ABAC ODI JOURNAL Vision. Action. Outcome

ISSN: 2351-0617 (print), ISSN: 2408-2058 (electronic)

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ABAC ODI JOURNAL Vision. Action. Outcome Vol 13(2) pp. 285-302

https://assumptionjournal.au.edu/index.php/odijournal

Published by the
Organization Development Institute
Graduate School of Business and Advanced Technology Management
Assumption University Thailand

ABAC ODI JOURNAL Vision. Action. Outcome
is indexed by the Thai Citation Index and ASEAN Citation Index

Influencing Factors of Postgraduates' Perceived Usefulness and Continuance Intention Towards Chinese University MOOCs: A Case Study of Chongqing University

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Received: 18 July 2025. Revised: 08 August 2025. Accepted: 29 August 2025

Abstract

This study delves into the factors affecting postgraduates' perceived usefulness (PU) and continuance intention (CI) to use Chinese University MOOCs, focusing on postgraduates from two engineering majors at Chongqing University, China. Rooted in Expectation - Confirmation Theory (ECM), S-O-R model and Technology Acceptance Model (TAM), the research examines seven variables: Perceived Ease of Use (PEU), Learning Engagement (LEN), Perceived Usefulness (PU), Satisfaction (SAT), Cognitive Presence (CP), Continuance Intention (CI) and Teaching Presence (TP). A quantitative approach was adopted, with 500 valid questionnaires collected. CFA (Confirmatory Factor Analysis) results demonstrated that the measurement model boasted high reliability and validity (AVE > 0.5, Cronbach's Alpha > 0.7). SEM (Structural Equation Modeling) analysis supported all six hypotheses, revealing significant positive relationships. The findings highlight that both system-related factors (PEU, PU) and interaction-related factors (TP, CP, LEN, SAT) are critical to sustaining postgraduates' MOOC usage.

Keywords: postgraduate, perceived usefulness, continuance intention, MOOCs, SEM, CFA.

Introduction

The expression "MOOC," which stands for Massive Open Online Course, was coined by Downes (2008). Originating as an educational concept centered on open, social, and network-based learning, it was first implemented in a course that initially targeted 25 on-campus students. However, the course unexpectedly attracted approximately 2,300 students to participate online—highlighting the unprecedented scalability of this learning model.

In China, MOOCs are pivotal in alleviating educational resource shortages and serve as a significant pedagogical tool (Huang & Qi, 2025). The government actively promotes their integration into daily teaching, with many universities offering various MOOCs. As part of higher education, students earn credits via MOOCs, yet they have lower pass rates than traditional compulsory and selective courses. MOOC mean scores are lower than selective courses but comparable to compulsory ones. Factors like learning behavior, motivation,

perceived value, environment, previous experience, and self-regulation significantly impact MOOC performance, with the learning environment (location and tools) newly identified as influential.

Chongqing University (CQU), is a key comprehensive university under China's Ministry of Education, part of the "211 Project", "985 Project" and "Double First-Class" initiatives. Covering 12 disciplines, it has 35 colleges and over 52,000 students, including 26,000 postgraduates. CQU actively promotes MOOCs. It has partnered with platforms like Chinese University MOOCs, with 16 postgraduate MOOCs launched. During the pandemic, its Graduate School offered 507 online courses, attracting 29,000+ student participations, boosting postgraduates' use of MOOCs. It also participates in "MOOCs for Western China", sharing courses like Engineering Economics to support education in western regions. The Graduate School of Chongqing University carried out online teaching relying on various online teaching platforms and teaching resources. In that semester, a total of 507 online course sessions were planned, with more than 29,000 student participations. Graduate students were an important group among the participants, which to a certain extent promoted graduate students' use of online resources such as MOOCs. This study focuses on the two postgraduate majors of Mechanical and Vehicle Engineering and Electrical Engineering at Chongqing University. Among the postgraduate majors of Chongqing University, these two majors hold a pivotal position in terms of student numbers and academic influence. Therefore, the investigation on them in this study has certain positive significance for the online education of the university itself and even that of the whole country.

The majority of these influencing factors are derived from the ECM, SOR model, and other associated theories. As a result, this research contributes to a deeper exploration of the comprehensive quality assessment within the realm of MOOCs' continuance intention. By taking into account both the external and internal driving forces behind learners' intentions to keep using MOOCs, it enables a more robust and rational analysis. This not only enriches the existing understanding of MOOCs' continuance intention but also provides a more comprehensive perspective for future studies in this area. It allows researchers to better grasp the complex interplay of various factors and develop more effective strategies to enhance learners' long - term engagement with MOOCs.

Literature Review

Perceived Usefulness

The concept of "perceived usefulness" pertains to an individual's firm belief that a particular system has the potential to elevate their performance (Davis et al., 1989). Students tend to be more receptive to MOOCs if they think these platforms can significantly contribute to their learning success (Wu & Chen, 2017). Ma (2025) proposed that perceived usefulness refers to learners' positive evaluation of the effectiveness of MOOCs in enhancing their knowledge and skills, as well as their recognition of the practical value of the platform in supporting learning objectives. It reflects the extent to which learners perceive MOOCs as

beneficial for achieving academic goals, such as improving language proficiency or mastering course content.

Hypothesis 1: Perceived usefulness has significant impact on continuance intention.

Perceived Ease of Use

Davis et al. (1989) defined perceived ease of use as the learner's mental experience, which reflects the extent of compatibility between the user and the electronic device. It reflects the user's anticipation of the simplicity and intuitiveness of operating the system, suggesting that a higher perception of ease of use implies the individual believes they can engage with the system smoothly, without having to invest a great deal of energy in mastering its functions. They further proposed that this notion is associated with how individuals assess the exertion involved in the process of using the system. This indicates that when a person deems a system easy to use, they anticipate expending minimal effort while interacting with it. Such definitions highlight the significance of this construct in understanding users' attitudes towards various systems. By considering how users perceive the ease of use, designers can better optimize systems to meet user expectations, ultimately enhancing user acceptance and adoption rates. According to Alshammari and Babu (2025), perceived ease of use measures the user's perception of the ease of using a particular technology. Specifically, it is defined as a user's impression of how easy and simple it is to interact with it.

Hypothesis 2: Perceived ease of use has significant impact on perceived usefulness.

Satisfaction

Satisfaction is a crucial construct within the Expectation-Confirmation Model (ECM). As per Bhattacherjee (2001), who drew on ECM principles, two elements influence users' intent to keep using an information system. These are: users' contentment with their past usage experiences and their anticipations regarding future use post - adoption. Satisfaction in the context of this study refers to learners' overall evaluation of their experience with MOOC platforms, which is influenced by factors such as cognitive load, expectation confirmation, and perceived usefulness. It reflects learners' positive or negative feelings toward the MOOC learning process, including their contentment with course design, learning outcomes, and platform performance (Ma, 2025).

Hypothesis 3: Satisfaction exerts a substantial influence on continuance intention.

Learning Engagement

In e-learning contexts, Blasco-Arcas et al. (2013) observed that engagement embodies learners' emotional involvement, which can be either enhanced or diminished by their exchanges with peers and instructors. Meanwhile, Reschly and Christenson (2022) framed engagement as a type of learning motivation, wherein learners dedicate time and energy to their studies with the aim of reaching their intended educational goals. Jiang and Peng (2025) defined learning engagement as the extent of a student's active involvement in a learning activity and it is characterized as energized, directed, and sustained actions. Additionally,

"online task engagement" is specifically used to describe participation in online learning tasks (e.g., videos watched, assignments submitted, posts written) as measured by tracking data from learning management system.

Hypothesis 4: Learning engagement has significant impact on continuance intention.

Cognitive Presence

Kanuka and Garrison (2004) introduced cognitive presence as the ability of individuals to construct meaning through sustained communication. They highlighted its crucial role in fostering critical thinking and advanced learning. It encompasses the psychological processes through which learners engage in critical thinking, explore new concepts, resolve content-related questions, and construct meaning through reflection and dialogue. Specifically, it involves activities such as developing explanations or solutions, utilizing diverse information sources, and enhancing understanding of basic concepts through reflection on course content and discussions (Putra et al., 2025).

Hypothesis 5: Cognitive Presence has significant impact on continuance intention.

Teaching Presence

Shea et al. (2006) emphasized that creating and maintaining a community of inquiry necessitates a teaching presence that is thoughtful, committed, and meticulous. Their research highlighted the crucial role of educators in fostering an environment conducive to intellectual exploration and collaborative learning.

Building on this idea, Akyol and Garrison (2008) put forward the view that teaching presence functions as an effective instructional approach throughout the learning journey. They put forward the idea that when educators actively manifest their teaching presence, it has the potential to exert a beneficial influence on students' learning encounters and results. Such active demonstration of teaching presence can involve various aspects, like being readily accessible for guidance, providing timely feedback, and actively facilitating classroom discussions. These actions can create a more conducive learning atmosphere, which in turn can enhance students' understanding of the subject matter, boost their motivation, and ultimately lead to more favorable academic outcomes.

Law et al. (2019) further contended that it is precisely the teachers' teaching presence that bolsters learners' cognitive and social presence. This indicates that a strong teaching presence not only enriches students' understanding and knowledge acquisition but also enhances their sense of connection and interaction within the learning community. Overall, these studies consistently affirm the significance of teaching presence in diverse educational contexts and its far - reaching influence on the learning process.

Hypothesis 6: Teaching Presence has significant impact on continuance intention.

Continuance Intention

Joo et al. (2018) defined a certain term as the eagerness of individuals to keep participating in a course. When students possess a strong inclination to keep using a platform,

they become motivated to utilize it and are more prone to persevere with their studies. This means that it reflects the conscious decisions people make regarding their engagement with MOOCs. Such definitions are crucial as they help in clearly understanding the concept of users' attitudes and decisions towards MOOCs. They form the basis for further research into why students choose to use or discontinue using MOOCs, and how platforms can be designed or improved to better meet users' needs and expectations.

Technology Acceptance Model (TAM)

Proposed by Davis et al. (1989), the Technology Acceptance Model (TAM) is rooted in the Theory of Reasoned Action (TRA) and focuses on users' perceptions of technology to explain and predict their acceptance and usage. It identifies two key constructs: perceived usefulness (the belief that technology enhances performance) and perceived ease of use (the belief that technology is free of effort). Both constructs are influenced by external variables, including system design, user characteristics, task complexity, policies, and organizational structures. TAM has been widely applied in fields like education (e.g., evaluating online teaching platforms) and business (e.g., assessing enterprise resource planning systems) to improve user acceptance by aligning technology with user needs (Davis et al., 1989).

Stimulus-Organism-Response (S-O-R) Model

Developed by Mehrabian and Russell (1974) in environmental psychology, the S-O-R model describes how external stimulus (S) trigger internal psychological Organism (O), which in turn drive behavioral responses (R). It rejects direct stimulus-response relationships, emphasizing that external influences must be processed through cognitive and emotional states to produce behavior. Originally applied to study physical environments (e.g., retail spaces), it has expanded to fields like marketing (analyzing consumer responses to advertising) and information systems (exploring user behavior on digital platforms). In MOOCs, stimuli include gamification, social interactions, and platform features; the organism encompasses cognitive, affective, and motivational states; and responses involve engagement behaviors (e.g., participation) and continuance intentions.

Expectation-Confirmation Theory (ECM)

Initially proposed by Oliver (1980) and extended by Bhattacherjee (2001), the Expectation-Confirmation Model (ECM) explains post-purchase satisfaction and continuance behavior through components: expectations (pre-use beliefs), perceived performance (post-use evaluation), confirmation (comparison of expectations and performance), satisfaction, and loyalty. It has been adapted to information systems and e-learning, such as studying students' use of electronic textbooks(Stone & Baker-Eveleth, 2013) and mobile messaging. In MOOC research, ECM explains continuance intentions, with factors like perceived usefulness, confirmation, and satisfaction influencing sustained engagement (Alraimi et al., 2015).

Research Methods and Materials

Research Framework

This research's conceptual framework was grounded in a synthesis of multiple theoretical frameworks. It drew on the Technology Acceptance Model (TAM), initially formulated by Davis et al. (1989). This model focuses on users' acceptance of new technologies based on perceived usefulness and ease of use. It identifies two key constructs: perceived usefulness (PU) and perceived ease of use (PEU).

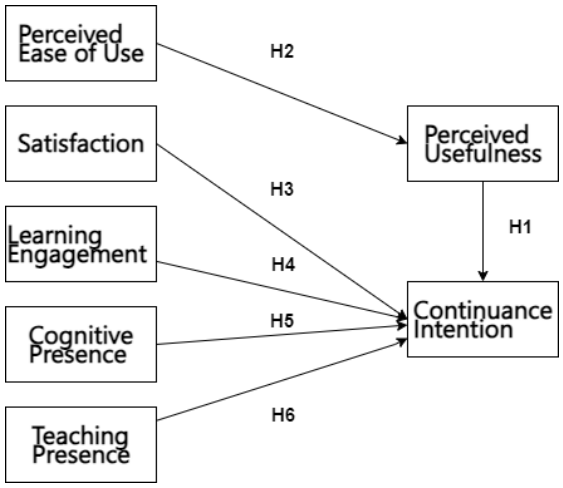
Additionally, it incorporated the Stimulus-Organism-Response (S-O-R) model proposed by Mehrabian and Russell (1974). This model posits that environmental stimuli influence an organism's internal state, which then leads to a response, and is useful for understanding user reactions in various contexts. It emphasizes that external influences must be processed through cognitive and emotional states (CP; TP; LEN) to produce behavior.

Also included was the Expectation-Confirmation Theory (ECM) that Bhattacherjee (2001) extended, which helps explain post-adoption behavior. ECM explains post-purchase satisfaction (SAT) and continuance behavior (CI) through components: expectations, perceived performance, confirmation, satisfaction, and loyalty.

By taking these theoretical building blocks and adapting them to the specific context of this investigation, researchers crafted a one-of-a-kind conceptual framework. The detailed layout of this framework is presented visually in Figure 1, capturing how these diverse theories interrelate to guide the study's analysis.

Figure 1

Conceptual framework



Note: Created by the author

The aim of this study is to explore the critical factors of Chinese University MOOCs that significantly influence postgraduate students' perceived usefulness (PU) and continuance intention (CI) to use such platforms in Chongqing, China. The variables examined in this paper include: Learning Engagement (LEN), Cognitive Presence (CP), Satisfaction (SAT), Perceived Ease of Use (PEU), and Teaching Presence (TP).

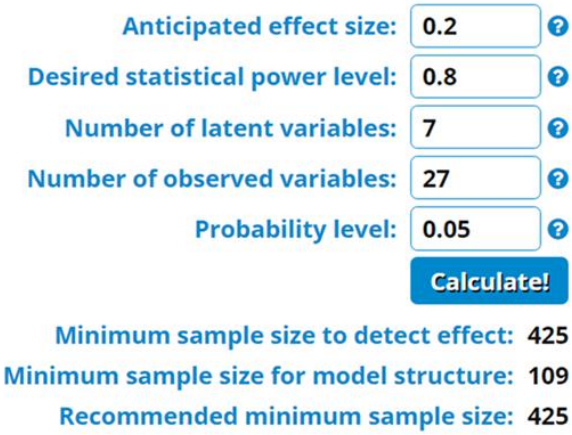
Research Methodology

This study employed a descriptive research approach, designing a questionnaire to carry out quantitative research on the factors affecting postgraduate students' continuance intention and perceived usefulness to use Chinese University MOOCs in Chongqing, China. The questionnaire comprises three sections: screening questions; a 5-point Likert scale (1 = "strongly disagree" to 5 = "strongly agree") assessing seven variables to test six hypotheses; and demographic items (gender, age, grade, etc.). Before wide distribution, the research carried out a preliminary trial involving 50 individuals., and the questionnaire met the passing standard in expert evaluation of the Item-Objective Consistency Index (IOC).

According to the calculation results in Figure 2, this study involved 27 questions with seven variables, and the expected effect size was set to be 0.2 in the structural equation modeling software. 425 questionnaires should be distributed at least in this study. However, because the minimum sample of the model mechanism is 100. Therefore, the researcher will distribute 500 questionnaires to collect the data.

Figure 2

Sample Size Calculator for Structural Equation Models



Note: Soper, D. (2006). Calculator: A-priori Sample Size for Structural Equation Models. Daniel Soper. https://www.danielsoper.com/statcalc/calculator.aspx?id=89

All questionnaires in this study will be distributed to students at Chongqing University. To ensure the authenticity of respondents' identities, only those postgraduates who have had at least one semester of experience using MOOC platforms will be included. Meanwhile, in

consideration of data reliability and validity, each participant is required to complete only one questionnaire, with verification through their student ID numbers. The research subjects are postgraduate students from the College of Mechanical and Vehicle Engineering at Chongqing University.

First, an online questionnaire was created via WeChat (a Chinese application), distributed to the selected population, and the collected data were used to establish a database. Subsequently, the response rate for each item in the questionnaire was calculated. The data gathered from the questionnaires passed validity and reliability tests using the Cronbach's Alpha method.

The collected data were transferred into SPSS and analyzed with SPSS AMOS. To assess convergent validity and reliability, the research conducted Confirmatory Factor Analysis (CFA). This step was essential to ensure the appropriateness of the conceptual framework and the robustness of the model, verifying that the variables measured as intended and the overall structure was sound.

Subsequently, the research employed Structural Equation Modelling (SEM) to explore causal relationships among variables. Through SEM, it could evaluate how different factors interacted, which was crucial for validating research hypotheses and deriving meaningful conclusions.

Population and Sample Size

The Mechanical and Vehicle Engineering as well as the Electrical Engineering at Chongqing University both hold important positions among the university's graduate programs and have high academic influence, as both of them are selected into the "Double First - class" discipline program. In addition, the scale of graduate students in - reading in these two disciplines is close to a quarter of the total, which makes them quite representative as samples for this study.

Using non-probability methods, the study selected postgraduate students from Chongqing University, China, and distributed questionnaires via an online platform. In the course of this study, 531 questionnaires were disseminated among the designated target population, with 500 valid responses collected. The proportional sample size allocated to each major was determined based on the population size of the two majors and the size of each group, aiming to ensure the collection of 500 valid questionnaires. Specifically, 348 valid questionnaires were ultimately received from postgraduates majoring in Mechanical and Vehicle Engineering, and 152 from those majoring in Electrical Engineering.

Sampling Strategy

Depending on this research goal and the study, when designing the sampling procedure, the author adopted multistage sampling including Purposive Sampling, Stratification Random Sampling, as well as Purposive and Convenient Sampling for this study. The researcher calculated the sample size proportion for each university. This calculation was based on two key factors: the enrollment numbers of the two relevant majors at each institution and the total

number of 500 questionnaires available for distribution.

To be specific, there are 348 questionnaires sent to postgraduate students whose major is Mechanical and Vehicle Engineering. Researcher distributed the rest 152 questionnaires to the postgraduate students majoring in the Electrical Engineering accordingly. Subsequently, questionnaires were disseminated to students from each major, in accordance with the sample proportions tabulated as follows.

Table 1

Sample Unit and Sample Size

Major Name	Population Size	Proportional Sample Size
Mechanical and Vehicle Engineering	2016	348
Electrical Engineering	804	152
Total	2820	500

Note: Created by the Author

Results and Discussion

Demographic Information

Among the participants, 118 were female (23.6%) and 382 were male (76.4%). In terms of MOOC usage experience, 187 postgraduates (37.4%) had studied on Chinese University MOOCs for at least one semester, while 313 (62.6%) had done so for two semesters or more. Detailed demographic data is provided in Table 2.

Table 2

Demographic Information

Demographic and General Data (N=500)	Frequency	Percentage
Student Status: postgraduate	500	100%
female	118	23.6%
male	382	76.4%
Chinese University MOOC Experience:(One semester)	187	37.4%
Chinese University MOOC Experience:(Two or above)	313	62.6%

Note: Created by the Author

Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) was carried out to assess the seven variables within our conceptual framework. The results of this analysis determined significant scale items for each variable. Alongside, we observed satisfactory factor loadings, which together confirmed that the model fits well.

As can be seen in Table 3, all the fit indices either reached or exceeded the acceptable criteria. This demonstrates that the structural equation model (or the relevant statistical model) being evaluated has an outstanding alignment with the data. These metrics suggest that the

model effectively captures the inter - relationships between the variables within the dataset. They indicate that the model has been successful in mirroring how different variables interact and influence one another. In essence, the model is a reliable depiction of the real - world connections among these variables, enabling a more accurate interpretation of the data and facilitating valid inferences and analyses.

Table 3

GoF for CFA

Fit Index	Acceptable Criteria	Values
CMIN/df	< 3.00 (Hair et al., 2013)	1.097
GFI	⩾ 0.85 (Kline, 2016)	0.953
AGFI	⩾ 0.80 (Sica & Ghisi, 2007)	0.942
NFI	⩾ 0.80 (Hu & Bentler, 1999)	0.952
CFI	⩾ 0.80 (Bentler, 1990)	0.995
TLI	⩾ 0.80 (Sica & Ghisi, 2007)	0.995
RMSEA	< 0.08 (Pedroso et al., 2016)	0.014

Note: Created by the Author

Table 4 data reveals that every variable exhibits sound internal consistency reliability, with all Cronbach's Alpha coefficients surpassing the 0.7 threshold. The factor loadings for most variables are also within acceptable ranges, suggesting that the items in each scale are appropriately related to the constructs they are meant to measure. All variables boast high Composite Reliability scores, a clear sign of strong convergent validity. What's more, each variable's Average Variance Extracted (AVE) exceeds the 0.5 benchmark, further validating the constructs in terms of the variance they explain in their respective indicators.

Table 4

CFA Result, Composite Reliability, and Average Variance Extracted

Variables	Source of Questionnaire (Measurement Indicator)	No. of Item	Cronbach's Alpha	Factors Loading	CR	AVE
Perceived Usefulness (PU)	Davis et al. (1989)	4	0.847	0.750-0.786	0.847	0.581
Satisfaction (SAT)	Bhattacherjee (2001)	4	0.848	0.748-0.777	0.848	0.582
Learning Engagement (LEN)	Rappaport (2007)	4	0.858	0.726-0.802	0.858	0.603
Continuance Intention (CI)	Joo et al. (2018)	4	0.861	0.677-0.812	0.838	0.564
Perceived Ease of Use (PEU)	Davis et al. (1989)	3	0.818	0.748-0.793	0.818	0.600
Cognitive Presence (CP)	Kanuka and Garrison (2004)	4	0.858	0.763-0.795	0.858	0.603
Teaching Presence (TP)	Shea et al. (2006)	4	0.869	0.772-0.796	0.869	0.625

Note: Created by the Author

Table 5 reveals that, for every variable examined, the square root of its Average Variance Extracted (AVE) surpasses the correlation values it shares with other variables. This result underscores the uniqueness of each construct, serving as evidence that all constructs within this research exhibit strong discriminant validity. This characteristic is essential to confirm that the constructs being measured are discrete and do not inappropriately overlap.

Table 5

Discriminant Validity

Variable	PU	SAT	LEN	CI	PEU	CP	TP
PU	0.762						
SAT	0.374	0.763					
LEN	0.364	0.403	0.777				
CI	0.368	0.365	0.395	0.751			
PEU	0.303	0.271	0.322	0.362	0.775		
CP	0.359	0.356	0.430	0.379	0.358	0.777	
TP	0.420	0.404	0.386	0.391	0.318	0.433	0.791

Note: Created by the Author

Structural Equation Model (SEM)

In this study, structural equation modeling (SEM) was performed using SPSS AMOS, with iterative refinements made to the model, yielding fit indices that indicated a favorable model fit: CFI = 0.904, CMIN/df = 2.956, NFI = 0.863, GFI = 0.852, AGFI = 0.824, TLI = 0.895, and RMSEA = 0.063. These values are detailed in Table 6.

Table 6

GoF for SEM

Fit Index	Acceptable Criteria	Values
CMIN/df	< 3.00 (Hair et al., 2013)	2.956
GFI	⩾ 0.85 (Kline, 2016)	0.852
AGFI	⩾ 0.80 (Sica & Ghisi, 2007)	0.824
NFI	⩾ 0.80 (Hu & Bentler, 1999)	0.863
CFI	⩾ 0.80 (Bentler, 1990)	0.904
TLI	⩾ 0.80 (Sica & Ghisi, 2007)	0.895
RMSEA	< 0.08 (Pedroso et al., 2016)	0.063

Note: Created by the Author

Hypothesis Testing Results

Hypothesis testing outcomes are detailed in Table 7, with all six hypotheses in the structural model validated. Standardized path coefficients reflect both the strength and direction of inter-variable relationships, while each hypothesis demonstrates notably high t-values and significance levels (marked by "***", indicating $p < 0.001$). This confirms the statistical significance of the relationships posited in the structural model, revealing that these

variables exert a non-random, tangible impact on Continuance Intention and Perceived Usefulness—aligning with the model's core claims.

Table 7

Hypothesis Result of the SEM

Hypotheses	Paths	Standardized Path Coefficients (β)	S.E.	T-Value	Tests Result
H1	CI<---PU	0.170	0.044	3.377***	Supported
H2	PU<---PEU	0.458	0.055	8.125***	Supported
H3	CI<---SAT	0.168	0.045	3.330***	Supported
H4	CI<---LEN	0.235	0.040	4.605***	Supported
H5	CI<---CP	0.174	0.044	3.477***	Supported
H6	CI<---TP	0.167	0.041	3.372***	Supported

Note: *** p<0.001, ** p<0.01, * p<0.05, Created by the Author

Table 7 shows that all six hypotheses were supported. Specifically, the structural path coefficients revealed:

H1:PU → CI, coefficient = 0.170

H2:PEU → PU, coefficient = 0.458

H3:SAT → CI, coefficient = 0.168

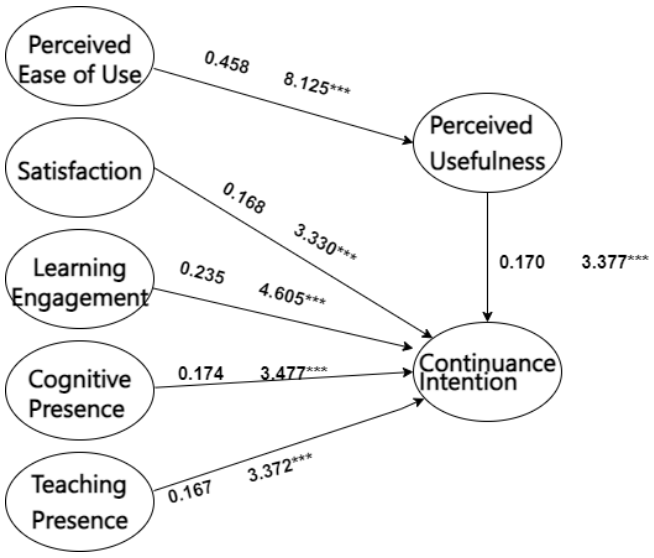
H4:LEN → CI, coefficient = 0.235

H5:CP → CI, coefficient = 0.174

H6:TP → CI, coefficient = 0.167

Figure 3

Path Diagram Analysis



Note: Created by the Author

Each variable serves as a crucial determinant of its corresponding outcome. The findings validate that every hypothesized variable significantly drives its respective outcome. Specifically, Perceived Ease of Use (PEU) has the most substantial impact on Perceived Usefulness (PU), while Learning Engagement (LEN) exerts the greatest direct influence on Continuance Intention (CI).

The SEM results confirmed all six hypotheses, revealing nuanced relationships between system-related and interaction-based factors in shaping postgraduates' continuance intention (CI) toward MOOCs. Notably, Perceived Ease of Use (PEU) exerted the strongest influence on Perceived Usefulness (PU) ($\beta = 0.458$), aligning with TAM's core assertion that ease of use precedes and enhances perceived utility (Davis et al., 1989). This finding underscores that postgraduates—who often balance rigorous academic research with MOOC learning—prioritize platforms that minimize technical friction. A streamlined interface reduces cognitive load, allowing them to focus on content absorption rather than navigating tools, thereby reinforcing their perception of MOOCs as valuable.

For CI, Learning Engagement (LEN) emerged as the most impactful predictor ($\beta = 0.235$), supporting Reschly and Christenson's (2022) view that sustained involvement drives behavioral persistence. This is particularly salient for engineering postgraduates, whose MOOC usage is often tied to specialized skill development; interactive elements (e.g., project-based tasks, peer discussions) foster deeper content mastery and emotional investment, motivating continued participation.

Cognitive Presence (CP) ($\beta = 0.174$) and Teaching Presence (TP) ($\beta = 0.167$) also significantly influenced CI, echoing the Community of Inquiry framework (Garrison et al., 2000). CP's role highlights that postgraduates value opportunities to construct knowledge through critical dialogue—essential for advanced engineering coursework—while TP emphasizes the need for instructors to provide structured guidance, such as clarifying complex concepts or aligning MOOC content with research goals.

Perceived Usefulness (PU) ($\beta = 0.170$) and Satisfaction (SAT) ($\beta = 0.168$) demonstrated moderate but significant effects on CI. This confirms that MOOCs must deliver tangible academic benefits (e.g., complementing thesis research, updating technical skills) and meet user expectations to retain postgraduates. For instance, courses mapped to "Double First-Class" discipline requirements at Chongqing University are more likely to be perceived as useful, directly boosting continuance intention.

Conclusions and Recommendations

Conclusions

This research explored the factors that shape postgraduate students' perceived usefulness (PU) and their intention to keep using (CI) Chinese University MOOCs, with a specific focus on postgraduates from two majors at Chongqing University. Adopting a quantitative methodology, it collected 500 valid responses and integrated the three models to analyze seven variables.

Confirmatory Factor Analysis (CFA) validated the strong reliability and validity of the measurement model. All Cronbach's Alpha values went beyond 0.7, Composite Reliability (CR) values signaled solid internal consistency, and Average Variance Extracted (AVE) values were above 0.5. Discriminant validity was also confirmed, as the square root of each construct's AVE was greater than its correlations with other variables.

The results of Structural Equation Modeling (SEM) lent support to all six hypotheses. Perceived Ease of Use (PEU) had the most significant impact on Perceived Usefulness (PU) ($\beta = 0.458$), which shows that an easy-to-use interface directly boosts students' sense of MOOCs' value. When it comes to Continuance Intention (CI), Learning Engagement (LEN) had the strongest direct effect ($\beta = 0.235$), followed by Perceived Usefulness (PU) ($\beta = 0.170$), Teaching Presence (TP) ($\beta = 0.167$), Cognitive Presence (CP) ($\beta = 0.174$), and Satisfaction (SAT) ($\beta = 0.168$). These results indicate that both system-related elements (PEU, PU) and interaction-based factors (LEN, CP, TP, SAT) are crucial in maintaining postgraduates' use of MOOCs.

Recommendations

Drawing on the study's findings, a set of recommendations has been formulated to enhance postgraduates' sustained willingness to participate in MOOCs provided by Chinese universities.

Optimize Platform Usability Based on PEU-PU Dynamics: Given PEU's strong impact on PU ($\beta = 0.458$), developers should prioritize intuitive design tailored to engineering postgraduates. For example, integrating one-click access to course materials relevant to mechanical or electrical engineering curricula (e.g., finite element analysis tutorials) and ensuring compatibility with research software (e.g., MATLAB) would reduce operational effort. Simplified navigation between lecture videos, simulation datasets, and assessment tools can further enhance perceived usefulness.

Amplify Learning Engagement Through Discipline-Specific Activities: LEN's dominant role in CI ($\beta = 0.235$) necessitates interactive, engineering-focused tasks. Instructors could design collaborative projects (e.g., troubleshooting mechanical system simulations via MOOC forums) or gamified quizzes on electrical circuit design, aligning with the hands-on nature of engineering education. Real-time feedback on these activities—linked to LEN—would reinforce sustained participation.

Strengthen Teaching and Cognitive Presence for Advanced Learning: To leverage TP's ($\beta = 0.167$) and CP's ($\beta = 0.174$) effects, instructors should explicitly connect MOOC content to postgraduate research. For example, TP could be enhanced by scheduling live Q&A sessions on applying MOOC-derived theories (e.g., control systems) to thesis work, while CP could be fostered through guided debates on emerging engineering trends (e.g., renewable energy technologies), encouraging knowledge co-construction.

Tailor Content to Enhance Perceived Usefulness and Satisfaction: Given PU's ($\beta = 0.170$) and SAT's ($\beta = 0.168$) influence, MOOCs should emphasize practical utility for engineering postgraduates. This includes featuring case studies from Chongqing University's "Double First-Class" disciplines (e.g., automotive engineering innovations) and offering certificates recognized in thesis or job applications. Regular surveys to address dissatisfaction—such as outdated technical content—would further solidify CI.

By addressing these areas, educators and platform administrators can create a more engaging, effective MOOC environment tailored to postgraduate needs, promoting sustained participation and improving learning outcomes.

Limitations

Like any research endeavor, this study has certain constraints that merit consideration. Regarding the research subjects, the sample was confined solely to postgraduate students from Chongqing University, leading to a rather homogeneous sample source. This could undermine the generalizability of the findings and hinder an accurate portrayal of how university students from other institutions across China utilize Chinese University MOOCs. Furthermore, the research was restricted to students specializing in engineering, with no inclusion of those from other academic disciplines. Given that students of different majors are likely to have varying needs and experiences when using MOOCs, this also somewhat compromises the comprehensiveness of the research outcomes.

Further Exploration

To address the limitations of the current study and enhance its global relevance, future research should expand its scope by incorporating comparative analyses with international MOOC platforms such as edX and Coursera, drawing on insights from global MOOC literature.

First, cross-platform comparisons could explore how the influencing factors identified in this study—such as Perceived Ease of Use (PEU), Learning Engagement (LEN), and Teaching Presence (TP)—manifest differently in Chinese versus international contexts. For instance, edX's emphasis on collaborative learning tools (e.g., discussion boards with real-time translation) and Coursera's integration of industry partnerships (e.g., certification pathways with tech firms) might shape postgraduates' continuance intention through distinct mechanisms (Kizilcec et al., 2017; Reich, 2020). Investigating whether PEU exerts a similarly strong impact on Perceived Usefulness (PU) across platforms, or if cultural differences in learning

preferences (e.g., reliance on instructor-led guidance vs. self-directed exploration) alter the salience of Teaching Presence, could reveal context-specific patterns.

Second, global literature highlights the role of scalability and accessibility in MOOC adoption (Breslow et al., 2013), which could be integrated into future models. For example, comparing how Chongqing University's MOOCs, designed for a specific institutional context, perform against edX's open-access courses in terms of sustaining postgraduates' engagement might illuminate the influence of platform governance (institutional vs. consortial) on Continuance Intention (CI). Additionally, research on international platforms' use of adaptive learning algorithms (e.g., Coursera's personalized course recommendations) could inform whether such technological features moderate the relationship between Learning Engagement and CI—an aspect unexamined in the current study.

Third, exploring cross-cultural variations in user expectations would enrich the understanding of MOOC continuance. Studies on edX and Coursera note that Western learners often prioritize flexibility and skill applicability (Hew & Cheung, 2014), whereas Chinese postgraduates in this study showed strong sensitivity to institutional alignment (e.g., credit recognition). Future research could quantify these differences, examining whether constructs like Cognitive Presence (CP) are more strongly tied to academic performance in Chinese MOOCs or to professional development in international platforms.

Finally, incorporating global datasets would enhance generalizability. For example, co mparing the impact of Satisfaction (SAT) on CI among Chinese postgraduates and learners fro m diverse regions using Coursera (e.g., in Europe or Southeast Asia) could reveal whether sati sfaction mechanisms are universally applicable or context-bound (Alraimi et al., 2015). Such comparisons would position the findings within a broader global discourse, bridging gaps bet ween Chinese and international MOOC research.

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