

INVESTIGATING THE DETERMINANTS OF MOOC CONTINUANCE INTENTION USING EXPECTATION-CONFIRMATION MODEL

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Abstract—Openness to MOOCs indicates the Initial stage of enrolling to a module conducted as MOOC. However, this does not guarantee the students will continue choosing other credit-bearing MOOCs in the University. This research examines the determinants of MOOC Continuance Intention among Taylor's University students with regards to determinants such as apprehension, motivation, and openness to MOOCs, which is grounded on Expectancy-Confirmation Model-Information Technology (ECM-IT). There were 366 participants responding to the online survey carried out during the period of August 2021 to July 2022. The questionnaire included measurable constructs such as Computer Apprehension, Internet Apprehension, TIMES (Taylor's Moodle) Apprehension and MOOC Apprehension as well as MOOC Motivation, MOOC Openness, MOOC-Acceptance Confirmation and MOOC Continuance Intention. Reliability test indicated high Cronbach's alphas (internal consistency) for all constructs. Pearson correlation demonstrated that Computer Apprehension, Internet Apprehension, TIMES Apprehension impacted MOOC Apprehension which in turn influenced MOOC-Openness, MOOC-Motivation and MOOC-Continuance Intention.

Keywords— MOOC, Motivation, Continuance Intention , Openness and Apprehension.

I. INTRODUCTION

Higher Education is aggressively shifting toward the online education driven by the rapid development of digital and instructional technologies. This paradigm shift has prompted exponential growth of Massive Open Online Courses (MOOCs). Class Central (2021) reported that about 19400 MOOCs were introduced in 950 universities globally, with about 3100 new courses added to the list with a total of 220 million of MOOCs learners in 2021. In 2014, Malaysia implemented credit-bearing MOOCs in general study modules for university students in its Public Universities and later institutionalised MOOCs as credit-bearing course in Malaysia public and private universities in 2016 (Shahar, 2016). Since then many institutes of higher learning adopted credit-bearing MOOCs for its general study modules such as Hubungan Etnik (Ethnic Relation) and Tamadun Islam dan Tamadun Asia, TITAS (Islamic Civilization and Asian Civilization), which are mandatory for all Malaysian undergraduates. However, these 2 modules are delivered as blended learning mode in public universities with about 30% of online delivery while the remaining content was conducted in physical mode. Taylor's University became the pioneer to deliver 100% online mode of MOOCs for the two general study modules among Malaysia universities in 2016. There are more than 1200 students enrol to each of these modules every semester.

A. MOOC Continuance Intention

The new era of digital communication and ubiquitous computing has an important impact on the new educational landscape among the 21st-century learners as learning can take place anytime, anywhere on their own pace using radio waves and WiFi. MOOCs have become an integral part of this education landscape and increasingly drawn the attention of researchers and stakeholders in higher education. Mawaddah (2018) formulated a conceptual model to identify the factors that determine users repeatedly selecting MOOCs for their learning. The model demonstrates the relationship between usefulness, enjoyment, interactivity and openness with MOOC continuance intention. The research framework focused on post adoption of MOOC in Malaysia MOOC usage. Lee & Kwon (2011) stated that continuance intention is the user's decision in continue using a specific technology in post adoption. Cui (2018) explored the relationship between students' multidimensional self-efficacy and MOOC continuance intention, grounded his research on Bhattacharjee's Expectation Confirmation Model-Information

Technology (ECM-IT) (2001). ECM-IT emphasized that the success of IS relied on continuous adoption and not its initial usage. Thus, to sustain and promote the development of MOOCs, educators are encouraged to explore strategies to encourage the continuous adoption of MOOCs (Admiraal et al., 2014).

B. Problem Statement

In 2018, Taylor's University introduced the Taylor's Curriculum Framework (TCF) that focuses on "Teach Less Learn More" (TLLM) strategy. The TCF aims to prepare future-ready graduates by instilling self-directed and life-long learning. This approach progressively reduces traditional teaching and learning approach by inclusion of online delivery from 30% in the first year to more than 80% in the third year of their study period to inculcate students' independent and peer-learning abilities. This effort aims to develop students' continuance intention to undertake credit bearing MOOCs for their postgraduate study or career advancement in future. However, despite being termed as digitally literate students in the 21st century, they have experienced predominantly traditional, face-to-face education. These students could struggle with the transition to learning via MOOCs, experiencing apprehension with regards to their performance, virtual interaction, and overall dissatisfaction. Such challenges could discourage them from engaging with MOOCs in the future. This research aims at investigating the relationship among MOOC apprehension, MOOC-Acceptance Confirmation, MOOC Motivation, MOOC Openness and MOOC Continuance Intention among students at Taylor's University.

C. Purpose and Objectives

This study aims to assess students' MOOC Continuance Intention at Taylor's University. More specifically, this study aims to:

1. Investigate the relationship between MOOC-Acceptance Confirmation and MOOC Continuance Intention.
2. Examine the relationship between MOOC Continuance Intention and other determinants such as MOOC Openness, MOOC Apprehension and MOOC Motivation, and
3. Analyze the effects of computer Apprehension, internet Apprehension, and TIMES Apprehension on MOOC Apprehension.

D. Theoretical Framework

The current study adapts the perspective of Bhattacharjee's ECM-IT model and defines MOOC-Acceptance Confirmation (expectation) as the degree in which learners believe that the MOOC Apprehension will be reduced through their learning experience which will lead to positive effect on MOOC Motivation. MOOC Openness has been shown to positively affect MOOC Motivation (Loh, et. al., 2019). This can serve as a baseline for the confirmation judgements. Figure 1 shows the current research framework adapted from Expectation Confirmation Model.

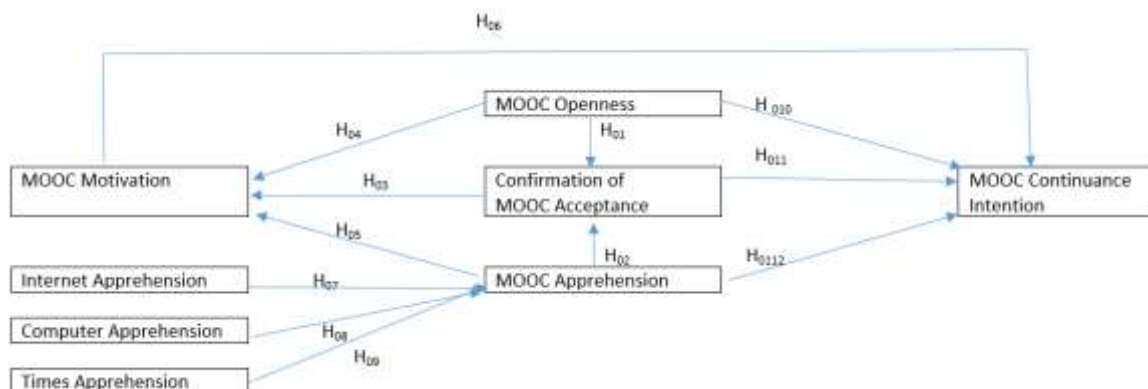


FIGURE 1: RESEARCH FRAMEWORK ADAPTED FROM EXPECTATION CONFIRMATION MODEL

E. Definitions of research constructs in this study

1) MOOC Motivation: MOOC Motivation refers to the internal and external forces which drive students to engage, persist, and succeed in learning via MOOCs, increases their competence to ensure enhancement of their performance in MOOC and leads to a positive learning experience in the online learning environment.

2) MOOC Openness Towards Learning TITAS: MOOC Openness refers to students' willingness to learn TITAS via MOOC platform. It indicates the degree of their receptiveness to the new idea and new pedagogy of learning TITAS on the MOOC platform.

3) Apprehension Towards Learning TITAS Via MOOC Environment: The apprehension of learning TITAS via MOOC platform refers to the affective dimension of fear and worry with regards to misuse of information technology in MOOC platform. This may lead to miscommunication in their learning process to achieve the required academic performance. This construct is categorized into various dimensions, such as MOOC Apprehension, Computer Apprehension, Internet Apprehension and TIMES platform Apprehension.

4) MOOC Continuance Intention: MOOC Continuance Intention is defined as students' favorable attitude toward undertaking MOOCs resulting in students repeatedly enrolling to other credit-bearing MOOCs at Taylor's University.

5) MOOC Acceptance Confirmation: MOOC acceptance confirmation refers to the degree to which students' expectation in learning TITAS via MOOC are fulfilled, which is indicated in reduced MOOC Apprehension and increased MOOC Motivation and MOOC Openness toward MOOCs.

F. Null Hypotheses

A set of null hypotheses were derived from the research framework adapted from ECM in this study..

$H_{0(1)}$: No significant positive correlation between MOOC Openness and MOOC-Acceptance Confirmation among students taking TITAS MOOC.

$H_{0(2)}$: No significant negative correlation between MOOC Apprehension and MOOC-Acceptance Confirmation among students taking TITAS MOOC.

$H_{0(3)}$: There is no statistically significant positive correlation between MOOC-Acceptance Confirmation and MOOC Motivation for students taking TITAS MOOC.

$H_{0(4)}$: No significant positive correlation between MOOC Openness and MOOC Motivation among students taking TITAS MOOC.

$H_{0(5)}$: No significant negative correlation between MOOC Apprehension and MOOC Motivation among students taking TITAS MOOC.

$H_{0(6)}$: There is no statistically significant positive correlation between MOOC Motivation and MOOC Continuance Intention for students taking TITAS MOOC.

$H_{0(7)}$: No significant positive correlation between Internet Apprehension and MOOC Apprehension among students taking TITAS MOOC.

$H_{0(8)}$: No significant positive correlation between Computer Apprehension and MOOC Apprehension among students taking TITAS MOOC.

$H_{0(9)}$: No significant positive correlation between TIMES Apprehension and MOOC- Apprehension among students taking TITAS MOOC.

$H_{0(10)}$: No significant positive correlation between MOOC Openness and MOOC Continuance Intention among students taking TITAS MOOC.

$H_{0(11)}$: No significant positive correlation between MOOC-Acceptance Confirmation and MOOC Continuance Intention among students taking TITAS MOOC.

$H_{0(12)}$: No significant positive correlation between MOOC Apprehension and MOOC Continuance Intention among students taking TITAS MOOC.

II. METHODOLOGY

A. Study Design

This study adopted correlational research design to investigate the determinants of MOOC Continuance Intention based on Expectation-Confirmation Model.

B. Sample

This study was conducted in August 2021 semester and March 2022 Semester and 366 undergraduate students enrolled in TITAS module participated in this survey. Participants comprising 43 first semester students, 236 second semester students, 76 third semester students and 11 fourth semester students. The sample included 216 female students, 150 male students. The sample consisted of 49 Malay, 275 Chinese, 26 Indian and 16 other races.

C. Procedure

The TITAS MOOC was offered exclusively to Malaysian students. These students had completed 12 years of formal education before enrolling into undergraduate program at Taylor's University. A 2-hours physical session was conducted in Week 1. Instructor will provide a thorough explanation of this module conducted via MOOC. They will be guided to register and navigate the OpenLearning and TIMES platform during this in-person session. Two times of Integrated Synchronous Learning (ISL) sessions will be conducted by the instructor in week six and week twelfth respectively to facilitate real time synchronous discussion to address any issues pertaining to students' assignments and projects. Students were required to participate in the weekly activities by completing the assignments and quizzes, watching videos and carrying out self-independent learning which practically replacing face-to-face lessons throughout the semester. Students were required to fully complete the weekly activities (checkpoints) which serve as attendance for MOOC.

D. Data Collection

A self-developed online questionnaire was posted and administered via the TITAS MOOC platform at the end of August 2021 semester and March 2022 semester. This instrument aimed to evaluate students' MOOC Continuance Intention and examine the relationship between MOOC Continuance Intention and other constructs such as MOOC-Acceptance Confirmation, MOOC Openness, MOOC Apprehension and MOOC Motivation among students at Taylor's University.

The online questionnaire included 6 items of MOOC Openness ($\alpha = 0.838$), 6 items of MOOC Motivation ($\alpha = 0.874$), 6 items of MOOC-Acceptance Confirmation ($\alpha = 0.899$), 8 items of MOOC Continuance Intention ($\alpha = 0.833$), 14 items of MOOC Apprehension ($\alpha = 0.960$), 5 items of Computer Apprehension ($\alpha = 0.872$), 4 items of Internet Apprehension ($\alpha = 0.899$) and 7 items of Times platform Apprehension ($\alpha = 0.947$). Cronbach's alphas (α) for all the variables were high, indicating that the questionnaire has strong internal consistency and reliability.

E. Data Analysis

IBM SPSS, version 20, was used to perform statistical analysis. All the null hypotheses formulated from the research framework adapted from ECM were tested based on the descriptive and correlational analysis.

III.RESULTS

This study employed Pearson's Product Moment Correlation Coefficient to examine the relationship among all the variables under investigation. The Correlation Matrix between the variables used for hypothesis testing is shown in Table 1. The results of hypothesis testing for each null hypothesis were tabulated in Table 2

A. Correlation Matrix

Table 1. Correlation Matrix for Variables (N = 366)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. MOOC Openness	1.000							
2. MOOC Acceptance Confirmation	.536**	1.000						
3. MOOC Motivation	.749**	.539**	1.000					
4. MOOC Continuance Intention	.689**	.500**	.774**	1.000				
5. MOOC Apprehension	-.265**	-.275**	-.434**	-.265**	1.000			
6. Computer Apprehension	-.312**	-.295**	-.412**	-.283**	.742**	1.000		
7. Internet Apprehension	-.284**	-.254**	-.331**	-.276**	.649**	.671**	1.000	
8. TIMES Apprehension	-.338**	-.309**	-.418**	-.297**	.825**	.703**	.654**	1.000

** $p < .01$

B. Hypotheses testing

The hypotheses formulated from the research framework in this study were tested using Pearson's correlation. The correlation coefficient from the Correlation Matrix indicating a significant relationships between pair of constructs in the null hypothesis. The results for the hypotheses testing are summarized in Table 2. All the null hypotheses ($H_{0(1)}-H_{0(12)}$) were rejected.

Table 2: Results of Hypotheses Testing

Null Hypothesis H_0	Variables tested	r	p	Direction of relationship	Decision on H_0
$H_{0(1)}$	MOOC Openness ↔ MOOC Acceptance Confirmation	.536	< .01	Positive	Rejected
$H_{0(2)}$	MOOC Apprehension ↔ MOOC Acceptance Confirmation	-.275	< .01	Negative	Rejected
$H_{0(3)}$	MOOC Acceptance Confirmation ↔ MOOC Motivation	.539	< .01	Positive	Rejected
$H_{0(4)}$	MOOC Openness ↔ MOOC Motivation	.749	< .01	Positive	Rejected
$H_{0(5)}$	MOOC Apprehension ↔ MOOC Motivation	-.434	< .01	Negative	Rejected
$H_{0(6)}$	MOOC Motivation ↔ MOOC Continuance Intention	.774	< .01	Positive	Rejected
$H_{0(7)}$	Internet Apprehension ↔ MOOC Apprehension	.649	< .01	Positive	Rejected
$H_{0(8)}$	Computer Apprehension ↔ MOOC Apprehension	.742	< .01	Positive	Rejected
$H_{0(9)}$	TIMES Apprehension ↔ MOOC Apprehension	.825	< .01	Positive	Rejected
$H_{0(10)}$	MOOC Openness ↔ MOOC Continuance Intention	.689	< .01	Positive	Rejected
$H_{0(11)}$	MOOC Acceptance Confirmation ↔ MOOC Continuance Intention	.500	< .01	Positive	Rejected

H ₀₍₁₂₎	MOOC Apprehension ↔ MOOC Continuance Intention	-.265	< .01	Negative	Rejected
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IV DISCUSSION

Analysis from Pearson's correlation demonstrated significant relationships between the following pairs of constructs:

1. Strongest positive association between MOOC Motivation with MOOC Continuance Intention ($r = .774$, $p < .01$), implying that MOOC Motivation is a strong determinant of MOOC Continuance Intention, which significantly predicts students' willingness to continue taking MOOCs.
2. Similarly, MOOC Openness has significant positive correlations with MOOC Motivation ($r = .749$, $p < .01$) and MOOC Continuance Intention ($r = .689$, $p < .01$). MOOC Openness with MOOC Motivation ($r = 0.749$) and MOOC Continuance Intention ($r = 0.689$);
3. MOOC Apprehension negatively correlated with MOOC Motivation ($r = -.434$, $p < .01$) and MOOC Acceptance Confirmation ($r = -.275$, $p < .01$), implying that apprehension toward technology or the MOOC environment can hinder motivation and confidence.

A strong correlation among the constructs of the Expectation-Confirmation Model—MOOC Apprehension, MOOC Openness, MOOC acceptance confirmation, MOOC motivation, and MOOC Continuance Intention with regards to learning TITAS via MOOC was confirmed in this study. Students who were open to MOOC experienced lower MOOC Apprehension (Mean = 1.77, SD = 0.65) and confirmed their positive expectations by achieving better grades, leading to higher MOOC Motivation (Mean = 2.77, SD = 0.57) and MOOC Continuance Intention (Mean = 2.74, SD = 0.49).

TITAS MOOC had been adopted for several semesters prior to this study. Action on improvement and revision on the quality of its contents and ease of use based on students' feedback have been continuously updated. This action has resulted in higher rating for all measurable variables in this study. Moreover, the demographic of participants which indicated that majority of the participants were in their second semester (236) and third semester (76). These students have taken another general study module (Ethnic relation) offered in MOOC prior to enrolling in TITAS, and hence prior learning experience in MOOC has reduced their MOOC Apprehension level. Specifically, TIMES Apprehension showed the highest correlation coefficient with MOOC Apprehension. This indicated that learners' familiarity and confidence with the use of Taylor's TIMES platform will reduce apprehension in learning TITAS via MOOC.

I. CONCLUSION

This study has confirmed that all the null hypotheses were rejected. The results of this study aligned with the proposed research framework. Students were initially open to new approach of learning TITAS via MOOC; while undertaking TITAS MOOC, their apprehension level has been reduced, associated with the increased in MOOC Openness and MOOC acceptance confirmation as they have made better grade in TITAS. In this way, their expectation of learning TITAS MOOC was consistent with the confirmation of MOOC-acceptance in positive way. With increased MOOC Motivation, students' MOOC Continuance Intention has also increased, which predicted their intentions to continue taking credit-bearing MOOCs in future.

Overall, the study reinforces that enhancing MOOC platform usability and reducing apprehension are crucial to promoting students' continued engagement in credit-bearing MOOCs. High MOOC Continuance Intention indicates that students are more likely to choose MOOCs for future learning, supporting lifelong learning habits and career adaptability.

II. SUGGESTION FOR FUTURE STUDY

Since 2024, Taylor's University has integrated HyFlex learning as a key strategy to enhance digital literacy and adapt to evolving educational needs in its business plan. This approach combines hands-on and remote learning, catering to digital-native students while promoting creativity, critical thinking, and collaboration. Generative AI is embedded within this learning approach to enrich learning experiences, such as creating avatars to simulate diverse clinical psychology cases or hospitality scenarios. By leveraging AI and hybrid mode, Taylor's enhances adaptability among students and staff, preparing them to be explorers rather than mere achievers in the digital age (The Edge Malaysia, 2025).

The same survey instrument could be adapted to study HyFlex Stickiness on modules conducted in HyFlex Learning approach such as Philosophy and Current Issues, Appreciation of Ethics & Civilization and other modules offer at Taylor's university on the relationship among the constructs, using the same framework or combined with other theoretical framework.

Future studies could also examine differences across gender, race, and semester level with regards to Continuance Intention in MOOCs and Modules conducted in HyFlex mode or compare outcomes between HyFlex and MOOC approaches to validate the findings across learning models with regards to constructs such as continuance intention, opening, motivation, apprehension and so on.

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