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Course Performance and Retention in a Massive Open Online Course: A Case Study at Universiti Teknologi MARA

Nurul Hidayana Mohd Noor

[1] Faculty of Administrative Science & Policy Studies, Universiti Teknologi MARA (UiTM), Seremban, Negeri Sembilan, Malaysia

***Corresponding author. Email:** hidayana@uitm.edu.my

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Abstract

Technological progress has influenced the Malaysian education landscape, as described and planned for in the 2015-2025 Malaysia Education Blueprint*, which significantly emphasises the use of information technology in teaching and learning. This also coincides with Education 4.0, a framework that highlights the importance of applying 21st-century skills in education. The Malaysian government has initiated using Massive Open Online Courses (MOOCs) as a new learning platform. Although MOOCs have been found to enhance teaching and improve student engagement, many studies also show that students' willingness to use MOOCs is still moderate. This study aimed to identify course performance and retention of the MOOC method as a learning medium for the Applied Research Project course (course code ADS555) at the Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA. This study also evaluated the influence of context-specific perceived value dimensions (i.e., interface, ubiquity, content, and pedagogy values) on course performance and retention. The study population involved the students enrolled in the ADS555 MOOC, of which 200 students were systematically selected as respondents. The data obtained were analysed using Structural Equation Modelling. The study results revealed that interface, ubiquity, content, and pedagogy values significantly affect course performance and retention. This study proves that using MOOCs can increase student knowledge in learning research methodology and statistics and predicts student retention in continuing to use e-learning. The research implications, limitations, and future suggestions are highlighted in the last section.*

Keywords: *interface value, ubiquity value, content value, pedagogy value, course performance, course retention*

1. Introduction

Massive Open Online Courses (MOOCs) are a series of open educational resource initiatives derived from Open Educational Resources (OERs) (Çakiroğlu et al., 2023). MOOCs were initially created by the world's top universities, such as Harvard, Cambridge, Stanford, Yale, Australian National University, King's College London, Monash University, as well as large companies such as Google, Microsoft, and Samsung. Some available platforms that offer free MOOCs include: (1) Coursera (https://www.coursera.org/), (2) Udacity (https://www.udacity.com/), (3) EDX (https://www.edx.org/), (4) Khan Academy (https://www.khanacademy.org/), (5) Udemy, (https://www.udemy.com/), and (6) Codecademy (http://www.codecademy.com/).

MOOCs were introduced in 2008; the term was coined by Dave Cormier from the University of Prince Edward Island and Bryan Alexander of the National Institute for Technology in Liberal Education (Al-

Rahmi et al., 2019). The original goal of MOOCs was to increase the level of networking between students, the community, and practitioners. This aligns with the growing concern for lifelong learning, which focuses on continuous learning and the voluntary pursuit of knowledge (Jansen et al., 2020). The Malaysian government has consistently planned to turn the country into a regional education hub and attract more international students to study locally. Therefore, implementing MOOCs was considered a valuable tool to achieve this goal (Aparicio et al., 2019). MOOCs act as a tool for international branding for universities in Malaysia and provide risk-free education to international students, who can take up a MOOC of their choice before deciding whether or not to enrol (Aparicio et al., 2019; Çakiroğlu et al., 2023).

In Malaysia, the Faculty of Engineering at the privately-run Taylor's University was the first to use MOOCs through entrepreneurship courses offered to second-year students (Albelbisi & Yusop, 2020). This was a new beginning for e-learning in Malaysia. The platform initially chosen to deliver MOOCs in Malaysia was OpenLearning, which features a forum for students to give and receive comments and further encourage learning interaction. In the context of this country, MOOCs Malaysia was launched as one of the main agendas of the Ministry of Education, described in the 2015-2025 Malaysia Education Blueprint (Albelbisi & Yusop, 2020).

MOOCs have evolved into several different iterations, including connectivist MOOCs (cMOOCs) that emphasise the social aspect of online learning and the autonomy students have in directing their own learning (Çakiroğlu et al., 2023). Educational technology creates new opportunities and affords new platforms to empower learning, change the form of knowledge delivery, and improve creativity in teaching and learning (Wong et al., 2019). A MOOC platform benefits lecturers and students (Virani et al., 2023). According to Deng et al. (2019), MOOCs enable students to interact with coursemates from various educational backgrounds. Bao (2020) explains that online courses, flexible design, and interactivity development in MOOCs contribute to the excitement surrounding its use. MOOCs also influence student-related aspects, such as achievement, motivation, interaction, and self-confidence (Albelbisi & Yusop, 2020; Deng et al., 2019). Meanwhile, Jansen et al. (2020) found that students are willing to use MOOCs as an online learning platform to improve their knowledge and skills.

Nevertheless, the use of MOOCs at Universiti Teknologi MARA (UiTM) is still new, and not all courses are currently on offer as MOOCs. Moreover, there are also difficulties in managing MOOCs. First, any technical error on a MOOC platform may affect the implementation of online teaching and learning (Xiao et al., 2019). Second, the lack of human aspects or face-to-face interaction means students have to study and work alone (Xiao et al., 2019). Traditional classroom training is also thought to be more interactive than MOOCs. As well, the absence of immediate feedback from the course instructor can affect the quality of learning (Zulkifli et al., 2020). In addition, according to Aljaraideh (2019), students need more motivation to use MOOCs because MOOCs are only implemented for specific courses (Aljaraideh, 2019). Internet access is also a challenge for instructors and students. Dridi et al. (2020) argued that Internet access is one of the main challenges instructors face when implementing online learning. Similarly, Aljaraideh (2019) stated that the gap between urban and rural Internet access is wide. Most students living in rural areas have poor Internet coverage.

Considering the above, by adapting the Customer Perceived Value (CPV) model, this study examined the influence of interface, ubiquity, content, and pedagogy values on course performance and retention. This study aimed to discuss the use of MOOCs as an advanced learning method in higher education by emphasising the essential values of MOOCs and how they could influence student performance and course retention. More research on MOOCs in Malaysia is still needed, especially those evaluating the impact of MOOCs, and this has prompted the need for further studies.

This study hoped to bridge an essential gap in MOOC literature by investigating the quality of MOOCs through the lens of the CPV model. The study developed a conceptual framework that may serve as a foundation for future research on MOOCs, for which the literature could be more relevant. Several studies have examined the benefits of enrolment in MOOCs; however, the objective evaluation of their effectiveness needs to be determined. Therefore, using course performance as an indicator, this study

could provide strong evidence for MOOC implementation performance. Objective performance measures such as course performance represent a fair method of evaluating the performance of MOOCs.

2. Literature Review

2.1. MOOCs as a Learning Method

MOOCs are an evolution in global education, and students from anywhere worldwide can sign up for any MOOC. There are several implementation aspects of learning using MOOCs. Among them are the physical characteristics of MOOCs development, methods, and course materials (Al-Rahmi et al., 2019; Aparicio et al., 2019; Jansen et al., 2020; Virani et al., 2023). The Malaysian government has consistently planned to turn the country into a regional education hub and attract more international students to study locally. Therefore, implementing MOOCs has been considered a valuable option to achieve this goal (Jansen et al., 2020). MOOCs are one of the latest learning methods in Malaysia. In 2014, the first MOOCs were developed and introduced in Malaysia under the e-learning units at selected public universities. In September of that year, the Ministry of Education released MOOCs in collaboration with four public universities (Albelbisi & Yusop, 2020): Ethnic Relations in Malaysia (Universiti Kebangsaan Malaysia, UKM), 2) Asian and Islamic Civilisation (Universiti Putra Malaysia, UPM), 3) Introduction to Entrepreneurship (UiTM), and 4) ICT Competence (Universiti Malaysia Sarawak, UNIMAS) (Albelbisi & Yusop, 2020). At the time, it was recommended that instructors took advantage of MOOCs as a new learning approach.

Malaysian MOOCs comprise three types of courses: general courses, niche courses, and lifelong learning courses. Each higher education provider can develop and offer courses in the above categories. The MOOC Working Committee, under the Ministry of Higher Education, coordinates the topics and types of courses to be offered. On average, a MOOC runs between a minimum of five weeks and a maximum of 14 weeks, and the course is usually based on a minimum of two course learning outcomes. The duration of engagement or student learning hours is 40 notional learning hours, equivalent to one credit hour. The enrolment period for each MOOC must be announced in the course introduction section (Albelbisi & Yusop, 2020).

According to Aparicio et al. (2019), MOOCs have similar characteristics to other online learning platforms. Physical features include the use of text, videos, quizzes, and assessments, as well as frequent discussions and forums. The first MOOC project in Malaysia was launched in March 2013. By 2014, five higher education institutions (i.e., UKM, UPM, UiTM, UNIMAS, and Open University Malaysia) had begun offering MOOCs. Today, the popularity of MOOCs is growing, and they were included under the ninth thrust ('Globalised Online Learning') of the 2015-2025 Malaysia Education Blueprint (Albelbisi & Yusop, 2020). Malaysian MOOCs emphasise flexible learning, outcome-based learning, focusing on achievement and student outcomes.

MOOCs are massive, which means they can accommodate many participants, yet managing and evaluating their progress takes a lot of work (Aljaraideh, 2019). In addition, it is challenging to meet the needs of each participant. Participants only follow guidelines set by a university or institution. Some criticisms or issues have been linked to MOOCs; for example, only a few participants complete MOOCs because many feel less motivated and think that MOOCs are less valuable (Annamalai, 2019). There is also a competitive shift among MOOC providers. Although MOOCs are open, they are not necessarily easy to disseminate globally because the teaching content needs to be first translated for use by people who are not native speakers of the MOOCs' medium of instruction (Aljaraideh, 2019). In addition, more research is needed, especially regarding the support system required by a university and institution (Annamalai, 2019). Public acceptance also makes it challenging to structure information for each person with their own opinions and levels of understanding (Annamalai, 2019; Zhang et al., 2019).

At UiTM, a local public university in Malaysia, MOOC development began in 2014, and within three years, 600 courses were ready as MOOCs. These were placed under 'U-Future', a platform for managing e-learning at UiTM (Sarmin et al., 2021). The four features of the UiTM MOOCs are course information,

learning materials, activities, and course evaluation. These are in line with the needs of blended learning methods as stated in the national e-learning agenda. UiTM's MOOCs are generally connected to the university's Integrated Academic System (Aziz, 2018). Students and lecturers can access MOOCs based on their list of registered courses. At the same time, lecturers can upload and update the course learning materials and information. The MOOCs can be accessed through any browser or mobile device.

The study focused on evaluating the subject of the Applied Research Project (course code ADS555). Developed in 2021 and opened for public enrolment in 2022, this MOOC is directed at inculcating research abilities related to logical research. This course comprises 10 topics, applies identifying, formulating, comprehending, and presenting an independent study, and culminates in submitting a research report and oral presentation. Thus far, the course has enrolled more than 300 participants and won the Gold Award at the 2022 Virtual International e-Content Development Competition. Students can view details and join the course at https://ufuture.uitm.edu.my/mooc/course_detail.php?course=ADS555.

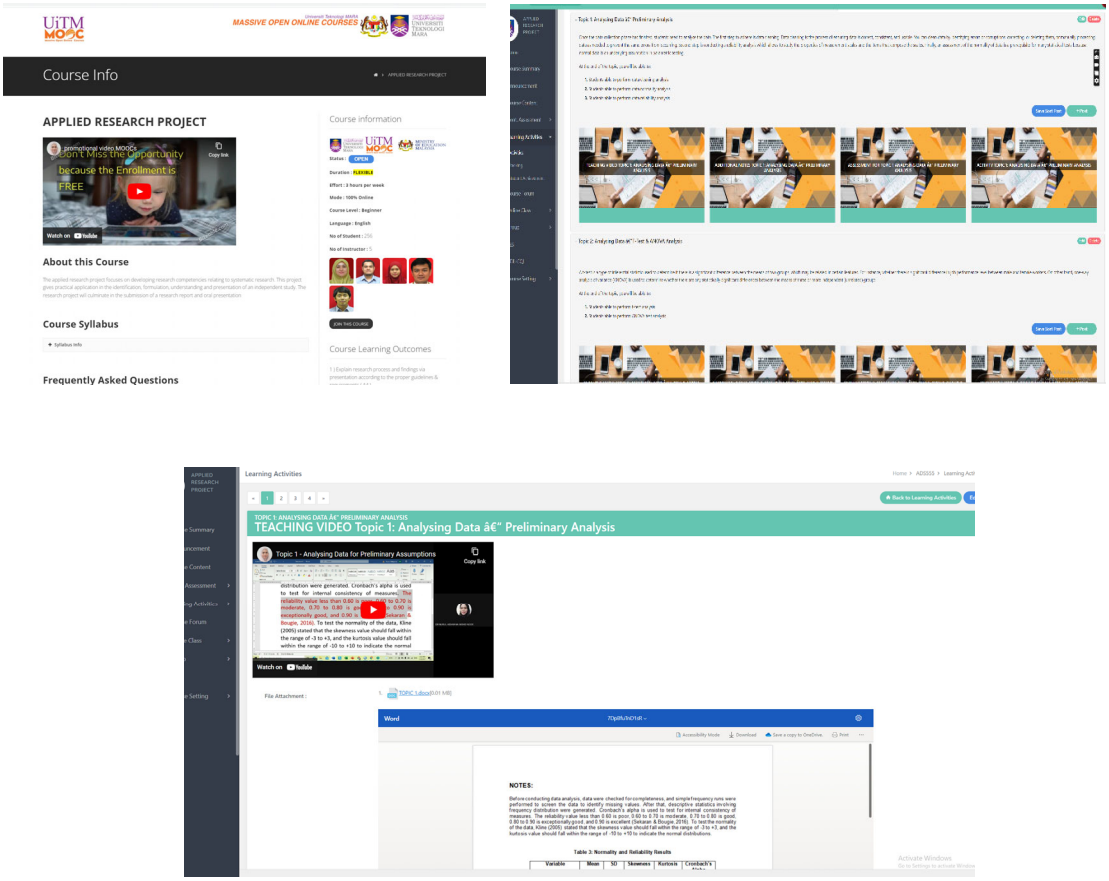

Figure 1. The MOOC interface for ADS555

2.2. Advantages of Using MOOCs

Like face-to-face classes, MOOCs require interaction, considered the most crucial element in online learning (Topali et al., 2023). Through MOOCs, students can interact with their classmates from various educational backgrounds (Al-Rahmi et al., 2021; Aziz, 2018) and share views and ideas. Students can also interact personally with course trainers and ask questions (Duan, 2022). MOOCs provide a forum and discussion space to expand interaction and network of relationships and provide a way for supportive learning (Ramirez-Asis et al., 2022). Empirical studies have reported that MOOC engagement could improve student motivation and academic performance (López Meneses, 2020; Ramirez-Asis et al., 2022). The findings provide meaningful ideas for future research. MOOCs can stimulate and enhance students'

engagement and contribution and meet students' preferences (Duan, 2022). In addition, MOOCs enable the transfer of information between lecturers and students, information which can be accessed at any time (Al-Rahmi et al., 2021; Topali et al., 2023). MOOCs also provide opportunities for distance learning students, who can register for and follow any online course (Ma & Lee, 2020).

With MOOCs, students do not need to travel to attend classes. This is one of their most significant benefits and an absolute lifeline for students who live in the countryside. This relates to MOOCs' ability to help students save time and money (Ramirez-Asis et al., 2022). In addition, MOOCs could reduce additional expenditures, such as for buying books and making copies of study materials (Stamovlasis & Tsanidis, 2023). MOOCs allow instructors to connect with their students via two-way and group discussions (Goglio & Bertolini, 2021). In an offline model, the class comprises concise bursts of information, and it is often difficult for students to remember something they have learnt. In MOOCs, students can access previous information and retrieve learning content (Kumari & Naaz, 2020). For instance, video sessions can be held live and recorded by the instructors. Students can log on to the discussion forums, and access files, supplies, and others from distributed online folders. MOOCs also allow students to note and save materials digitally. This also positively impacts the environment because use of digital resources reduces paper consumption (Guerrero et al., 2021). MOOCs afford students the opportunity to develop their potential by exploring new things through the Internet (Stamovlasis & Tsanidis, 2023).

Compared to the conservative classroom learning method, MOOCs are more suitable for millennial students. The MOOCs' delivery method combines formal and informal learning approaches (Ma & Lee, 2020). MOOC platforms also provide two-way communication: instructors will give the learning material directly, and students can ask questions and review. Using this technique, virtual learning is more delicate because instructors and learners can interact collaboratively (Kumari & Naaz, 2020). Thus, MOOCs help improve learning effectiveness (López Meneses et al., 2020). MOOCs also allow anyone with Internet access to access learning materials at minimal cost (Goglio & Bertolini, 2021; Ma & Lee, 2020). The implementation of MOOCs aims to allow unrestricted access to anyone interested in learning, without limit to the number of participating students (Duan, 2022). Past studies show that MOOCs can strengthen students' critical thinking, understanding, writing, and abilities (Goglio & Bertolini, 2021; Guerrero et al., 2021; Stamovlasis & Tsanidis, 2023). In addition, the interactive feature helps students improve teamwork skills through learning activities that require interaction among students and sophisticated technology (Ramirez-Asis et al., 2022). Staubitz and Meinel (2019) found that participants' perception of team assignments on the MOOC platform was positive, and many completed the assignments. This shows that the components in MOOCs can provide a good foundation for large-scale teamwork-based tasks.

2.3. Hypotheses and Research Objectives

Based on the above, the objectives of the study were:

1) To examine the influence of context-specific perceived value dimensions (i.e., interface, ubiquity, content, and pedagogy values) on course performance.
2) To examine the influence of context-specific perceived value dimensions (i.e., interface, ubiquity, content, and pedagogy values) on course retention.

Subsequently, this study hypothesised the following:

- Hypothesis 1: Interface value significantly influences student course performance.
- Hypothesis 2: Ubiquity value significantly influences student course performance.
- Hypothesis 3: Content value significantly influences student course performance.
- Hypothesis 4: Pedagogy value significantly influences student course performance.
- Hypothesis 5: Interface value significantly influences course retention.
- Hypothesis 6: Ubiquity value significantly influences course retention.
- Hypothesis 7: Content value significantly influences course retention.
- Hypothesis 8: Pedagogy value significantly influences course retention.

As shown in Figure 2, there are eight hypotheses that the researcher assessed in this study.

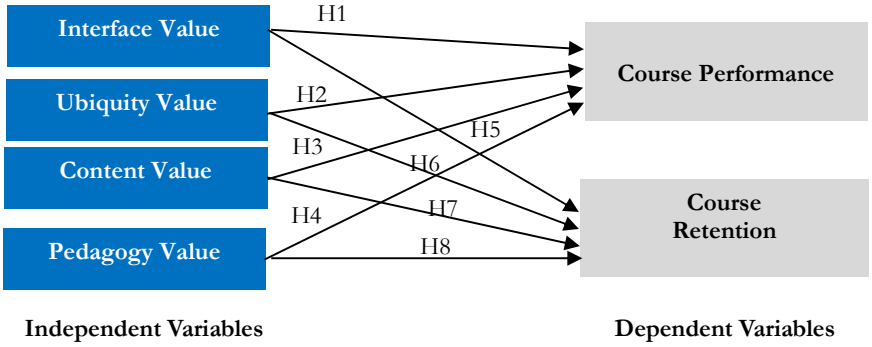

Figure 2. The proposed research model

3. Research Methodology

A descriptive survey was conducted using a questionnaire as a research tool to obtain data. A total of 200 students were selected using systematic random sampling as a probability sampling method. They were among the 300 students enrolled in the Applied Research Project course. The research instrument for measuring interface, ubiquity, content, and pedagogy values, as well as course retention was adapted from the study of Dastane and Haba (2023). On the other hand, course performance was evaluated based on scores the students obtained for the ADS555 subject. All variables were assessed using a five-point Likert measurement varying from one ('strongly disagree') to five ('strongly agree'). The survey was put through a pilot study to redefine the factors of each construct. The reliability of the questionnaire was also assumed, and the alpha value for the variables met the acceptable range. Corresponding to Nunnally (1978), the tool of a study is considered to have satisfactory internal consistency if the value of Cronbach's Alpha coefficient surpasses 0.70 (α value > 0.70). Suggestions by Kline (2023) and Hair et al. (2021) were pursued to verify data normality. The attained values for skewness and kurtosis were within ± 2 and ± 7, respectively. Therefore, the acceptable results indicate that the data were distributed normally. Table 1 summarises the instruments used in this study.

Table 1. Measurement of the Variables

Variables	Items	Skewness	Kurtosis	Cronbach's Alpha Coefficient
Pedagogy Value	The tutors teaching on this MOOC app have outstanding pedagogy.	-1.210	0.525	0.837
	The instructors will communicate the programmes on this MOOC app.			
	The technique method on this MOOC app helps grasp the subject.			
Content Value	These MOOC app videos are considerably transparent for learning.	-0.111	-0.509	0.861
	Exceptional quality academic matter is available on this MOOC app.			
	I can find the newest course subject listed in this MOOC app.			
Interface Value	It is simpler to find a course on this MOOC app.	-0.386	-0.901	0.853
	I am happy to use this MOOC app for education.			
	My knowledge of using MOOC apps has been excellent.			

Variables	Items	Skewness	Kurtosis	Cronbach's Alpha Coefficient
Ubiquity Value	I can sign up for the course on this MOOC app from anywhere.	-1.501	0.292	0.849
	I can study anytime through the MOOC app.			
	My study location can be adaptable because of the MOOC app.			
Course Performance	The score attained for the subject (ADS555)	0.012	1.222	NA
Course Retention	I will always use the MOOC app for my learning purposes.	-0.309	0.357	0.841
	I prefer to use the MOOC app for my studies all the time.			
	MOOC apps will be used in the future for knowledge possession.			

This study employed the Structural Equation Modelling (SEM) analysis method. SEM is a combination of regression and factor analyses that can solve equations with more than one dependent variable. The analysis is divided into two main steps: (1) measurement model and (2) path analysis. In SEM, several fitness indices describe the model's fit obtained from the statistics. To determine the model's fit, the values for Comparative Fit Index (CFI), Goodness Fit Index (GFI), and Tucker Lewis Index (TLI) are expected to be equal to or exceed 0.90. The values scale from 0.00 ('poor fit') to 1.00 ('perfect fit') (Hair et al., 2021). The Root Mean Square Error of Approximation (RMSEA) explains the residual found in the model. The expected RMSEA value should be equal to or lower than 0.05, which indicates a close fit, whereas if the value is between 0.05 and 0.08, the model can still be assumed as a good fit (Hair et al., 2021). The chi-square ($\chi 2/df$) value equal to or lower than three is considered acceptable (Hair et al., 2010).

4. Findings and Discussion

4.1 Demographic Profile

The respondents' demographic characteristics are summarised in Table 2. In this study, 125 (62.5%) respondents were male, and 75 (37.5%) were female. Most respondents were aged 18 to 24 years (n = 176, 88%), followed by those aged 25 to 29 years (n = 24, 12%). In terms of past MOOC user experience, four (2%) respondents reported having used them for less than a month, 23 (11.5%) respondents had used them for one to three months, 134 (67%) respondents had used them from three to six months, and 39 (19.5%) respondents had used them for more than six months. Of 200 students, 114 (57%) respondents scored an 'A' for the course. This was followed by '+A' (n = 34, 27%), '-A' (n = 26, 13%), '+B' (n = 14, 7%), 'B' (n = 10,5%), and '-B' (n = 2, 1%).

Table 2. Demographic Profile of the Respondents

No.	Profile	Frequency (n)	Percentage (%)
1	**Gender**		
	Male	125	62.5
	Female	75	37.5
2	**Age**		
	18-24 years	176	88
	25-29 years	24	12
	30 years and older	0	0
3	**Experience**		
	Less than one month	4	2
	1–3 months	23	11.5

	3–6 months	134	67
	More than six months	39	19.5
4	**Course Performance (Score)**		
	+A	34	17
	A	114	57
	-A	26	13
	+B	14	7
	B	10	5
	-B	2	1

4.2 Confirmatory Factor Analysis (CFA)

For this study, various indicators of the confirmatory model were acceptable ($\chi^2/df = 1.506$, GFI = 0.920, TLI = 0.970, CFI =0.960, and RMSEA = 0.029). Figure 3 shows the basic model using the confirmatory factor analysis (CFA).

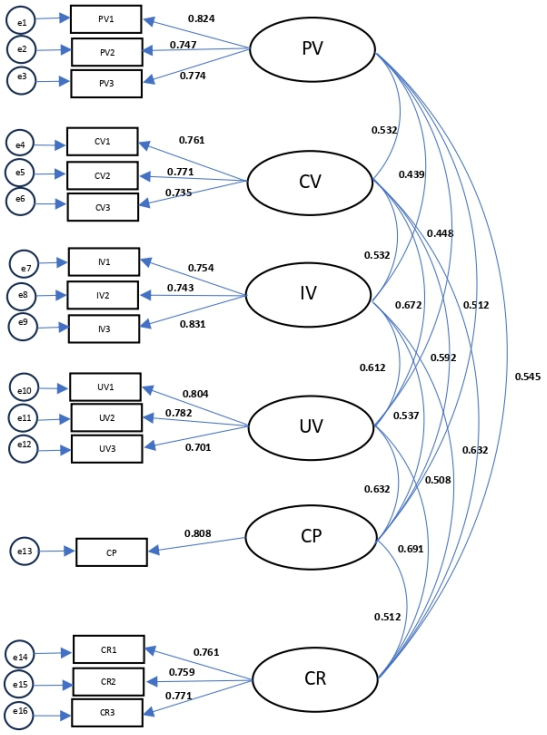

Figure 3. Confirmatory Factor Analysis (CFA)

Note. PV = Pedagogy Value, CV = Content Value, IV = Interface Value, UV = Ubiquity Value, CP = Course Performance, CR = Course Retention.

4.3 Convergent and Discriminant Validity

Cronbach's Alpha (CA), Convergent Validity, and Composite Reliability (CR) were used to measure the value validity and reliability of the study. To determine convergent validity, the researcher needed to ensure that the CR value equals or exceeds 0.6, and the Average of Variance Extracted (AVE) values are equal to or exceed 0.05 (Hair *et al.*, 2021). Table 3 describes the Factor Loading, Average Variance Extracted (AVE), CR, and CA for the study variables. Based on the figures in Table 3, the factor loading for each study item exceeded 0.60, and AVE, CR, and CA estimates were within the appropriate range

(Hair *et al.*, 2021). The study then assessed the discriminant validity by looking at the diagonal value. Agreeing with Fornell and Larcker (1981), a diagonal value is said to have discriminant validity when it is equal to or exceeds 0.85. Table 4 shows that discriminant validity was achieved as the values exceeded 0.85.

Table 3. Values of Factor Loading, AVE, CR, and CA

Variable	Items	Item Loadings	Average Variance Extracted (AVE) (≥ 0.50)	Composite Reliability (CR) (≥ 0.60)	Cronbach's Alpha α (≥ 0.70)
Pedagogy Value	PV1 PV2 PV3	0.824 0.747 0.774	0.632	0.838	0.837
Content Value	CV1 CV2 CV3	0.761 0.771 0.735	0.565	0.839	0.861
Interface Value	IV1 IV2 IV3	0.754 0.743 0.831	0.605	0.833	0.853
Ubiquity Value	UV1 UV2 UV3	0.804 0.782 0.701	0.623	0.841	0.849
Course Performance	CP1	0.808	0.610	0.881	NA
Course Retention	CR1	0.761	0.624	0.850	0.841
	CR2	0.759			
	CR3	0.771			

Table 4. Discriminant Validity

No.		1	2	3	4	5	6
1	Pedagogy Value	**0.794**					
2	Content Value	0.532	**0.751**				
3	Interface Value	0.439	0.532	**0.777**			
4	Ubiquity Value	0.448	0.672	0.612	**0.794**		
5	Course Performance	0.512	0.592	0.537	0.632	**0.781**	
6	Course Retention	0.545	0.632	0.508	0.691	0.512	**0.789**

Note. Values in the diagonal show the square root values of AVE.

4.4 Structural Model Analyses

After careful examination, Pedagogy Value ($\beta = 0.302$, $p<0.001$), Content Value ($\beta = 0.395$, $p<0.001$), Interface Value ($\beta = 0.375$, $p<0.001$), and Ubiquity Value ($\beta = 0.265$, $p<0.001$) were found to influence course performance significantly. Moreover, Pedagogy Value ($\beta = 0.362$, $p<0.001$), Content Value ($\beta = 0.575$, $p<0.001$), Interface Value ($\beta = 0.513$, $p<0.001$), and Ubiquity Value ($\beta = 0.514$, $p<0.001$) significantly influenced course retention. These results demonstrating such positive effects are derived from the design aspect, presentation, interaction, and overall evaluation of the learning activities. Combining text, animation, graphics, and audio can strengthen student knowledge and understanding. Productive MOOCs can produce interactive teaching delivery and promote meaningful learning. Figure 4 summarises the path coefficients of the research model, and Table 5 shows the hypotheses test results.

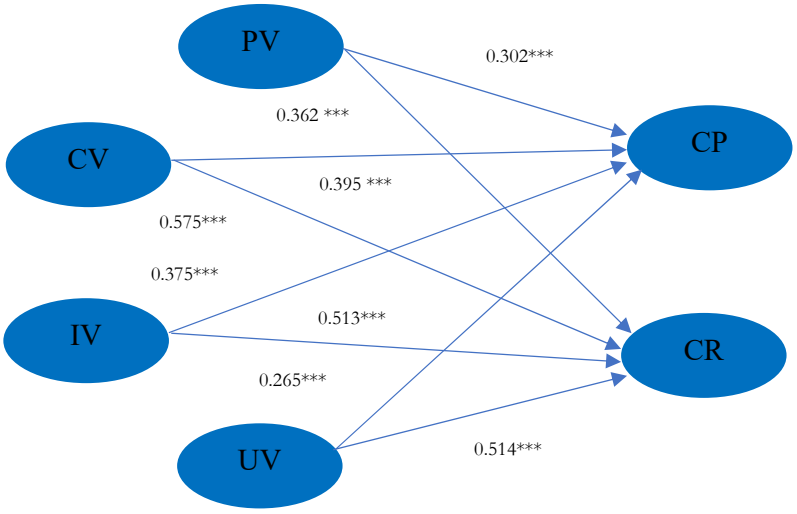

Figure 4. Path coefficients of the research model

Note. PV = Pedagogy Value, CV = Content Value, IV = Interface Value, UV = Ubiquity Value, CP = Course Performance, CR = Course Retention

Table 5. Hypotheses Test Results

Hypothesis	Path	β	*p*-value	Remarks
H1	PV → CP	0.302	***	Supported
H2	CV → CP	0.395	***	Supported
H3	IV → CP	0.375	***	Supported
H4	UV → CP	0.265	***	Supported
H5	PV → CR	0.362	***	Supported
H6	CV → CR	0.575	***	Supported
H7	IV → CR	0.513	***	Supported
H8	UV → CR	0.514	***	Supported

Note. PV = Pedagogy Value, CV = Content Value, IV = Interface Value, UV = Ubiquity Value, CP = Course Performance, CR = Course Retention

4.5 Discussion

This study sought to determine the influence of interface, ubiquity, content, and pedagogy values on course performance and retention. As described earlier, the statistics obtained were examined using the SEM. The findings revealed that interface, ubiquity, content, and pedagogy values significantly influence course performance and retention. These results prove that the adoption of MOOCs and its processes can yield a significant positive impact. MOOCs' pedagogical concepts differ from those of other online learning platforms. This can attract more people to register for and use MOOCs as a learning medium (Kumari & Naaz, 2020). MOOCs can improve students' understanding and positively affect their achievement (Guerrero et al., 2021). Using audio and video recording applications, slide presentations, and video-based content can make teaching and learning more exciting and fun and frees studying from the limitation of time (Stamovlasis & Tsanidis, 2023). MOOCs allow the transfer of information between lecturers and students at any time. They can also provide solutions for professionals and practitioners to hone additional skills and obtain information related to their profession (Staubitz & Meinel, 2019). This study concluded that the customer-perceived quality of MOOCs could also affect their effectiveness.

Course trainers need to understand the MOOC environment and enablers of its delivery fully. The content of developed learning activities must be made easy to understand and meet learning objectives (Ma & Lee, 2020). The instructors must also be able to present learning content in interactive and exciting

ways. MOOCs experts have encouraged instructors to improve audio delivery because unclear sound can disrupt the learning process. In addition, the researcher suggests that questions must be posed from lower to higher levels to encourage students' cognitive development. Learning activities need to be developed and arranged in an orderly manner. The language used in the activities must also be clear and easy to understand. Moreover, the duration of any learning video needs to be kept short to avoid causing students to feel bored, and the characteristics of the learning materials must ensure meaningful and practical learning. Appropriate display-screen design can increase students' interest (López Meneses et al., 2020); even the background colour must be appropriate. Media must be infused with elements of praise. According to education scholars, effective media displays an attractive visual presentation infused with applying pure values (Duan, 2022; Ramirez-Asis et al., 2022). Regarding motivation, experts suggest placing motivational elements either in text or verbally at the beginning of, during, or end of the video. Finally, MOOCs must be evaluated, and data analysis methods should be carefully determined to ensure that MOOC implementation meets its objectives. Examples of suitable evaluation involve exam-based, survey-based, or experimental-based studies.

5. Conclusion

Along with the rapid development in education today, various emerging technologies give educators diverse options to improve their teaching and learning processes. Educational technology also opens new opportunities to empower learning, change the form of knowledge delivery, enhance creativity in teaching and learning, and even transform the education ecosystem in Malaysia. In Malaysia, MOOCs have been offered as a collection of various courses available through a platform known as OpenLearning (Sarmin et al., 2021). Overall, MOOCs have expanded the boundaries of higher education. MOOCs are large-scale distance learning methods accessible to anyone, anywhere in the world. This study has contributed to the wealth of knowledge by giving theoretical and practical implications. This study has also offered extensive insights into MOOCs' quality considerations and how these perceived qualities could influence course retention and performance. The results will inform instructors and other stakeholders regarding what should be considered in the design of MOOCs. However, this study nonetheless had some restrictions. Firstly, this study uses a small sample size of 200 respondents. Therefore, generalising the study's results for the entire population will require greater accuracy. Future studies need to focus more on samples with more substantial sample sizes. Secondly, this study uses inquiries based on the respondents' observations for assessing course retention; future studies can benefit by acquiring data from various sources. Finally, this study only reviewed one MOOC. Therefore, the research findings may not be generalisable to other MOOC formats and designs.

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