

A Systematic Review on Engagement, Motivation, and Performance in MOOCs During the Post-Pandemic Time

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ABSTRACT

Since the outbreak of the pandemic in 2019, pandemic prevention and control has gradually become normal, and internet-based massive open online courses (MOOCs) have become widely available. Aiming to give an insight into learner engagement, motivation, and learning performance in MOOCs in the post-pandemic time, this study reviewed 52 articles through VOSviewer clustering and preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. It is concluded that learners' engagement in MOOCs is restricted by their own management strategy and psychological factors; in addition, learners in MOOCs are motivated by internal or external factors, thus making different responses; lastly, the study finds that in addition to engagement and motivation, the technical conditions of online learning can also affect learning performance to a large or small extent. It is expected that this study can provide reference for the future study into these aspects in MOOCs, especially in the post-pandemic time.

KEYWORDS

Engagement, MOOCs, Motivation, Performance

INTRODUCTION

In response to the COVID-19 pandemic, global higher education has undergone significant changes since its outbreak in 2019. In turn, various sectors have responded to the virus prevention policy of staying at home, which has resulted in most educational institutions worldwide shutting down since March 2020 (Jiang et al., 2021). Recognizing this, the local Ministry of Education has prioritized the enhancement of online education resources and the widespread utilization of various online education platforms (Iosif et al., 2021). As a result, numerous universities have turned to massive open

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online courses (MOOCs) to aid in ensuring the timely completion of teaching tasks. Consequently, technology-oriented online learning platforms have amassed immense popularity and continue to experience significant growth even in the post-epidemic era.

MOOCs were first introduced by a distinguished university in the United States. These courses are rooted in the traditional approach of developing and publishing educational materials, implementing learning management systems, and integrating those systems with more open online resources. The emergence of MOOCs has made high-quality educational materials accessible to everyone who seeks self-improvement, enabling them to benefit from renowned courses taught by distinguished professors at reputable universities (Jordan, 2015). Consequently, MOOCs have the potential to reduce the existing gap in educational resources in colleges and promote educational equity. Currently, as the global pandemic persists, the use of MOOCs is on the rise, with more people and institutions making full use of them to strengthen and improve online courses (Chiu & Hew, 2018).

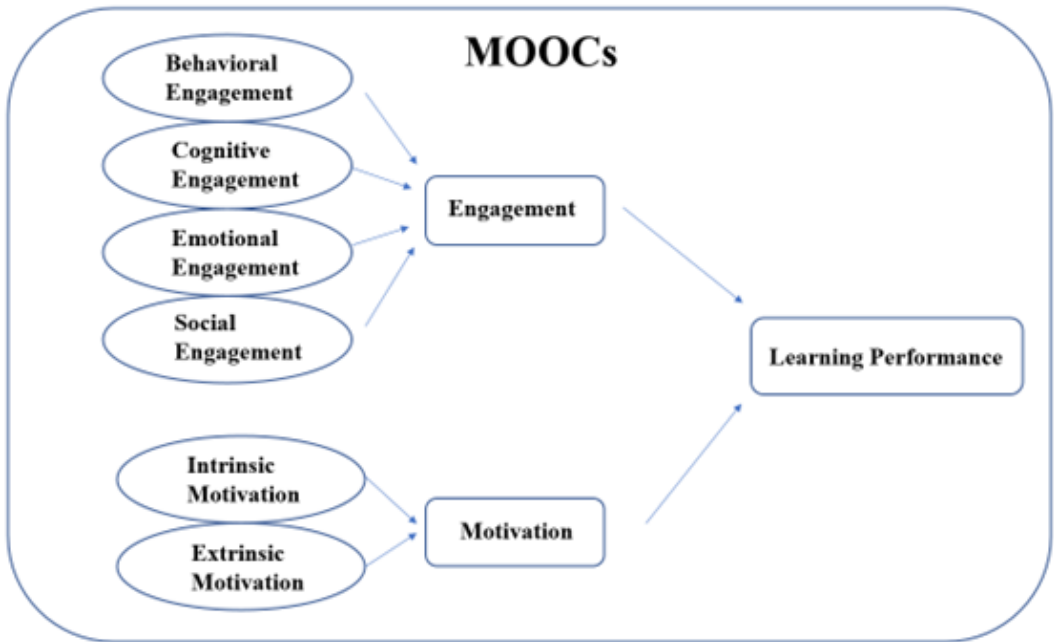
The present study follows a structured research design that entails thirteen distinct steps. Drawing upon the theoretical framework pertaining to the intricate relationship between engagement, motivation, and learning performance, the research proceeds with a series of meticulously executed procedures. These include formulating research questions, conducting a preliminary search, establishing inclusion and exclusion criteria, designing a comprehensive search strategy, exploring relevant search databases, evaluating title and abstract screening, scrutinizing full-text documents, conducting a manual search, extracting and assessing data quality, performing literature analysis, conducting double data checking, and drafting the manuscript. The research team employed VOSviewer clustering to facilitate identification of research foci. To ensure the rigor of the literature review, the researchers drew upon the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and conducted in-depth analysis of the selected articles.

With the increasing number of learners transitioning to MOOCs during and after the global pandemic, several researchers have investigated the implications of MOOCs in the field of education. In line with this trend, the present study aims to identify the key factors affecting learner achievement in MOOCs. Specifically, we seek to investigate the impact of various factors on learner engagement, motivation, and learning performance in MOOCs during the post-epidemic period.

Scholars contend that a positive correlation exists between motivation, engagement, and learning performance. As reported by de Barba, Kennedy, and Ainley (2016), students' motivation and participation regarding learning can significantly forecast their academic performance. Notably, the enhancement of student engagement and motivation can result in a considerable improvement in learning performance, as illustrated in Figure 1 (Brooker et al., 2018). Given that students in MOOCs-based learning lack supervision, they often discontinue their learning and fail to complete assigned tasks within the stipulated time frame. This diminished engagement can trigger lower motivation, and consequently, lower learning performance. Consequently, the exploration of these three variables is crucial in MOOCs-based learning.

Given the complex interplay among the three aforementioned variables, investigating them in greater detail is imperative. Motivated students are more likely to engage actively in MOOCs-based learning, adequately complete tasks sans the guidance of teachers or peers, and ultimately achieve success in their educational pursuits. Conversely, high-performing learners may become more motivated to participate in the learning experience unfettered from any constraints. With unfettered access to educational resources, learners can undertake self-regulated learning, a crucial factor for success in MOOCs-based learning settings. As such, it is paramount to address the intricate relationships between motivation, performance, and engagement to enhance MOOC-based learning outcomes (Yu et al., 2022). The research questions will focus on the factors that may influence learners' engagement, motivation, and performance in MOOCs in the post-epidemic time.

Figure 1. The theoretical framework of the study



THE ROLE OF LEARNERS' ENGAGEMENT

The notion of student engagement has undergone a significant transformation. Initially, student engagement was characterized as a unidimensional construct that revolved around aspects like the duration of time devoted to a task, a student's sense of belonging, participation in academic activities, psychological investment in comprehending knowledge, and the attention and effort expended in the process of learning (Terras & Ramsay, 2015). However, recent research has increasingly viewed student engagement as a multidimensional construct, with varying sub-categories of student engagement being proposed across different studies. Typically, student engagement is classified into four sub-commitments, namely cognitive engagement, behavioral engagement, emotional engagement, and social engagement (Deng et al., 2019).

The four identified categories of engagement each possess distinct attributes. Behavioral engagement pertains to the physical participation and involvement of students in educational activities, which are typically manifested through tangible actions. Students exhibiting behavioral engagement must comply with institutional requirements and participate in both academic and extracurricular activities (Almutairi & White, 2018). The behavioral dimension of student engagement is commonly favored in MOOC research, mainly due to its ease of identification (G. Sun & Bin, 2018). Assessing student behavioral engagement in MOOCs typically involves evaluating discrete learning activities, such as "note-taking" (Veletsianos, 2017) and "video activity" (Stathakarou et al., 2018). Emotional engagement in MOOCs refers to a state of emotional commitment characterized by the students' connection to the institution, instructors, peers, and learning materials (Liu et al., 2022). Positive and negative emotions are both relevant, and research has thoroughly investigated both aspects in the MOOC context. For example, Henderikx et al. (2019) explored various emotions, such as altruistic and inter-generational emotions as well as negativity, which occur in discussion boards. In contrast, cognitive engagement typically involves an individual's psychological investment in understanding complex ideas or concepts and acquiring complex skills (Liu et al., 2022). Attending to metacognition

and self-regulation is also paramount. MOOC researchers investigating cognitive engagement found that learners play a critical role in influencing their self-regulated learning behavior.

Social engagement in MOOCs pertains to socially constructed interactions between learners and instructors as well as among peers, rather than individual characteristics that are associated with other types of engagement. Social engagement is fostered through participation in academic activities with peers, as well as through the quality of interactions and efforts to develop and maintain relationships during the learning process (Wang et al., 2022). Indeed, the significance of collaborative and social learning in MOOCs has been underscored (Loizzo et al., 2017), as well as the examination of interaction and communication patterns in virtual communication platforms, such as online discussion boards (Chiu & Hew, 2018).

The literature has demonstrated the fundamental importance of student engagement in the process of learning and teaching (Tang et al., 2020). Actively engaging with course material has been associated with higher completion rates of MOOCs and improved academic performance (de Barba et al., 2016). Conversely, disengagement has been shown to impede knowledge acquisition and hinder the successful completion of MOOCs tasks (de Freitas et al., 2015).

RQ1: What factors can influence learners' engagement in MOOCs in the post-epidemic time?

THE ROLE OF LEARNER MOTIVATION

Research in the field of learning motivation centers predominantly on two primary categories: intrinsic and extrinsic motivation. Intrinsic motivation is linked to individual attitudes and expectations, pursuit of challenging goals, beliefs regarding the value of learning, and a desire for knowledge acquisition (Hew & Cheung, 2014), as well as an internal sense of contentment (Li et al., 2016). In contrast, extrinsic motivation is contingent upon rewards and recognition, punishment, social influence, and competition (Littlejohn et al., 2016).

Continuous research endeavors have been undertaken to investigate the impact of intrinsic and extrinsic motivation on learner engagement in Massive Open Online Courses (MOOCs) (Kizilcec et al., 2019), along with the underlying factors that drive this effect. These investigations have demonstrated that both extrinsic and intrinsic motivation can enhance performance, albeit to varying extents. Encouragingly, the research of Tang et al. (2018) affirms the centrality of intrinsic motivation in the learning process, positing that learners who are intrinsically motivated are inclined to sustain a consistent level of forum participation. Such learners possess an ardent interest in the course material and exhibit a high level of self-assurance towards attaining proficiency (Xie et al., 2019). They remain highly enthusiastic towards learning and are undaunted by the presence of bottlenecks or complexities, thereby constituting an active contributor to the forum discussions.

On the other hand, extrinsic motivation has limited impact on enhancing the performance of online learning. The decision to enroll in Massive Open Online Courses (MOOCs) is typically determined by expectancy values and achievement goals, with institutional credit requirements often serving as added impetus. These learners are motivated by expectations of the course, the learning materials, and the skills that can be acquired through MOOCs. Furthermore, the prospect of future rewards resulting from undertaking the course is also a crucial aspect of their external motivation (Garcia-Loro et al., 2020). Expectancy-value and achievement goals exhibit a positive correlation, with participants having a high rate of expectancy values - namely, those who are convinced of the course's utility in their personal growth - displaying active engagement, thereby augmenting their motivation to achieve commendable outcomes.

RQ2: What factors can influence learner motivation in MOOCs in the post-epidemic time?

THE ROLE OF LEARNING PERFORMANCE

Learner performance, which is the average grade that every learner obtains in all quizzes within Massive Open Online Courses (MOOCs), is affected by student engagement and motivation (H. T. Tang et al., 2018). Firstly, research indicates that learner participation is the primary indicator that influences learner performance (Phan et al., 2016). Secondly, intrinsic motivation is particularly significant in the context of MOOCs, as it enhances learning performance in various course activities, including online discussions. Upon examining the connection between intrinsic motivation, behavioral engagement, and academic performance, it was found that a significant and positive correlation exists between learning motivation and performance among school students (Formanek et al., 2019).

Previous research (Deng et al., 2019) has produced conflicting findings regarding the relationship between engagement styles and learner performance. On one hand, several studies suggest that learners' engagement positively correlates with their performance (Kizilcec et al., 2017). More specifically, learners who frequently log in, study learning materials, actively participate in discussions, and promptly complete quiz questions tend to perform better (Shin et al., 2018). Conversely, contradictory evidence has surfaced, which suggests that learners who invest less time and effort achieve better academic results than those who exhibit maximum engagement (Arora et al., 2017). Further, even learners who possess multidimensional engagement patterns typically achieve equivalent levels of academic performance (Deng et al., 2019).

With respect to Massive Open Online Courses (MOOCs), this study offers valuable insights into comprehending the efficacy of diverse engagement strategies, and how each facet of engagement contributes to learners' performance. Results obtained indicate that a pragmatic approach towards engagement, coupled with judicious utilization of supportive resources, can strongly influence performance outcomes within the MOOC platform. When assessing learner performance in MOOCs, longitudinal trajectories of forum participation are deemed more accurate measures than overall convergence, especially as emphasized in prior research.

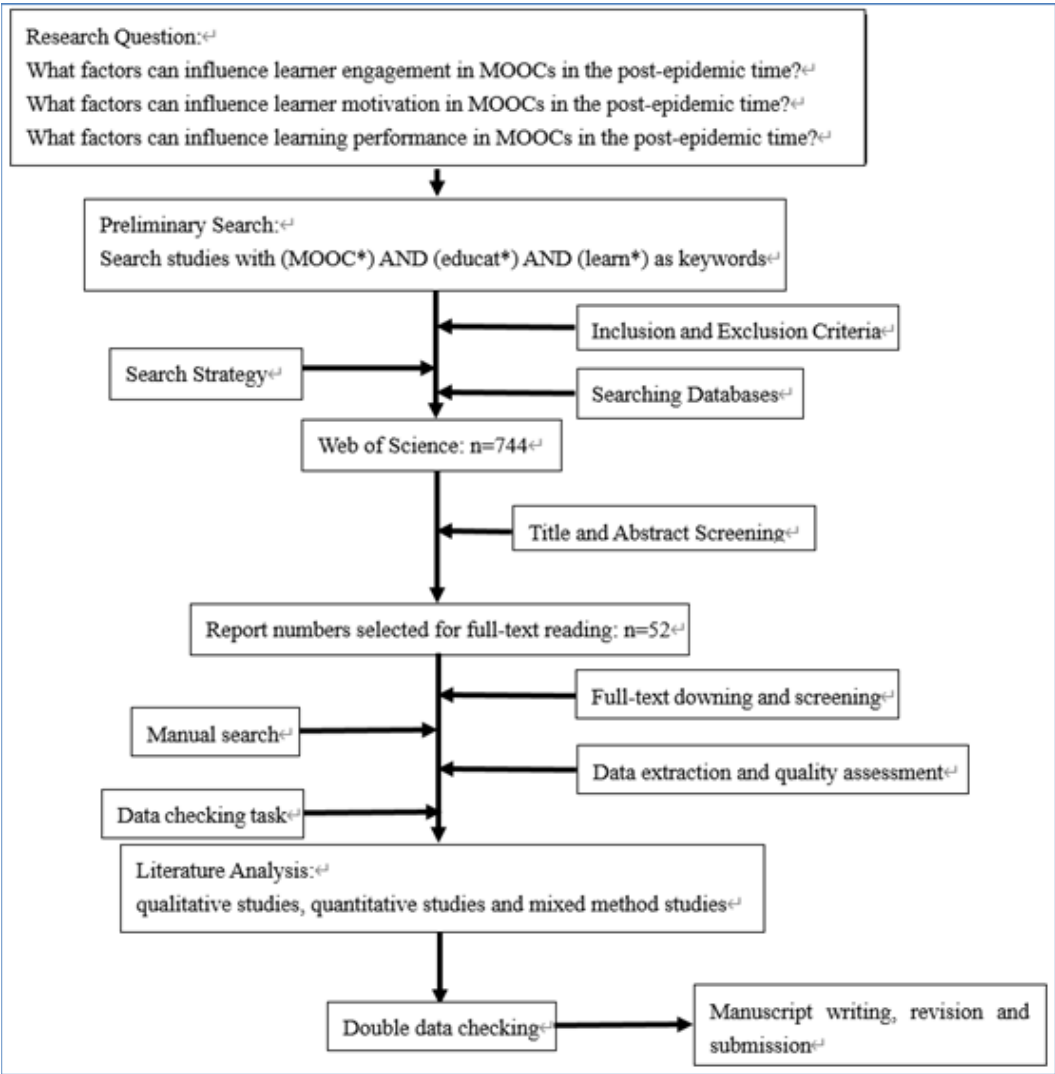
In the context of motivation, the learners who display self-direction towards the application of their concepts within a case-based learning environment, benefit from an enhanced learning effectiveness (D. Lee, Watson, & Watson, 2019). Moreover, a case-based learning strategy has been shown to promote self-motivation in students, which in turn increases their self-management and leads to self-regulated learning, according to previous studies (Stathakarou et al., 2018). The adoption of intrinsic motivation is contingent upon the fulfillment of three fundamental psychological needs, specifically the needs for autonomy, competence, and relatedness (Sun et al., 2019). Satisfaction of these needs can be facilitated by teachers' support, and can foster students' self-regulation in learning, consequently leading to improvements in academic performance, as demonstrated by recent research (Neha et al., 2021).

RQ3: What factors can influence learning performance in MOOCs in the post-epidemic time?

RESEARCH METHODS

The research design utilized a rapid evidence evaluation review methodology as described by Yu, Gao, and Wang (2021). The systematic review was executed in a step-by-step manner as illustrated in Figure 2, as reported by Tawfik and colleagues (2019). Furthermore, the study incorporated relevant theoretical frameworks proposed by various scholars, such as Uman (2011), Muka et al. (2020), Choi et al. (2019), Neely et al. (2010), Petticrew (2001), Hiebl (2023), Phillips and Barker (2021), and Harden et al. (2004). A comprehensive overview of the distinct procedures adopted in each step of the review process is provided in the subsequent section.

Figure 2. A flow chart for the systematic review



PRELIMINARY SEARCH

The researchers initially considered (MOOC*) AND (educat*) AND (learn*) as keywords on the Web of Science under all fields to include all possible studies related to MOOCs. The researchers eventually retrieved 4,230 results from Web of Science ranging from January 2009 to February 2022. On the above basis, the researchers further refined the search results to the articles in the field of Education Educational Research or Education Scientific Disciplines since our attention was mainly paid to the application of MOOCs by teachers and learners. In addition, only studies in the last 5 years were included, after excluding low-quality or irrelevant articles, the researchers finally obtained 1388 results.

Based on bibliographic data, the researchers created a map through the program VOSviewer citing data from Web of Science. When it came to the analysis type, the researchers chose Co-occurrence. In the column “unit of analysis”, the researchers chose “All keywords”, and the counting method is

“full counting”. Then VOSviewer turned into the threshold, in our research, the minimum number of occurrences of a keyword was 10, of the 3903 keywords, 124 met the threshold. For each of the 124 keywords, the total strength of the co-occurrence links with other keywords was calculated. The keywords with the greater total link strength were selected (Figure 3). The link of these selected keywords was 3101, and the total link strength was 8458 (Figure 3). A total of 124 items were divided into 7 clusters (Figure 3)

The total link strength (N = 1155) of MOOCs was the top item. Other items such as engagement (N=442), performance (N=366), and motivation (N=343) were also highly ranked, which indicated that student engagement, motivation, and learning performance in MOOCs were popular research themes in recent decades (Figure 4).

INCLUSION AND EXCLUSION CRITERIA

The present study followed specific inclusion and exclusion criteria to determine eligibility of selected articles. The inclusion criteria comprised of: (1) rigorous study design; (2) provision of sufficient information pertaining to engagement, motivation, and learning performance in relation to MOOCs; (3) publication within the last five years; and (4) utilization of qualitative, quantitative, or mixed research methods. On the other hand, the exclusion criteria involved: (1) poorly designed or low quality studies; (2) investigations on topics unrelated to engagement, motivation, and learning performance or not contextualized in regards to MOOCs; (3) inclusion of book chapters, book reviews, proceeding papers, review articles or unpublished works; and (4) inaccessibility of full-text of the study.

Figure 3. Clustering keywords via VOSviewer

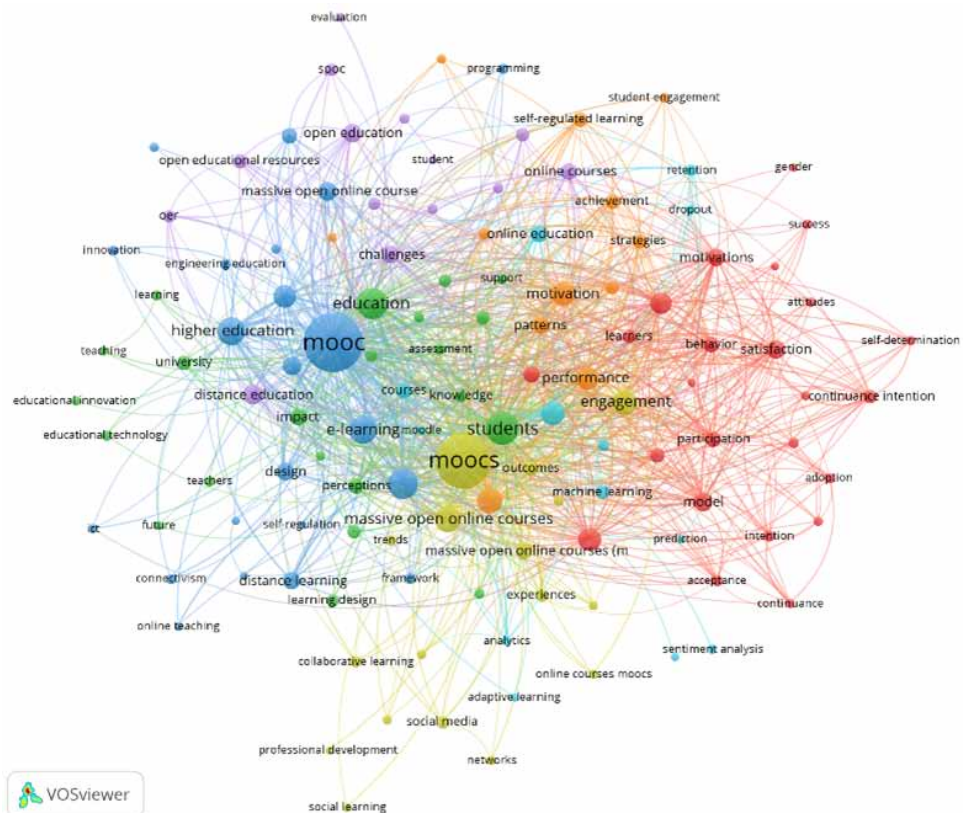


Figure 4. Keywords and total link strength

Create Map

Verify selected keywords

Selected	Keyword	Occurrences	Total link strength
<input checked="" type="checkbox"/>	moocs	383	1155
<input checked="" type="checkbox"/>	mooc	444	1021
<input checked="" type="checkbox"/>	students	140	716
<input checked="" type="checkbox"/>	education	126	483
<input checked="" type="checkbox"/>	online learning	120	452
<input checked="" type="checkbox"/>	engagement	84	442
<input checked="" type="checkbox"/>	performance	71	366
<input checked="" type="checkbox"/>	online	81	363
<input checked="" type="checkbox"/>	massive open online courses	86	355
<input checked="" type="checkbox"/>	motivation	75	343
<input checked="" type="checkbox"/>	higher education	105	337
<input checked="" type="checkbox"/>	higher-education	67	326
<input checked="" type="checkbox"/>	open online courses	60	302
<input checked="" type="checkbox"/>	e-learning	97	285
<input checked="" type="checkbox"/>	motivations	43	275
<input checked="" type="checkbox"/>	satisfaction	45	243
<input checked="" type="checkbox"/>	learning analytics	72	242
<input checked="" type="checkbox"/>	model	44	233
<input checked="" type="checkbox"/>	patterns	39	208

< Back Next > Finish Cancel

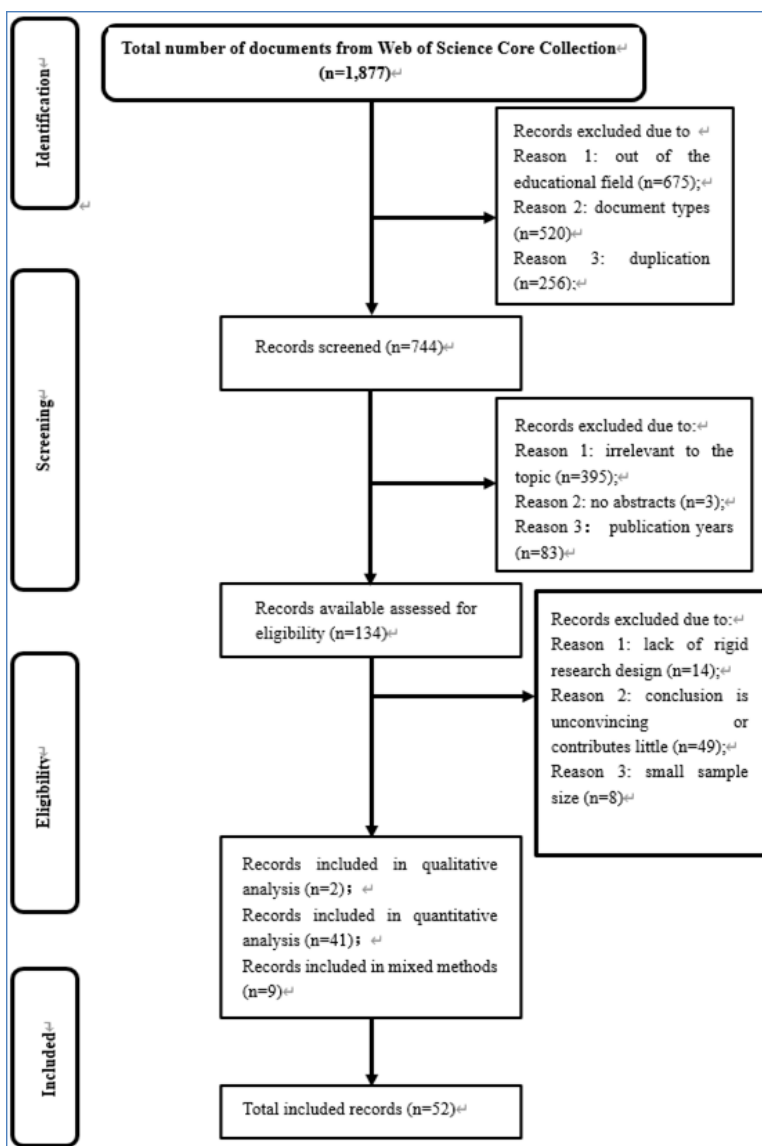
Search Strategy

Upon identifying the research focus, the researchers proceeded to further refine the search keywords to ensure accuracy and specificity. The refined search keywords were “(MOOC*) AND (educat*) AND (engagement)” OR “(MOOC*) AND (educat*) AND (motivation)” OR “(MOOC*) AND (educat*) AND (performance)”, and the search was conducted on Web of Science to gather articles related to Education, Educational Research, or Education Scientific Disciplines. A total of 1202 results were obtained, and subsequent assessment of these studies was conducted in accordance with the Preferred Reporting Items for Systematic Review and Meta-analysis Protocol (PRISMA-P) guidelines (Figure 5) (Moher et al., 2015). The PRISMA-P, developed in 2009, serves as a tool to facilitate the identification of the purpose, methodology, and outcomes of a systematic review or meta-analysis (Page et al., 2021).

LITERATURE SEARCH

The researchers primarily utilized Web of Science, an extensive and sophisticated online database, to retrieve a wide array of scholarly publications. This database encompasses several citation indices, including Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Conference Proceedings Citation Index- Science

Figure 5. A flow chart of the literature inclusion based on PRISMA-P



(CPCI-S), Conference Proceedings Citation Index- Social Science & Humanities (CPCI-SSH), Emerging Sources Citation Index (ESCI), Current Chemical Reactions (CCR-EXPANDED), and Index Chemicus (IC), all of which were readily accessible through Web of Science.

TITLE AND ABSTRACT SCREENING

In prior stages of the research methodology, the elimination of redundant publications and those that diverged from an educational scope or strayed from appropriate typologies had been conducted manually. Thereafter, a quartet of researchers scrutinized the imported articles placed in an autonomous EndNote library. With careful evaluation of each article's title and abstract, researchers selectively excluded entries on reasonable grounds. Specifically, this research necessitated the inclusion of

only those articles that explored the correlation between learner engagement, motivation or learning performance within the context of MOOCs, and whose conclusions were both compelling and significant in the educational domain.

FULL-TEXT DOWNLOADING AND SCREENING

Following rigorous screening procedures, a total of fifty-two appropriate articles were deemed suitable for downloading. Numerous search engines furnished links to freely accessed complete-text publications. In order to acquire comprehensive access to targeted articles, the researchers perused Web of Science, which would identify available full-texts produced by the publisher. In the case where full-texts could not be located, the investigators sought out relevant online research websites routed according to the provided Digital Object Identifier (DOI) numbers. Furthermore, the research team arrived at a consensus regarding articles requiring thorough scrutiny in the event of disagreements.

MANUAL SEARCH

To comprehensively explore all potential sources of information, the investigators pursued a manual search for relevant publications that may have been excluded in the initial search (Vassar, Atakpo, & Kash, 2016). Additionally, the researchers conducted supplementary searches for literature pertaining to online learning, particularly within the context of the post-pandemic era. As engaging with authors or experts may result in delayed responses, the researchers primarily relied on the examination of reference lists from previous studies. It is important to note that all of the potentially applicable articles were subject to a meticulous review process in accordance with the established inclusion criteria (Tawfik et al., 2019).

DATA EXTRACTION AND QUALITY ASSESSMENT

In order to evaluate the quality of the articles, the researchers employed an assessment methodology based on the approach proposed by Feng, Gonzalez, Amor, Lovreglio, and Cabrera-Guerrero (2018). Two researchers who specialize in applied linguistics, one of whom was an internal author, initially rated the articles. Subsequently, two researchers with expertise in other areas within the liberal arts evaluated the articles according to three core criteria:

- (1) How relevant is the topic of the study to address the focus of this systematic review?
- (2) How relevant are the conclusions used to answer the research questions of this systematic review?
- (3) How relevant is the research design for addressing the research questions of this systematic review?

Following a thorough review of the literature, the researchers were tasked with rating each study based on a series of questions utilizing a scoring system ranging from 1 to 3. In this context, a score of 1 indicated a low correlation, while a score of 3 represented a high correlation, yielding a potential total score between 3 and 9. By utilizing SPSS, the researchers achieved a satisfactory level of inter-rater reliability ($k=0.78$) and calculated the mean score for the selected articles (mean=6.18). Accordingly, it may be concluded that the studies identified for inclusion in this systematic review were relevant and of high quality.

DATA CHECKING

In order to mitigate the potential impact of human error and bias, the researchers conducted a thorough process of data checking. Specifically, each full-text article was examined and compared against its

previously assigned score in order to detect discrepancies or other errors in the data. Additionally, in an effort to ensure that all articles were reviewed with the same level of rigor and consistency, different reviewers were assigned to assess the articles in question several days later.

LITERATURE ANALYSIS

The researchers employed the literature analysis approach to synthesize prominent literature pertaining to the topic at hand over the past ten years (Lei, Zhang, Tan, Zhang, & Liu, 2018). This methodical strategy enabled the researchers to effectively isolate and extract a set of influential factors drawn from the literature (Mendes, da Cruz, & Angelo, 2015). Following a thorough process of searching, analyzing, and verifying the content of the collected articles, the researchers classified them into three distinct categories based on their specific focus areas: learners' engagement, learner motivation, and learning performance. Subsequently, the researchers conducted a detailed and meticulous review of these articles, taking careful and purposeful notes within each category. Drawing from an established theoretical framework detailing the complex interplay between learners' engagement, motivation, and learning performance, the researchers identified and summarized the various factors that are likely to influence learners' performance across different variables.

RESULTS AND DISCUSSION

RQ1: What Factors Can Influence Learners' Engagement in MOOCs in the Post-Pandemic Time?

Learners' engagement manifests in diverse forms such as behavioral, cognitive, emotional, and social engagement, which each exhibit distinct characteristics and interplay with one another during the learning process. In analyzing the factors that impact engagement in MOOCs, the researchers have classified them into two primary categories: management factors and psychological factors.

Management Factor

Amidst the COVID-19 epidemic, there has been significant progress in the development of online courses, prompting a growing number of learners to shift their focus to open-access platforms. Nevertheless, online learning encounters several issues, with an abundance of learners who participate actively in these courses inevitably failing to complete them. Therefore, self-regulation assumes a critical role in enhancing learning engagement, while learners' control is found to exert limited influence on engagement, as revealed by recent research (Y. Q. Sun, Guo, & Zhao, 2020).

Existing literature on online learning universally acknowledges the significance of time management skills for learners engaged in MOOCs. Such courses provide a diverse learning experience that is not bound by time or geography. By leveraging effective time management strategies, learners can complete the required tasks with ease, while also being able to allocate sufficient time for other activities. However, in practice, this ideal scenario is seldom achieved. In fact, research has shown that encouraging learners to pre-commit to a specific learning schedule has relatively weak, negative impacts on their long-term engagement, persistence, and performance. This is attributed to the low cost of breaking such commitments, as violations of scheduled task completion are not met with serious consequences, but rather with psychological repercussions, as evidenced by the findings of Baker, Evans, and Dee (2016).

The adoption of diverse engagement strategies in MOOCs by learners can be attributed to their individual objectives. The lack of alignment between their initial intentions and subsequent engagement levels indicates differences in their approach to time management. While some learners exhibit a high degree of proficiency in managing their time, others might not fare as well. Nonetheless, a majority of MOOCs learners tend to engage with the learning platform during their leisure time (Li et al., 2022).

Psychological Factor

During the pandemic, when physical social activities have been restricted, individuals have been compelled to rely on the Internet as a medium for social interaction and exchange of ideas and emotions. Consequently, there has been an unprecedented surge in the dependence on the Internet, particularly concerning psychological well-being.

Scholars have discovered a positive correlation between the previously mentioned four types of engagement (Wei, Saab, & Admiraal, 2021). Specifically, if a learner experiences emotional satisfaction with a particular aspect of Massive Open Online Courses (MOOCs), their behavioral engagement is likely to increase unconsciously, resulting in frequent course participation. Throughout the learning process, the learner will continuously deepen their understanding of the coursework, particularly with regard to the advantages of persistent study. This contributes to improvements in their cognitive engagement and encourages active involvement in the interactive environment. In the context of MOOCs, social engagement is also essential, requiring more high-quality peer interaction activities to enhance learners' performance through interactivity (Meek et al., 2017).

In light of existing literature, it is advantageous to utilize a framework that caters to the three fundamental psychological needs essential to the design of Massive Open Online Courses (MOOCs). These needs, namely autonomy, competence, and relatedness, align with the tenets of self-determination theory and have been found to foster positive user experiences (N. I. Martin, Kelly, & Terry, 2018). Furthermore, a crucial factor in promoting engagement in online learning is the level of self-efficacy regarding internet-based learning. This construct can be subdivided into general internet-based learning self-efficacy, which has a positive impact on both behavioral and emotional engagement, and functional internet-based learning self-efficacy, which contributes to emotional and cognitive engagement in MOOCs (Kuo, Tsai, & Wang, 2021).

Adopting a multi-faceted and person-centered approach, a recent investigation has categorized MOOC learners into three cohorts based on their levels of engagement across distinct dimensions. Specifically, the three categories of learners are delineated as individually engaged, least engaged, and wholly engaged, with the former manifesting high levels of behavioral, cognitive, and emotional engagement but limited social engagement. The least engaged cluster demonstrates moderate levels of cognitive and emotional engagement but reduced levels of behavioral and social engagement. Lastly, wholly engaged learners exhibit the highest levels of engagement across all four types, within and across the three aforementioned groups. The authors also emphasize the importance of accounting for learner diversity, such as gender and motivation, when evaluating performance in MOOCs, rather than solely relying on engagement metrics (Deng et al., 2019).

RQ2: What Factors can Influence Learner Motivation in MOOCs in the Post-Pandemic Time?

Motivation is the psychological feature that prompts learners to initiate, guide, and maintain certain behaviors with willingness, which is usually comprised of extrinsic motivation and intrinsic motivation.

External Factor

MOOCs have emerged as an alternative mode of delivering educational content during the current pandemic era. In contrast to traditional brick-and-mortar educational models, MOOCs possess unique attributes that differentiate them from face-to-face instruction. However, theoretically driven pedagogical interventions may interact with students' diverse motivations in unanticipated ways, as suggested by previous research (Baker et al., 2016). Engagement-promoting variables such as teaching presence, rewards, and perceived usefulness are among the key factors that have been found to influence learners' motivation in MOOCs.

In the context of MOOCs, individuals who are not officially enrolled as students tend to prioritize the acquisition of practical skills and relevant certificates over self-development, self-improvement,

and the enjoyment of learning, which are favored by registered students (Hew & Cheung, 2014). The latter cohort do not consider certificates and skills to be urgently required by their profession. Although the level of guidance provided by instructors in MOOCs is less than that in traditional teaching modalities, the implementation of daily learning tasks by instructors and the attainment of institutional credits serve as external motivators for learners (Brunskill, Zimmaro, Thille, & Acm, 2018). In addition, instructors' behaviors can have a motivational impact on students, and they can enhance learners' satisfaction by intentionally promoting positive emotions while minimizing negative emotions. Positive emotions can broaden learners' perspectives and stimulate them to explore novel ideas. This is conducive to pleasance or desirable situational responses (Wu, Han, Sun, Wan, & Zhao). Once good results are achieved, learners will be rewarded either spiritually or materially by teachers or institutions, which is also attractive to learners.

Internal Factor

Diverse types of motivations often produce distinct outcomes. Intrinsically motivated learners typically engage actively in a range of learning activities, as they possess an inherent drive, and are enthusiastic and attentive throughout the learning process. Conversely, although extrinsically motivated learners may occasionally achieve favorable results, their progress tends to be passive since they lack autonomy, which limits their involvement (Tang et al., 2018). In MOOCs, individuals who participate due to a waning interest in the course content are prone to instability, unsustainability, and cognitive inertia, attributable to unclear objectives and a dearth of impetus, adversely affecting their learning efficacy (Li et al., 2022). The most important thing is that participation is not a whim. Instead, learners' regular participation should persist until the end of the course. In this way, learners can finally benefit from the course and achieve satisfactory results (Canal et al., 2015).

Hence, digital platforms ought to leverage their distinct advantages, entailing educational innovation in both pedagogical approaches and instructional materials, by integrating features such as gamification, simulations, and project-based learning. These innovative strategies aim to enhance learners' satisfaction, enabling them to engage actively and successfully complete their course of study (Romero-Rodriguez, Ramirez-Montoya, & Gonzalez, 2020).

RQ3: What Factors can Influence Learning Performance in MOOCs in the Post-Pandemic Time?

As previously discussed, academic attainment within Massive Open Online Courses (MOOCs) is invariably influenced by learners' level of motivation and engagement, as well as their ability to acquire and apply knowledge effectively. The scholars in the field have identified two principal factors that significantly impact these outcomes: technological factor and learner factor.

Technological Factor

The interplay between performance and the contextual and environmental factors of learning serves as a critical determinant of success (Formanek et al., 2017). Superior online learning experiences can enhance learners' retention of knowledge, deepen their understanding, and cultivate a continuing desire to learn, ultimately resulting in desirable learning outcomes and a positive trajectory toward future achievement.

Massive Open Online Courses (MOOCs) have proven to be an effective strategy for ensuring the continuity of academic instruction during the COVID-19 pandemic (Lau et al., 2018). However, MOOCs may not always represent the optimal solution for certain educational domains. For instance, practical disciplines that heavily emphasize experiential learning may not benefit as substantially from online instruction as they would from conventional approaches that entail real-time demonstrations and in-person communication. Hands-on practice is indeed essential to enable learners to truly comprehend and master the requisite competencies. Nevertheless, online learning is preferable when it comes to knowledge acquisition and conceptual understanding (Altalhi, 2021).

Following the subsidence of the epidemic, and the ongoing application of preventative measures, online learning has become a normative mode of instruction, in which learners have progressively acquired proficiency in using digital devices to attain knowledge and enhance their cognitive repertoire. In comparison to the initial phase of the outbreak, the level of users' digital literacy has markedly increased.

Learner Factor

It is imperative to explore learners' engagement and motivation, as their assessment can aid in identifying prospective successful learners (Hew, 2016). A positive association between motivation and engagement exists (Ben-Eliyahu et al., 2018) with motivation serving as the primary catalyst for engagement (Martin et al., 2017). Regular involvement in scholastic activities promotes students' autonomy, enabling them to comprehend the curriculum in greater depth and, thereby, stimulating their interest (Lee, Tzeng, Huang, & Su, 2021). Whether through a strategy for enhancing learners' engagement or motivation, improved academic performance, greater academic knowledge retention, and favorable outcomes can be achieved, either directly or indirectly (Chaw & Tang, 2019).

Alongside the examination of engagement and motivation as key determinants of performance, the provision of continuous formative feedback to learners is recognized as an efficacious approach for optimizing their academic achievements. Feedback can serve as a tool for enhancing students' performance by discerning areas of improvement (Cobos & Ruiz-Garcia, 2021; Wang & Yu, 2022). By utilizing feedback that is grounded in students' previous performances, learners can gain a comprehensive understanding of their performance and make strides towards enhancing their academic abilities.

CONCLUSION

Major Findings

The present study's findings suggest that management and psychological factors significantly influence learners' engagement patterns, which ultimately impact their course learning and activity engagement under diverse conditions. Motivation was examined in terms of extrinsic and intrinsic aspects, each with distinct emphases. Extrinsic motivation emphasizes external stimuli, while intrinsic motivation arises from the learners themselves. Nonetheless, both engagement and motivation were found to have either direct or indirect effects on learners' performance, which were identified as learner factors in this investigation. Furthermore, the assessment of learners' proficiency in using Internet-based learning technology also played a role in shaping their performance.

LIMITATIONS

This study is not immune to limitations. Firstly, the collection of publications for this study solely relied on the Web of Science, which may have resulted in limited sources. In the future, researchers should consider incorporating other corpora to expand the literature base. Secondly, this study primarily concentrates on MOOC learners' engagement, motivation, and learning performance during the post-pandemic era. However, the existing literature is sparse, primarily due to the limited availability of resources. As such, it's anticipated that future researchers will incorporate additional relevant literature to either supplement or progress this study further.

FUTURE RESEARCH DIRECTIONS

In order for MOOCs to continue achieving success, it is paramount for them to appropriately address eight challenges, which include online teaching, support, assessment, external target groups, flexibility,

quality, reputation, and efficiency based on the work of Schophuizen et al. (2018). Future research endeavors should concentrate on analyzing the behavioral disparities among MOOC learners by categorizing them into corresponding classes based on their behavioral patterns. This approach would help implement effective targeted teaching on MOOCs as suggested by B.W. Liu, Wu, Xing, Cheng, and Guo. To provide learners with necessary support in times of any learning-related or technical issues, MOOC providers should establish a distinct support system as recommended by Al-Adwan (2020). Moreover, MOOC designers should put more emphasis on formative assessment as suggested by Hew, Hu, Qiao, and Tang (2020). Finally, to achieve specific teaching goals, MOOCs ought to formulate diverse courses aligned with the cultural attributes of people from different ethnic groups, as highlighted by Qin, Jia, and Ma (2019). MOOCs designers must ensure good instructional quality by using the right pedagogical approaches or categorizing class videos into theoretical video, experimental video and analytic video (Fianu et al., 2018).

Future research could consider utilizing the structural equation model to continuously explore the various learner factors that influence learning intentions, extending beyond the perceived usefulness and perceived ease of use identified as significant elements, to include self-directed learning through motivation, self-monitoring, and self-management. Such an approach has been proposed by Garrison (1997) and if employed, MOOCs instructors can potentially achieve desired effects in incorporating MOOCs into their educational practices, as suggested by Al-Adwan (2020). Another pertinent characteristic related to learner completion in MOOCs is interpersonal interaction and learning analytics, as highlighted by Yu (2021) and Navio-Marco & Solorzano-Garcia (2021). Nonetheless, future explorations rooted in the stimulus-organism-response (S-O-R) framework could expand on the technological and environmental features of MOOCs to include aspects like interactivity, media richness, and sociability in a bid to further enhance the platform's overall effectiveness, as proposed by Zhao, Wang, and Sun (2020).

Subsequent research endeavors can focus on investigations concerning student engagement, motivation, and learning performance within MOOCs, taking into account the unique learning circumstances, specifically in the wake of the epidemic outbreak. The resultant findings will serve as a useful resource for both MOOCs users and developers, with the ultimate aim of bolstering the educational role and influence of the MOOC platform in concert with other pedagogical methodologies. The pedagogical implications of this research may manifest as teachers attaining a better understanding of learners' individual characteristics, thus allowing them to more effectively devise targeted measures tailored to divergent learning objectives and individual student capabilities. By doing so, students can realize enhanced academic achievements. In addition, the lessons garnered from MOOC-centric education can also be extended to conventional teaching approaches, thereby bringing about a significant transformation in educational practice.

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