Issues in Information Systems
Volume 26, Issue3, pp. 302-318, 2025

DOI: https://doi.org/10.48009/3_iis_2025_2025_124

Expanded expectation-confirmation model using tangible and intangible benefits of MOOCs: The case of Peru

Marcelo Briceño-Egúsquiza, *Universidad del Pacífico, me.bricenoe@alum.up.edu.pe*
Michelle Rodríguez-Serra, *Universidad del Pacífico, rodriguez_m@up.edu.pe*

Abstract

Driven by significant technological advancements in education, Massive Open Online Course (MOOC) platforms have become a global phenomenon. However, while the worldwide average for internet usage devoted to educational purposes is high, there are specific regions and countries where the population does not utilize the internet for educational purposes despite having internet access. This gap has left students in higher education who have not engaged with MOOCs at a disadvantage in their professional development, with fewer opportunities than those who participate in these online courses. Thus, it is essential to understand the factors motivating continuous engagement with MOOCs among undergraduate students and recent graduates. Using an adapted version of the expanded Expectation-Confirmation Model (ECM), this research develops a benefits-confirmation model to examine factors influencing the intention to continue using MOOCs. A total of 213 responses were collected through an online survey, and structural equation modeling was used for analysis. The findings demonstrated a significant influence of perceived tangible benefits on the intention to continue using MOOCs, and most hypotheses related to ECM were supported.

Keywords: expectation-confirmation model (ECM), continuance intention of use, MOOCs, perceived benefits

Introduction

In recent years, the education system has experienced significant transformations in teaching and learning practices, primarily driven by the digital transformation of the educational environment and the rise of technological innovations (Nurović & Poturak, 2021). These developments have facilitated more effective learning experiences by offering flexible resources that adapt to the diverse learning styles of individual students (Huang et al., 2020). Massive Open Online Courses (MOOCs) have emerged as a prominent educational advancement among these innovations. MOOCs are defined as online courses that enable extensive enrollment, providing a model of higher education that is accessible and inclusive in contrast to the traditional, face-to-face educational system (Malik & Hooda, 2023; Papadakis, 2023). The popularity of MOOCs has grown substantially, with platforms such as Coursera, edX, and Khan Academy seeing exponential increases in enrollment. For example, in 2011, the first three courses offered by Stanford University attracted over 300,000 participants, marking the inception of the MOOC movement. By 2021, these platforms had amassed over 220 million learners globally, excluding China (Class Central, 2021).

The rapid expansion of online learning platforms, particularly MOOCs, can be attributed to their capacity to eliminate barriers to accessing higher education. These platforms enable students to learn from any

location and at their own pace, without the constraints of a fixed schedule. Furthermore, many of these courses are free, enhancing their accessibility and appeal across diverse socioeconomic backgrounds (Du, 2020; Kaplan & Haenlein, 2016). In addition to the general advantages of MOOCs, prior research has identified two distinct categories of perceived benefits that support the educational and professional development of users, particularly those who are simultaneously enrolled in traditional higher education institutions, such as universities (AlMunifi & Aleryani, 2023). Professionally, MOOCs offer tangible benefits, including the opportunity to secure a first job, transition into new career paths, receive incentives, and earn promotions (Castaño-Muñoz & Rodrigues, 2021). Academically, these courses provide intangible benefits, such as acquiring additional knowledge, enhanced academic competencies, and reinforcing and developing new skills (Jia et al., 2019).

While the use of MOOCs offers numerous benefits, higher education students without access to this educational technology face disadvantages in both learning and professional opportunities, such as less reinforcement of theory and limited practical skills, particularly in regions where Internet use for educational content is limited (AlMunifi & Aleryani, 2023; Castaño-Muñoz & Rodrigues, 2021). Globally, 38.1% of Internet use is dedicated to education platforms like MOOCs (Statista, 2024a), with the highest participation in North America and Europe. In contrast, Latin America has lower ICT usage for education (Gameel & Wilkins, 2019) Although countries like Brazil and Colombia exceed 30% of Internet use for educational purposes, approaching the global average (Statista, 2024a). Peru, however, shows a different scenario: while over 90% of households have Internet access (Statista, 2024b) Only 8.8% use it for educational content such as MOOCs (Osiptel, 2023), creating a gap of nearly 30%.

Based on the previous discussion, this study aims to examine the impact of perceived tangible and intangible benefits on the continued use of MOOCs, specifically in the context of Peru. The remainder of this document is organized as follows. Section 2 reviews literature on MOOCs' factors, benefits, target audiences, study areas, and usage continuity models. Section 3 discusses the theoretical framework, including the expanded expectation-confirmation model and perceived benefits. Section 4 outlines the study model and hypotheses. Section 5 describes the methodology, data collection, analysis techniques, and sample. Section 6 presents and analyzes the main results. Section 7 addresses the implications for MOOC platforms and educational stakeholders in Peru. Finally, Section 8 offers conclusions and recommendations for future research.

Literature Review

An exhaustive review of prior literature on the use of MOOCs and the perceived benefits associated with them was conducted. This review has been organized into three sections: (1) the positive factors and benefits related to MOOCs and target audiences, (2) the primary areas of focus of existing studies on MOOCs, and (3) the models used to measure the continuity of their use.

Regarding the first topic, it is relevant to analyze the numerous studies that have explored the positive factors associated with MOOCs (Kaplan & Haenlein, 2016; Lambert, 2020; Malik & Hooda, 2023; Papadakis, 2023) to determine whether the tangible and intangible benefits perceived by users of MOOCs have been studied significantly. Among the most relevant findings is the work of Baturay (2015), which analyzed survey data from Coursera participants in the United Kingdom, most of whom had already completed their bachelor's or master’s degree (42.8% and 36.7% respectively). Key benefits identified included flexibility in timing and location, free global access, ease of use, interactive video content, and the opportunity for forum participation. Other research has examined the professional benefits that MOOCs offer, particularly in enhancing workforce skills (Castaño-Muñoz & Rodrigues, 2021; Du, 2020). For

instance, Karnouskos (2017) investigated how continuous learning through MOOCs influenced workplace innovation levels. This study considered each employee's cultural background, prior knowledge, peer interactions, and technology usage, focusing mainly on participants with master's and doctoral degrees (48% of respondents). Results indicated that MOOCs significantly enhanced professional skills and fostered innovation in the workforce, serving as a valuable platform for acquiring new knowledge. In summary, while numerous studies have highlighted certain positive aspects of MOOCs focused on people mostly with master's degrees and doctorates, there has been limited investigation into the tangible and intangible benefits for undergraduate students and whether these benefits significantly impact the continuity of MOOC use among this population.

In addressing the second topic, it is essential to delve deeper into the limited studies focusing on undergraduate students and the impact of tangible and intangible benefits of MOOCs. Key areas of study with this population have included awareness rates and general benefits of MOOCs (Li et al., 2024; Nilanjana & Manoj Kumar, 2021). For example, Geryk (2024) analyzed awareness among bachelor's and master's students at a Polish university, revealing that over 90% of MOOC users believed these courses enhanced their competencies. This suggests a notable positive impact in the academic field, particularly among students in developed countries, and it is relevant to analyze it in greater detail. A few studies have specifically analyzed the main tangible and intangible benefits of MOOCs, including one by AlMunifi & Aleryani (2023). This study found that the main intangible benefit for professionals who participate in MOOCs is improving their knowledge. Additionally, many respondents reported concrete accomplishments, including job promotions, moving into more advantageous positions, or even launching their own businesses. Nevertheless, this study was restricted to professionals in the Middle East and North Africa. Moreover, additional studies have explored how MOOCs complement traditional higher education. Jia et al. (2019) conducted a statistical analysis of nursing students in China using SPSS 21.0, evaluating online interactions, participation rates, and performance outcomes. The study found that 89.5% of blended learners passed their MOOCs, compared to 8.3% of students who only studied online. Additionally, 59.6% of blended learners achieved excellent performance ratings, compared to only 4.2% of those who studied exclusively online. In summary, while some benefits of MOOCs have been documented in undergraduate education, existing research has largely focused on students in fields such as medicine, nursing, and foundational management in countries like Poland and China. There remains a gap in research on the effects of MOOCs in disciplines such as business, technology, and engineering, particularly within contexts distinct from those of developed countries, such as Peru.

Regarding the third topic, it is relevant to analyze previous studies investigating the factors that motivate the adoption of MOOCs to determine the model to use. Numerous previous studies have been predominantly based on the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Dastane & Haba, 2023; Wu & Chen, 2017). In contrast, models like the Expectation Confirmation Model (ECM) have been applied only infrequently, despite their robust validation within information systems. For instance, Feitosa de Moura et al. (2021) applied TAM to assess blended learning MOOCs in a Fundamentals of Management course at a public university in Brazil, resulting in improved performance even in traditional, offline classrooms. Regardless of these positive findings, the study focused exclusively on a MOOC developed by the university rather than on a global platform. Nonetheless, the ECM has been validated as an effective model for studying the continued use of information technologies. Thong et al. (2006) conducted an examination of post-adoption perceptions within the ECM framework in the context of mobile internet services in Hong Kong, confirming its robustness and highlighting that satisfaction and confirmation of expectations are key variables driving IT continuance. Similarly, Limayem & Cheung (2008) analyzed the continuity of use of e-learning platforms, focusing on the Blackboard Learning System, demonstrating that an extended ECM model is highly applicable to educational platforms, with both usage level and user satisfaction significantly impacting

continued IS usage. Furthermore, Oghuma et al. (2015) employed an expanded ECM model to explore factors affecting users' intentions to persist with two instant messaging applications in Korea, finding strong support for all hypotheses associated with the ECM model.

Based on the preceding discussion, the current study seeks to address the following key gaps: 1) There are few studies on the impact of knowing the tangible and intangible benefits on the continuity of use of MOOCs, 2) the proposal of traditional higher education complemented with MOOCs has not been deepened in undergraduate students in areas such as business, technology and engineering and 3) the expanded model of ECM has not been used to evaluate the continuity of use of MOOCs in a context as different as the reality of the use of the educational internet in Peru, despite the fact that the ECM has demonstrated robustness and has been recommended for educational platforms.

Theoretical Framework

Expanded Expectation-Confirmation Model (ECM)

The present research adopts the modified expanded ECM proposed by Oghuma et al. (2015), which builds upon the original ECM framework established by Bhattacherjee (2001). This model has effectively elucidated the main factors influencing users' continued engagement with information systems (ISs). It is particularly relevant, as MOOC platforms represent an information system whose effectiveness is contingent upon students' ability to complete their courses and persist in utilizing these platforms for additional learning. The modified expanded ECM includes the analysis of confirmation, satisfaction, continuance intention, and post-usage beliefs of users, which include perceived usefulness and enjoyment (Oghuma et al., 2015).

Perceived Benefits: Tangible and Intangible Benefits

While the extended ECM offers a theoretical framework for assessing the continuity of IS use, other studies affirmed the need to add additional benefits apart from usefulness, enjoyment, and satisfaction to measure their degree of impact (DeLone & McLean, 2004; Oghuma et al., 2015). Childers et al. (2001) indicate that perceived benefits may function as key factors influencing the adoption of IS. Similarly, Seddon (1997) states that this variable can enhance enthusiasm for using IS and is often regarded as a fundamental element influencing continued usage behavior. Consumers are driven when they recognize the clear value in the service or product and hold firmly to the advantages it offers (Oghuma et al., 2015).

Perceived benefits refer to an individual's evaluation of the advantages of using specific technology, particularly those that alternative systems cannot provide (Lee, 2009; Seddon, 1997). Although concepts like usefulness, enjoyment, and satisfaction may seem closely related to perceived benefits, Oghuma et al. (2015) clarify that perceived benefits should be understood as distinct. This is because perceived benefits encompass a broader range of advantages compared to these other factors, and they vary depending on the nature and characteristics of the technology in question. For instance, their study focused on mobile communication services, highlighting unique features relevant to that context, including network and network benefits. However, in the present study, the concepts of these specific benefits, as discussed by Oghuma et al. (2015), are not applicable. Instead, these will be replaced by two types of perceived benefits specifically tailored to the characteristics of MOOCs, which will be elaborated further. In particular, Ray et al. (2019) emphasized the significance of considering specifically perceived benefits and their effects on learning experiences within the education sector, of which MOOCs are a part.

MOOCs offer features such as easy access to interactive content, including videos and forums, that have a positive impact on both educational aspects and the professional profile of their students (Castaño-Muñoz

& Rodrigues, 2021; Du, 2020). Considering these attributes, perceived benefits can be categorized into two types: intangible and tangible benefits. Intangible benefits encompass the perception of enhanced knowledge, reinforcement of skills, improved academic competence, and the acquisition of specific new skills (AlMunifi & Aleryani, 2023; Ray et al., 2019). While the latter refers to benefits such as the perception of obtaining a job opportunity, starting one's own business, receiving a promotion or recognition or moving to a better job opportunity (AlMunifi & Aleryani, 2023).

Intangible benefits aim to contextualize the user's perception of the potential advantages of utilizing MOOCs, particularly in academic and knowledge-related dimensions, as outlined previously. The educational potential of MOOCs allows them to complement students' academic skills and theoretical knowledge. For example, if they have extensive courses on specific skills for each topic, a business student could choose courses focused on business management and leadership to boost their knowledge in the sector. In contrast, tangible benefits are more closely associated with the perceived ability of MOOC students to enhance their accomplishments within their professional profiles. The possibility that MOOCs add to the profile of a traditional higher education student is considerable, as they distinguish themselves from offline students with these certifications that denote greater effort and knowledge.

To ensure contextual relevance, the tangible and intangible benefits included in this study were adapted based on preliminary qualitative interviews with Peruvian university students and recent graduates. For instance, tangible benefits such as "moving to a better job" and "receiving a promotion" were frequently mentioned by participants as motivations to take MOOCs. Intangible benefits, such as "reinforcing a particular skill" or "acquiring new knowledge," were similarly refined through pilot testing to reflect academic needs and professional aspirations specific to the Peruvian context.

Research Model

This research intends to evaluate the influence of tangible and intangible benefits on the continued utilization of MOOCs in Peru by proposing a benefits confirmation model that elucidates post-adoption behavior. The model integrates the extended ECM with perceived benefits, which are categorized into tangible and intangible benefits, and is applicable to online education platforms such as MOOCs.

This study incorporates several hypotheses adapted from both the traditional and extended ECM proposed by Oghuma et al. (2015), Thong et al. (2006) and Bhattacherjee (2001), discussed in the previous section.

Satisfaction, which measures the extent to which users' pre-existing expectations of an information system are met by its actual performance, is indicative of higher levels of continued use among users who are more satisfied with their experience using a service or product (Limayem & Cheung, 2008; Thong et al., 2006). It plays a key role in positively influencing the intention to continue using an IS like MOOCs (Bölen, 2020; Oghuma et al., 2015; Thong et al., 2006). In this regard, continuance intention of use refers to generating a long-term relationship between the user and the service or product, resulting in repetitive and familiar usage (Lee & Kwon, 2011). MOOC platforms must understand and fulfill users' expectations before they begin a course to ensure satisfaction. In this context, higher education institutions should conduct market research on MOOC platforms, analyzing the types of courses their students are interested in, and even segmenting them by categories such as technological skills, soft skills, and more. Thus, the following hypothesis is presented:

H1*: Satisfaction (SAT) positively affects Continuance Intention (INT)*

Users' expectations regarding technology are summarized as personal beliefs, significantly enhancing user satisfaction and the intention to persist in utilizing a MOOC (Oghuma et al., 2015; Thong et al., 2006). In particular, perceived usefulness is defined as the degree to which an information system fulfills users' expectations about its performance (Oghuma et al., 2015), while perceived enjoyment refers to the extent to which users find the experience of using the system enjoyable and engaging (Thong et al., 2006). Research on motivation indicates that both extrinsic factors, such as perceived usefulness, and intrinsic factors, such as perceived enjoyment, play a critical role in influencing users' behavioral intentions for continued use and their overall satisfaction levels (Bölen, 2020; Oghuma et al., 2015; Thong et al., 2006). Based on this research and ECM literature, users of MOOCs who experience enjoyment in their learning process are likely to achieve higher satisfaction levels, as are students who believe that using MOOCs enhances their learning outcomes and professional development. Thus, the following hypotheses are proposed:

H2*: Perceived Usefulness (USE) positively affects Continuance Intention (INT)*
H3*: Perceived Enjoyment (ENJ) positively affects Continuance Intention (INT)*
H4*: Perceived Usefulness (USE) positively affects Satisfaction (SAT)*
H5*: Perceived Enjoyment (ENJ) positively affects Satisfaction (SAT)*

Confirmation is conceptualized as the degree to which a user's prior expectations are validated or invalidated through their experience with an information system. This validation occurs when the perceived performance of the system exceeds the user's expectations, leading to a state of positive satisfaction; conversely, when performance falls short, disconfirmation results (Churchill & Surprenant, 1982; Oghuma et al., 2015). The ECM posits that a robust confirmation of users' expectations regarding MOOCs is strongly linked to increased levels of satisfaction (Bölen, 2020; Oghuma et al., 2015; Thong et al., 2006). Additionally, participation in MOOCs not only reinforces users' perceptions of the platforms' usefulness but also amplifies the enjoyment they derive from their educational experiences (Oghuma et al., 2015; Thong et al., 2006). Then:

H6*: Confirmation (CON) positively affects Satisfaction (SAT)*
H7*: Confirmation (CON) positively affects Perceived Usefulness (USE)*
H8*: Confirmation (CON) positively affects Perceived Enjoyment (ENJ)*

According to Lee (2009) and Seddon (1997) research, perceived benefits are characterized as an individual's assessment of the advantages associated with using MOOCs, accounting for the total costs incurred and distinguishing these benefits from those offered by alternative or substitute e-learning course platforms. In the educational sector, which encompasses MOOCs, Ray et al. (2019) concluded that it is essential to examine perceived benefits on student learning continuity.

Based on AlMunifi & Aleryani (2023) tangible benefits include the perception of obtaining a job opportunity, starting one's own business, receiving a promotion or recognition, or moving to a better job opportunity. The possibilities that the use of MOOCs adds to the professional profile of a traditional higher education student are considerable, as they distinguish themselves from offline students, who denote greater effort and capabilities. This study posits that tangible benefits positively influence perceived usefulness and enjoyment, as enhancements to a learner's professional profile are likely to yield additional utilitarian and hedonic advantages for the user. For example, the opportunity to enhance one's professional profile and acquire advanced job skills in areas of interest fosters a stronger perception among students that MOOCs are highly beneficial. Additionally, increased participation in forums and discussions with like-minded people make this learning experience more enjoyable. Accordingly, the following hypotheses are proposed:

H9*: Perceived Tangible Benefit (PTB) positively affects Perceived Usefulness (USE)*
H10*: Perceived Tangible Benefit (PTB) positively affects Perceived Enjoyment (ENJ)*

On the other hand, MOOCs provide a perception of increased knowledge, reinforcement of skills, greater competence in the academic field, and acquisition of a particular new skill due to the characteristics it has compared to those of traditional education (AlMunifi & Aleryani, 2023; Ray et al., 2019). Consequently, as user ratings of features such as interactive content, discussion forums, and the availability of multiple academic certificates within a short timeframe increase, it is anticipated that the utilitarian academic benefits of MOOCs will also rise, as reflected in perceived usefulness. Thus, a positive effect of perceived intangible benefits on perceived usefulness is expected. Furthermore, intangible benefits encompass hedonic perceptions related to the features of MOOCs, suggesting that this construct is likely to have a direct positive impact on perceived enjoyment. For instance, users of MOOCs may view blended education as providing superior learning tools and diverse types of content compared to traditional methods, leading to a more enjoyable experience with blended learning facilitated by MOOCs. Then:

H11*: Perceived Intangible Benefit (PIB) positively affects Perceived Usefulness (USE)*
H12*: Perceived Intangible Benefit (PIB) positively affects Perceived Enjoyment (ENJ)*

Methodology

Measurement Instrument

The proposed model consists of 7 constructs, each adapted and measured following previous studies on the ECM (Bhattacherjee, 2001; Oghuma et al., 2015; Thong et al., 2006), tangible benefits and intangible benefits (AlMunifi & Aleryani, 2023; Ray et al., 2019). The measurement items employed in this study are detailed in the Appendix, with each item evaluated using a five-point Likert scale (1: Strongly Disagree, to 5: Strongly Agree).

Data Collection Technique

Data was collected through an online survey distributed via Google Forms in Spanish, with an estimated completion time of 10 minutes. To ensure the accuracy of the analysis, respondents first had to confirm their status as students or graduates up to a maximum of one year after completing their undergraduate studies at a higher education institution in Peru, with only those answering affirmatively proceeding to the next filter. In the second stage, participants were asked whether they had used or were currently using any MOOC platform during their undergraduate studies, and only those who responded 'yes' continued to the subsequent section. Finally, respondents were instructed to answer all measurement items with reference to the specific MOOC platform they had utilized. This study adhered to ethical standards for minimal-risk research involving humans. All participants received an informed consent statement at the beginning of the online questionnaire. This statement explained the study's objectives, guaranteed anonymity, clarified that no personal data would be collected, and emphasized the voluntary nature of participation. Only respondents who agreed to these terms were allowed to proceed.

Sample

This research is based on the continuous use of MOOCs in conjunction with undergraduate studies in Peru. Accordingly, the target population of the sample is composed of students or graduates up to a maximum of one year after having completed their undergraduate studies at a prestigious Peruvian university who have previously completed or are currently enrolled in MOOCs, whether they have obtained the certificate of the course for having completed it or not. In addition, they must be between 18 and 27 years old, from any

social stratum and of any gender. It will be indifferent for the present study if the individuals are carrying out a pre-professional internship, are working under contract or simply are not working.

The online survey for this study utilized a snowball sampling technique to recruit participants using social media, conducted between October and November 2024.

After filtering out inattentive responses identified through control questions, a total of 213 valid responses remained for analysis from the initial 282 received. Following Cohen's (1992) recommendations of sample size, given that the research model includes three independent variables, a minimum of 59 observations is required to detect an R2 value of at least 0.25, ensuring a statistical power of 0.9 at a 0.05 significance level (Hair et al., 2010). Therefore, the sample size of 213 is deemed sufficient.

The sample consisted of a nearly equal distribution of male (50.7%) and female (49.3%) respondents, with ages ranging from 18 to 27 years, reflecting the characteristics of the target population outlined previously.

Data Analysis

This study employs structural equation modeling (SEM) to evaluate the research model, as it addresses causal relationships between latent variables (Hair et al., 2017). Latent variables are constructs that cannot be observed or directly measured (Bollen, 2002; Kyle et al., 2020), commonly used to study abstract concepts like attitudes, beliefs, or intentions for which direct measurement instruments are unavailable (Moustaki, 1996). Since latent variables are not directly observable, they must be inferred from multiple measurable items, typically using rating scales, to estimate the underlying construct (Kyle et al., 2020). In this study, the nine variables are latent, as they capture perceptions and intentions, and were therefore measured through multiple items, as detailed in the Measurement Instrument subsection. Consequently, SEM is an appropriate approach for this research. Smart PLS will serve as the analytical tool for this study.

Results

Analysis of Reliability and Validity

The validity of the measurement model was established using construct reliability, convergent validity, and discriminant validity. We used item reliability, internal consistency, and average variance extracted (AVE) to assess the reliability and convergent validity. The item reliability was assessed by examining each item's loading on its corresponding latent variable. All item loadings were found to be greater than the criterion of 0.7 (see Appendix 1) that Barclay et al. (1995) suggested.

The internal consistency (reliability) was assessed by examining the composite reliability and Cronbach's alpha values, which ranged from 0.902 to 0.934 and from 0.839 to 0.905, respectively (see Table 1). Both composite reliability and Cronbach's alpha values were greater than the recommended value of 0.7 (Nunnally, 1978). The study also found that all AVE values were greater than the criterion of 0.5 (see Table 1) suggested by Hu et al. (2004). These results indicate that our measurement model is reliable and internally consistent.

To establish the discriminant validity, this study compared the correlations among the variables with the square root of the AVEs. Adequate discriminant validity is present when the square root of the AVEs is greater than the correlations among the constructs (Chin, 1998). In addition, the heterotrait-monotrait ratio (HTMT).

Table 1: Reliability and Convergent Validity

Construct	α	CR	AVE
Satisfaction	0.839	0.903	0.756
Continuance Intention	0.866	0.918	0.789
Confirmation	0.867	0.918	0.789
Perceived Usefulness	0.855	0.902	0.697
Perceived Enjoyment	0.895	0.927	0.760
Perceived Tangible Benefits	0.864	0.908	0.712
Perceived Intangible Benefits	0.905	0.934	0.779

Note: α = Cronbach's alpha; CR = Composite reliability; AVE = Average variance extracted

According to current literature, HTMT values supporting discriminant validity should be lower than 0.85 if constructs are conceptually different, while the threshold is set to 0.90 if the constructs are conceptually similar (Kline, 2011). Table 2 shows that all HTMT values are under 0.85, except those for confirmation (CON) and satisfaction (SAT), which are 0.89. This value is under 0.90 because these variables are conceptually related as CON is antecedent to SAT. Together, these tests suggest that our measurement model demonstrated adequate item reliability, convergent reliability, and discriminant validity.

Table 2: Heterotrait-Monotrait Ratio (HTMT)

Construct	1	2	3	4	5	6	7
1. CON	---						
2. ENJ	0.792	---					
3. INT	0.737	0.694	---				
4. PIB	0.567	0.585	0.650	---			
5. PTB	0.541	0.674	0.653	0.759	---		
6. SAT	0.890	0.739	0.716	0.591	0.506	---	
7. USE	0.753	0.801	0.745	0.611	0.673	0.633	---

Structural Model

To assess the explanatory power of the proposed structural model, this study analyzed the R2 values of the dependent variables and the paths between the variables (see Figure 1). As for the statistical significance of each path was estimated using a bootstrapping method of 5,000 subsamples as recommended by Hair et al. (2017). The proposed research model accounts for 52.6%, 58.5%, 60.7%, and 52.2% of the variances (R2 values) in perceived usefulness, enjoyment, satisfaction, and continuance intention of using MOOCs, respectively. The results of the path analysis indicate confirmation influence perceived enjoyment (H8, $\beta=0.523$, $p<0.001$), satisfaction (H6, $\beta=0.625$, $p<0.001$), and perceived usefulness (H7, $\beta=0.456$, $p<0.001$). This study supported the direct effects of satisfaction on continuance intention (H1, $\beta=0.318$, $p<0.001$). Moreover, the results show that perceived usefulness influences continuance intention (H2, $\beta=0.364$, $p<0.001$). Also, perceived tangible benefits have a significant direct effect on perceived enjoyment (H10, $\beta=0.311$, $p<0.001$) and perceived usefulness (H9, $\beta=0.294$, $p<0.001$). Additionally, this study found that perceived enjoyment influences continuance intention (H3, $\beta=0.151$, $p<0.1$) and satisfaction (H5, $\beta=0.228$, $p<0.01$). However, the analysis indicated that the effect of perceived usefulness on satisfaction with MOOCs, as well as the effect of perceived intangible benefits on both perceived enjoyment and perceived usefulness, were found to be non-significant, and thus, hypotheses H4, H12, and H11 were not supported.

Discussion and Implications

Assessing MOOCs' perceived tangible and intangible benefits is especially valuable for Peruvian university students, as understanding these benefits appears to positively impact ongoing engagement with MOOC platforms positively. This insight may aid in advancing digital transformation in Peru's higher education sector and enhancing student experiences, as MOOCs can effectively supplement traditional classroom learning and support students' professional development. This research examined whether the perceived benefits, both tangible and intangible, contribute to continued MOOC use. Using a statistically robust model, this study analyzed the data and variables, revealing empirical support for the significance of certain factors and affirming most of the proposed hypotheses.

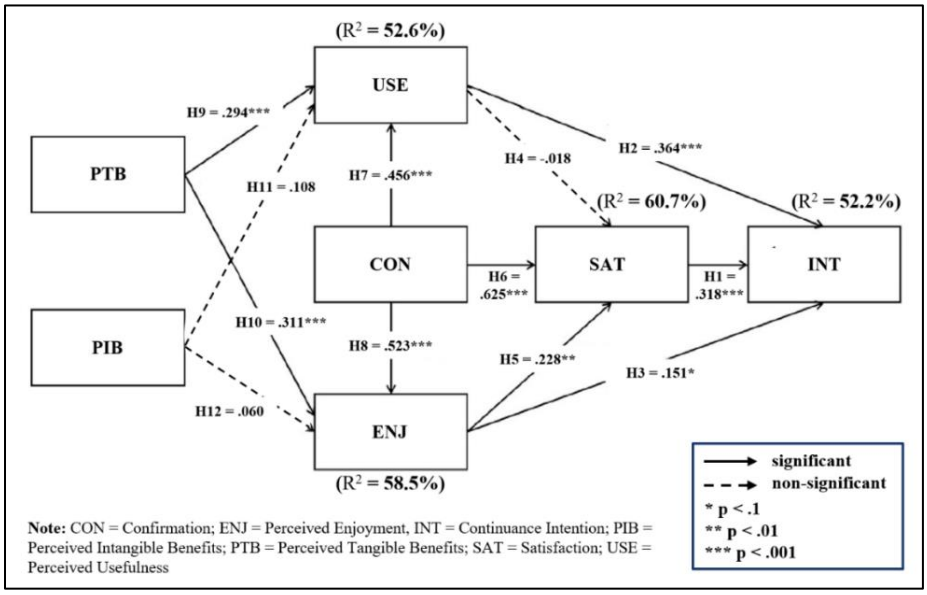

Figure 1: Structural Equation Model Assessment

Concerning the hypotheses of this study, findings indicate that perceived tangible benefits positively influence both the perceived enjoyment and perceived usefulness of MOOCs, which subsequently enhance users' intentions to continue using these online educational platforms. This suggests that users' motivation to use MOOCs grows as they perceive more tangible benefits, such as gaining recognition or improved job prospects. Additionally, the study demonstrates that confirming users' prior expectations regarding MOOC usage positively affects perceived usefulness, enjoyment, and satisfaction, all of which directly contribute to users' intentions to persist with MOOC usage. Finally, it was found that perceived enjoyment in learning through MOOCs significantly impacts user satisfaction, which, in turn, influences the intention to keep using these online courses.

Three hypotheses were not supported. First, while perceived usefulness positively affected MOOC continuity, it did not significantly enhance user satisfaction. Second, perceived intangible benefits did not have a notable impact on either perceived usefulness or enjoyment. This could be because in Peru, many young university students, who often face time constraints and limited financial resources, may not prioritize courses that expand their knowledge or skills without yielding clear, tangible outcomes. As a result, these students or recent graduates might focus more on direct and concrete benefits, such as obtaining certifications, gaining recognition, securing initial employment, or achieving career advancement. This

emphasis aligns with the observed significant effect of perceived tangible benefits on the continuity of MOOC use.

This finding may also reflect broader cultural and socioeconomic dynamics in Peru. Many undergraduate students face significant time constraints due to work or financial responsibilities, which may lead them to prioritize short-term, tangible outcomes—such as certifications or job advancement—over more abstract educational gains. Additionally, the structure of the Peruvian education system often emphasizes credentials and employability, which could further contribute to the greater weight placed on tangible benefits when choosing to engage with MOOCs.

Theoretical Implications

This study found a gap in the literature review regarding the role of tangible and intangible benefits perceived by university students or recent graduates from business, engineering, or technology fields who have used or currently use MOOCs, particularly concerning their continued usage. Furthermore, previous research suggests that factors driving the adoption and continued use of such educational technologies may be influenced by the specific context, particularly the Peruvian setting.

This study, therefore, contributes by identifying a positive and significant impact of perceived tangible benefits on both perceived usefulness and enjoyment, which in turn influence the intention of university students or recent graduates to continue using MOOCs. Notably, the variables included in the study's research model were selected and adapted to reflect the Peruvian context accurately. Additionally, the study provides empirical evidence of the positive impact of variables such as perceived usefulness, enjoyment, and satisfaction on the intention to continue using MOOCs. The findings suggest that future research on MOOC adoption and continued use could incorporate these variables into usage-intention frameworks when assessing similar educational technologies in other comparable contexts, including Latin American countries. Moreover, this study also found that perceived intangible benefits did not significantly influence the continued use of MOOCs within the Peruvian context.

Practical Implications

Based on previous findings, this study offers recommendations for MOOC platforms, higher education institutions, and students or recent graduates. First, regarding marketing strategies and incentives to attract users, MOOC platforms in Peru should design advertising content that emphasizes the potential tangible benefits of using their courses, such as acquiring certificates that enhance students' professional profiles, leading to better job opportunities or potential promotions. This marketing approach could attract a broader audience, such as the Peruvian population, to use MOOC platforms.

Second, concerning enhancing students' professional profiles, universities and higher education institutions should facilitate access to MOOC subscriptions for their students through strategic partnerships with MOOC platforms. Such collaboration would enable students to supplement their academic profiles, potentially yielding better outcomes in the transition to professional life and enhancing the institution’s prestige within the region.

Third, to develop proactive behavior aimed at achieving better professional results, students or recent graduates from higher education institutions should take the initiative to enroll in MOOCs. By understanding the potential tangible benefits, they could independently strengthen their professional profiles, achieving greater success when entering the job market or seeking better employment opportunities.

Conclusions

This study has identified the factors that may influence undergraduate students or recent graduates to continue using MOOCs, specifically within the Peruvian context. It highlights that perceived tangible benefits positively impact both the perceived usefulness and enjoyment of using these educational platforms, which, in turn, influence the continuity of MOOC use. Additionally, it was found that the variable of perceived intangible benefits did not significantly impact on the intention to continue taking these online courses.

Limitations and Future Studies

This study has certain limitations. First, although the sample size of 213 observations is generally acceptable, future research could benefit from including a larger sample. A broader population would enhance the external validity of the model. Second, this study focused on measuring the influence of perceived tangible and intangible benefits on the intention to continue using MOOCs. Given that perceived intangible benefits did not have a significant impact, it is recommended that future research incorporate additional types of benefits that students may perceive from MOOCs. Including these new variables could improve understanding of the factors that motivate students or recent graduates in Peru to engage with these educational platforms and ultimately strengthen strategies for attracting new users.

References

AlMunifi, A. A., & Aleryani, A. Y. (2023). Online Courses in Technology and Engineering: To What Extent Do They Tangibly Enhance Professional Development? *International Journal of Emerging Technologies in Learning*, *18*(11), 226–250. https://doi.org/10.3991/ijet.v18i11.34833

Barclay, D., Higgins, C., & Thompson, R. (1995). The Partial Least Squares (PLS) Approach to Causal Modeling: Personal Computer Adoption and Use as an Illustration. *Technology Studies* 2 (2): 285–309.

Baturay, M. H. (2015). An Overview of the World of MOOCs. *Procedia - Social and Behavioral Sciences*, *174*, 427–433. https://doi.org/10.1016/j.sbspro.2015.01.685

Bhattacherjee, A. (2001). Understanding Information Systems Continuance: An Expectation-Confirmation Model. *MIS Quarterly*, *25*(3), 351–370. https://doi.org/10.2307/3250921

Bölen, M. C. (2020). Exploring the determinants of users' continuance intention in smartwatches. *Technology in Society*, *60*. https://doi.org/10.1016/j.techsoc.2019.101209

Bollen, K. A. (2002). Latent Variables in Psychology and the Social Sciences. *Annual Review of Psychology*, *53*(1), 605–634. https://doi.org/10.1146/annurev.psych.53.100901.135239

Castaño-Muñoz, J., & Rodrigues, M. (2021). Open to MOOCs? Evidence of their impact on labour market outcomes. *Computers and Education*, *173*. https://doi.org/10.1016/j.compedu.2021.104289

Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. Journal of Retailing, 77, 511–535. https://doi.org/10.1016/S0022-4359(01)00056-2

Chin, W. W. 1998. The Partial Least Squares Approach for Structural Equation Modeling. In Modern Methods for Business Research, edited by G. A. Marcoulides, 295-336. Mahwah, NJ: Lawrence Erlbaum Associates.

Churchill, G. A., & Surprenant, C. (1982). An Investigation into the Determinants of Customer Satisfaction. Journal of Marketing Research, 19(4), 491-504. https://doi.org/10.1177/002224378201900410

Cohen, J. (1992). Statistical Power Analysis. *Current Directions in Psychological Science*, *1*(3), 98–101. https://doi.org/10.1111/1467-8721.ep10768783

Daniel, J. (2012). *Sampling Essentials: Practical Guidelines for Making Sampling Choices*. https://doi.org/https://doi.org/10.4135/9781452272047

Dastane, O., & Haba, H. F. (2023). What drives mobile MOOC's continuous intention? A theory of perceived value perspective. *International Journal of Information and Learning Technology*, *40*(2), 148–163. https://doi.org/10.1108/IJILT-04-2022-0087

DeLone, W. H., & McLean, E. R. (2004). Measuring e-commerce success: Applying the DeLone & McLean information systems success model. International Journal of Electronic Commerce, 9, 31–47. https://doi.org/10.1080/10864415.2004.11044317

Du, X. (2020). Embedding linkedin learning MOOCs to enhance students' educational experience and employability. *Proceedings of the European Conference on E-Learning, ECEL*, *2020-October*, 163–172. https://doi.org/10.34190/EEL.20.082

Feitosa de Moura, V., Alexandre de Souza, C., & Noronha Viana, A. B. (2021). The use of Massive Open Online Courses (MOOCs) in blended learning courses and the functional value perceived by students. *Computers and Education*, *161*. https://doi.org/10.1016/j.compedu.2020.104077

Gameel, B. G., & Wilkins, K. G. (2019). When it comes to MOOCs, where you are from makes a difference. *Computers and Education*, *136*, 49–60. https://doi.org/10.1016/j.compedu.2019.02.014

Geryk, M. (2024). MOOC awareness and utilization among students of selected Polish universities. *International Journal of Contemporary Management*, *60*(1), 27–43. https://doi.org/10.2478/ijcm-2023-0019

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th ed.). Englewood Cliffs: Prentice Hall.

Hair, J. F., Hult, G. T., Ringle, C. M., and Sarstedt, M. 2017. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Thousand Oaks, CA: SAGE Publications.

Hu, X., Z. Lin, A. B. Whinston, and H. Zhang. 2004. Hope or Hype: On the Viability of Escrow Services as Trusted Third Parties in Online Auction Environments. *Information Systems Research* 15 (3): 236-249.

Huang, R., Tlili, A., Yang, J., & Chang, T.-W. (2020). *Handbook on Facilitating Flexible Learning During Educational Disruption: The Chinese Experience in Maintaining Undisrupted Learning in COVID-19 Outbreak*. https://www.researchgate.net/publication/339939064

Jia, M., Gong, D., Luo, J., Zhao, J., Zheng, J., & Li, K. (2019). Who can benefit more from massive open online courses? A prospective cohort study. *Nurse Education Today*, *76*, 96–102. https://doi.org/10.1016/j.nedt.2019.02.004

Kaplan, A. M., & Haenlein, M. (2016). Higher education and the digital revolution: About MOOCs, SPOCs, social media, and the Cookie Monster. *Business Horizons*, *59*(4), 441–450. https://doi.org/10.1016/j.bushor.2016.03.008

Karnouskos, S. (2017). Massive open online courses (MOOCs) as an enabler for competent employees and innovation in industry. *Computers in Industry*, *91*, 1–10. https://doi.org/10.1016/j.compind.2017.05.001

Kline, R. B. 2011. *Principles and Practice of Structural Equation Modeling*. New York: Guilford Press.

Kyle, G., Landon, A., Vaske, J., & Wallen, K. (2020). Tools for assessing the psychometric adequacy of latent variables in conservation research. *Conservation Biology*, *34*(6), 1353–1363. https://doi.org/10.1111/cobi.13625

Lambert, S. R. (2020). Do MOOCs contribute to student equity and social inclusion? A systematic review 2014–18. *Computers and Education*, *145*. https://doi.org/10.1016/j.compedu.2019.103693

Lee, M. C. (2009). Factors influencing the adoption of Internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. Electronic Commerce Research and Applications, 8, 130–141. https://doi.org/10.1016/j.elerap.2008.11.006

Lee, Y., & Kwon, O. (2011). Intimacy, familiarity and continuance intention: An extended expectation–confirmation model in web-based services. Electronic Commerce Research and Applications, 10, 342–357. https://doi.org/10.1016/j.elerap.2010.11.005

Li, S., Zhao, Y., Guo, L., Ren, M., Li, J., Zhang, L., & Li, K. (2024). Quantification and prediction of engagement: Applied to personalized course recommendation to reduce dropout in MOOCs. *Information Processing and Management*, *61*(1). https://doi.org/10.1016/j.ipm.2023.103536

Limayem, M., & Cheung, C. M. K. (2008). Understanding information systems continuance: The case of Internet-based learning technologies. *Information and Management*, *45*(4), 227–232. https://doi.org/10.1016/j.im.2008.02.005

Lin, C. P., & Bhattacherjee, A. (2008). Elucidating Individual Intention to Use Interactive Information Technologies: The Role of Network Externalities. *International Journal of Electronic Commerce*, *13*(1), 85–108. https://doi.org/10.2753/JEC1086-4415130103

Malik, V., & Hooda, M. (2023). MOOCs Revamping Indian Higher Education: Escalating Access, Equity, and Quality. In *Journal of Higher Education Theory and Practice* (Vol. 23, Issue 12). https://doi.org/https://doi.org/10.33423/jhetp.v23i12.6238

Moustaki, I. (1996). A latent trait and a latent class model for mixed observed variables. *British Journal of Mathematical and Statistical Psychology*, *49*(2), 313–334. https://doi.org/10.1111/j.2044-8317.1996.tb01091.x

Nilanjana, P., & Manoj Kumar, S. (2021). *Awareness on Massive Open Online Courses (MOOCs) among the Postgraduate Students of North East India with Special Reference to Assam University, Silchar and Tripura University, Agartala: A Study*. https://up.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/awareness-on-massive-open-online-courses-moocs/docview/2525720538/se-2?accountid=41232

Nunnally, J. C. 1978. *Psychometric Theory*. New York: McGraw-Hill.

Nurović, E., & Poturak, M. (2021). Rethinking the Concept of the Education through Digitalization of Higher Education Institutions and Blockchain. *International Journal of Social Sciences & Educational Studies*, *8*(2). https://doi.org/10.23918/ijsses.v8i2p88

Oghuma, A. P., Chang, Y., Libaque-Saenz, C. F., Park, M. C., & Rho, J. J. (2015). Benefit-confirmation model for post-adoption behavior of mobile instant messaging applications: A comparative analysis of KakaoTalk and Joyn in Korea. *Telecommunications Policy*, *39*(8), 658–677. https://doi.org/10.1016/j.telpol.2015.07.009

Osiptel. (2023). *¡La única encuesta dedicada al acceso y uso de los servicios públicos de telecomunicaciones en el Perú! ERESTEL 2022 Encuesta Residencial de Servicios de Telecomunicaciones*. https://repositorio.osiptel.gob.pe/handle/20.500.12630/860

Papadakis, S. (2023). MOOCs 2012-2022: An overview. *Advances in Mobile Learning Educational Research*, *3*(1), 682–693. https://doi.org/10.25082/amler.2023.01.017

Ray, A., Bala, P. K., & Dasgupta, S. A. (2019). Role of authenticity and perceived benefits of online courses on technology based career choice in India: A modified technology adoption model based on career theory. *International Journal of Information Management*, *47*, 140–151. https://doi.org/10.1016/j.ijinfomgt.2019.01.015

Seddon, P. B. (1997). A respecification and extension of the DeLone and McLean model of IS success. Information Systems Research, 8, 240–253. https://doi.org/10.1287/isre.8.3.240

Statista. (2024a). *1.0 statistic - global-main-reasons-for-using-the-internet-q1-2024*. https://www-statista-com.up.idm.oclc.org/statistics/1387375/internet-using-global-reasons/

Statista. (2024b). *Internet usage in Peru*. https://www-statista-com.up.idm.oclc.org/study/75182/internet-usage-in-peru/

Straub, D., & Gefen, D. (2004). Validation Guidelines for IS Positivist Research. *Communications of the Association for Information Systems*, *13*. https://doi.org/10.17705/1cais.01324

Thong, J. Y. L., Hong, S. J., & Tam, K. Y. (2006). The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance. *International Journal of Human Computer Studies*, *64*(9), 799–810. https://doi.org/10.1016/j.ijhcs.2006.05.001

Wu, B., & Chen, X. (2017). Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model. *Computers in Human Behavior*, *67*, 221–232. https://doi.org/10.1016/j.chb.2016.10.028

Xu, H., Dinev, T., Smith, J., & Hart, P. (2011). Information privacy concerns: Linking individual perceptions with institutional privacy assurances. *Journal of the Association for Information Systems*, *12*(12), 798–824. https://doi.org/10.17705/1jais.00281

Appendix: Survey Items

Constructs	Measurement Items	Loadings	Adapted From
Satisfaction (SAT)	How do you feel about your overall experience of using MOOCs? SAT 1: Very displeased-very pleased SAT 2: Very dissatisfied-very satisfied SAT 3: Very frustrated-very contented	 0.840 0.885 0.883	Oghuma et al. (2015)
Continuance Intention (INT)	INT 1: I intended to continue using MOOCs in the future. INT 2: I will always try to use MOOCs in my professional life. INT 3: I will keep using MOOCs as regularly as I do now.	0.885 0.916 0.862	Thong et al. (2006)
Confirmation (CON)	CON 1: My experience with using MOOCs was better than what I expected. CON 2: The service level and educational content provided by MOOCs was better than what I expected. CON 3: Overall, most of my expectations from using MOOCs were confirmed.	0.884 0.896 0.886	Oghuma et al. (2015), Thong et al. (2006)
Perceived Usefulness (USE)	USE 1: I find MOOCs useful in daily life. USE 2: Using MOOCs helps me accomplish things more quickly. USE 3: Using MOOCs increases my productivity. USE 4: Using MOOCs helps me perform many things more conveniently.	0.805 0.835 0.809 0.887	Thong et al. (2006)
Perceived Enjoyment (ENJ)	ENJ 1: Using MOOCs is enjoyable. ENJ 2: Using MOOCs is pleasurable. ENJ 3: I have fun with using MOOCs. ENJ 4: I find using MOOCs to be interesting.	0.900 0.870 0.861 0.857	Thong et al. (2006)
Perceived Tangible Benefits (PTB)	PTB 1: Using MOOCs could help me getting a job opportunity. PTB 2: Using MOOCs could help me starting my own business. PTB 3: Using MOOCs could help me receiving a recognition or promotion. PTB 4: Using MOOCs could help me moving to a better job opportunity	0.803 0.784 0.871 0.912	AlMunifi & Aleryani (2023), Ray et al. (2019)
Perceived Intangible Benefits (PIB)	PIB 1: Using MOOCs could help me improve my knowledge. PIB 2: Using MOOCs could help me reinforce a particular skill. PIB 3: Using MOOCs could help me acquire a new skill. PIB 4: Using MOOCs could help me enhance greater academic competence.	0.910 0.897 0.882 0.840	AlMunifi & Aleryani (2023), Ray et al. (2019)