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College students' willingness to continue using MOOC platform: configuration analysis based on FSQCA method

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Abstract: The continuous use of MOOC can encourage college students to obtain knowledge and promote the development of the MOOC platform. However, the retention rate and completion rate of MOOC are not high, which should be addressed. Otherwise, students cannot effectively acquire knowledge, which may negatively affect the education quality and restrict the platform development. Considering that existing research on learners' willingness to continue using MOOC mainly focuses on the net effects of conditions on the result, this paper takes college students as research objects, adopts FSQCA method, and studies the configuration effects of five factors that influence their willingness to continue using MOOC. The results show that a single factor does not constitute a necessary condition, and three configurations form the continuous use intention. These findings could reveal the configuration causes of college students' willingness to continue using MOOC and provide references for the sustainable development of the MOOC platform.

Keywords: MOOC platform; college students; continuous use; configuration effects; FSQCA method.

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1 Introduction

MOOC platform is an open learning platform, which breaks the traditional learning mode and broadens the learning boundaries of learners both in scope and scale. Since 2011, three major MOOC learning platforms, namely Coursera, edX, and Udacity, have caused great shocks in the education industry (Carrera and Ramírez-Hernández, 2018). Compared with traditional teaching methods and early e-teaching methods, MOOC has many advantages. For example, it allows learners to access educational resources regardless of geographical location, economic status, or time constraints (Liu et al., 2021). Therefore, learners can use MOOC to learn whether they are in rural or urban areas, as well as in ethnic minority areas or economically underdeveloped areas (Jia and Ericson, 2017). Moreover, during the MOOC learning process, learners can independently control the learning pace through functions such as pausing and replaying to ensure effective mastery of knowledge (Jin, 2020; Lv et al., 2021). Furthermore, MOOC provides a wide variety of resources for learning from all over the world in many fields (Qi, 2025), such as biology, medicine, and mathematics (Han and Meng, 2024), meeting the learning needs of learners from various disciplines. In addition, MOOC can track and record learners' learning behaviour data in real-time (Du et al., 2024; Xie et al., 2024; Zhang et al., 2020), providing a basis for improving teaching strategies and promoting continuous innovation in educational models. However, despite the many benefits of MOOC, there are still some shortcomings (Henderikx et al., 2019). For instance, in the MOOC learning process, there exist issues such as lack of motivation, insufficient academic background, and inadequate course resources, which cause the loss of users and make researchers doubt its effectiveness (Jordan, 2014). Besides, MOOC lacks authenticity and participation (Zhao and Gao, 2024), suffers from poor communication between educators and learners (Zhang et al., 2023a), and cannot provide learners with practical and hands-on opportunities (Jiang et al., 2021). Moreover, MOOC emphasises knowledge transmission, but has shortcomings in ability development and personality shaping (Feng, 2024). Additionally, as an online learning platform, the regulation of the MOOC platform is insufficient (Li et al., 2021). Some literature shows that learners of online and distance education are more likely to drop out than traditional students (Clay et al., 2008; Dutton et al., 2001; Levy, 2007), and some studies also indicate that the completion rate of MOOC is less than 10% (Pursel et al., 2016; Xing and Du, 2019). As a result, high attrition rate has always been regarded as the root problem that MOOC needs to solve, but this problem has not been improved for a long time (Reich and Ruipérez-Valiente, 2019).

In the process of effective and sustainable development of MOOC, learners' willingness to continue using it plays a significant role because it can improve learners' learning effect, while low willingness reduces the effectiveness (Jung and Lee, 2018; Zhao et al., 2020). Moreover, high sustained willingness could promote the confidence of the developers and builders of MOOC and enable them to design and develop a better platform to a certain extent (Sari et al., 2020). On the contrary, low persistence intention will reduce their confidence and even cause them to doubt the platform they have developed. Therefore, research on the sustained use intention of MOOC learners is of great value. Previous literature has shown that the sustained willingness of MOOC learners is influenced by various factors, including teaching presence and task-technology fit (Kim and Song, 2022), psychological stimulation and emotion (Shanshan and Wenfei, 2024), which provide important references for the development of the MOOC platform.

However, in general, the current research on learners' intention to continually use the MOOC platform focuses on analysing the net effects of conditions on outcome based on symmetric causal relationships. According to general systems theory (Boulding, 1956), the emergence of social phenomena is the result of multiple factors working together, so the perspective of configuration should be applied to study (Ragin and Strand, 2008). For users of the MOOC platform, the willingness of continuous using it is also influenced by multiple factors. College students are one of the main types of users of MOOC platform, and they can learn extensive knowledge in and out of class through it to expand their vision. Therefore, based on the perspective of configuration, this article takes college students as the research objects and uses the FSQCA method to study the configuration effects of five conditions, which are system quality, course quality, learning presence, significant others, and self-efficacy, in order to obtain reasonable explanations for college students' willingness to continue using MOOC and provide references for promoting the sustainable development of it.

The following structures of this article are as follows: The second part introduces the literature review and conceptual model. The third part explains the method and data. The fourth part presents the research results, and the fifth and sixth parts are the discussion and conclusions, respectively.

2 Literature review and conceptual model

2.1 Literature review

Selection method of conditions guided by existing knowledge and previous literature is reasonable when using FSQCA for research (Zhang and Du, 2019), and this selection strategy has been proven to be effective and practical by Verbeke et al. (2019), who selected antecedent conditions based on existing literature for exploring the configurations of opportunism in international market entry in the process of using FSQCA. Accordingly, this paper chooses the five conditions of system quality, course quality, learning presence, significant others, and self-efficacy as the antecedents referring to existing studies. Firstly, system quality reflects the friendliness of the MOOC platform system to learners in learning environment. Literature has shown that the system quality of the MOOC platform, such as compatibility with different Internet terminal devices (Li and Zhu, 2022), flexibility of rhythm and self-regulation in the learning process (Narciss et al., 2007), and the course recommendation function (Li et al., 2023a; Yao, 2023), has impacts on learners' satisfaction (Albelbisi et al., 2021; Fan, 2025), which will in turn influence learners' willingness to continue using it (Chi et al., 2024; Peng and Peng, 2025). Additionally, existing studies have also proposed that system quality can directly affect the learners' willingness to continuously use MOOC, namely the better the system quality, the more it can increase users' inclination to constant use (Li and Guo, 2017; Yang, 2017). Therefore, this paper chooses system quality as a condition. Besides, previous studies have demonstrated that the course quality of MOOC has a significant impact on learners' satisfaction and course completion (Hew et al., 2020; Jung et al., 2019), and the higher the quality of course on the MOOC platform, the more likely learners are to stick with it (Albelbisi and Yusop, 2019). Julia et al. (2021) pointed out that the course quality of MOOC could affect the sustained use and retention rate of learners. According to Zhen and Fan (2023), there is a significant correlation

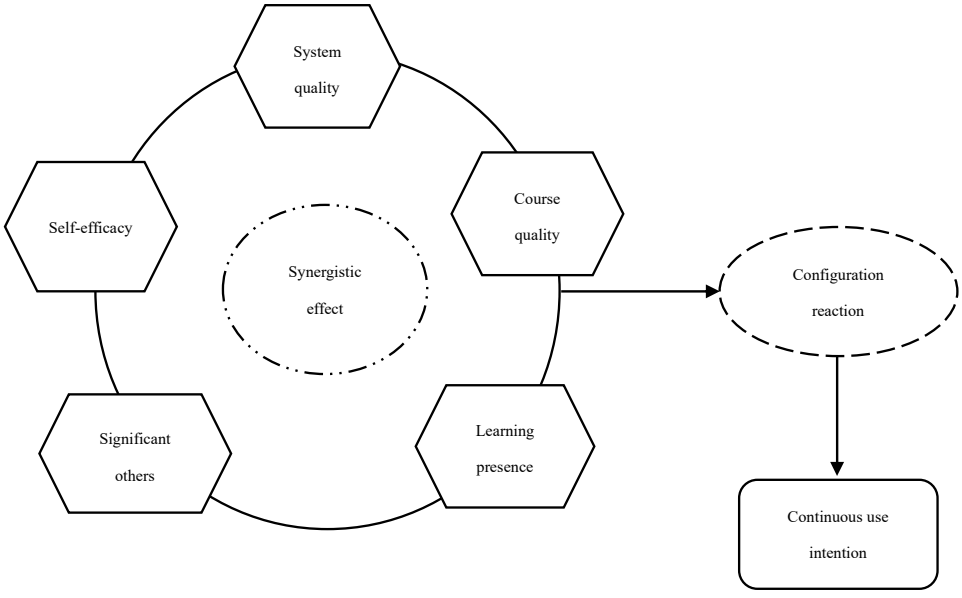
between course quality and learners' willingness to continue using MOOC. The quality of course on the MOOC platform should be improved to enhance learners' learning effect (Zhang and Zhang, 2019), and then improve learners' continuous use intention. Therefore, course quality is selected as a condition. Moreover, as an online learning platform, MOOC is different from offline learning, in which learners can seek help from teachers or classmates when encountering problems. Previous study has shown that face-to-face learning methods are more favoured by learners (Wang et al., 2023), such as on-site interaction, communication, and discussion, which can enhance learners' motivation (Sun, 2025), learning outcomes (Liu and Fan, 2024; Tang et al., 2025), and learning satisfaction (Li et al., 2020). In the context of MOOC learning, when encountering knowledge that is not understood, if learners can also have interaction and communication with others as in actual scenarios, their learning enthusiasm will increase, and their learning outcomes will be better (Hew, 2016; Valdivia Vázquez et al., 2018), thereby making them more willing to continue using MOOC. Consequently, learning presence serves as a condition in this paper. Furthermore, previous studies have reported that individual behaviours are influenced by significant others (Wang and Lu, 2022; Ye et al., 2024), which may be parents, elders, brothers and sisters, teachers, classmates, and friends (Laible et al., 2000). The words and actions of significant others can serve as behaviour models for individuals, thereby influencing individuals' actions (Xu and Chen, 2025; Yu and Dong, 2024). Also, individuals tend to imitate the behaviour patterns of significant others (Wu and Ou, 2025). As a result, the learning process of individuals could be influenced by significant others. Specifically, if significant others continue using MOOC, or encourage and support individuals to use MOOC for learning, then the continued use of MOOC learners will be enhanced. Therefore, this article chooses significant others as another condition. In addition, self-efficacy refers to individuals' belief in their ability to successfully perform specific behaviours (Bandura, 1982). Previous research has proposed that individuals with strong self-efficacy believe that they are capable of completing learning tasks (Xiang et al., 2025). In the process of learning on the MOOC platform, learners inevitably encounter related problems, such as unclear pronunciation by teachers (Jiang and Peng, 2024) and lack of communication with others (Wang and Qin, 2022). At this point, learners with high self-efficacy have the confidence to overcome these difficulties and challenges (Shao and Zhao, 2025; Wang, 2023), and then continue to use MOOC for learning. Consequently, this article considers self-efficacy as a condition.

The relevant studies have conducted in-depth analyses of the continued use intention of MOOC among learners, and identified the relevant factors such as system quality and course quality, which enrich the research in corresponding fields. However, existing literature considers the impact of a single condition on the willingness to continue using MOOC, and few studies have examined this issue from a configuration perspective. Based on general systems theory (Boulding, 1956), the sustained willingness to use MOOC should be the result of multiple conditions working together, and it is necessary to study this issue from a configuration perspective. Therefore, this article adopts the FSQCA method to analyse the reasons for the sustained use intention of college students towards MOOC, providing more realistic explanations for the issue and proposing corresponding interventions to improve the college students' sustained use intention and promote the sustainable development of the MOOC platform.

2.2 Conceptual model

According to the description above and combining with the configuration view, the conceptual model can be established as shown in Figure 1.

Figure 1 Conceptual model



3 Method and data

3.1 Method

Qualitative comparative analysis (QCA) is a popular research method that integrates quantitative and qualitative analysis. QCA posits that the occurrence of a result is due to the combined effect of different factors. Based on different set forms, QCA has three different types, which are crisp set CSQCA, multi-valued qualitative comparative analysis (MVQCA), and fuzzy set qualitative comparative analysis (FSQCA). As one of these three classifications, FSQCA allows variables to be calibrated to any value between complete membership and complete non-membership. Thus, FSQCA is widely used in many fields, such as management (Kumar et al., 2022), education (Zheng et al., 2023), and medicine (Zhang et al., 2023b).

As a research method, FSQCA is suitable for handling studies involving complex phenomena. By using fuzzy set theory to process imprecise data, FSQCA can not only capture subtle differences and complex relationships between variables, but also effectively explore how different combinations of conditions lead to a certain result. FSQCA provides a new perspective and methodological foundation for scientific research. Given to the research issue and context of this article, the FSQCA method is used.

3.2 Data collection

Questionnaire survey method is adopted to collect data in this paper and a corresponding Likert scale is used. All items in the questionnaire are based on existing literature. The measurement results of items are evaluated in five gradations (1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, and 5 – strongly agree). For condition variables, the larger the values of items they contain, the stronger the adequacy for the result, while the larger the values of items contained in the outcome variable, the more representative the willingness to continue using the MOOC platform. The questionnaire survey of this study was conducted online from September 2023 to April 2024. In this process, participants were college students from China, and before participation, each of them was given informed consent. In addition, their participation was voluntary and anonymous. Apart from assuring that the participants were college students, in order to ensure the validity of this study, these participating students were either currently using the MOOC platform for learning or had some MOOC learning experience, meaning they had completed a certain level of MOOC coursework, excluding invalid samples who merely registered on the platform without actually participating in learning activities. In the end, 471 questionnaires were collected. After screening, unqualified questionnaires with non-standard filling, short or long filling time, and obvious errors in filling out were deleted, and then 334 valid questionnaires were obtained, with a data collection efficiency of 70.91%. The overall Cronbach's α coefficient for the retained questionnaires was 0.913, with each variable demonstrating a Cronbach's α exceeding 0.7, indicating acceptable internal consistency. Structural validity was assessed through factor analysis, yielding a Kaiser-Meyer-Olkin (KMO) value of 0.890 and a minimum cumulative variance contribution rate of 74.94%. Furthermore, all question items displayed factor loadings exceeding 0.50, affirming the questionnaires' robust measurement validity.

Among the valid samples, there were 87 males and 247 females, accounting for 26.05% and 73.95% respectively. 9 students aged 18 to 19, 45 students aged 19 to 20, 134 students aged 20 to 21, 129 students aged 21 to 22, and 17 students aged 22 to 23, accounting for 2.70%, 13.47%, 40.12%, 38.62%, and 5.09%, respectively. For the retained valid data, the average value, standard deviation, maximum value and minimum value of all condition variables and result variable are calculated, and the descriptive statistics of data are shown in Table 1. To be clear, the value of each variable is the average of all its items included in the questionnaire.

Table 1 Descriptive statistics of data

Statistical indicator	*Condition*					*Result*
	System quality	*Course quality*	*Learning presence*	*Significant others*	*Self-efficacy*	*Continuous use*
Average value	4.13	3.81	3.60	3.39	3.55	3.46
Standard deviation	0.59	0.61	0.75	0.70	0.67	0.71
Maximum value	5.00	5.00	5.00	5.00	5.00	5.00
Minimum value	1.67	1.33	1.00	1.00	1.00	1.00

3.3 Data calibration

As for the FSQCA method, data calibration is a crucial step because subsequent analysis can only be carried out after it. Referring to previous research, the three calibration points, namely the complete membership point, intersection point, and complete non-membership point, are set at 0.9, 0.5, and 0.1 to transform the values of variables (Greckhamer, 2016), and then, the calibration anchor points can be acquired, which are shown in Table 2. It is worth mentioning that for the purpose of avoiding the configuration attribution problem where the membership degree of antecedent case is exactly 0.50, this article subtracts the 0.001 constant from the 0.5 membership degree (Crilly et al., 2012).

Table 2 Calibration anchor points of variables

Variable		*Anchor point*		
		Complete membership point	*Intersection point*	*Complete non-membership point*
Condition	System quality	5.00	4.00	3.33
	Course quality	4.67	4.00	3.00
	Learning presence	4.67	3.67	3.00
	Significant others	4.00	3.33	2.67
	Self-efficacy	4.33	3.67	3.00
Result	Continuous use	4.33	3.33	2.67

4 Results

4.1 Necessity results

During the necessity analysis, if a condition has a necessity greater than 0.9, it is a core condition that can strongly explain the result and should be considered in subsequent analysis (Zhan and Chen, 2025). On the contrary, if the necessity of a condition is less than 0.9, then it is not necessary for the result (Hou and Yin, 2025). The necessity results of the conditions in this paper are shown in Table 3. As can be seen from Table 3, each condition's necessity does not exceed 0.9, which illustrates that no single condition can explain the formation of high sustained use intention of college students towards MOOC (Feng et al., 2024; Li et al., 2024).

4.2 Configuration results

With reference to existing literature, in this article, the case threshold is set to 3 (White et al., 2021), the consistency threshold is set to 0.75 (Ma, 2024), and the PRI consistency threshold is set to 0.7 (Greckhamer et al., 2018). Through FSQCA software, the resulting configurations can be acquired, which are shown in Table 4. Based on the configuration representation method of Fiss et al. (2014), in Table 4, ● and • indicate the existence of conditions, ⊗ and ⊗ indicate the lack of conditions, ● and ⊗ represent core conditions, •

and ⊗ mean edge conditions, and blank stands for that conditions can exist or not exist in configurations and have no impact on the result.

Table 3 Results of necessity analysis

Condition	*High willingness to continue using MOOC*
System quality	0.717
~System quality	0.516
Course quality	0.626
~Course quality	0.611
Learning presence	0.673
~Learning presence	0.535
Significant others	0.769
~Significant others	0.441
Self-efficacy	0.739
~Self-efficacy	0.454

Table 4 Results of configuration analysis

Condition	*High willingness to continue using MOOC*		
	S1	*S2*	*S3*
System quality			⊗
Course quality		⊗	⊗
Learning presence	•		●
Significant others	●	●	
Self-efficacy	●	●	●
Consistency	0.930	0.892	0.932
Raw coverage	0.496	0.384	0.274
Unique coverage	0.178	0.067	0.022
Overall solution consistency		0.900	
Overall solution coverage		0.584	

In Table 4, there are three configurations that lead to high willingness to continue using MOOC, and the consistency indicators are 0.930, 0.892, and 0.932, respectively, which are effective in light of previous studies (Gao et al., 2025; Ma, 2024) and indicate that all configurations can effectively explain high sustained use. The overall solution consistency index is 0.900, which is valid according to existing literature (Qin and Sun, 2021; Wu et al., 2025) and further shows that the three configurations covering the vast majority of cases are also sufficient for highly sustained use. The overall solution coverage is 0.584, which is reasonable based on prior research (Li et al., 2023b; Ong and Johnson, 2023) and illustrates that the three configurations could explain more than 58% of the reasons for highly sustained use.

Configuration S1 shows that the combined effects of learning presence, significant others, and self-efficacy can trigger college students' willingness to continue using MOOC. Among them, learning presence is an auxiliary condition, and significant others and self-efficacy are core conditions. In the real learning situation, college students can

interact with teachers and classmates, which can promote their understanding and mastery of knowledge and improve their learning enthusiasm. Therefore, if students have a considerable degree of learning presence in the using process of MOOC, which is the same as in the real situation, they will prefer it. Living in a collective environment on campus, college students have many types of significant others, such as friends, classmates, and teachers, and college students will be affected by significant others' behaviours. Consequently, significant others' behaviours of using MOOC for learning or the advice of them to use MOOC will have an impact on college students and encourage college students to continue using MOOC to some degree. Self-efficacy is an internal psychological factor of individuals on whether they can complete a certain job or task. College students with a strong sense of self-efficacy are more likely to believe that they can learn well through MOOC, even when they encounter some difficulties. It should be pointed out that system quality and course quality can exist or not exist in this configuration, without affecting the result, which means that the combined effect of learning presence, significant others, and self-efficacy can sufficiently bring about the willingness of college students to continue using MOOC.

Configuration S2 consists of significant others and self-efficacy, both of which are core conditions, again emphasising the importance of these two conditions. As mentioned above, the behaviours of significant others can have an impact on individuals. College students are surrounded by different types of significant others, including teachers, classmates, and friends. When these significant others seriously use MOOC, or when they support and encourage college students to use MOOC for learning, students' continued use of MOOC will be stimulated and enhanced. Self-efficacy is reflected in the context of college students' continuous use of the MOOC platform by whether they believe they have the ability to continue using it for learning and learn relevant knowledge well. College students with self-efficacy think that they can do things well, and they feel that they can use MOOC well, so they will continue to use the platform. It should be noted that this configuration does not include course quality, and system quality and learning presence can exist or not exist. In short, this configuration can be understood as: For college students with self-efficacy, when significant others around them have a positive effect on their MOOC learning, they will continue to use the MOOC platform.

Configuration S3 includes two conditions that are learning presence and self-efficacy, both of which are core conditions. The sense of presence in learning in the process of using MOOC reflects a similar situation during offline learning. For example, college students can discuss with other learners, communicate with instructors, or have game learning sessions when using MOOC. At the time the MOOC platform includes these features or scenarios, college students' willingness to continue using it will be enhanced. Like the previous two configurations, self-efficacy reflects individuals' confidence in their ability to accomplish something. MOOC learning is not a simple task, and learners may encounter some relatively difficult problems, so it requires long-term investment to complete learning activities. College students with self-efficacy have the confidence that they can successfully accomplish MOOC learning. Consequently, they continue using it for learning. In this configuration, the two conditions of system quality and course quality are not present, while the factor of significant others can exist or not exist, which means the presence or absence of significant others has no effect on the result. Therefore, according to this configuration, for college students with self-efficacy, when the MOOC

platform has a context that aligns with the real learning environment, even without system quality, course quality, or even the influence of significant others, they will continue to use the platform.

Therefore, firstly, it is meaningful to increase the sense of presence during the MOOC learning process, so that college students can more experience the feeling of on-site learning. Secondly, significant others should make full use of MOOC and set a good example through their behaviours to encourage college students to continue using MOOC. Moreover, the significance of self-efficacy is strong, so college students need to have adequate confidence and believe that they have the ability to complete MOOC learning activities. For college students who lack self-efficacy, they should take relevant measures to enhance it. The three configurations obtained in the article do not include system quality and course quality, perhaps because the survey subjects have a certain amount of MOOC learning experience, and the entire system and course quality of MOOC platform can meet their requirements, or they have become accustomed to the platform system and course resources on it.

4.3 Robustness analysis

This article conducts a robustness analysis of the configuration results as follows:

1 Changing the consistency threshold from 0.75 to 0.8 based on the previous literature (Dong and Jiang, 2022; Ma, 2024), and then the results obtained are completely consistent with the original ones.

2 Adjusting the PRI consistency threshold from 0.7 to 0.75 according to the existing research (Li et al., 2025; Yao and Zhong, 2024), and then the results obtained are basically same with the original ones (see Table 5).

Therefore, the configuration results of this article are relatively robust.

Table 5 Results of robustness test

Condition	*High willingness to continue using MOOC (PRI consistency threshold = 0.7)*			*High willingness to continue using MOOC (PRI consistency threshold = 0.75)*	
	S1	*S2*	*S3*	*H1*	*H2*
System quality			⊗		●
Course quality		⊗	⊗		⊗
Learning presence	•		●	●	
Significant others	●	●		●	●
Self-efficacy	●	●	●	●	●
Consistency	0.930	0.892	0.932	0.930	0.914
Raw coverage	0.496	0.384	0.274	0.496	0.311
Unique coverage	0.178	0.067	0.022	0.236	0.051
Overall solution consistency		0.900		0.917	
Overall solution coverage		0.584		0.547	

5 Discussion

5.1 Theoretical contributions and practical implications

MOOC is a meaningful learning platform for acquiring knowledge and has received increasing attention in recent years (Mays et al., 2021). MOOC can play a significant role in assisting teaching in reality. It provides free courses through the Internet and multimedia tools, and learners can freely learn what they are interested in. However, despite the benefits brought by MOOC, the retention rate, participation rate, and completion rate of learners are not high (Elçi and Narayanasamy, 2020). As a result, the sustained use of MOOC, as a vital element of successful learning, has been extensively studied by scholars (Dastane and Haba, 2023; Zhao et al., 2020). However, on the whole, existing research mainly focuses on the analysis of the net effects of influencing factors on the continued use of MOOC, which may inevitably lead to one-sided research results (Huang et al., 2023), and then cannot provide comprehensive explanations for this issue. Therefore, this article takes college students as research subjects and carries out a study on their willingness to continue using MOOC from a configuration perspective based on the FSQCA method, which is more in accordance with the actual situation.

As for theoretical contributions, this paper studies the factors affecting college students' willingness to continue using MOOC from a configuration perspective. Based on the five antecedents proposed in this article, there are three configurations that could lead to college students' willingness. Although these three configurations contain different factors, the results are consistent, which is also a reflection of the characteristics of the FSQCA method (Gao and Liu, 2024). Compared with previous studies, the results of this article provide more comprehensive explanations for this issue. In addition, this article expands the application scope of the FSQCA method and applies it in the field of higher education. The results obtained can provide references for the in-depth and continuous research on this issue.

In terms of practical implications, the study results of this paper can provide references for improving the willingness of college students to continually using MOOC, thus addressing the low participation and retention rates. Developing the platform and resources consumes a lot of time and effort of developers (Sari et al., 2020), and teachers also need to spend time trying to solve difficulties such as the lack of teaching experience in online environments or shooting and editing during the recording process (Blackmon, 2018; Lowenthal et al., 2018). If learners have weak willingness to continually using MOOC, the work enthusiasm of developers and teachers will be negatively affected, and most importantly, this state also makes it difficult for learners to achieve their own goals of MOOC usage and learning (Maya-Jariego et al., 2020; Milligan and Littlejohn, 2016). Therefore, based on the results of this study, the following aspects are worth considering.

Learning presence exists in two configurations, which can indicate its considerable importance. Undoubtedly, learning on the MOOC platform is different from learning in real life because real-life learning scenarios can facilitate face-to-face interaction, which could make the learning process more vivid, the atmosphere more active, and enhance learning motivation. As a result, if MOOC could provide real-life learning scenarios for learners during the use process, such as allowing them to communicate and discuss with teachers and classmates (Guo et al., 2022), and enabling them to feel feedback and support from teachers (Zhang et al., 2018), they will continue to use it. College is a collective living and learning environment where each college student's life and learning

will intersect with significant others such as teachers, classmates, and friends, and students' behaviours will also be influenced by these people around them (Sun, 2023). So, from this perspective, encouraging teachers and students to use MOOC will have a good effect on each other among college student community, which can promote the continuous use of MOOC to learn knowledge through a virtuous cycle. Subjectively speaking, as the main body of continuous use of MOOC, the relevant factors of college students themselves will naturally also affect their willingness to continue using MOOC. Self-efficacy exists as a core condition in all three configurations, which is sufficient to demonstrate its value. In the process of using MOOC, it is inevitable to encounter some difficulties, and college students with strong self-efficacy are more confident in solving them to ensure continued use. However, if the self-efficacy is slightly low, it is possible for students to give up (HadaviBavili and İlçioğlu, 2024). Therefore, enhancing college students' self-efficacy based on internal and external factors is the guarantee for them to continue using MOOC.

5.2 Limitations

It should be acknowledged that this paper is subject to the following research limitations:

1 The data of this paper come from participants' self-reports, thus there may be some measurement bias.

2 The study objects are Chinese college students, and the results obtained are likely consistent with the situation of college students in China. However, as for college students in other countries, more abundant results need to be acquired.

3 Cross-sectional data is used in this paper. As a result, the definition of causality cannot be carried out.

6 Conclusions

The continuous use of MOOC by college students can not only promote them to learn knowledge better, but also stimulate the sustainable development of the platform. To address the issue of low completion rate and user retention rate of MOOC, this article uses the FSQCA method to explore the willingness of college students to continue using MOOC from a configuration perspective based on five factors. The results show that any single factor is not necessary for the outcome. On the contrary, three configurations composed of different factors could lead to continuous use. Based on the three different configurations, this article analyses the willingness of college students to continue using MOOC, which can provide directions for promoting the sustainable development of MOOC.

This paper analyses college students' continuous use of MOOC from a configuration perspective and lays a foundation for further research. On one hand, in order to encourage college students to continue using the MOOC platform for learning and promote the sustainable development of MOOC, more valuable intervention measures should be studied and considered, such as the application of AR and VR technologies. On the other hand, as antecedent condition such as self-efficacy is dynamically changing, future

research should take the use of longitudinal data into account to expand the research findings.

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