model explains acceptable variance level of intention to continue use MOOCs in Malaysia sample.

6. Discussion of Findings

The statistical analysis from this study suggests that both direct effects of Usefulness and Enjoyment on MOOCs Continuance Intention are all positive and significant; thus accepted *H1* and *H2*. Students will stay longer in a

learning website if they perceived the system as provide benefits and may increase their performance in learning. Similarly, studies from [41], [44] also found that Usefulness was a significant predictor towards use behaviour. Besides, this study discovered that the direct relationship between Enjoyment and Continuance Intention was also significant, with the consistent by a study from [14]. The entertained and interactive application tools provided in MOOCs learning activities trigger students to the relaxation and joy feelings; thus motivate them to use MOOCs for a long term.

The other main goal of the present study is to empirically extend current understanding about the Internet Self-efficacy in the context of MOOCs. In particular, this study provided an empirical test of the differential effects of Internet Self-efficacy on the relationship between Usefulness and Continuance Intention as well as Enjoyment and Continuance Intention. This study demonstrated that self-efficacy differences have not established an influence as a moderator on the relationship between Usefulness and Continuance Intention. This means that at any level of self-efficacy, students do not consider Usefulness of the system as an important aspect in improving their motivation to continue use MOOCs. This finding was consistent with the finding from [63] who suggested that Self-efficacy did not moderate the relationship between Usefulness and use behaviour.

However, results illustrated in Figure 2 suggest that the interaction of Internet Self-efficacy and Enjoyment was significantly related to Continuance Intention so that the magnitude of the coefficient between Enjoyment and Continuance Intention is negatively influenced by the level of Internet Self-efficacy. Based on this research data observation it can be pointed that student at the lower level of the Internet Self-efficacy has stronger effect of Enjoyment on MOOCs Continuance Intention than their counterpart at the higher level. This is some way implies that these lower level performers were putting more efforts in their intention to continually use the Malaysia MOOCs applications as reflected in their stronger power.

This finding demonstrates that students with low Internet Self-efficacy actually benefit more from entertainment offered from MOOCs and tend to feel more pleasure to adopt MOOCs near future, compared with students with high Internet Self-efficacy. This is encouraging news for students low in Self-efficacy. Whatever reason for their low Self-efficacy, increasing their Enjoyment through Internet application in MOOCs is likely to help their intention to continue use MOOCs. By actively enhancing students' Enjoyment in MOOCs

activities, students initially low in Internet Self-efficacy receive an immediate boost in efficacy beliefs, which positively affects Continuance Intention.

7. Limitation and Future Research

This study ran analysis for the interaction effect by testing all the variables in one single model. Too many variables in a regression model may result in collinear or multicollinear problems [62], thereby the interactions between Internet Self-efficacy and other variables insignificant. Future research should explore how the moderator factor might influence usefulness and enjoyment on a separated model. Other limitation of this research is the emphasis on a student's intention to continue using MOOCs as measure of success for providers. Completion rates may not be the best measure to evaluate learning in MOOCs because open online registration courses are not the same as conventional courses [3]. Exploring alternative dependent variables like the percentage of content viewed, despite not participating in course assessments, is a different perspective that may also offer value for MOOC providers. In addition, the results of this study could be affected by self-selection bias as it only considered the active participants of MOOCs. Individuals who have already ceased to participate might have different perceptions about the influence of those identified factors on MOOCs Continuance Intention.

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