

Received June 20, 2021, accepted July 22, 2021, date of publication August 3, 2021, date of current version August 9, 2021.

Digital Object Identifier 10.1109/ACCESS.2021.3102293

How Gamification Leads to Continued Usage of MOOCs? A Theoretical Perspective

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This work was supported by King Mongkut's University of Technology Thonburi (KMUTT) Research Funding.

ABSTRACT The high dropout rate, lack of learners' motivation, and MOOC users' diversity are significant issues in MOOCs. In this sense, gamification is used to investigate if it can help to increase MOOC learners' motivation and engagement, leading to a continued usage scenario. Further, this article aims to propose a theoretical model to identify the factors affecting MOOC learners' continuance and empirically measure these factors. The model is based on the Expectation Confirmation Model (ECM) with additional constructs of motivation and gamification. Data is collected from 206 university students using an online survey. Structural Equation Modeling (SEM) is used for data analysis. The results show that motivation, satisfaction, and perceived usefulness influence continuous intention, with satisfaction being the most significant predictor ($\beta = 0.373$, $p < 0.000$). Motivation, confirmation, and perceived usefulness have a significant positive effect on satisfaction. Among the three gamification categories, achievement has the highest impact on motivation ($\beta = 0.208$, $p < 0.001$), followed by the social category ($\beta = 0.143$, $p < 0.032$). The effect of the immersion category is found to be non-significant. Based on the results, appropriate theoretical and practical implications are discussed.

INDEX TERMS Continuance intention, gamification, gaming elements, motivation, MOOC.

I. INTRODUCTION

The online learning environment is undergoing a constant change with the quick expansion of the internet, increased computer access, and convenient electronic services. Massive Open Online Courses (MOOCs) with virtual technology-enhanced learning environments are considered as a recent innovation in online learning [1]. MOOCs allow learners to take courses on a wide variety of subjects and have been used to improve the effectiveness of teaching and learning [1]. MOOCs provide tremendous advantages. For instance, they are free or low-cost online classes that are available to anyone, anytime at their own pace [2]. MOOC platforms, such as Coursera, edX, and Udacity, are now being used by schools, colleges, and several educational institutions worldwide to make their class offerings available online [2]. Platforms in this context refer to the online systems that instructors and students use to access the course materials [3], [4]. Further, these platforms expand alternatives and opportunities for higher education beyond the regular and

traditional classroom [3]. Though MOOC platforms offer students a cost-effective and convenient way to take classes, researchers have cast doubt over their effectiveness [2], [3]. Several studies highlighted that one of the most criticized aspects is the high dropout rate, and on average, less than 10 % of MOOC learners accomplish their courses [1]–[4]. Hence, further research is needed on learners' continuance intention to use MOOCs [4], [5]. Continuance intention to use refers to learners' enthusiasm to continue participating in a particular course; therefore, if learners have a strong continuance intention to use a given platform, they will be motivated to use it and will more likely persevere in their learning [4]–[6]. Also, MOOCs provide an emerging form of education and learning. However, the success of MOOCs depends on users' willingness to use, and acceptance of the system and its continued usage by learners themselves is a key to the success of MOOCs [4], [5], [7]. The low completion rate is because students are enrolling in MOOCs for different reasons, and there is a considerable variation of motive in interest also [8]. Some students are unable to retain their interest in the learning materials, and some view learning as a different form of experience in MOOCs [9].

The associate editor coordinating the review of this manuscript and approving it for publication was Ravinesh C. Deo^{ID}.

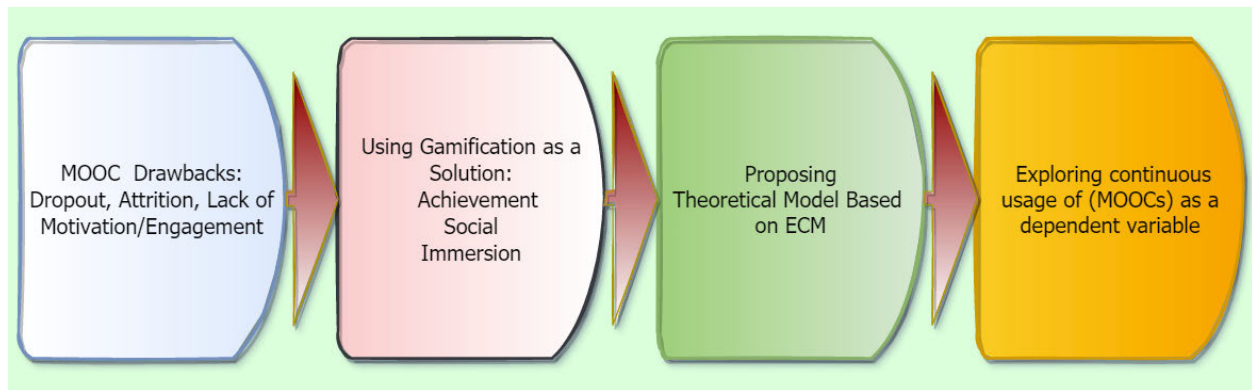


FIGURE 1. A showcase scenario of problem and solution of this study and how exploring continuous usage of (MOOCs) can be achieved.

In addition to the above points, researchers have indicated various challenges for continuance intention (initiating but not completing a MOOC), which is termed as unhealthy attrition [10]. First, this may include participants who are only interested in learning content or those who follow the activities and just participate selectively [7]. More attention needs to be given to learners belonging to this group of unhealthy attrition who aim to complete the courses but fail for various reasons. Such reasons may be due to learning style, culture, pre-knowledge, context, or metacognitive skills [3], [9]. For learners without a strong learning experience should be motivated and guided to have acceptable performance in a course [7]. Second, the MOOC environment lacks personal and face-to-face teacher student instruction, leading to feelings of disconnection, and this causes low interaction with the learning programs [11]. Consequently, these problems may dampen learners' motivation to continue learning online and may eventually lead them to drop off from online courses [12]. Thus, the goal of MOOCs should be to create an environment that involves learners in ways that will maintain their high interest and commitment to continued learning [11], [13]. Therefore, it is imperative that investigating the continuous usage of MOOCs is an important research problem to solve.

In this regard, gamification is proposed as a complement to existing learning approaches to provide learners with a powerful and motivational learning experience [7], [9], [14]. Gamification is a non-game environment that incorporates game design elements, intending to create a better user experience and increase motivation [14]. Although various studies have indicated the positive effects of gamification on user motivation, there is still a "black box," where the underlying relationship between gamification, motivation, and continuous usage of a system is not well-established [9], [14]. There is a need to evaluate the different elements of gamification and what effect they have on the learners' continuous intention [15]–[17]. Existing studies in this regard are mainly experimental based; still, there is a lack of theoretical foundation to explain the motivational effects related to MOOCs [8], [15], [18].

In addition to the current MOOC drawbacks as mentioned above, the current pandemic (COVID-19) scenario has even complicated the situation where the learners cannot go to their schools, colleges, and universities [19]–[22]. Therefore, teaching and learning are entirely online. This sudden outbreak of the pandemic left educational institutions with little time to plan and equip themselves with technology, solutions, and policies that would allow them to go completely virtual without affecting students' learning [20], [23]. For this reason, we must devise solutions and try to find out factors that lead to the drawbacks of MOOCs and give further clarifications on how we can improve them. Moreover, since the classes are fully online, whatever mechanisms we have for teaching and learning must be improved, and the shortcomings have to be minimized [19], [23]. Unless we find out solution/s for eliminating those drawbacks, the teaching and learning quality will be poor, and we cannot create an engaging online learning environment.

Therefore, keeping in mind the research gaps, the following are the objectives of this study: (1) What are the mostly used gamification elements that are used in the MOOC context, and for solving what purpose? (2) How do the gamification elements affect the learners' motivation that leads to a continuance usage scenario? In order to answer the above research questions, first, we identify the mostly used gaming elements and try to classify them into three groups: achievement, social, and immersion, based on their objectives. Second, based on the Expectation Confirmation Model (ECM), we propose a theoretical model that examines the impact of the different game elements belonging to the three categories and how it leads to a continuance usage scenario. A showcase scenario of the problem and solution of this research study and how exploring continuous usage of (MOOCs) can be achieved is shown in Figure 1.

II. RELATED WORK

A. THE CONTINUANCE USAGE OF MOOC

MOOC platforms are an advancement in open and distance education that have gained prominence in recent years [17]. However, due to the growing popularity of MOOCs with the emergence of numerous MOOC providers

and the increasing number of their users, the problem of the MOOC's continuance intention has gained considerable attention also [24]–[29]. Like any other technology, MOOCs cannot be exploited or deemed successful unless their target users accept and continue using them [2], [4]. In relation to continuous usage, two issues are prominent in the current literature. First, MOOCs' unusually high dropout rate of greater than 90% of learners is alarming [6], [30]. Therefore, educators have long struggled with high MOOC attrition rates. Learners who fail to accomplish a course are generally regarded as failure students, prompting plenty of studies into the factors that influence dropout or completion rates [10], [30]. In this regard, many researchers investigated students' profiles like demographic variables, personalization, commitment, attitudes, motivation, competence, self-efficacy, emotion, or prior experience. According to these studies, MOOC participants who are prone to drop out share similar demographic and personal traits with those who are likely to fail in traditional education. The goal of looking at these issues was to provide early interventions for learners who share a similar profile.

Recently, some studies tried to use Artificial Neural Network (ANN) for predicting the MOOC dropout. For example, authors in [6] tried to use a learning analytics approach using dropouts' heterogeneous learning behaviors for modeling an open-flow network of collective attention. Another study [30] made an effort to predict MOOC dropout using a hybrid algorithm based on Extreme Learning Machine and Decision tree. ANNs are efficient and successful in achieving pattern recognition in many problems [31], [32]. These articles asserted that recognizing the different roles played by introductory learning resources could prevent dropouts and improve the accuracy of prediction models. Since 2014, dropout research has expanded and remained an active research subject for the past 7 years. However, neither the completion rates have increased, nor has the issue of learners' continued intention been solved, highlighting the complexity of this well-researched but challenging problem [4], [30].

Second, there is a variety of interest and attempts among learners to sign up for MOOCs, and the various motivations result in learners having different handling of the courses [9], [18]. In this sense, researchers are highly concerned that this diversity among the MOOC users poses serious challenges and barriers for MOOC providers in designing effective courses that would fit all MOOC participants and lead to their continued usage [9], [15]. However, many efforts have been made to investigate the continuous intention of MOOC participants [4], [11], [24]–[28]. For instance, authors in [25] explore the factors affecting students' continuance intention to use MOOCs. They used (ECM) as a baseline model and integrated it with the Task Technology Fit (TTF) construct to analyze the factors influencing students' continuance usage of MOOCs. Authors in [26] investigate what factors influence learners' continuance intention in (MOOCs) in an online collaborative learning environment. They added social influence construct with ECM and used learning

outcomes to replace perceived usefulness in the context of MOOC learning. Similarly, the research study in [27] aims to identify factors that enhance an individual's intention to continue using MOOCs and, therefore, included perceived enjoyment, perceived openness, and perceived reputation. Recently, authors in [4] investigated the relationships among factors that affect learners' continuance intention to use (MOOCs). They used TAM as a baseline model and posited teaching presence and task technology fit as exogenous variables to check how they affect continuance intention to use MOOCs. Details of the studies related to MOOC continuance intention are shown in Table 1. As evident from Table 1, there are several research gaps. While on the one hand few studies have paid attention to the learners' continuance usage of MOOCs using a variety of theoretical models depending on their research setting, the concept of gamification has been largely ignored. However, the effects of gamification to enhance motivation and engagement is well-known in multiple contexts, including education (discussed in the next section). However, extant research has focused not much on how gamification can lead to continuance usage from a theoretical perspective.

In addition, the main objective of online learning, including MOOCs, according to existing literature, is to increase the accessibility of education to the general public, enhance the quality of learning, and lower the cost of education delivery [5], [19], [33]–[35]. Generally, learners benefit from MOOCs because they may learn from anywhere, at any time, at their own pace, and most of the MOOC courses are free. One thing has to be mentioned that before the emergence of COVID-19, the usage of MOOC platforms and their resources was mostly supplementary in addition to the regular classroom instruction delivered in schools and universities [19]–[21]. As a result of the COVID-19 scenario, it impacted all types of learning institutions worldwide, ranging from schools to colleges and universities, and an unprecedented situation has arisen, with a drastic shift in the mode of education delivery to be completely online-only [20], [36]. Therefore, lecturers have been forced to use some type of online delivery platform to deliver their courses. It is obvious now that there is a necessity for students to use MOOCs more than at any other time. As a result, in this chaotic circumstance of educational institutes being shut down, where blended learning or traditional classroom learning is not an option anymore, one of the most significant requirements is to investigate the factors affecting MOOC learners' continuous intention and how to create an engaging online learning environment by using the concept of gamification.

B. GAMIFICATION IN MOOC

Gamification is a rapidly growing field of research and has enjoyed widespread prominence since 2011 [37]. It has recently been applied to a variety of contexts such as marketing [38], healthcare [39], banking [40], education [41], and online learning [42]. Researchers have investigated various aspects of gamification in online learning like the

TABLE 1. Details of the studies related to MOOC continuance intention.

Ref.	Theory	Factors	Gamification	Results
[4]	TAM and TTF	PU, PEU, CI, TTF, and TP	X	Perceived usefulness, task-technology fit affected continuance intention to use, and teaching presence was not significantly related to continuance intention to use.
[5]	ECM and TTF	PU, CONF, SAT, TTF, and CI	X	Satisfaction, perceived usefulness, and task-technology fit significantly affected continuance intention to use.
[9]	Self-proposed based on IS	IQ, SysQ, SerQ, SAT, Use, II, OI, ENJ, CH, and GAM	✓	Gamification was the most important driver in explaining the individual impact of MOOCs and a gamified learning environment is a decisive factor in the success of MOOCs.
[11]	Self-proposed Model	Liking, ENJ, CI, Metacognition, and ENG	X	Metacognition was positively related to (liking, enjoyment, and engagement). Also, these 3 were positively related to continuance intention to use MOOCs.
[24]	ECM	ATT, CUR, SAT, PU, CONF, and CI	X	Variables (attitude and curiosity) added to ECM were all found to be significant in explaining continuance intention.
[25]	ECM and TTF	PU, CONF, TTF, CI, and SAT	X	Satisfaction, Task-technology fit, Confirmation, and Perceived usefulness did influence students' intention to continue using MOOC systems indeed.
[26]	ECM & TTF	TTF, PU, SAT, CONF, and CI	X	Perceived usefulness, satisfaction and task-technology fit were important precedents of the intention to continue using MOOCs.
[27]	ECM	SAT, CONF, CI, KO, PP, and SI	X	Knowledge outcome was the first powerful indicator of users' continuous intention of MOOCs. The performance proficiency, and social influence were significant as well.
[28]	IS & TAM	PU, PEU, SysQ, SerQ, CQ, and CI	X	System quality, course quality, and service quality were significant antecedents of the continuance intention of individuals.
[29]	Self-proposed based on TTF	CV, TSK, CD, CI, and INT	X	The vividness of course content, teacher subject knowledge, and MOOC interactivity positively affect students' intention to revisit MOOCs.

Note: IQ = Information Quality. SysQ = System Quality. SerQ = Service Quality. SAT = Satisfaction. II = Individual Impact. OI = Organizational Impact. ENJ = Enjoyment. CH = Challenge. GAM = Gamification. CI = Continuance Intention. ENG = Engagement. PU = Perceived Usefulness. CONF = Confirmation. ATT = Attitude. CUR = Curiosity. KO = Knowledge Outcome. SI = Social Influence. PP = Performance Proficiency. CV = Course vividness. TSK = Teacher subject knowledge. INT = Interactivity. PEU = Perceived ease of use. CQ = Course Quality. CD = Course Difficulty. ECM = Expectation Confirmation Model. TTF = Task Technology Fit. IS = Information Success. TAM = Technology Acceptance model. TP = Teacher Presence.

gaming elements used [43], designing gamified frameworks for education [44], and investigated the effects of gamification on various student characteristics [45], [46]. There are significant shortcomings in the current MOOC design that gamification could improve, like the high dropout, low completion rates, and a lack of learner motivation that create challenges for MOOC continuance usage [30], [47]. As a result, gamification could be adopted as a solution to enhance MOOC learners' engagement/ motivation and further allow them to achieve their own goals within the MOOC scenario [42]. Once MOOCs created such an environment that motivates and engages learners to maintain their high interest and commitment, they will use MOOCs continuously. Moreover, MOOC learners could further develop their own plans and achieve their personal goals by implementing gamification in MOOCs [47]. Also, the deployment of gaming elements within MOOC environments could increase students' engagement levels. Many efforts have been made to empirically check the positive impact of gamification in MOOCs [42]–[45]. For example, a study [48] recently checked if the gamification in MOOCs can promote students'

learning and focused on the challenge gaming element to prove whether the use of challenge-based gamification as an innovative pedagogical strategy can be affected by MOOC participants. The article reported that gamification is a strategy that can motivate learners to stay active during a large portion of the course. Even though existing research illustrates the positive effects of gamification related to various learning activities in a MOOC, yet it is not clear as to which are the most effective gaming elements that should be used [15], [37], [49]. Further, the question remains which categories of gamification are more closely related to increase the motivational level of MOOC users. Also, current research studies have mainly been experimental studies focusing on single or few gaming elements, and this has prevented them from giving a more holistic view of how gamification has a broader impact on the motivation of MOOC participants [15], [37], [49]. Therefore, based on existing literature, we classify gamification into three categories: Achievement, Social, and Immersion (ASI) and try to investigate the efficacy of the relevant gaming elements in a MOOC context. It should be noted that no prior studies have taken a more

holistic approach and investigated the impact of all the gamification categories in a MOOC setting. Additionally, very few works have focused on the theoretical aspects of gamification and what factors are important in this scenario. Authors in [9] proposed a theoretical model based on IS success theory and gamification in the context of MOOC. They integrated gamification as a single factor to investigate the decisive role of gamification in explaining the success of MOOCs. Their findings showed that gamification plays a crucial role in the success of MOOCs. In contrast, we investigate the role and effect of the three gamification categories based on ECM, aiming to increase the motivation and engagement levels of learners, leading to the MOOC's continuous usage.

C. GAMIFICATION CATEGORIES

In literature related to playing games, gamification, players' motivation, and game design categories, a distinction is often made between the following three categories: Achievement, Social, and Immersion (ASI), which reflect key elements of game design [37], [49]–[53]. First, the achievement category refers to motivating users by giving them a challenging situation and enjoyment towards achieving a particular objective [37], [49]. For example, points are typically rewarded for the successful completion of a specific activity and engage learners by supporting their personal achievement [15]. Researchers implemented the application of gamification in the achievement category in the context of learning and education [7], [42], [54]. For instance, authors in [7] examined the influence of badges, leaderboards, and awards to increase the learners' engagement in a MOOC setting. They used a questions and answers system, which allows offering different badges as electronic rewards for learners, and a leaderboard highlighting the most participative learners. Similarly, a gamification board with challenges, badges, and leaderboards was used to enhance the engagement and motivation level of MOOC participants in [42], [47]. The board was linked to a question related to the central topic of each teaching unit. The questions were multiple choice with four options, and the badge was linked to the number of times it took the user to correctly answer the question. Moreover, authors in [54] proposed the use of in-course redeemable rewards such as points, cards, and tickets that were issued to learners when completing pre-defined learning-oriented tasks. Utilizing rewards in such a way can improve players' motivation and engagement due to the possibility of achieving such new content and objects and using them in the game itself to progress or perform better.

Second, the social category refers to a social environment in which users can make meaningful social connections with others [9], [52]. This can happen when users desire to cooperate by introducing teams (creating defined groups of users) that work together towards a shared objective [9]. Learners expect integration into the social environment. Therefore, when they experience a sense of unity and develop close relationships with others, they may get satisfaction in becoming more closely related, which enhances their well-being and

motivation [55], [56]. Several researchers applied gamification to the social category in the education domain. For e.g., a new MOOC platform was built to realize social relations between participants in a learning environment by authors in [57]. They provided teamwork and discussion forums. With the discussion forums, students were able to interact with other students and instructors. The rewards were given from the activity of each learner through points obtained from each "like" provided by the instructor or other students in a discussion. It was observed that the learners liked to cooperate by introducing teams that worked together towards a shared objective. Another study [58] implemented gaming elements to increase student engagement and interaction in a MOOC. The authors used activities related to the interaction between 22 students reading and writing in the MOOC discussion forum and watching videos.

Third, Immersion-related game elements assist in keeping users engaged in an interested and challenging self-directed activity [15], [49]. Researchers applied gamification to the immersion category in the context of learning and education [57], [59]. E.g., authors in [57] proposed a gamification design that refers to personalization /customization to support the creation of student motivation through gamification within the MOOC platform. The design was used as a guide for building a new MOOC platform that pays attention to the personalization of learners to increase their intrinsic motivation toward completing the MOOC courses. Another research study [59] described that avatars are visual representations that can be customized by learners and can achieve the psychological need of someone's autonomy and the freedom to personalize and adapt a particular character along the learning path. In addition, game elements of storytelling and narrative assist users in experiencing the significance of their activities and a sense of voluntary in a gamified system [60]–[62].

As evident from the above discussion, a myriad of gaming elements have been used by extant researchers belonging to the three categories. The basic motive behind using the gaming elements is to enhance social participation, improve the motivation level of the students by creating a more engaged and immersive learning environment. However, most of these studies are conducted based on experiments. Since high dropout rates and low student motivation are some of the major shortcomings related to MOOCs, more theoretical research should be conducted so as to identify the relevant factors that can lead to MOOC success [15]. As evident, the gamification aspect has not been properly incorporated into the current theories/models, and it is not known as to how the various gaming elements really impact the MOOC objectives. According to the current literature [15], [63], applying various achievement-related gaming elements is generally the most common way to gamify activities. Particularly, badges, leaderboards, points, progress bars, and levels are mostly applied in the current literature. The second dimension involved social elements in multiple forms, competition, cooperation, and team-based activities. Various immersion-related gaming elements such as stories, narratives, avatars,

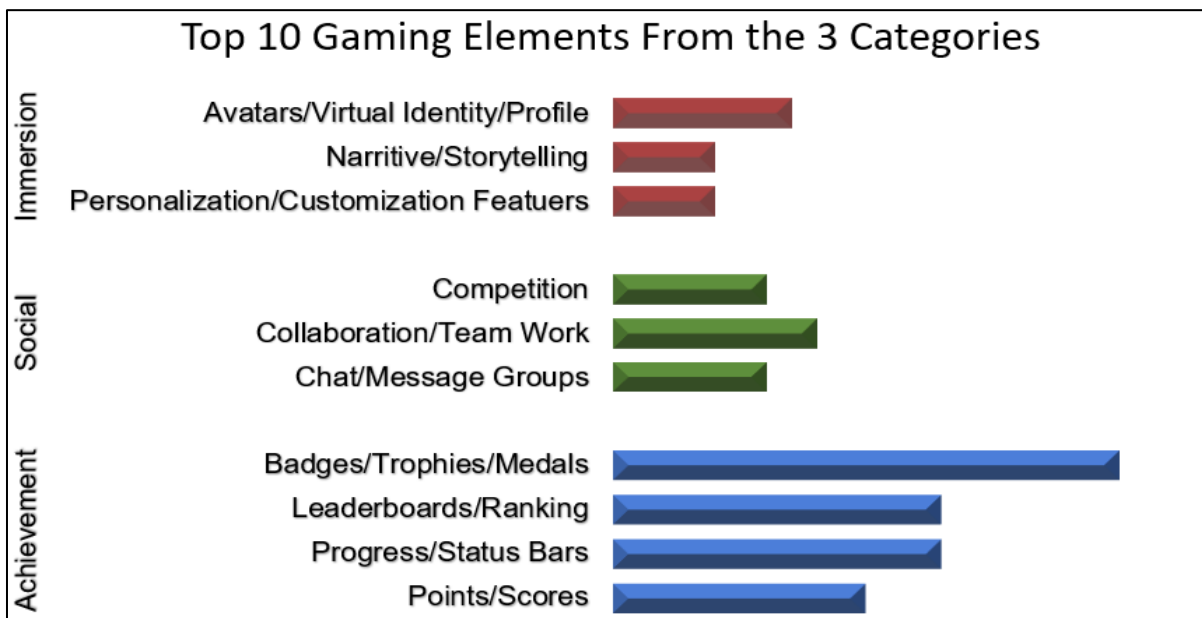


FIGURE 2. Top 10 gaming elements most frequently used related to the three gamification categories.

etc., are used, but these were not as commonly implemented as achievement and social in the education context. Therefore, we consider the top 10 mostly used gaming elements related to all the three categories, which are most frequently used in the current literature [15], [37], [49], [63]. By considering these studies, the relevant elements are depicted in Figure 2. Detailed information regarding the gaming elements used in a MOOC context and mapping them into the three (ASI) gamification categories are available in our previous works [15], [49].

III. RESEARCH MODEL AND HYPOTHESES

A. EXPECTATION CONFIRMATION MODEL AND ITS USAGE IN MOOC

The ECM investigates the information system (IS) continuance intention of users, which is a better measure of IS success than investigating the initial acceptance [26], [64]. Information system continuance being influenced by a user’s satisfaction with the IS [27], [65]. The ECM relationships show that perceived usefulness and confirmation influence user satisfaction, while IS continuance intention is affected by both user satisfaction and perceived usefulness [27], [28], [66]. ECM has been widely adopted in previous research on MOOC continuance usage to explain and predict the learners’ intentions [25]–[27]. For example, authors in [25] used ECM as a baseline model and integrated it with the task technology fit construct to investigate the intention of learners to continue using MOOCs. Another study [26] extended ECM by adding the social influence construct and using learning outcomes to replace perceived usefulness in MOOC learning. Similarly, another study [27] expanded the ECM to include an intrinsic variable of motivation (perceived enjoyment) and

two prominent features of MOOC (‘perceived openness’ and ‘perceived reputation’) to understand learners’ continuance intention to use MOOCs. Recently, a research study [24] explores factors underlying the continuance intention to learn in the MOOC context. By modifying and extending the ECM, the authors suggest a research model. These studies clearly indicate that the ECM can be extended. Although the above studies demonstrated ECM’s ability to explain learners’ continuance intention, few researchers have taken gamification into account in theoretical models as most of the studies are experimental based. To the best of our knowledge, no study has integrated both motivation and gamification into the ECM. To fill this research gap, we extend ECM by adding the motivation and the three gamification (ASI) constructs. The proposed research model is shown in Figure 3.

B. EFFECT OF PERCEIVED USEFULNESS

It can be defined that the Perceived Usefulness (PU) of MOOCs is the degree to which an individual believes that MOOCs can be a driving force for achieving learning objectives [1]. Several research studies found that PU has a significant, positive correlation with continuance usage of MOOCs [17], [19], [67]. Similarly, other studies provide empirical support for the positive influence of PU on use intention [26], [27], [65]. E.g., it was reported that the intention to continue using MOOCs is significantly influenced by PU [1], [43]. Concerning the MOOCs continuance, it is expected that learners are likely to develop a positive intention towards MOOCs continuance if they find the platform to be useful for learning. Moreover, PU is a prerequisite of MOOC success and a basic requirement for MOOC platforms [17], [27]. In addition, PU refers to perceived MOOC

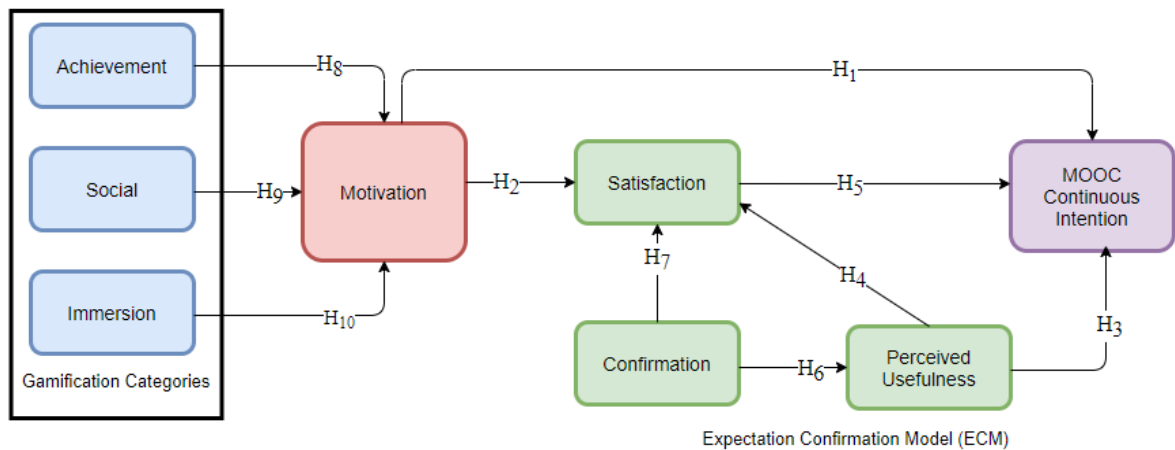


FIGURE 3. The proposed research model.

quality, which is related to satisfaction. The current literature identified various research that provides empirical support for the relationship between PU and satisfaction in the context of MOOCs [17], [68]. Also, Bhattacharjee [64] proposed that PU can predict users' satisfaction. Therefore, we hypothesize:

H₃. *Perceived usefulness will have a significant, positive effect on the continuance intention to use MOOCs.*

H₄. *Perceived usefulness will have a significant, positive effect on MOOC learners' satisfaction.*

C. EFFECT OF SATISFACTION

Satisfaction is defined as users' emotions after using IS, and it is an important construct to predict user post-adoption behavior [69], [70]. Due to the popularity of MOOCs, satisfaction with these courses has captured the interest of researchers, and it is one of the most important factors that explain continuous use of products or services [17], [70]. Perceived satisfaction tends to be used to assess the success or failure of a system, particularly in the case of continuance intention, as the use of the system provides user satisfaction [71], [72]. Specific to MOOCs, satisfaction refers to the learners' perception of enjoyment and accomplishment in the learning environment [26], [27]. If learners feel satisfied with MOOCs, they will have a stronger intention to continue usage [26]. Therefore, a wide variety of studies provide empirical support for the direct effect of satisfaction on use intention [17], [27], [28], [71]. Thus, satisfaction may affect continuance intention to use MOOCs and therefore:

H₅. *Learners' satisfaction is positively associated with MOOC's continuance intention to use.*

D. EFFECT OF CONFIRMATION

Confirmation refers to users' evaluations of a product, service, or technology artifact [27]. Users make evaluations when they compare their initial expectations with the performance of a product, service, or technology artifact. The

performance and initial expectation lead to disconfirmation, which has a strong influence on satisfaction [24]. Information system continuance intention being contingent on the user's satisfaction, the users' confirmation of expectations, and perceived usefulness [24], [64]. The ECM posits that IS usage confirmation has a positive influence on satisfaction and perceived usefulness [64]. Further, a positive confirmation will result in higher-level satisfaction; while they feel that their actual performance is worse than their prior expectation, their confirmation will be negative [26], [27]. This negative confirmation will thus result in lower satisfaction levels. Specific to MOOCs, when learners' actual performance overcomes their prior expectations, they will be satisfied with their prior learning experience. Moreover, several empirical studies found a direct link between confirmation and satisfaction [27], [64], [69] and perceived usefulness [1], [24], [69] in a MOOC setting. Thus, it is hypothesized:

H₆. *Confirmation, while using MOOCs, has a positive effect on perceived usefulness.*

H₇. *Confirmation, while using MOOCs, has a positive effect on satisfaction.*

E. INCORPORATING THE MOTIVATION CONSTRUCT

Understanding motivation in online learning environments is gaining much interest among researchers. Motivation is perceived as a reason/goal for a person to act in a given way and a specified situation, or it is part of the purpose and belief of a person as to what is essential or not [45], [73]. In learning, motivation is an important reason for initiating and continuing action in the use of technology, especially in MOOCs for self-regulated learning [24], [73], [74]. The current literature has indicated evidence that motivations like curiosity and interest have a significant impact on learners' intention to use or persist in using MOOCs [75]. It is also identified that motivation significantly predicts learners' performance and achievement in MOOCs [76]. Moreover, other researchers

revealed that interest, challenge, curiosity, or fun are motivations that drive individuals to take MOOCs [77], [78]. In the educational setting (MOOC), learners may bring motivation, that is, curiosity and a thirst for new experiences, on the one hand, the need to obtain new skills or credentials that will be a benefit to them in the future, on the other hand. According to the results of previous studies, motivation is a significant predictor of the learner's commitment to the course, which, in turn, is a major predictor of retention on the MOOC [78]. It is presumed that the learners are likely to develop a positive intention towards MOOCs continuance if they are motivated to use MOOCs [15]. Also, several studies have confirmed that motivation positively affects user satisfaction in online learning [17], [79]. Thus, consistent with the previous research, we hypothesize:

H₁. *Motivation will have a significant positive effect on the learners' continuance intention to use MOOCs.*

H₂. *Motivation will have a significant positive effect on the MOOC learners' satisfaction.*

F. EFFECT OF ACHIEVEMENT-RELATED GAMING ELEMENTS ON MOTIVATION

Psychologically, every individual has a natural tendency to exploit various environments, resolve multiple challenges, and develop their skills [49]. Gaming elements relevant to achievement allow users to learn new skills, set clear goals, and receive feedback as these features clearly demonstrate their achievements [80]. E.g., in a gamified system, the level represents learners' progress by gathering points or performing a specific activity. The most employed aspect of gamification is the use of an achievement system, often in the form of badges or rewards [37], [49]. The goal of these rewards is based on motivating people to undertake particular tasks and as tokens of recognition for specific achievements [15]. Unlocking or collecting badges can influence learners' behavior, leading them to select specific routes and challenges to earn the badges that are associated with them. Similarly, utilizing rewards can improve players' motivation and engagement due to the possibility of achieving new content and objects and using them in the game itself to progress or perform better [54], [62]. Consequently, learners will be more engaged & motivated with the MOOC in order to earn a greater achievement, which can lead them to the MOOC's continuous usage. This statement is supported by the findings of authors in [61], who reported on a large-scale experiment measuring the impact of virtual achievement in e-learning applications and found that virtual achievement has a positive motivational effect on learner engagement. Therefore, we assume that interacting with achievement-related gaming elements in a MOOC will increase MOOC users' motivational level, which leads to the MOOC's continuous usage. Thus, we hypothesize:

H₈ : *Achievement-related gaming elements have a significant positive effect on learners' motivation toward using the MOOCs.*

G. EFFECT OF SOCIAL-RELATED GAMING ELEMENTS ON MOTIVATION

Gamification strategies have shown potential benefits, not only in student motivation and engagement but also in promoting participation and improving learning in different educational environments. People expect integration into the social environment, and, therefore, when people experience a sense of unity and develop close relationships with others, they may get satisfaction in becoming more closely related [63], which enhances wellbeing and motivation. Gaming elements like (forums, messages, blogs, connections to social networks, and chat) will give users a stronger sense of connection and belonging to high-frequency contact, sharing of ideas, and reciprocity [37], [49]. Additionally, building strong relationships with other classmates and teammates can drive users' desire to perform well [11], [37]. Moreover, when a learner competes with others, the learner with the highest score wins a prize or other benefit, and therefore, learners enjoy their wellbeing and continue competing with others [37]. All these results are consistent with other research, which indicates that MOOC participants involved in substantial interactions with peers were less likely to drop out [56]. Research on MOOCs looked at social engagement through large online and small face-to-face groups showing a positive impact on MOOC completion [81]. Therefore, we propose that social-related gaming elements can increase motivation by helping MOOC learners to build social relationships with others. Accordingly:

H₉ : *Social-related gaming elements have significant positive effect on learners' motivation toward using the MOOC*

H. EFFECT OF IMMERSION-RELATED GAMING ELEMENTS ON MOTIVATION

These gaming elements help keep users engaged in an interested and challenging self-directed activity and can typically encourage and increase freedom/autonomy [37], [63]. E.g., the avatar refers to any user's representation in a virtual environment that can offer a free choice for users and generate stronger feelings of autonomy [63]. When one has the freedom to pursue an optimal outcome or engage in an activity, the sense of autonomy is high, and thus it increases motivation [55]. Interacting in a virtual environment has been shown to satisfy the need for autonomy and increase motivation. This statement is highly supported by a popular theory called Self-determination theory (SDT) that the events that satisfy autonomy needs result in higher motivation [24]. A study [81] investigated whether the game element (narrative) and other elements affected students' motivation and engagement on a peer assessment platform and gave a positive result. Other studies reported that game elements (storytelling/narrative) assist users in experiencing the significance of their activities and a sense of voluntary in a gamified system [60], [61]. Bormann and Greitemeyer [62] conducted an empirical study focused on the effects of a narrative game element and predicted that storytelling would foster

immersion and the player's experience of need satisfaction, which leads to motivation. Besides, by giving learners control over a MOOC environment, they should experience more autonomy and have more motivation to continue with the activity, which should lead to a more enjoyable and engaging experience [82]. Thus, we assume that when learners interact with immersion-related gaming elements in a MOOC, they are more likely to perceive increased feelings of freedom and engagement, which leads to motivation. Therefore, we hypothesize:

H₁₀ : *Immersion-related gaming elements have a significant positive effect on learners' motivation toward using the MOOCs.*

IV. RESEARCH METHODOLOGY

A. PARTICIPANTS AND PROCEDURE

An online survey was conducted to collect the data for hypothesis testing. Our study sample includes students from Thailand only and those who have prior experience with MOOCs and are well conversant with the concept of gamification. A total of 219 responses were obtained, which after the process of data cleansing, were reduced to 206. 170 of the participants (83%) were male, and the remaining 36 of the participants (17%) were female. Moreover, 53 of the participants were bachelor's students, 102 Master's, and the remaining 51 were Doctoral. The majority of the respondents were under 36 years of age (58%). About 28% of the respondents were using the MOOCs very often, 16% often, 31% sometimes, and the remaining 25% were rare. Table 2 shows the details of the participants' demographics. As this study's research focused on users' continuance intention to study in a MOOC, MOOCs' prior experience was necessary before the participants could fill in the questionnaire. Additionally, the participants must have some experience playing video games either on their smartphones, laptops, tablets, Facebook Games, LINE Games, etc. Both these conditions will ensure that the selected study sample has sufficient experience in using MOOCs and also experience with the gamification concept. We had to resort to such a strategy because it is difficult to find a sufficient number of students

TABLE 2. Participants demographic profile.

Measure	Items	Frequency	Percent
Gender	Male	170	83
	Female	36	17
Age	20-25 Years	52	25
	26-35 Years	120	58
	36-45 Years	34	17
Education	Bachelor's Degree	53	26
	Master's Degree	102	49
	Doctoral Degree	51	25
MOOC Usage	Very Often	57	28
	Often	34	16
	Sometimes	64	31
	Rarely	51	25

who have experience in using a gamified MOOC platform. The participants were allowed to take the survey only if they passed both of these initial screening criteria. Further, the lockdown measures imposed by the pandemic posed some problems to the data collection procedure. Therefore, a convenience sampling strategy was used, which is a type of non-probability sampling for the purpose of data collection. In this sampling, method samples are drawn from that part of the population that is close to hand. Moreover, the contacted participants were further requested to contact and distribute the survey link among their friends. Thus, a certain degree of snowballing effect also took place. Further, while answering the survey questionnaire, we informed the participants that their participation was entirely voluntary, and they have the right to cease participating in the survey at any time during the process. In addition, the promise of data confidentiality and anonymity was also stated clearly in the survey. The whole survey (questionnaire), along with the proposal, was approved by the Institutional Review Board (IRB) of the first author's university to check for possible ethical issues.

B. MEASUREMENT ITEMS

To ensure validity, well-established scales from the literature were adopted to measure the study's constructs. The questions for perceived usefulness (3 items) were adapted from [64], [73], and satisfaction (4 items) was developed from [64]. Five items for motivation were adapted from [17], [24], [45], and continuance's intention (2 items) was measured according to [26], [27]. Three items for confirmation were adopted from the previous studies in [27], [64]. The question items for the three gamification categories (4 items for achievement, 3 items for social, and 3 items for immersion) were developed by referring to the studies [37], [50]. The most frequently used gaming elements from the current literature have been selected in this study from the three categories. Achievement related gaming elements are (badges/trophies/ medals, leaderboards/rankings, points/score, and progress/status bars). Social-related game elements are (competition, team/cooperation, and chat/message groups). Immersion-related gaming elements are (avatars/virtual identity/profile, narrative/storytelling, and personalization features). The questionnaire measured used in the current study is presented in Table 3. About the gamification categories, participants were asked to estimate the importance of interaction with three constructs of gamification (ASI), ranging from 1 (not at all important) to 7 (extremely important). All the other variables (motivation, satisfaction, perceived usefulness, confirmation, and MOOC continuous intention) were measured on a 7-point scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

V. EMPIRICAL ANALYSIS AND RESULTS

A. THE MEASUREMENT MODEL

A Confirmatory Factor Analysis (CFA) was conducted to test the Convergent validity of each construct. In this stage of

TABLE 3. Measurement of the current research study.

Constructs	Items	Description	Mean	Std. Dev
Immersion-related Gaming Elements [22, 33]	IMR ₁	The importance of interacting with (avatar/virtual identity/profile)	4.53	1.57
	IMR ₂	The importance of interacting with (customization/ personalization features)	4.66	1.52
	IMR ₃	The importance of interacting with (narrative/story)	4.65	1.49
Achievement-related Gaming Elements [22, 33]	ACH ₁	The importance of interacting with (badges/ medals/ trophies)	4.40	1.64
	ACH ₂	The importance of interacting with (points/scores)	4.37	1.60
	ACH ₃	The importance of interacting with (status bars/progress bars)	5.14	1.41
	ACH ₄	The importance of interacting with (leaderboards/ rankings)	4.47	1.61
Social-related Gaming Elements [22, 33]	SOC ₁	The importance of interacting with (competition)	4.63	1.58
	SOC ₂	The importance of interacting with (team/cooperation)	4.84	1.54
	SOC ₃	The importance of interacting with (Chat/message groups)	5.00	1.50
Motivation [15, 16, 30]	MTV ₁	I find learning the MOOCs interesting	5.19	1.14
	MTV ₂	I enjoy learning the MOOCs	5.12	1.20
	MTV ₃	The MOOC I learn has practical value for me	5.23	1.15
	MTV ₄	The MOOCs I learn is more important to me	5.41	1.08
	MTV ₅	I am interested in discovering how things work	5.38	1.11
Perceived Usefulness [46, 55]	PU ₁	Using MOOCs would enhance my learning effectiveness.	5.15	1.28
	PU ₂	Using MOOCs would improve my learning performance	5.22	1.18
	PU ₃	Using MOOCs enables me to acquire more knowledge.	5.50	1.10
Satisfaction [46]	SAT ₁	Using MOOC makes me feel very satisfied	4.93	1.24
	SAT ₂	Using MOOC makes me feel very delighted	4.94	1.18
	SAT ₃	Using MOOC makes me feel very contented	4.89	1.14
	SAT ₄	Using MOOC makes me feel very pleased	4.85	1.08
Continuance Intention [18, 19]	CI ₁	I intend to continue using MOOC rather than discontinue its use	4.91	1.27
	CI ₂	I intend to continue using MOOC rather than use any alternative means	4.55	1.16
Confirmation [19, 46]	CNF ₁	My experience with using MOOCs was better than I expected	4.82	1.20
	CNF ₂	The service level provided by MOOCs was better than what I expected	4.79	1.10
	CNF ₃	Overall, most of my expectations of MOOCs were confirmed	4.88	1.14

evaluating the model, the aim was to test whether the 27 scales used were valid and reliable [83]. The convergent validity was assessed by examining the following. First, factor loadings for each of the items in the measurement model were checked (should be at least 0.7). Second, the Average Variance Extracted (AVE) for each of the constructs was measured. The Fornell Larcker criteria [84] of convergent validity states that the composite reliability (CR) and the AVE values should be greater than the benchmark values of 0.60 and 0.50, respectively. Table 4 shows the results indicating all the criteria are satisfied in both cases. Additionally, internal consistency was also measured for all the items by evaluating the Cronbach's Alpha values. A generally accepted rule is that the values of Cronbach's Alpha (0.6 to 0.7) indicate an acceptable level of reliability [85]. In our case, all the values are greater than 0.7. Next, the discriminant validity refers to the extent to which a construct is truly distinct from other constructs by empirical standards [83]. The discriminant validity is checked based on the following two criteria: the Fornell Larcker criterion, which states that the square root of AVE for each of the latent constructs must be greater than its correlation with any other constructs

in the model, and the Heterotrait-Monotrait (HTMT) ratio of correlations test, wherein the HTMT statistics cannot exceed 0.85 [84]. The inter-item correlation matrix is given in Table 5 with the diagonal elements representing the square root of AVE, the below-diagonal elements representing the inter construct correlations, and the above-diagonal elements representing the HTMT statistics, showing sufficient discriminant validity. To check for the common method bias (CMB), the variance inflation factors (VIFs) were measured, which generated automatically by the software SmartPLS 3, for all the latent variables in a model.

The recommended criteria state, if all VIFs resulting from a full collinearity test are equal to or lower than 3.3, the model can be considered free of common method bias [86]. Table 4 shows the VIFs obtained less than 3.3 for all the latent variables in the model. Alternatively, Harman's Single Factor Test was also done. We checked the following conditions: There is one factor that accounts for the majority of the co-variances among the measures, and the factor analysis results in a single factor [87]. Therefore, unrotated principal component factor analysis was done, and the total variance accounted for by the first factor was found at 35.90%. Thus, this research study is

TABLE 4. Various statistics of the measurement model.

Constructs	Items	Factor loading	Skewness	Kurtosis	CR	AVE	Cronbach's α	VIF
Immersion-related Gaming Elements	IMR ₁	0.776	-.570	-.130	0.89	0.74	0.82	2.74
	IMR ₂	0.912	-.671	-.070				
	IMR ₃	0.889	-.664	.133				
Achievement-related Gaming Elements	ACH ₁	0.865	-.662	-.406	0.91	0.72	0.87	2.27
	ACH ₂	0.891	-.646	-.292				
	ACH ₃	0.834	-1.207	1.284				
	ACH ₄	0.815	-.646	-.310				
Social-related Gaming Elements	SOC ₁	0.795	-.571	-.255	0.89	0.73	0.82	2.94
	SOC ₂	0.899	-.792	.228				
	SOC ₃	0.882	-.883	.549				
Motivation	MTV ₁	0.857	-.953	.910	0.93	0.73	0.90	3.09
	MTV ₂	0.849	-.945	1.133				
	MTV ₃	0.865	-.851	1.135				
	MTV ₄	0.864	-1.150	1.204				
	MTV ₅	0.840	-1.023	1.529				
Perceived Usefulness	PU ₁	0.771	-1.312	1.740	0.87	0.61	0.82	2.32
	PU ₂	0.844	-1.117	1.168				
	PU ₃	0.705	-.844	1.112				
Satisfaction	SAT ₁	0.878	-.966	.920	0.92	0.75	0.89	2.83
	SAT ₂	0.889	-.665	.378				
	SAT ₃	0.850	-.597	.348				
	SAT ₄	0.861	-.595	.413				
Continuance Intention	CI ₁	0.877	-.785	.535	0.68	0.75	0.71	x
	CI ₂	0.865	-.398	.025				
Confirmation	CNF ₁	0.896	-.525	.410	0.91	0.78	0.86	1.00
	CNF ₂	0.889	-.434	.394				
	CNF ₃	0.877	-.689	.383				

TABLE 5. Inter-item correlation matrix, HTMT statistic, and discriminant validity.

	ACH	CNF	CI	IMR	MTV	PU	SAT	SOC
ACH	0.852	0.113	0.172	0.659	0.182	0.217	0.144	0.712
CNF	0.116	0.887	0.626	0.098	0.659	0.565	0.723	0.045
CI	0.177	0.638	0.871	0.201	0.647	0.622	0.719	0.138
IMR	0.690	0.100	0.200	0.861	0.177	0.201	0.172	0.756
MTV	0.183	0.738	0.657	0.182	0.855	0.728	0.767	0.154
PU	0.225	0.569	0.637	0.211	0.730	0.764	0.695	0.233
SAT	0.146	0.743	0.721	0.173	0.783	0.712	0.870	0.112
SOC	0.716	0.049	0.153	0.773	0.188	0.252	0.115	0.860

Note: The diagonal values (marked in bold) represent the square root of AVE, the below-diagonal values represent the inter-construct correlations, the above-diagonal values represent the HTMT statistics. ACH: Achievement; CNF: Confirmation; CI: continuance intention; IMR: Immersion; MTV: Motivation; PU: Perceived Usefulness; SAT: Satisfaction; SOC: Social.

free of CMB because neither a single factor is extracted nor any single factor accounts for more than 50% of the variances.

B. THE STRUCTURAL MODEL

SEM was used to test the structural model, and it is suitable for verifying the relationships between the constructs of a proposed research model [83]. The analysis results for the structural model are indicated in Table 6. Hypothesis H₁ states that motivation positively impacts the learners' continuance intention to use MOOCs ($\beta = 0.302, p < 0.032$); thus, hypothesis H₁ accepted. From the result, it is obvious that motivation has a significant positive effect on the MOOC learners' satisfaction ($\beta = 0.336, p < 0.000$), explaining

70% of the variance of the dependent variable, and therefore, hypothesis H₂ is supported. On the other hand, hypothesis H₅ suggests that learners' satisfaction is positively associated with MOOCs' continuance intention to use. The statistical results showed a significant positive relationship with the MOOC continuance intention ($\beta = 0.373, p < 0.000$), explaining 57% of the variance, hereby supporting hypothesis H₅. Besides, perceived usefulness has a significant, positive effect on both continuances intention to use MOOCs ($\beta = 0.217, p < 0.000$), explaining 57% of the variance as a dependent variable and MOOC learners' satisfaction ($\beta = 0.279, p < 0.001$), explaining 70% of the variance, thus supporting hypothesis H₃ and H₄. Similarly, confirmation, while using

TABLE 6. Summary of results for the research hypotheses.

Hypothesis and Relationship	T-Values	P-Values	β Coefficient	Decision
H ₁ Motivation -> Continuous Intention	1.53	0.032	0.302	Accepted
H ₂ Motivation -> Satisfaction	3.78	0.000	0.336	Accepted
H ₃ Perceived Usefulness-> Continuous Intention	2.75	0.000	0.217	Accepted
H ₄ Perceived Usefulness -> Satisfaction	3.72	0.001	0.279	Accepted
H ₅ Satisfaction -> Continuous Intention	4.73	0.000	0.373	Accepted
H ₆ Confirmation -> Perceived Usefulness	9.62	0.000	0.568	Accepted
H ₇ Confirmation -> Satisfaction	4.89	0.000	0.343	Accepted
H ₈ Achievement -> Motivation	0.72	0.001	0.208	Accepted
H ₉ Social -> Motivation	0.72	0.032	0.143	Accepted
H ₁₀ Immersion -> Motivation	0.59	0.557	0.068	Not accepted

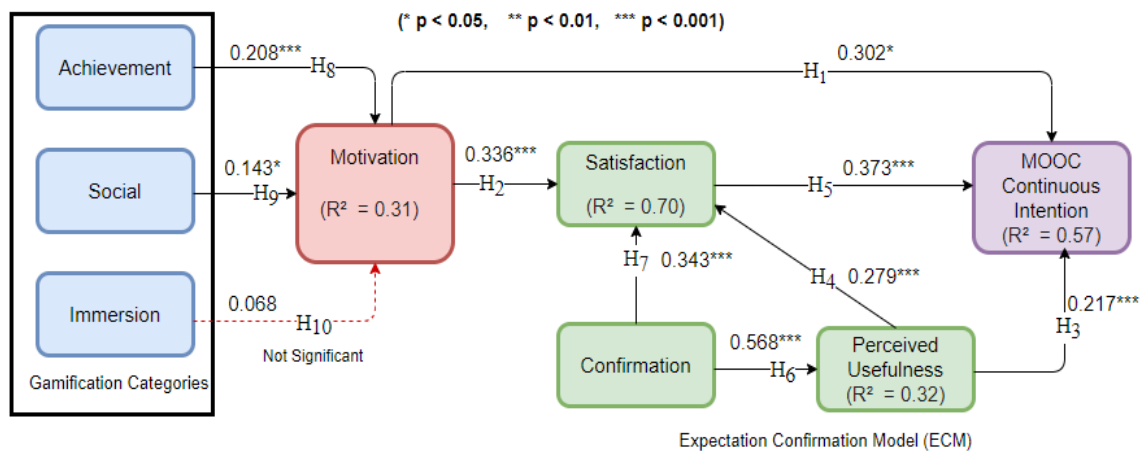


FIGURE 4. Summary of results for the research hypotheses.

MOOCs, has a positive effect on perceived usefulness ($\beta = 0.568, p < 0.000$) explaining 32% of the variance and satisfaction ($\beta = 0.343, p < 0.000$), hereby accepting hypothesis H₆ and H₇ respectively. Also, motivation was hypothesized to be affected by achievement, social, and immersion from the gamification categories. Both achievement and social-related gaming elements have a direct and positive relationship with motivation corresponding to the statistical results of achievement ($\beta = 0.208, p < 0.001$) and social ($\beta = 0.143, p < 0.032$), explaining the 31% of the variance of the dependent variable. The effect of achievement and social game elements was found to be significant; therefore, hypotheses H₈, H₉, are supported. Finally, a positive relationship between immersion-related gaming elements and motivation was not found ($\beta = 0.068, p > 0.557$); thus, H₁₀ is not accepted. The summary of the hypotheses results is given in Figure 4.

VI. DISCUSSION

The growth of the internet era has transformed educational systems, enabling an improvement in learning opportunities within and outside educational institutions. In this regard, MOOCs have encouraged the development of open

access to education, as it provides an opportunity to increase the transference and dissemination of knowledge. However, in studies related to MOOC adoption and continuous use intention, the high dropout rate is often cited to be the major drawback in MOOC, as only 10% of the learners accomplish their courses [1], [7], [8]. A limited number of researchers have also investigated the factors that affect MOOCs’ learners’ continuous intention [1], [27]. In information system literature, the exploration of continuance usage is more significant than the initial acceptance behavior, especially in the online learning context, where learning is a long process, and both patience and persistence are necessary [25]. Therefore, attracting more loyal users will be critical to the MOOCs designers and researchers in general; that is why learners’ motivation is one of the more under-discussed topics today [83]. In order to fill in these research gaps, the current research study concentrated on continuing intention in the MOOC environment to assist learners in achieving their learning goals, support the growth of the MOOC culture, and empirically test the proposed research model with the data collected from a sample of students in Thailand.

A. MAJOR FINDINGS

A significant relationship was found between perceived usefulness and satisfaction. This finding adds to the results obtained from many previous works [88], [89], which indicated that user perception of the efficiency of learning through MOOCs is reflected in the level of user satisfaction. Another interesting aspect is that motivation has a direct and positive effect on MOOC learners' continuous intention. This finding is in line with the previous research [83], [88]. For instance, the authors in [88] established an indirect relationship between motivation and MOOC learners' retention through learner commitment to the course. The results of another research [3] showed that social motivations mainly (competence and relatedness) had a significant impact on behavioral intentions in MOOCs. Likewise, researchers in [11] and [90] examined student's motivation in the form of interest in MOOCs; their results suggest that increasing the students' interest will increase their intention to learn through MOOCs. All these results indicate that the learners are likely to develop a positive intention towards MOOCs continuance if they are motivated to use MOOCs. Thus, it can be affirmed that individual motivation is a significant predictor of MOOC's continuous intention. Finally, it is worth mentioning that a study [10] addressed the motivations of learners who had registered for MOOCs and whose initial desire was to complete the course but were non-completers because of various reasons. Difficulty in juggling work and study, poor course design, technical inability, and high interest in learning workload were significant obstacles that hindered the completion.

Satisfaction had a significant positive effect on MOOC users' continuous intention, and the result is in accordance with previous research [17], [27], [72], [83], highlighting that satisfaction is the right way to increase the efficacy of MOOCs. A similar finding reported in [16] confirmed the importance of the construct (satisfaction) in explaining continuous use intention in MOOCs. These finding advocates that satisfaction is the most important predictor of continuous use intention and the current research work has confirmed that. This speculates that it is significant for students to feel satisfied with their initial MOOC course to encourage their continuance intention to use MOOCs in the future [72]. Therefore, it can be asserted that the greater the satisfaction of learners, the greater their intention to use MOOC continuously. Further, confirmation had a significant positive relationship with both perceived usefulness and satisfaction. Students' extent of confirmation deriving from the performance of MOOCs and initial expectation to the MOOCs is essential determined of perceived usefulness as well as satisfaction with MOOCs. This finding is in line with existing research [25], where it is found that confirmation is a strong determinant of both perceived usefulness and satisfaction. Specific to MOOCs learning, we speculate that when learners' actual performance overcomes their prior expectations, they will be satisfied with their prior learning experience.

Lastly, a significant relationship was found between the two gamification categories (achievement and social) and motivation. Our findings are in line with the existing literature [10], [15], [37], [41], [91], where it is found that gamification can increase users' motivation. For example, the study in [10] theoretically investigated gamification in the context of MOOC. They used gamification as a reflective second-order construct of enjoyment and challenge and found that gamification is the most prominent factor in explaining the individual impact of MOOCs. The findings in [37] indicating that achievement-related gaming elements have a strong relationship with motivation. Another empirical study [8] reported a similar finding. The authors implemented activities, levels, badges, points, leaderboards and stated that these elements lead to better learning performance in MOOCs. Similarly, study in [92] highlighted that the achievement-related gaming elements have a positive effect on user motivation and need satisfaction and feeling of fun and flow experience while using MOOC will result in higher time spent in MOOC course. In addition, Badges, leaderboards, levels, tasks, etc., offer not only immediate feedback (which can engage users and generate flow experience and skill development) but also help users to understand others in a gamified service or system.

On the other hand, interaction with social-related game elements was positively associated with MOOC users' motivation [37], [41]. A similar result was reported by authors in [8] indicated that the implementation of social gaming elements where learners can communicate with their fellow students and instructors would make learning more interesting in MOOC. This will encourage MOOC learners to assist each other and get more understanding in the process. As an important part of social media, social-related gaming elements facilitate the low-cost information exchange, where users can acquire more skills and knowledge to achieve a sense of accomplishment. Not only that, but users can also easily get relatedness by communicating, talking, and connecting with others in the gamified environment or service [15], [37], [92]. Eventually, authors in [44] reported that gamification will work effectively in MOOC if educators and learners are willing to cooperate/collaborate and will further serve as motivation assistance for both parties to participate actively in any MOOCs.

Strangely, interaction with immersion-related game elements was not associated with MOOC learners' motivation. One possible explanation might be that the participants did not use any gamified MOOC platform yet; that way, they may not understand the meaning of integrating the immersion gaming elements into MOOC platforms. Secondly, it may be because much of the initial effect comes after using a gamified platform over time, which means that gamification's behavioral impact comes when learners use or interact with an actual gamified platform over time [37]. For instance, a story is a way to set a long-term goal for increasing immersion and so give meaning to the course.

B. THEORETICAL CONTRIBUTION

This work makes considerable theoretical contributions to the information systems research, particularly MOOCs and gamification, by contributing holistic findings on the relationship between gamification, MOOC, and motivation. First, a recently systematic review [15] of MOOC and gamification literature indicated a lack of theoretical research; and suggested that more impetus should be given to strengthen and empirically validate the positive role of gamification and how it affects the existing motivational theories. Therefore, to the best of the authors' knowledge, this is the first attempt to propose a theoretical model that extends ECM with motivation and three categories of gamification in a MOOC context. Our study indicates that the proposed model is an adequate model to explain MOOC learners' continuous intention. Based on the R² values, not only continuous intention but all the dependent variables (motivation, satisfaction, and perceived usefulness) are adequately explained in the proposed model.

Second, the systematic literature review in [63] showed that current research related to gamification has thus far lacked investigation of what kind of gaming elements can really increase people's motivation. Like, several studies examined a single or limited number of game elements such as badges [7], [8], points [9], storytelling/narrative [60], [62], customization [37], and leaderboards [7], [42] in a MOOC context. Hence, an important implication is the theoretical integration of the gamification block into three different categories. The current research investigated the role of three holistic gamification categories and their impact on MOOC users' motivation, which consisted of 10 common gaming elements. The gamification block is the most important driver of MOOC continuous usage and influenced directly on MOOC users' motivation apart from the immersion category. Strangely, there was no significant positive relationship between gaming elements related to the immersion category and the MOOC users' motivation. This is unusual, still an interesting aspect to be considered.

Third, this study explored a direct relationship between (motivation, satisfaction, and continuous intention), The scarcity of previous works where few studies established indirect relationships between motivation and continuous intention [88], [90]. In contrast, our study's result has a particular importance, which demonstrates the direct and positive effect of individual motivation on MOOC learners' continuous intention.

C. PRACTICAL CONTRIBUTION

Motivation, satisfaction, and perceived usefulness mainly explained the continuous usage intention of MOOC users. This research implies that expectations regarding pleasant experience, the effectiveness of the learning process, and the confirmation of learners' expectations are together predictors of satisfaction in the context of MOOCs. If MOOC participants think that the course is useful, enjoyable, satisfies their expectations, and consequently provides support for their

field of study or work, it will affect their level of satisfaction with MOOCs. From MOOC providers' perspective, the main implication is that MOOC designers must pay attention that MOOC courses should be structured to mitigate any possible problems that may cause dissatisfaction and optimize variables that may improve the confirmation and perceived usefulness, which are associated with students' satisfaction levels.

Another interesting implication is the implementation of gaming elements. However, the most employed aspect of gamification is the use of an achievement system, often in the form of badges, points, or rewards. The aim of the system is to motivate and engage learners in their tasks and use them as tokens of recognition for specific achievements. These points, badges, or rewards are displayed on a leaderboard and would provide a sense of competitiveness between learners and their online coursemates. As a result, learners will be more engaged & motivated with the MOOC in order to earn a greater achievement. Also, gamification provides progress tracking serves as guidance for learners to see their progress in a specific course towards the learning goal and may affect how users perceive their progress and their perception of the usefulness of the course. For example, study modules are released in steps, either by the deadline or unlockable activities, and this would motivate learners to keep checking their course progress. It is also a significant implication that social gaming elements, mainly competition, team/ cooperation, and chat/message groups, are increasing the interactivity of MOOC participants, leading to a higher degree of motivation and enjoyment. Accordingly, MOOC providers can take benefit from these elements to incorporate them into their platforms for increasing interactivity among the MOOC users. Besides, audience analysis is a significant part of gamification because it can identify all motivational aspects needed and the learners' base knowledge [47], [48]. Sometimes, gamification in MOOCs includes team/group assignments or projects; therefore, the learners' tendencies towards competition and cooperation should be identified.

To conclude, MOOC designers might expect MOOC success (continued usage) if the users find the platform to be useful for learning, when they are engaged/motivated and satisfied by their experience of using MOOC courses. Besides, we consider gamification as a significant motivating factor to the overall continuation/success of MOOCs. It has the potential to decrease student dropout rates and enhance learner satisfaction and user experience. Therefore, both the educational sector and industry now have empirical evidence for the factors underlying continuous intention or viable MOOCs.

VII. CONCLUSION

This research work investigated the continuance intention to use MOOCs and the role of gamification. A theoretical model was proposed based on the ECM to identify the factors affecting MOOC learners' continuance and empirically measure these factors in a MOOC context. Unlike the previous studies related to MOOC continuance intention [11],

[24]–[26], [28], [45], this research largely focused on using gamification as a solution to increase the engagement/motivational levels of MOOC users, which will further lead to a continued usage scenario. Also, we believe that gamified learning environments are considered to be the next competitive key value in higher education institutions [9]. For this purpose, we further extended the ECM model by incorporating the three gamification categories: achievement, social, and immersion. The reason behind classifying gamification into three categories was to design a gamification strategy to engage/motivate the various types of MOOC users, as researchers revealed that MOOC users' diversity creates challenges for MOOC providers in designing effective courses that will suit all types of learners [9], [18].

In addition, the novelty of this research are as follows: First, current research works related to MOOC and gamification have mainly been experimental based (empirical) studies [8], [42], [44], [58], while our research has focused on how gamification can lead to MOOC continuance usage from a theoretical perspective. We found only one study in [9] where it proposed a theoretical model together with IS success theory and gamification in the context of MOOC. But it used gamification as a reflective second-order construct of enjoyment and challenge. It means, these two gaming elements (enjoyment and challenge) should not be representatives as there are many other gamification elements that have better potential to increase engagement/motivation, such as badges, points, leaderboards, etc.

Second, previous articles focused on single or few gaming elements such as badges [7], [8], points [10], storytelling/narrative [60], [62], and leaderboards [42], [57] in a MOOC context, and this has prevented them from giving a more holistic view of how gamification has a broader impact on the motivation of MOOC participants. In contrast, the current research examined the role of the three holistic gamification categories (achievement, social, and immersion) and their impact on motivation, which consisted of the top 10 commonly used gaming elements. This is because learners have been participating in MOOCs for a variety of reasons [18]. For example, some learners are only interested in a learning experience or try to collect as many certificates as possible instead of completing the course to understand the entire content [16]. However, some game elements might not be adequate for all MOOCs users, e.g., always giving points and badges to learners is not enough. Finally, participants lose their interest while interacting with a system [9].

Third, according to the existing literature, one of the prime reasons for gamifying a MOOC platform was to improve the MOOC users' motivation [15]. Hence, we added the motivation construct to our model and examined the direct relationship between motivation, MOOC users' satisfaction, and continuous intention. Besides the ECM factors, this work proves the crucial role of gamification on motivation and the direct effect of motivation in explaining the continuance usage of MOOCs. The findings highlighted that the proposed model explained 57% by user satisfaction, motivation, and

perceived usefulness, with satisfaction being the most significant predictor of the continued intention. However, user satisfaction was explained 70% by motivation, confirmation, and perceived usefulness. It means user expectations regarding pleasant experience, the effectiveness of the learning process, and the confirmation of learners' expectations were together predictors of satisfaction in the context of MOOCs. The motivation was the second most significant variable that explained continuous intention, and therefore, MOOCs should create an environment that motivates/engage learners in ways that will maintain their high interest and commitment to continued learning.

Furthermore, gamification played a significant role, as the achievement and social gamification categories had a positive and direct effect on MOOC learners' motivation. Also, motivation is explained in 31% by achievement and social gamification categories, where achievement has a higher impact on motivation. It clearly indicates that gamification has the potential to motivate MOOC users, which will further lead to continued usage. It also shows that applying achievement-related gaming elements is the most significant way to gamify MOOC platforms. Especially, Badges, leaderboards, points, and progress bars, and these elements were mostly applied in the current literature as well. The next is social elements in multiple forms, social networking features, cooperation, and team-based activities to be considered. Immersion-related gaming elements, such as stories, narratives, avatars, and so on, were used but were not significant as achievement and social in the MOOC context. Therefore, practitioners and MOOC designers should be careful while gamifying MOOC platforms in selecting suitable gaming elements by considering their context and target users.

In short, our work contributes to both theoretical and practical perceptions, which are valuable for MOOC providers and designers, either in higher education or industry. Moreover, we found that gamification has the potential to motivate MOOC users, and gamified learning environment is a significant factor in the continued usage of MOOCs. Generally, this study provides the foundation for future research related to gamification in MOOC, increases our understanding of the development of learners' continuance intention to learn in a MOOC, and assists us in examining a potential approach to motivate learners' continuous usage by adopting gamification.

A. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Although the current work investigated the relationship between gamification, motivation, and MOOC; still, some limitations should be noted. First, we asked the participants' opinions about the importance of having the gaming elements in a MOOC platform that measures self-reported preferences of gaming elements, whereas full experiment designs may be better equipped to infer causality during interacting with gaming elements and the user experience. Such a method could contribute to reducing eventual subjective bias, typical of questionnaire-based surveys. Second, we considered

motivation as a single dimension construct. In order to have a deeper understanding of the different types of motivation, future research should focus on doing a more granular analysis in terms of separate intrinsic and extrinsic motivation or the intrinsic need satisfaction (autonomy, competence, and relatedness). This will help explain the mechanisms of how gamification affects MOOC learners' motivations and provide a psychological theoretical basis for future research on gamification, MOOC, and behavioral outcomes. Third, the data for this article was gathered in one survey, and we affirm that a longitudinal study could contribute to a more efficient model. Fourth, we did not examine the moderating effect of gamification in the model, so future research should focus on this aspect. Fifth, future research can also investigate whether the relationship between gamified interaction and motivation is moderated by other user characteristics variables, such as demographics, gender, user personality, and cultural differences. Finally, examining the efficacy of each (separate gaming element) is another dimension to be considered in future research.

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