*May-June 2020*
*ISSN: 0193-4120 Page No. 4698-4708*

# Testing the Moderating Effect of Internet Self-Efficacy using Partial Least Square Path Modelling Approach

**Mawaddah Mohamad[1], Mohd Kamarul Irwan Abdul Rahim[2], Khoo Yin Yin[3]**

School of Technology Management and Logistics
Universiti Utara Malaysia, 06010 Sintok, Kedah, Malaysia[1],[2]
Universiti Pendidikan Sultan Idris[3]
mawaddah.mohamad@uum.edu.my[1], mk.irwan@uum.edu.my[2]

***Article Info***
***Volume 83***
***Page Number: 4698-4708***
***Publication Issue:***
***May - June 2020***

**Abstract**

MOOCs continuance intention is an open question as the completion rates and the overall use of the system were substantially low. This study developed a research model consisting of four contributing factors related to MOOCs features, namely usefulness, enjoyment, interactivity and openness in order to understand how these factors affect MOOCs continuance intention at Higher Institutions in Malaysia. In addition, Internet self-efficacy was proposed as a moderator variable to give a better understanding of how the individual difference affects continuance intention. Using the quantitative approach, online questionnaires were distributed to students enrolled in Malaysia MOOCs program, registered in Open Learning platform. A total of 267 valid questionnaires were used for the analysis using the Partial Least Square Path Model (PLSPM) approach. The findings revealed that continuance intention was directly affected by usefulness, enjoyment and openness, but not interactivity. Perhaps the tasks given in the MOOCs activities were more related to the individual assignment which does not trigger students to interact, causing them to feel less connected in the MOOCs environment. Then the analysis was run to test the moderating effect of Internet self-efficacy. The results indicated that Internet self-efficacy negatively moderated the relationship between usefulness, enjoyment, and interactivity on continuance intention respectively. This tendency implies that users at the lower end of the moderating effect tend to place more effort in achieving better continuance intention than those at the upper end.

***Article History***
***Article Received:****19 November 2019*
***Revised:*** *27 January 2020*
***Accepted:*** *24 February 2020*
***Publication:*** *16 May 2020*

***Keywords*****:** *MOOCs continuance intention, Internet self-efficacy, e-learning, Path Model, Partial Least Square*

## 1. Introduction

As a major aspect of developments, the utilisation of the internet and website is one of the quick developments and most effective methods for correspondence. In the meantime, studies on Self-efficacy and the internet are linked to students' being confident in their ability of utilising web apparatuses in sharing information and communicating. The presence of the internet in individuals' lives daily is unquestionable. In learning process, for instance, the internet has turned into a source for students to obtain data, acquire learning materials and the best way in imparting knowledge to others [1]. The online learning such as MOOCs which is web-based has opened its doors to instructors to having superior correspondence and cooperation with students by the utilisation of apparatuses like emails, social networking sites and video software [2].

*May-June 2020*
*ISSN: 0193-4120 Page No. 4698-4708*

With the development of online instruction, it is progressively critical to consider Internet Self-efficacy as an indicator of achievement in online instruction[3]. In this investigation, Internet Self-efficacy regards people who not only learned through web-based learning but also communicated with them. Students may considerably differ in their web encounters and abilities [4, 5]. Students with low Internet Self-efficacy might be more averse to totally participate in online systems or substance because of absence of confidence [3, 6, 7]. In turn, this can diminish students' involvement and aim to proceed in online learning. Additionally, an essential aspect of student learning behaviours is connected to students' self-concept, thus Internet Self-efficacy has come to be a noteworthy factor of learning attainment.

A close accord has risen in the education literature that student learning attitude have imperative impacts on learning. As an instance, utilisation of social media for teaching is a way to instil a more informal approach to learning behaviours [8]. While a significant part of the accentuation to date has been on instructor-composed endeavours to empower learning practices, few investigations focus on the individual differences of student online learning behaviours [6]. For that reason, the present study seeks to investigate how the Internet Self-efficacy like students' confidence and skills in applying e-learning specifically MOOCs apparatus impacts learning behaviours.

In light of the above discussion, Self-efficacy's role in web-based learning situations still requires more research. Additionally, Internet Self-efficacy had critical effect on students' fulfillment of online conditions and aim to enroll in future online courses as shown by several studies. Meanwhile, a few others did not demonstrate any relationship. In the meantime, Internet Self-efficacy anticipated student performance and fulfillment with web learning yet in other research it was accounted for on the contrary. There are a few examinations feature on the personal differences which may influence user performance and behavior towards the online system; to such an extent that person with low Internet Self-efficacy perhaps is more averse to totally take part in online system or content because of little confidence and the other way around [3, 9, 10]. This investigation considers incorporating individual contrasts that may impact the heading or enhance the immediate connection between the recognized variables and intention to utilize MOOCs as has been proposed.

## 2. Review of Literatures, Research Model & Hypotheses Development

### 2.1 Usefulness

Usefulness or perceived usefulness is defined as an individual's perception that the use of technology can improve performance [11]. Accordingly, [12] use the similar concept of Usefulness introduced by [11] in formulating the Expectation Confirmation Model and suggested that the Usefulness of information technology has a positive effect on users' Continuance Intention. Actually, the intention to adopt again is because of the functions offered by the system itself which allowed users perceived the system as a beneficial tool. Generally, if the users found the system or technology can give benefit to them, they will have the intention to use it for a long term or on a continuous basis [13]. Meanwhile, past investigation supports the concept that high self-efficacy has more solid impact than on user with low self-efficacy on the path between Usefulness and behavioral [4, 14, 15]. A study by [14] discovered that computer Self-efficacy impacts the outcome expectation which have similar concept with Usefulness [11]; and are gained greatly form advantages related with executing a particular task. With regards to adoption of e-learning setting, Internet Self-efficacy is especially associated. As more students believe in their capacities to ace or utilize the online learning system such as confidence in posting in bulletin board, uploading files and connecting with people, the more they expect to receive the benefits from such innovation. Apart from that, [16] affirmed that possessing a high experience in using internet for learning is influencing perceived usefulness and the intention of students in using e-learning. Based from the discussion, this study proposed the following hypothesis;

*Hypothesis 1a: Usefulness effects MOOCs Continuance Intention.*

*Hypothesis 1b: Internet Self-efficacy moderates the relationship between Usefulness and MOOCs Continuance Intention.*

### 2.2 Enjoyment

A large and growing body of literature has investigated the role of Enjoyment as one of the intrinsic motivations in determining user use behaviour. For example, [17, 18] utilized the concept of Enjoyment in order to conceptualize students' intrinsic motivation to use computer and web-based learning system. Apart from that, findings from [19] also concluded that intention to stay longer in blog was significantly determined by the level of Enjoyment. The outcome exhibit that individuals with higher level of Enjoyment tend to spend time longer in blog compared to those who were in low level of Enjoyment. [20] drew the attention to that computer Self-efficacy impacts the individual's viable utilisation. For instance, workers with great computer Self-efficacy tend to experience more fun and less anxiety when utilizing a computer, thereby impacting their self-expectations and performance [21, 22, 23] This is an account of people will have a tendency to appreciate practices they believe they are fit for performing and abhors those they don't feel good with. In addition, individual with strong Self-efficacy will adapt easily to the technology and thought that it was anything but difficult to utilize, and in this way likely shaped a positive reaction (which is development of fulfilment) to apply and keep utilizing the technology near future [24]. In particular, people with strong Internet Self-efficacy have a tendency to gain greater happiness in embracing the new online innovation. This is clarified by

May-June 2020
ISSN: 0193-4120 Page No. 4698-4708

the theory of "optimal flow" which proposes that possessing the imperative aptitudes upgrades one's pleasure in task completion [25, 26]. Along these lines, this investigation advances the accompanying Hypothesis 2.

*Hypothesis 2a: Enjoyment effects MOOCs Continuance Intention.*

*Hypothesis 2b: Internet Self-efficacy moderates the relationship between Enjoyment and MOOCs Continuance Intention.*

### 2.3 Interactivity

The measurement of Interactivity for this study was divided into two categories. First is the Interactivity in terms of person interaction; and second, is the Interactivity between users and system. As suggested by [22, 27], personal communication includes interactive communication between students and instructor, as well as among students themselves. Meanwhile, the Interactivity between users and system refers to how users perceived when they interact using the system. This includes the effectiveness of the communication tools (e-mail, chat room, discussion room, etc.) and weather the tools make them feels connected. Given the fact that the online learning website guest is likewise an internet user, it is acceptable to clarify that user different of Internet Self-efficacy becomes a moderating variable to study the Interactivity effect on e-learning acceptance. Students with higher level of Internet Self-efficacy on interactivity devices such as discussion room, forum and chatting application, will have the tendency to use and reuse the system in the event that they feel that application will provide them advantage in exchange knowledge [10, 28, 29]. Confidence in utilizing social network sites, for instance, will expand group interaction, enhance social connection, and get easily involved in information exchange in a virtual learning environment. In this manner, this investigation signifies to an endeavour to inspect the moderating effect of user Internet Self-efficacy on Interactivity and intention of continuous web-based learning usage, which would propose the Hypothesis 3.

*Hypothesis 3a: Interactivity effects MOOCs Continuance Intention.*

*Hypothesis 3b: Internet Self-efficacy moderates the relationship between Interactivity and MOOCs Continuance Intention.*

### 2.4 Openness

Openness is a prominent feature of MOOCs. The concept of Openness give opportunity to students all over the world experiencing learning activities without any entry requirements and the most special is no courses fees will be charged. [30] found a positive and significant relationship between perceived Openness and intention to continue using MOOCs. This was supported by the findings from Rousing [31] which construed that user adopt MOOCs because of the high absence of cost barriers of access. These include free enrolment, and are provided with free reading materials. The fast-growing internet use in education enhances learners to learn whenever and wherever via any free-web-based learning offered [32]. However, as MOOCs are free and there are no actions taken for inability to finish, empowers students to drop in (and out) of courses at their own willingness. The level of Internet Self-efficacy that users may possess could encourage their use of e-learning apparatus (e.g., chat room, downloading, watch videos and so on.) and the idea of Openness will give them the opportunity to stay in contact performing activities with no limits. Students with high Internet Self-efficacy have greater possibility of directing and managing their own learning. With this self-coordinated approach, and the Openness of MOOCs platform, students will probably prevail with regards to performing learning tasks, for example, uploading/downloading learning materials, viewing documents, and participating in discussion boards [33]. This will expand opportunities of continuous utilisation of the application; and subsequently prompts Hypothesis 4 below;

*Hypothesis 4a: Openness effects MOOCs Continuance Intention.*

*Hypothesis 4b: Internet Self-efficacy moderates the relationship between Openness and MOOCs Continuance Intention.*

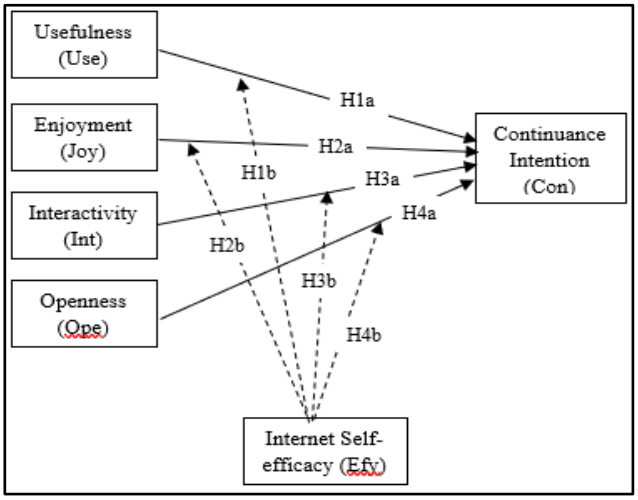


Figure 1: Research Model

## 3. Method & Data Collection

All the constructs and the corresponding measure items were adapted from previous literature to fit the context of this study. Specifically, items measure Continuance Intention was by using self-reported measurement by [12]. Items to measure Usefulness was adapted from the measurement used by [11] and [34], meanwhile the Enjoyment's construct was adapted from [17] and [35]. Items to measure Interactivity was adapted based on scales by [22] and items used by [27]. Openness construct was measured by using the measurement developed by

*May-June 2020*
*ISSN: 0193-4120 Page No. 4698-4708*

[30], and finally the moderator variable Internet Self-efficacy was referred to the work of [7] and items used by [36]. Two undergraduate students who were active in MOOCs and one expert from information technology management background were invited to take part in a pilot survey. Based on their feedback, the wording of several items was adjusted and improved. All the items were measured with a five-point disagree-agree Likert scale.

This study used internet survey approach using electronic questionnaire. This is because electronic questionnaire is easy to administer and can move globally as a massive number of students reported are using Malaysia MOOCs program. The survey was administered to collect data from students enrolled in Malaysia MOOCs program. An e-mail invitation has been sent to 500 students randomly selected from e-mail list obtained from OpenLearning platform. All the questionnaire items in this study were displayed using Google form (free of charge) and will be emailed to respondents privately seeking for their feedback. Respondents are required to click on the link provided in order to be connected to the questionnaires.

## 4. Findings

This study utilises the bootstrapping approach in the construction of the t-statistics and the corresponding p-value aided by the Smart-PLS (version 3.2.0). The results of the outputs for each path coefficient are presented in Table 1. The path coefficient values are all positive except for the beta of H3a that relate Int to Con. Thus, the betas (βs) of H1a, H2a and H4a are in the correct direction as hypothesised by the inner model. The $\beta_3$ estimated value (-0.002) is almost a zero (0) value and does not support the directional hypothesis significantly (p-value of 0.487) at either levels (5 or 1%). This means that this $\beta_3$ criterion cannot support the model defined directional relationship (Int→Con) validity. Besides having correctly directed coefficients H1a, H2a and H4a are each significant with p-values reported respectively at very small values (0.002, 0.00 and 0.001). Thus indication of the validity support for the hypothesised directions (Use→Con, Joy→Con, and Ope→Con) based on the β and significant criterion. One is to note that the reported path coefficients are standardised betas (βs). This allows the ordering and comparison between effects possible [37]. Observing this based on the Table 1 the H2a path is highest (0.478) in effect. Next (0.421) is the H1a followed by H4a (0.198) and almost no effect for H3a.

Table 1: Path coefficient and significance test

| Hypo-theses | Relation-ship | Path coefficient (β) | t statistics | p-value |
|---|---|---|---|---|
| H1a | Use→Con | 0.241* | 2.869 | 0.002 |
| H2a | Joy→Con | 0.478* | 5.252 | 0.000 |
| H3a | Int→Con | -0.002 | 0.033 | 0.487 |
| H4a | Ope→Con | 0.198* | 3.196 | 0.001 |

### 4.1 Moderation Effect Validation

There are four exogenous factors (Use, Joy, Int and Ope) that explain the behaviour of that endogenous Continuance Intention (Con) as hypothesised in the H1a-H4a. Thus, this consequently forwarded the need to understand the role of this moderating effect separately through the defined moderator models. Since the chosen approach to verify the effect of the moderator (or interaction) is that of product item, block of data items referred to by this interaction construct are products.

Table 2: Moderator models specified by Hypothesis (H)

| **Model H1b:** **R-square = 0.635; R-square adj = 0.631** | | | |
|---|---|---|---|
| Relationships | Coefficients | *t*-statistics | *p*-values |
| Efy → Con | 0.244 | 3.373 | 0.000 |
| Use → Con | 0.621 | 9.912 | 0.000 |
| EfyUse → Con | -0.046 | 1.352 | 0.089 |
| **Model H2b:** **R-square = 0.681; R-square adj = 0.677** | | | |
| Relationships | Coefficients | *t*-statistics | *p*-values |
| Efy → Con | 0.215 | 3.879 | 0.000 |
| Joy → Con | 0.671 | 12.716 | 0.000 |
| EfyJoy → Con | -0.050 | 1.548 | 0.061 |
| **Model H3b:** **R-square = 0.583; R-square adj = 0.578** | | | |
| Relationships | Coefficients | *t*-statistics | *p*-values |
| Efy → Con | 0.308 | 4.802 | 0.000 |
| Int → Con | 0.534 | 7.842 | 0.000 |
| EfyInt → Con | -0.051 | 1.482 | 0.069 |
| **Model H4b:** **R-square = 0.538; R-square adj = 0.532** | | | |
| Relationships | Coefficients | *t*-statistics | *p*-values |
| Efy → Con | 0.332 | 4.073 | 0.000 |
| Ope → Con | 0.470 | 5.574 | 0.000 |
| EfyOpe → Con | -0.027 | 0.585 | 0.279 |

For example, in this study an interaction construct labelled as EfyUse is defined by the product of Efy (the moderator) and exogenous Use and this EfyUse introduced into the moderator model that relates Use to Con. Thus, the direction and strength of the moderator effect can be evaluated by the path coefficient of that interaction construct introduced. Naturally their validity

*May-June 2020*
*ISSN: 0193-4120 Page No. 4698-4708*

tested based on the criteria beta (β) coefficient level significance and $R^2$ determination coefficient tests for their valid (quality) use.

The display in Figure 2 view the path model (PM) of each moderator inner models. While summary of Table 2 is the output needed for validity testing on each moderator model (again aided by the smartPLS application).The p-value column of Table 2are all less than 0.10 indicating 10% significance of the beta (β) coefficients except for the interaction path EfyOpe→ Con (p-value = 0.279). Thus, viewed from the β criterion the only path that does not have sufficient support for validity is the interaction effect (EfyOpe) of moderator model H4b.However all interaction effects are negative and judge by their values are of substantial influence as a moderator meaning that path effects are subjected to the levels of the moderator Efy. Deciding validity based on $R^2$ criterion depends on the cutoff points. The [38] cut-off are 0.67, 0.33 and 0.19 while that of [39] are 0.75, 0.50 and 0.25 respectively for substantial, moderate and weak valid model. The $R^2$ values for the moderator models H1b, H2b, H3b and H4b are respectively 0.635, 0.681, 0.583 and 0.538 as reported in Table 2, thus indicating that all the moderator models (H1b, H2b, H3b and H4b) are at the moderate level of validity viewed by both cut-offs. A closer interpretation of these interactions is explained in the following section.

### 4.2 Describing Interaction Effect

This study interaction results need a deeper elaboration and understanding as their model validity are supported although at the moderate level viewed from the $R^2$ criterion [39]. The elaboration and interpretation of favourable interaction effects for this research data will be based on the Table 3 summary collection of smartPLS related outputs. Before going into the table summary consider for example the moderator model H1b equation:

$$Con = (a)\times Use + (b)\times Efy + (c)\times Efy\times Use$$

Where (a), (b) and (c) are the path (or β) coefficients similar in notations to that of Figure 2 for Use, Efy and the interaction (EfyUse). The variables Con, Use and Efy are on the standardised scales and the variable Con is an Expected (or average) Con but here not explicitly written E(Con). The intercept and error term being zero on average are again not written thus simplifying the equation write-ups without jeopardising the intention of the model. This Moderator Model H1b states (define) that the endogenous Con is affected not only by the exogenous Use and Efy but also by the interaction (Efy × Use). Hence, the significance of interaction can legitimately be tested based on the integration path coefficient. Conditional on say a low level of the moderator Efy then the value of Efy = $Q_1$ (= – 0.70) and the Moderator Model H1b can be rewritten as:

$$Con = (b)(Q_1) + [(a) + (c)(Q_1)]Use$$

This rewritten equation says that the effect of Use on Con conditional at low level ($Q_1$) of the moderator Efy is the amount $[(a) + (c)(Q_1)]$. In Table 3 the product $(c)(Q_1)$ is the column Change and the effect of Use on Con considering (with) interaction is the amount $[(a) + (c)(Q_1)]$ reported under the column With interaction at Low level moderator Effect. Reading through the Use row under the With interaction (–0.70) column is the value 0.624 [= 0.621 + (–0.046) × (–0.70)]. Other exogenous variable effects on Con considering interaction included within a moderator model are similarly calculated.[40] stressed on the role of the sign and power that path coefficients played in moderating the direct effect relationship of constructs. Without interaction each exogenous constructs (first column) affect positively on the endogenous continuance intention (Con) as reported in the second column of Table 3. These direct effects on Con are sizeable, ranges between 0.47 and 0.67 and are all significant (*p*-values = 0.00), thus supporting the prior need for significant of the considered exogenous when introducing interaction (for example EfyUse) into the particular moderator model (H1b for the EfyUse example).

The latent variables inner model constructs are all unobservable. Their predicted values referred to as scores in the PLS analysis are the estimates that will be used in the explanation of role of the moderating effect model. The low Efy score chosen in for this study is –0.07 while 0.07 for high. These chosen values correspond approximately to the first and third quintile (Q1 and Q3) of the estimated Con scores. Between Q1 and Q3 are 50% of the scores. The estimated Efy scores are standardized scores that range from the negative end of the scale to the positive through zero and any other levels of Efy could have been chosen beside those two that this study specified. The important is to observe the effect of Use on Con (for example) conditional on the low or high level of the moderator Efy (or any other level choice). These low-level and high-level effects would differ if there is interaction. Otherwise without interaction the effects are similar at any level of Efy.

May-June 2020
ISSN: 0193-4120 Page No. 4698-4708

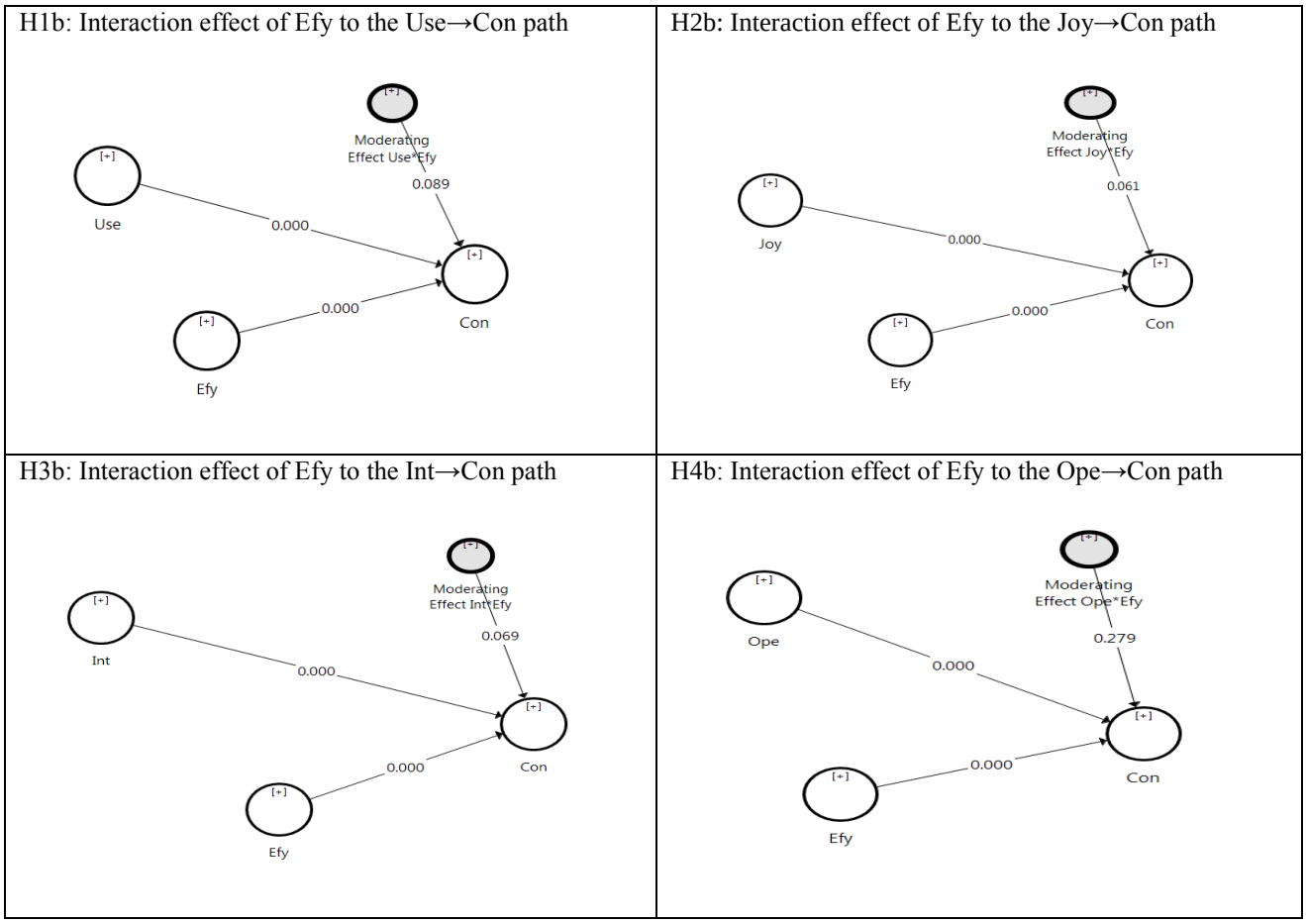


Figure 2: Path Model (PM) of each moderator inner models

For the latent construct Use, its direct effect on Con is 0.621 and is a significant contribution. Also significant is the negative interaction effect (– 0.046) and this contributes a change amount of 0.003 (which is the product –0.046 × –0.07) at the low (–0.07) level of Efy while a change amount of –0.003 (which is the product – 0.046 × 0.07) at the high level (0.07) to the conditional effect of Use on Con. Thus, accounting for (or with) interaction, the effect is 0.624 (which is the sum 0.621 + 0.003) at the lower scale of the moderator and 0.618 (which is the sum 0.621 + – 0.003) at the upper scale.

Therefore, based on this research data observation it can be pointed that student at the lower level of the Internet Self-efficacy (Efy) has stronger effect (0.624) for Use on Con than their counterpart (0.618) at the higher level. This in 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 (effect).Similar pattern is observed for the moderator (Efy) effect on the relation path Joy → Con. The conditional effect is positive and stronger (0.675) at the lower level of the moderator (Efy) compared to (0.667) that at the higher level. Therefore, the study notion again is that participants at the lower zone of moderator efficacy scores focus more efforts in their attempt to achieve better Continuance Intention (Con) performance compared to their counterpart at the higher zone. Comparing the power of effect within the moderator models, Joy is the strongest (0.671) among the four exogenous (exo). Use is second (0.621). The third is the construct Interactivity (Int) with a direct effect of 0.574 on Con. In this model the negative interaction effect (–0.051) is significant (at *p*-value of 0.069). Thus, the conditional effect of Int on Con at the low level of Efy is 0.538 and is 0.530 at the higher level. Although slight this phenomenon is similar to the previous two observations, users at the lower level of Efy are more effective in their power of affecting Con than their counterparts at the higher level. This again strengthens to the belief that users at the lower level put more effort to be stronger at their intention to continually use the MOOCs program.

Although the direct effect of Ope on Con is significant, the interaction effect is not (*p*-value = 0.279) but substantial at the size –0.027 of effect. Thus, the resulted conditional effects of Ope on Con at both levels of the moderator are sizable being 0.472 at the low level and 0.468 at the high level but are smallest in appropriate comparison with the other three exogenous constructs. However similar pattern of effect behaviour due to the moderator is observed. Students among the low level of

*May-June 2020*
*ISSN: 0193-4120 Page No. 4698-4708*

the moderator are better in their effect on con as compared to their counterparts at the high level.

From the above discussions it is obvious that the moderator Internet Self-efficacy (Efy) has exhibited a potential role in affecting any exogenous effect on Continuance Intention (Con). Above that the behaviour pattern that at lower level of the moderator participants tend to exhibit more for Continuance Intention than their counterpart at the higher level is similar for all exogenous. This tendency implies that user at the lower end of the moderating effect tends to placed more effort in achieving better Continuance Intention than those at the upper end.

### 4.3 Discussion of Findings and Conclusion

There are four direct effects for this study. First, the result shows that the Use → Con relationship as hypothesized in H1a is supported. This finding is consistent with prior studies related to e-learning continuance intention which found that Use has significant direct effect on Con [41, 42, 43, 44].Thus this is in conformity with the idea that learners performs within any system that they perceive as useful, will help them perform and can bring about future benefits.

Joy has the highest value of path coefficient reported ($\beta = 0.459$, $p < 0.05$) thus Joy is relatively the strongest predictor of Con among the four in Malaysia MOOCs context. This finding confirms H2a of the study that Joy significantly affects Con. The finding supported by [30] and [45] who reiterated that most learners were found to be motivated by fun and enjoyment in participating MOOCs activities.

Interactivity has no significant effect on Continuance Intention ($\beta = -0.011$, $p > 0.05$). This finding thus did not support H3a at the positive significant effect as hypothesised and is in contradiction with many previous studies [22, 46, 47, 48]. Although this finding was unexpected, more thought and explanation are needed to explore possible future actions to better understand possible role Interactivity plays in describing the variability in Continuance Intention. Such observation is reported by [49] and beyond that an observation from [50] reported that responsiveness (being one of the dimensions of interactivity) was insignificant in affecting users' satisfaction towards blogging services. This aspect of responsiveness between users is another possible explanation as this research concept of Interactivity (Int) includes interaction between students as well as student and lecture. Moreover, responsiveness or gaining feedback from other user sometimes takes time and consequently feels less connected in MOOCs environment.

Hypotheses testing H4a supports the relationship between Openess (Ope) and Continuance Intention (Con). This finding suggests that the individual Continuance Intention (Con) of using MOOCs can be improved as long as the system provides open resources, free of charge, and able to download materials for free. The statistically significant result of hypothesis H4a corresponds with the findings of [51] and [30] which revealed Openess (Ope) affects directly or indirectly user behavioural of Continuance Intention (Con) of using MOOCs.

The Hypothesis H1b claimed that Internet Self-efficacy (Efy) moderates the relationship between Usefulness (Use) and MOOCs Continuance Intention (Con). Although the interaction effect (EfyUse) is negative it is significant ($\alpha = 10\%$). The direct effect of Use on Con is 0.621. But conditional on low and high level of the moderator Efy the effects of Use on Con are 0.624 and 0.618 respectively. This differing of effect is a tendency of interaction. The pattern signifies that students at the Efy lower end displayed more effect of Use on Con than their counterpart at the higher end. This allude to a phenomenon that lesser Efy performers have more effort placed into their use of e-learning MOOCs applications which resulted in more effect. However, taking easy and for granted by students at the higher end of Self-efficacy (Efy) scale is an attitude to be avoided.

This finding that the Efy moderates Use on Con is in concordance with the findings from [15] that found that the user belief factor moderates the relationship between Usefulness (Use) and Continuance Intention (Con) to further use free website. But, the effect of Use on Con is higher with website users of better internet experience.

Table 3: Moderator (Efy) effect models on endogenous Con

| Exo | Effect without interaction (a) | Interaction effect (c) | | Effect at levels of moderator Efy | | | |
|---|---|---|---|---|---|---|---|
| | | | | Low = – 0.07 | | High = 0.07 | |
| | | coefficient | *p*-value | Change | With interaction | Change | With interaction |
| Use | 0.621 | - 0.046 | 0.089 | 0.003 | 0.624 | - 0.003 | 0.618 |
| Joy | 0.671 | - 0.050 | 0.061 | 0.004 | 0.675 | - 0.004 | 0.667 |
| Int | 0.534 | - 0.051 | 0.069 | 0.004 | 0.538 | - 0.004 | 0.530 |
| Ope | 0.470 | - 0.027 | 0.279 | 0.002 | 0.472 | - 0.002 | 0.468 |

Note: i. Change = (c) × (Efy level),
ii. Effect with interaction = (a) + Change and;
iii. Exo is exogenous construct.

*May-June 2020*
*ISSN: 0193-4120 Page No. 4698-4708*

Of encouraging observation by [52] is that Internet Self-efficacy (Efy) can translates into positive attitudes towards Internet learning environments. Possession of Internet Self-efficacy attributes among users on online learning environment is a preference needed in knowledge exploration. The boost in learning activities such as sharing ideas in classroom discussion, collaborating on assignments, participating in quizzes create confidence in the online users appreciation of the e-learning environment.

The Hypothesis H2b considers the significance that the interaction EfyJoy has on Con. The results from bootstrapping test presented before clearly support H2b at 10% significance (0.061 p-value) and with negative interaction EfyJoy effect (–0.050). This effect of Joy on Con conditional on Efy levels has similar pattern to that of the previous Use on Con conditional effect thus similar interpretation; users at the lower end of the Efy scale placed more effect on Joy to Con relationship than their counterparts at the higher end. Again, this is attributed to students within the high level of Efy tended to be complacent believing that they are better performers than their lower level weaker counterparts. Thus, this finding is a boost for whatever other reason one can allured to that by providing credible enhancement that provides entertainment and enjoyment to participants is a plus for Malaysia MOOCs students Continuance Intention (Con). In compliance with this study finding but in a different setting of application (mobile shopping), [53] discovered that Internet Self-efficacy (Efy) moderates Joy effect on adoption attitude towards mobile shopping. But additionally, [54] revealed that possessing stronger understanding at Efy affects user perception of Joy towards adoption of mobile shopping tended to exhibit stronger effect. Similar comparisons were established by[23] and [21] who asserted that employees having competence in computer Self-efficacy exhibit more fun with the application that tended to influence their work performance. However, this research observed that student at the lower level of the Internet Self-efficacy (Efy) exhibit stronger effect on the relationship of Enjoyment (Joy) on MOOCs Continuance Intention (Con) 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. While weaker students are of more concern to providers of MOOCs in their plan and strategy for improvement, better performed students cannot be neglected. Bearing this finding in mind ways of designing improved material and morale support and encouragement to student at whatever level of Efy should be the priority of universities and stakeholders for better future achievement of Malaysia MOOCs e-learning implementation.

As observed from the Figure2 and Table 3, H3b is significant (0.069 p-value) at the 10% alpha (α) level and the interaction EfyInt effect is negative (–0.051). Being significant in interaction effect the effect of Int on Con is conditional at moderator (Efy) level. For this study result at low level of Efy the effect of Int on Con is 0.538 whereas at high level this conditional effect of Int on Con is 0.530. Thus, similar to the earlier two cases (H1b and H2b) the effect is bigger at the low level but smaller at the high level of Efy. Similarly, the implication suggested that students at the lower end of the moderator (Efy) scale are more active in their participation on the Malaysia MOOCs e-learning environment comparative to their counterparts at the higher scale. Again, this phenomenon triggers concerns for improvements. Contrary to this study finding is that observation by [55] that student possessing high level of Internet Self–efficacy and Interactivity portrays significantly in their intention to continually using the MOOCs system and attributes this to confidence in the assisted tools, positive experience interacting with peers and teachers and provoking online questions posed by bulletin boards, emails and room discussions. On similar note [22] reasoned out autonomy contributing to student awareness leading to productivity in their e-learning application. These contrasts are ideas that needed positive consideration for improvements in the Malaysia MOOCs experience as interaction effect of the local scenario is negative not positive as those reported contrasted experience.

The direct effect (0.470) of Ope is significant on Con. Bringing interaction into the model in order to test the Hypothesis H4b resulted in the rejection of the existence of the postulated moderator Efy as reported in Table 3. The negative interaction effect though small (-0.027) compared to the other three (-0.046, -0.050, and -0.051) resulted in a sizable conditional effect on Con. At the low Efy scores the combined amount of effect is 0.472 while at the high scores this is 0.468. Thus, though not a significant interaction, similar pattern of smaller conditional effect for participants that score better in their Efy compared to their counterparts at the lower scale of Efy. Participating students within the lower scale of Efy has bigger effect on Con than their counterparts at the higher end of the Efy scores. This phenomenon seems prominent where having lower Internet Self-Efficacy these students put more efforts to establish a better conditional effect on Continuance Intention to use the e-learning. Consistent with findings from [3, 56]. Internet Self-efficacy was found as an insignificant predictor for student satisfaction in the open learning environment platform. Dissatisfy mostly resulted discontinue use of the system [12]. This may be because individuals who have low level of Self-efficacy are lack confidence, and see the Openness of MOOCs platform as a threat to be avoided and shy away from activities because of their perceived incapability to execute the activities. This study data reveals that students participating in the Malaysia MOOCs platform are free from the Self-efficacy moderating their direct effect of them possessing Openness on their Continuous Intention to further use the current system.

*May-June 2020*
*ISSN: 0193-4120 Page No. 4698-4708*

## 5. Direction for Future Research

The basic-effect model is the beginning with the four (Use, Joy, Int and Ope) concepts or constructs that defined their effect on Con. Only Use, Joy, and Ope was significant but not Int. Although a valid model by the $R^2$ standard the explanation can be improved by other factors not already included. This implies that further research extend the basic-effect model to include additional variables to increase the explanation on Con. For example, a possible other variable is Information Quality as proposed by [57].

Interactivity though not significant in this study has strong implications for increased student performance in e-learning systems [58]. Therefore, further examination into this factor is an avenue of future studies. In closer examination future research should consider [22, 58] clarification of the role played by their studied four specific interactivity factors: controllability, responsiveness, to-way-communication, and personalization. Thus, study on specific factors on interactivity may give a better understanding on which element of Interactivity actually contributed to MOOCs Continuance Intention. An investigation into the specific application issues to improve Interactivity can be the line taken in future study. The platforms that provide support for better Interactivity is another possible area of improvement that can be further investigated.

Another possibility of this study data not being supportive of the EfyInt (for example) interaction is from the statistical perspective. In particular this can be related to the sample size and is a pointer that should account for better sample size consideration in future research. Again, from statistical perspective multicolinearity is an issue in multiple regressions having many explanatory variables. Though not a problem in this study consideration of multicolinearity is to be considered in future research as it may influence the insignificant results of an introduced interaction. In addition, 'Group comparison' based on categorical variable is another future avenue to consider. Effects of predictors on Continuance Intention may differ between groups of universities categorised as intensive research on national grants and those not for example.

## References

[1] Richard, H., & Haya, A. "*Examining student decision to adopt web 2.0 technologies: theory and empirical tests".* Journal of Computing in Higher Education, 21(3), 183-198, 2009

[2] Abdullahi, S., Ransom, E. N., & Kardam, M. "*The significant of internet technology to education and students in acquiring quality education"*. International Letters of Social and Humanistic Sciences, 145-153, 2014

[3] Kuo, Y.-C., Walker, A. E., Schroder, K. E., & Belland, B. R. "*Interaction, internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses".* The Internet and Higher Education, 35-50, 2014

[4] Venkatesh, V., Thong, J., Chan, F., Hu, P., & Brown, S. *"Extending the two-stage information systems continuance model: Incorporating UTAUT predictors and the role of context".* Information Systems Journal, 527-555, 2011b

[5] Torkzadeh, G., Chang, J. C., &Demirhan, D. "*A contingency model of computer and Internet self-efficacy".* Information & Management, 541-550, 2006

[6] Prior, D. D., Mazanov, J., Meachem, D., Heaslip, G., & Hanson, J. "*Attitude, digital literacy and self-efficacy: Flow-on effects for online learning behaviour"*. Internet and Higher Education, 91-97, 2016

[7] Hsu, M.-H., & Chiu, C.-M. "*Internet self-efficacy and electronic service acceptance".* Decision Support Systems, 369-381, 2004

[8] Dabbagh, N., & Kitsantas, A. "*Personal learning environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning"*. The Internet and Higher Education, 15(1), 3-8, 2012

[9] Shi, J., Chen, Z., & Tian, M. "*Internet self-efficacy, the need for cognition, and sensation seeking as predictors of problematic use of the internet"*. Cyber Psychology, Bahavior, and Social Networking, 14(4), 213-234, 2011

[10] Livingstone, S., & Helsper, E. "*Balancing opportunities and risks in teenagers' use of the Internet: The role of online skills and Internet self-efficacy"*. New Media & Society, 12(2), 309-329, 2010

[11] Davis, F. "*Perceived usefulness, perceived ease of use, and user acceptance of information technology".* MIS Quarterly, 13(3), 319-340, 1989

[12] Bhattacherjee, A. "*Understanding information systems continuance: an expectation-confirmation model"*. MIS Quarterly, 25(3), 351-370, 2001

[13] Mittal, S. "*Understanding factors affecting university student's adoption of e-learning system in NCR".* Emerging Challenges in Business, Optimization, Technology, and Industry in Springer Proceedings in Business and Economics (pp. 185-198). Springer, 2018

[14] Suha, A., & Anne, M. "*The use of the UTAUT model in the adoption of e-Government services in Kuwait"*. Proceedings of the 4th Hawaii International Conference on System Sciences (pp. 1-11). IEEE Explore, 2008

[15] Castaneda, J., Francisco, M., & Teodoro, L. "*Web acceptance model (WAM): Moderating effects of user experience"*. Information & Management, 384-396, 2007

[16] Chokri, B. "*Factors influencing the adoption of the e-learning technology in teaching and*

*May-June 2020*
*ISSN: 0193-4120 Page No. 4698-4708*

*learning by students of a university class"*. European Scientific Journal, 8(28), 165-190, 2012

[17] Davis, F., Bagozzi, R., &Warshaw, P. "*Extrinsic and intricsic motivation to use computer in the workplace"*. Journal of Applied Social Psychology, 22(14), 1111-1132, 1992

[18] Saade, R., Tan, W., & Nebebe, F. "*Impact of motivation on intentions in online learning: Canada vs China"*. Issues in Informing Science & Information Technology, 137-147, 2008

[19] Wang, Y., Lin, H., & Liao, Y. "*Investigating the individual difference antecedents of perceived enjoyment in the acceptance of blogging"*. World Academy of Science, Engineering and Technology, 2010

[20] Compeau, D., & Higgins, C. "*Computer self-efficacy: development of a measure and initial test"*. MIS Quarterly, 19(2), 189-211, 1995

[21] Igbaria, M., &Iivari, J. "*The effects of self-efficacy on computer usage"*. Omega, 23(6), 587-605, 1995

[22] Pituch, K. A., & Lee, Y. K. "*The influence of system characteristics on e-learning use"*. Computers & Education, 27(2), 222-244, 2006

[23] Ong, C., Lai, J., & Wang, Y. "*Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies"*. Information & Management, 41(6), 795-804, 2004

[24] Donkor, F. "*Assessment of learner acceptance and satisfaction with video-based instructional materials for teaching practical skills at a distance"*. The International Review of Research in Open and Distributed Learning, 12(5), 74-92, 2011

[25] Csikszentmihalyi, M. "Flow: The Psychology of Optimal Experience". New York: Harper & Row. 1990

[26] Hoffman, D. L., & Novak, T. P. "*Marketing in hypermedia computer-mediated environments conceptual foundations: conceptual foundations"*. Journal of Marketing, 60(3), 50-68, 1996

[27] Alzahrani, J. G., & Ghinea, G. "*Evaluating the impact of interactivity issues on e-learning effectiveness"*. IEEE. 2012

[28] Medina, C., & Rufin, R. *"Social Network Sites as a moderating factor in e-learning platform adoption: An extension"*. Springer International Publishing Switzerland, 277-287, 2014

[29] Kanwal, F., & Rehman, M. "*Factors affecting e-learning adoption in developing countries: Empirical evidence from Pakistan's Higher Education sector"*. IEEE Access, 10968-10978, 2017

[30] Alraimi, K. M., Zo, H., &Ciganek, A. P. "*Understanding the MOOCs continuance: The role of openness and reputation"*. Computers & Education, 80, 28-38, 2015

[31] Rousing, T. *"The Openness of MOOCs: A multifaced investigation of four platform"*. Copenhagen Business School. Master Thesis, 2014

[32] Uzunboylu, H., Bicen, H., &Cavus, N. "*The efficient virtual learning environment: A case study of web 2.0 tools and Windows live spaces"*. Computers & Education, 720-726, 2011

[33] Shen, D., Cho, M.-H., Tsai, C.-L., &Marra, R. "*Unpacking online learning experiences: Online learning self-efficacy and learning satisfaction"*. The Internet and Higher Education, 10-17, 2013

[34] Ngai, E., Poon, J., & Chan, Y. "*Empirical examination of the adoption of WebCT using TAM"*. Computers & Education, 48(2), 250-267, 2007

[35] Lee, M. K., Cheung, C. M., & Chen, Z. *"Acceptance of internet-based learning medium: the role of extrinsic and intrinsic motivation"*. Information & Management, 42(8), 1095-1104, 2005

[36] Roca, J., Chiu, C., & Martinez, F. "*Understanding e-learning continuance intention: An extension of the technology acceptance model"*. International Journal of Human-Computer Studies, 683-696, 2006

[37] Ramayah, T., Hwa, C-J, Chuah, F., Memon, M. *"Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 3.0: An Updated and Practical Guide to Statistical Analysis"* Pearson Malaysia SdnBhd, 2nd Ed, 2017

[38] Chin, Wynne W. "How to write up and report PLS analyses", 2010

[39] Hair, J., Black, W., Babin, B., & Anderson, R. "*Multivariate data analysis"*. New Jersey: Pearson Prentice Hall, 2017

[40] Kock, N. "*Using WarpPLS in e-Collaboration studies: Mediating effects, control and second order variables and algorithm choices"*. International Journal of e-Collaboration, 7(3), 1-13, 2011

[41] Liaw, S., & Huang, H. "*Perceived satisfaction, perceived usefulness and interactive learning environments as predictors to self-regulation in e-learning environments"*. Computers & Education, 60(1), 14-24, 2013

[42] Liaw, S.-S., Huang, H.-M., & Chen, G.-D. "*Surveying instructor and learner attitudes toward e-learning"*. Computers & Education, 1066-1080, 2007

[43] Ramirez-Anormaliza, R., Sabate, F., & Llinas-Audet, X. "*The acceptance and use of the e-learning systems among the university teachers in Ecuador"*. Proceedings of EDULEARN16, (pp. 3666-3674). Barcelona, Spain. 2016

*May-June 2020*
*ISSN: 0193-4120 Page No. 4698-4708*

[44] Ismail, N. Z., Razak, M. R., Zakariah, Z., Alias, N., & Abd. Aziz, M. N. "*E-learning continuance intention among higher learning institution students' in Malaysia"*. Procedia - Social and Behavioral Sciences, 409-415, 2012

[45] Belanger, Y., & Thornton, J. "*Bioelectricity: A quantitative approach Duke University's first MOOC*". Durham, NC: Duke Center for Instructional Technology, 1-21, 2013

[46] Cheng, Y.-M. "*Roles of interactivity and usage experience in e-learning acceptance: A longitudinal study".* International Journal of Web Information Systems, 10 (1), 2-23, 2014

[47] Sa, J.-H., Lee, J.-M., Kang, T.-W., &Gim, G.-Y. K.-B. "*A study of factors affecting the intention of usage in MOOC"*. Advanced Science and Technology Letters, 160-163, 2016

[48] Yoo, W.-S., Lee, Y., & Park, J. "*The role of interactivity in e-tailing: creating value and increasing satisfaction"*. Journal of Retailing and Consumer Services, 17(2), 89-96, 2010

[49] Li, Y., Duan, Y., Fu, Z., & Alford, P. "*An empirical study on behavioural intention to reuse e-learning systems in rural China".* British Journal of Educational Technology, 43(6), 933-948, 2012

[50] Zhao, L., Lu, Y., Wang, B., & Huang, W. "*What makes them happy and curious online? An empirical study on high school students' Internet use from a self-determination theory perspective"*. Computers & Education, 56(2), 346-356, 2011

[51] Wu, B., & Chen, X. "*Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model"*. Computers in Human Behavior, 1-12, 2016

[52] Liang, J.-C., Wu, S.-H., & Tsai, C.-C. "*Nurses' internet self-efficacy and attitudes toward web-based continuing learning".* Nurse Education Today, 47(1), 768-773, 2011

[53] Yang, K. "*Consumer technology traits in determining mobile shopping adoption: An application of the extended theory of planned behaviour"*. Journal of Retailing and Consumer Services, 19(5), 484-491, 2012

[54] Iconaru, C. "*The moderating role of perceived self-efficacy in the context of online buying adoption"*. Broad Research in Accounting, Negotiation, and Distribution, 4(1), 20, 2013

[55] Ting, Y.-L. "*Tapping into students' digital literacy and designin negotiated learning to promote learner autonomy"*. The Internet and Higher Education, 25-32, 2015

[56] Puzziferro, M. "*Online technologies self-efficacy and self-regulated learning as predictors of final grade and satisfaction in college level online courses"*. American Journal of Distance Education, 22(2), 72-89, 2008

[57] Yang, M., Shao, Z., Liu, Q. & Liu C. "*Understanding the quality factors that influence the continuance intention of students toward participation in MOOCs".* Educational Technology Research and Development, 65, p. 1195-1214, 2017

[58] Evans, C., & Gibbons, N. "*The interactivity effect in multimedia learning"*. Computers & Education, 49(4), 1147-1160, 2007