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Navigating the Maze: A Multifaceted Exploration of Barriers to MOOC Implementation in Higher Education

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ABSTRACT
Massive open online courses (MOOCs) are transforming the educational landscape worldwide. Many higher education institutions are adopting MOOCs to offer quality education to large numbers of learners. However, despite their potential, MOOCs face numerous barriers to their successful adoption and implementation into traditional higher education. This paper identifies eighty-eight MOOC-related barriers by reviewing existing literature in-depth using hermeneutics and data-driven qualitative content analysis. The eighty-eight barriers were grouped into five conceptual categories. i.e. Technological (T), Institutional (I), Pedagogical (P), Personal (P), and Socio-Cultural (S). The "TIPPS" framework was developed based on these five categories, identifying the key barriers that impede the adoption and implementation of MOOCs in higher education. The TIPPS framework will guide HEI, policymakers, system developers, and scholars by providing a summary of MOOC barriers.

Keywords: MOOCs, Barriers, Higher education, HEI, Conceptual framework

Introduction

Massive Open Online Courses (MOOCs) have emerged as a powerful and influential force in the field of education (Azimi et al., 2024; Rambe & Moeti, 2017). MOOCs are characterized by their ability to involve large numbers of participants in quality education at free or low cost to almost anyone having access to the internet. Massive Open Online Courses provide a cost-effective and adaptable method for acquiring new expertise, progressing in one's profession, and delivering high-quality educational opportunities (Ossiannilsson, 2022). They have significantly altered how individuals acquire knowledge and gain access to information (Ossiannilsson, 2022). In addition to offering a free forum for professional growth, it adds that MOOCs are founded on learner-centered teaching (Roy, 2022). During COVID-19, when the whole system stood at a standstill, MOOCs helped continue higher education, providing flexibility, affordability, and the opportunity for learning relevant to the market (Anand Shankar Raja & Kallarakal, 2021). MOOCs are considered a viable substitute for conventional education because of their adaptability and ease of access (Papadakis, 2023). MOOCs are utilized by developing nations to improve the accessibility and standard of education, particularly in the fields of technology and business (Wall & Khalid, 2021). MOOCs have gained prominence in Asia and receive support from central governments through financial backing and legislative frameworks (Farley, 2023)

MOOCs, since its inception in 2008, have profoundly and widely influenced higher education worldwide (Nascimento Cunha et al., 2020; Voudoukis & Pagiatakis, 2022). It plays a vital part in higher education by enabling opportunities for online learning (Stagg et al., 2023; Tang & Xing, 2021; White et al., 2020), improving digital skills, and promoting transformational behaviors among researchers and organizations (León-Urrutia, 2019). MOOCs play a vital role in revolutionizing higher education on a worldwide scale. They improve accessibility, raise standards, and attract talented individuals. This is supported by statistics from NPTEL and Coursera courses, particularly during the epidemic (Rangaswamy et al., 2021). MOOCs are becoming increasingly popular in higher education, and they can transform how students get instruction and obtain micro degrees by completing numerous courses (Murray, 2019). In higher education environments, MOOCs have been incorporated into various learning types, fusing formal, non-formal, and informal learning experiences (Cha & So, 2020). To improve the efficacy of instruction in higher education, creative approaches to curriculum development have been explored, such as merging MOOCs with SPOCs (Li et al., 2020). There are many scholars who are working on integrating MOOCs into higher education. MOOCs have gained momentum as many countries are adopting them as a way to improve the gross enrollment ratio. However, despite their potential, MOOCs face numerous barriers to their successful implementation and integration into the traditional higher education system.

(Guerrero-Quiñonez et al., 2023) their study has mentioned barriers to the use of MOOCs in higher education, encompassing limited opportunities for interaction, individualized feedback, poor rates of course completion, and difficulties in fostering student interest and motivation owing to the vast number of participants. Similarly,(Usher & Hershkovitz, 2022) mentioned that the absence of an openness feature, insufficient knowledge and abilities, inadequate technology infrastructure, limited self-regulated learning skills, and a lack of teacher assistance are barriers to MOOC adoption in higher education. (Bhaskar et al., 2021) have investigated barriers hindering the acceptance of MOOCs among instructors in Indian colleges and universities and found that technological barriers, financial limitations, and insufficient teacher awareness are the main impediments. (N. Zulkifli et al., 2020) conducted a study to identify the primary barriers to using MOOCs at a specific polytechnic institution in Malaysia. The study revealed that the lack of internet/Wi-Fi connectivity emerged as a significant hindrance to incorporating MOOCs into the classroom. According to (Bylieva et al., 2021), implementation of MOOCs in higher education encompasses challenges in tailoring activities to individual students, the ease of accessing others' answers, and reduced student participation in online platforms, as emphasized in the case study on enriching the philosophy course.

As is evident from existing literature, various researchers have analyzed MOOC-related barriers to higher education from a micro perspective. There is a complete lack of literature that holistically brings all the barriers to MOOC adoption and implementation in higher education under a single domain. To fill the gap in the literature, this paper aims to explore and unveil various barriers that affect the adoption and implementation of MOOCs into traditional higher education by undertaking an in-depth review of MOOC literature. The author identifies and examines the main barriers and sub-barriers. These barriers are then classified under the proposed TIPPS framework to provide a structured approach to conceptualizing and addressing the same. The proposed TIPPS framework will assist education stakeholders in developing and implementing solutions.

Methodology

This study conducted a literature review using a two-step procedure. In the first step, relevant articles were found by searching many research databases like Scopus, Web of Science, ERIC, IEEE Xplore, Science Direct, and PubMed. To identify pertinent papers from the research databases, the author employed keywords such as MOOC, MOOCs, and Massive Open Online Courses, along with a variety of synonyms that conveyed the meaning of "barrier," such as shortcomings, problems, limitations, issues, obstacles, challenges, and difficulties. Various names describe the process of acquiring knowledge via internet technology, such as online education, online learning, e-learning, m-learning, virtual learning, internet learning, remote education, web-based education, and web-based learning. The authors intentionally avoided all such similar words. They focused exclusively on MOOC, MOOCs, and massive open online courses, with the motto of discovering all the barriers that affect MOOC implementation and adoption in higher education. Furthermore, the author also utilized Google Scholar to get additional peer-reviewed publications to enhance the variety and comprehensiveness of the papers discovered in our search. A comprehensive evaluation was conducted on both qualitative and quantitative studies. There were no restrictions based on the nation of study, and only articles published in English were included. The search span was from the year 2008 to the year 2023; it was in 2008 that the term MOOC was first introduced to the world by Dave Cormier, a faculty member at the University of Prince Edward Island in Canada, to describe an online course being provided by the University of Manitoba (McGreal et al., 2015). During the second phase of the sorting procedure, the authors thoroughly examined each paper's title, abstract, introduction, and conclusion. Papers unrelated to barriers to MOOC adoption and implementation were excluded.

Following the preliminary evaluation, a grand total of 278 papers were discovered. A compilation of 113 barriers was generated. Nevertheless, it was noted that multiple barriers that were found, albeit described using various terminology, conveyed the same barriers in meaning. The authors investigated all remaining publications, employing hermeneutic phenomenology and content analysis to discern the essential coherence and structure from the textual object of research. The literature recommends utilizing several questions to examine artifacts: How are barriers stated? What comprises the data population? What is the specific setting or circumstances in which the experiment is conducted? What are the limits of the analysis? What do the article's conclusions determine? After encoding the inference categories and deleting duplications, 88 distinct barriers to MOOC adoption and implementation in higher education were established (Refer to Tables I-V for precise definitions, detailed descriptions, and relevant literature references on barriers). The authors managed to highlight the overlap in current literature by identifying the barriers observed in several papers, as indicated in Tables I-V author column.

Proposed TIPPS framework

From Table (I – V), it is evident that the predominant body of research primarily examines specific barriers or examines barriers from a narrow perspective, such as the viewpoints of teachers, students, or administrators. While it is essential to prioritize this focus to manage systems development and research experiments effectively, stakeholders must also maintain a contextual understanding of how their activities align with the broader body of literature. Prior studies have

lacked a comprehensive examination of the barriers to MOOCs. There is a need for a thorough analysis of each barrier and how they interact and affect the acceptance and effectiveness of MOOCs

The author noted that many researchers have discussed different barriers to MOOCs as per their research area. Although there are many barriers to MOOC, these are the mostly scattered. A comprehensive list of all the barriers is absent. (Henderikx et al., 2018) in his study found forty-four barriers that a MOOC learner may encounter during his MOOC journey. (Henderikx et al., 2018) empirically classify thirty-five barriers into four different categories i.e. (1) social interaction, (2) course design, (3) lack of technical and online learning skills, and (4) time, support, and motivation. According to Henderikx et al., "course design" is a MOOCs related barrier, whereas "lack of technical and online learning skill" as well as "time support and motivation" are non-MOOC-related barriers, and "social interaction" are partly MOOC and partly non-MOOC related barriers. Building on his earlier work, (Henderikx et al., 2021) further refined the classification of the forty-four barriers into six categories, namely, (1) social interactions, (2) academic skills, (3) content-related issues, (4) technical skills and problems, (5) situational issues and (6) individual motivation. Content-related issue categories were identified as MOOC-related barriers, academic skills, situational issues, and individual motivation as non-MOOC-related barriers, and social interaction and technical skills as partly MOOC-related. Similarly, (Ma & Lee, 2019), in their study about barriers to the use of MOOCs in developing countries faced by a student, identified seven main barriers and their various sub-barriers, namely usage barriers, value barriers, risk barriers, traditional barriers, image barriers, individual-level barriers, and environmental level barriers. Additionally, (Dang et al., 2022) classified the different barriers to MOOCs under four categories of barriers, namely usage barriers, value barriers, tradition barriers, and image barriers.

The above classification of MOOC barriers is from the individual perspective. When holistically analyzing the barriers to MOOC adoption and implementation in higher education, these individual barriers are one among many other categories of barriers. (Yunusa, 2018) conducted research on the level of knowledge, acceptance, and obstacles faced in sub-Saharan Africa about MOOCs in higher education. A total of sixty-five barriers and challenges were identified, which were grouped under seven broad categories, namely, (1) ICT infrastructure challenges, (2) system-related challenges, and (3) student/ workforce skills/ training deficit. (4) administrative / management support and policy issues, (5) technical support issues, (6) resource constraint and budgetary issues, and (7) cultural challenges and lack of resources. Similarly, barriers to the process of digitally transforming higher learning institutions can also be classified into (1) environmental, (2) strategic, (3) organizational, (4) technological, (5) people, and (6) cultural (Gkrimpizi et al., 2023). One of the most detailed studies on barriers to technology-based learning in higher education was presented by (Mirata et al., 2022), which divided barriers thematically into five conceptual categories: organizational challenges, regulatory challenges, pedagogical challenges, technological challenges, and global challenges.

After conducting a detailed review of MOOC-related barriers in higher education from available literature, the author could not find a single framework where all the barriers presented in this paper could fit. Although various frameworks incorporate most of the barriers to MOOCs, there is a conspicuous absence of a framework that incorporates MOOC-related barriers in higher education. Accordingly, the TIPPS framework was proposed to facilitate structuring all MOOC-related barriers into technological, institutional, pedagogical, personal, and socio-cultural categories (see Figure 1).

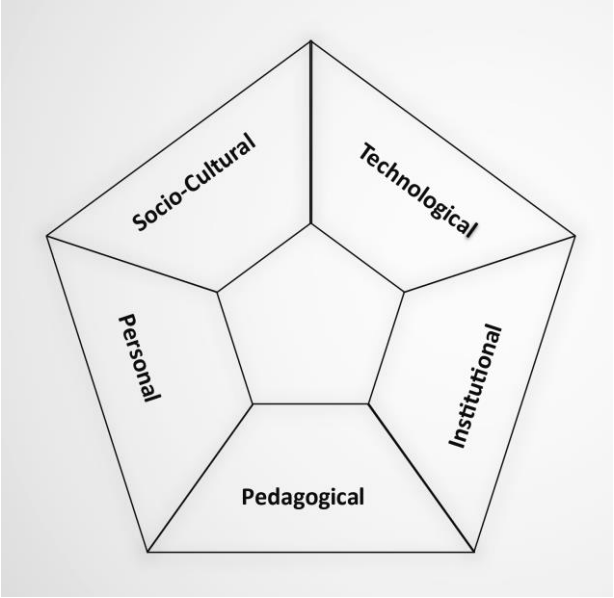

Figure 1.
TIPPS framework – organizing technological, institutional, pedagogical, personal and socio-cultural barriers.

The "technological" category in this TIPPS framework contained eight MOOC barriers related to technology: Unreliable internet and broadband, ICT skills, lack of technical support, inadequate technical infrastructure, digital divide, lack of device compatibility, availability of computer and other equipment, and unreliable electricity. The unique barrier names have been revised to reflect the definition and addition of a conceptual category called "Technology." Refer to Table I for comprehensive information regarding barriers 1-8.

Table I: Barriers in the literature pertaining to MOOC: **Technological**

S. No	Barriers	Descriptions	Supporting Literature
1.	Unreliable Internet and broadband	Difficulty in accessing online resources, course materials, video lecture streaming and downloading, and online interaction in the discussion forums due to slow and unreliable internet and broadband.	(Ma & Lee, 2019; Rautela et al., 2022; Weinhardt & Sitzmann, 2019)
2.	ICT skills	A lack of ICT skills will make it difficult for learners to navigate MOOC platforms, utilize online tools, access course content, and interact with peers and instructors.	(Gameel & Wilkins, 2019; Kop, 2011; Kop et al., 2011; Ma & Lee, 2020; Mishra et al., 2022; Singh & Kakkar, 2023; Weinhardt & Sitzmann, 2019)
3.	Lack of technical support	Lack of technical personnel to perform various tasks such as network management, system maintenance, and helping learners experiencing technical problems.	(Aljaraideh, 2019; Khlaif et al., 2021; Marrhich et al., 2020; Schophuizen et al., 2018)
4.	Inadequate technical infrastructure	It refers to outdated hardware, software, servers, and insufficient bandwidth capacity.	(Kumar & Al-Samarraie, 2018; Ma & Lee, 2020; Naveed et al., 2017; Schophuizen et al., 2018; Singh & Kakkar, 2023)
5.	Digital divide	It refers to disparities in digital skills, usage opportunities, technology access, and internet connectivity	(Gameel & Wilkins, 2019; Rautela et al., 2022; Singh & Kakkar, 2023)
6.	Lack of device compatibility	Technological challenges arise due to the compatibility issue of MOOC content with desktop computers, laptops, tablets, and smartphones. The different operating systems, screen sizes, resolutions, processing power, and speed further exacerbate the problems.	(Celik & Cagiltay, 2023; Klindžić et al., 2019)
7.	Availability of computer and other equipment	Insufficient access to essential hardware like computers, laptops, mobile, and tablets can hinder access to MOOCs.	(Ma & Lee, 2019)
8.	Unreliable electricity	This refers to load shedding, voltage fluctuations, etc.	(Mirata et al., 2022)

The twenty "institutional barriers" to MOOC in higher education from relevant literature included in the proposed TIPPS framework are resource constraint, lack of publicity, lack of policy support, absence of clear strategic vision, institutional reputations, inadequate infrastructure, recognition and accreditation, lack of training, institutional support, weak regulatory policies, external target group/ addressing target audience, educational flexibility, educational efficiency, lack of financial support, workload, meeting deadlines, insufficient awareness within the academic institution, lack of quality in instructional design, unavailable course credit, complex copyright and intellectual property, inadequate research on lifelong learning with MOOCs. Refer to Table II for comprehensive information regarding barriers 9-28

Table II: Barriers in the literature pertaining to MOOC: **Institutional**

S. No	Barriers	Descriptions	Supporting Literature
9.	Resources constraint	It refers to inadequate financial resources for personnel, technology, and content creation that the universities face.	(Gregori et al., 2018; Ma & Lee, 2020; Naveed et al., 2017; Shapiro et al., 2017)
10.	Lack of publicity	Higher education institutions' insufficient promotion and marketing efforts hinder the visibility and engagement of MOOCs among potential learners, reducing their impact and reach.	(Ma & Lee, 2020)
11.	Lack of policy support	The absence of supportive policies at institutional levels can create barriers to the integration and sustainable use of MOOCs in higher education institutions.	(Gregori et al., 2018; Na-Ajele Gadija Williams-Buffonge, 2021; Naveed et al., 2017; Schophuizen et al., 2018)
12.	Absence of clear strategic vision	Institutions may find it difficult to successfully deploy MOOCs if they don't have a clear strategic plan for integrating them into their curriculum.	(Gregori et al., 2018; Schophuizen et al., 2018)
13.	Institutional reputations	Higher education institutions' reputation and prestige significantly impact the perceived value and credibility of their MOOC offerings, with strong institutions attracting more learners and lesser-known institutions facing significant hurdles.	(Alraimi et al., 2015; Ruipérez-Valiente et al., 2022)
14.	Inadequate infrastructure	This includes poor infrastructure, human resources, and unsustainable resources by HEI, other than technical infrastructure.	(Mishra et al., 2022; Rautela et al., 2022)
15.	Recognition and accreditation	MOOCs' lack of formal recognition and accreditation may hinder their acceptance in academic and corporate.	(Chugh et al., 2023; Cilliers et al., 2023; Shapiro et al., 2017)
16.	Lack of training	Training is not readily available for faculty and staff to design, deliver, and assess MOOCs. The instructors may encounter difficulties in adjusting to distinctive teaching techniques and technological tools.	(Bordoloi et al., 2020; Naveed et al., 2017; Rautela et al., 2022)
17.	Institutional support	Without sufficient institutional backing, MOOC programs may lack the essential resources and incentive to flourish, endangering their sustainability and long-term survival.	(Gregori et al., 2018; Hakimi et al., 2024; Nortvig & Christiansen, 2017a)
18.	Weak regulatory policies	This refers to poor regulatory policy on quality assurance, methods of assessment, transfer of course of credits, and privacy of data	(King & Lee, 2023; Tømte et al., 2017)
19.	External target group	Universities may find it difficult to pinpoint and connect with the MOOC target audience, especially for external learners outside the university.	(León-Urrutia et al., 2018; Schophuizen et al., 2018)
20.	Educational flexibility	Higher education institutions may struggle to adapt traditional models to MOOCs due to rigid academic structures and scheduling constraints.	(Schophuizen et al., 2018)

21.	Educational efficiency	The widespread adoption of MOOCs in higher education may be hindered by concerns about their efficiency and usefulness as instructional tools.	(Schophuizen et al., 2018)
22.	Lack of financial support	Insufficient funding for MOOC development, maintenance, and marketing can hinder institutions' ability to offer high-quality MOOCs, compete in the market, and meet evolving learners' needs.	(Naveed et al., 2017)
23.	Insufficient awareness within HEI	Stakeholders inside educational institutions may struggle to accept MOOCs due to a lack of awareness or knowledge about their benefits and potential.	(Mishra et al., 2022)
24.	Unavailable course credit	The lack of mechanisms for awarding course credits for completed MOOCs may diminish their appeal and value to learners seeking formal recognition.	(Bordoloi et al., 2020)
25.	Complex copyright and intellectual property rights (IPR)	Challenges to copyright laws and intellectual property rights might impede the development and utilization of MOOC resources in educational settings.	(Bordoloi et al., 2020)
26.	Integration issues	Integrating MOOCs with traditional courses requires substantial modifications in course design and delivery, which are challenging for institutions that lack the necessary infrastructure, resources, and support to implement such changes.	(Dalipi et al., 2018; de Lima Guedes et al., 2022)
27.	Institutional collaboration	Lack of trust, communication, coordination, legal, financial, and administrative challenges hinder institutional collaborations.	(Erkkie & Kadhila, 2021; Nortvig & Christiansen, 2017b)
28.	Ineffective LMS	Poor interface and technical glitches affect the functionality and usability of the LMS used for MOOCs.	(Veluvali & Surisetti, 2022)

The “pedagogical barriers” of MOOCs to higher education enumerated in the proposed TIPPS framework encompass barriers relating to teaching methodology, assessment challenges, course-related issues, and instructor challenges. There are 20 barriers were found in the literature and grouped under pedagogy. These 20 barriers are lack of interaction with the instructor and learner, inadequate interaction with peers, failure to understand the content, inadequate background, poor course design, limited feedback, inappropriate online assessment, dropout, no formal set of entry requirements, skill gap among educator, lack of time to develop MOOC courses, instructor resistance to change, having a sense of speaking into a vacuum, lack of learner participation in an online forum, ethics in online education, redundancy, lack of knowledge and training on the part of teacher and administrator using ICT, lack of motivation of the teachers in altering their teaching methods from chalk-talk to techno-pedagogy. Refer to Table III for comprehensive information regarding barriers 29-48.

Table III: Barriers in the literature pertaining to MOOC: **Pedagogical**

S. No	**Barriers**	**Descriptions**	**Supporting Literature**
29.	Lack of interaction with the instructor and learner.	The absence of direct engagement between instructors and learners can lead to disconnection and hinder engagement and support in MOOCs.	(Atiaja & Guerrero, 2016; der & Mohamed Fahmy Yousef, 2015; Gregori et al., 2018; Hew & Cheung, 2014; Hone & El Said, 2016; Ma & Lee, 2020; Zhao et al., 2020)
30.	Inadequate interaction with peers	Limited or insufficient opportunities for learners to engage, collaborate, and interact with their fellow learners. These affect knowledge	(Kop et al., 2011; Ma & Lee, 2020; Moore & Blackmon, 2022; Rautela et al., 2022; Zhao et al., 2020)

		sharing, critical thinking, and community building among learners in MOOC.	
31.	Failure to understand the content	Refers to the challenges that learners may face when they struggle to understand or grasp the course material, topics, or subject matter provided in the MOOCs.	(Hew & Cheung, 2014; Hone & El Said, 2016; Ma & Lee, 2020)
32.	Inadequate background	Learners with insufficient prerequisite knowledge or skills may struggle to engage with course materials and follow the instructor's instructions.	(Hone & El Said, 2016; Ma & Lee, 2020; Shapiro et al., 2017)
33.	Poor course design	It refers to the inadequacy in course design, unclear learning objectives, and information overload, which results in dissatisfaction and learner dropout.	(Kim et al., 2021; Kumar & Al-Samarraie, 2018; Moore & Blackmon, 2022; Wei & Taecharungroj, 2022; Xiao et al., 2019)
34.	Limited feedback	The capacity to provide tailored feedback can be constrained in large MOOCs. Learners may miss out on personalized instruction and techniques for improvements.	(Atiaja & Guerrero, 2016; der & Mohamed Fahmy Yousef, 2015; Hew & Cheung, 2014; Rautela et al., 2022; Wei et al., 2021; Xiao et al., 2019)
35.	Inappropriate online assessment	Inappropriate or ineffective assessment methods can fail to measure learners' knowledge and skills in MOOCs. Online assessments are prone to online cheating and plagiarism.	(der & Mohamed Fahmy Yousef, 2015; Hew & Cheung, 2014; Rautela et al., 2022; Wei & Taecharungroj, 2022)
36.	High dropouts	There are high dropouts in MOOC courses because of a lack of motivation, challenging course content, and competing priorities.	(Hew & Cheung, 2014; Huang et al., 2023; Mishra et al., 2022; Rasheed et al., 2019)
37.	No formal set of entry requirements	Anyone can enroll in MOOCs.The lack of specific prerequisites may lead to diverse groups of learners with different levels of readiness and motivation, which might complicate the design and delivery of the course.	(der & Mohamed Fahmy Yousef, 2015; Xiao et al., 2019)
38.	Skill gap among instructor	Variations in the abilities and capacities of instructors can affect the standard of instruction and student assistance.	(Gordillo et al., 2021; Schophuizen et al., 2018)
39.	Lack of Time to Develop Courses	Developing top-notch MOOCs can require a significant investment of time. Faculty members may find it challenging to balance their regular teaching obligations with the development of MOOCs.	(Blackmon, 2018; Naveed et al., 2017)
40.	Instructor resistance to change	Higher education institutions may struggle to integrate MOOCs if teachers resist using new technologies or teaching methods.	(Naveed et al., 2017; Stackhouse et al., 2020)
41.	Having a sense of speaking into a vacuum	Instructors may experience a sense of disconnection and a decline in motivation as there is no direct interaction with learners.	(Hew & Cheung, 2014)
42.	Inadequate participation in online forum	Inadequate discussion in online forums may defeat the purpose of critical thinking that MOOC wants to imbibe.	(Almatrafi & Johri, 2019; Du et al., 2022; Galikyan et al., 2021)
43.	Ethical consideration	The legitimacy and trustworthiness of MOOC assessments and certifications are questioned by concerns about academic dishonesty and	(Rautela et al., 2022; Surahman & Wang, 2022)

		unethical conduct, such as plagiarism and cheating.	
44.	Redundancy	Repeated content or activities may result in boredom and impair the effectiveness of educational experiences.	(Ginting et al., 2022; Kumar & Al-Samarraie, 2018)
45.	Faculty motivation	MOOCs fail if the faculties are not motivated to use technology to improve their instruction.	(Bordoloi et al., 2020; Doo et al., 2020; Yıldırım, 2022)
46.	Faculty effort	Inadequate effort put in by faculty due to workload pressures, lack of training, and intellectual property rights concerns.	(Blackmon, 2018; Zhu et al., 2019)
47.	Inflexibility in delivery mode	Inflexibility in MOOC delivery modes, particularly self-paced, can hinder learner engagement compared to instructor-paced courses.	(Avello et al., 2020; Onah et al., 2022)
48.	Pedagogical model	A shift from a traditional pedagogical model to a more student-centered and self-directed learning model for MOOCs.	(Daniel et al., 2015; Shah et al., 2022)

The author identified numerous individual or personal barriers to MOOCs in higher education and classified them into the "Personal" category. Learners or students encounter these obstacles when completing their course, which can impede their participation and success in MOOCs. The TIPPS framework has 32 unique barriers that pertain to students or learners. Refer to Table IV for comprehensive information regarding barriers 49- 80.

Table IV: Barriers in the literature pertaining to MOOC: **Personal**

S. No	**Barriers**	**Descriptions**	**Supporting Literature**
49.	Lack of self-regulations	The absence of self-regulation among students in MOOCs could hinder their ability to organize, establish goals, and assess progress, adversely affecting their learning experience and achievement.	(Kim et al., 2021; Kizilcec et al., 2017; Kop, 2011; Littlejohn et al., 2016; Ma & Lee, 2019, 2020)
50.	Time constraint	Learners with demanding schedules may struggle to allocate time to MOOCs, as balancing academics with personal and professional responsibilities may hinder participation.	(Chen et al., 2018; Eglseer, 2023; Ma & Lee, 2020; Rautela et al., 2022; Shapiro et al., 2017)

51.	Economic or Financial problem	Financial constraints, such as the cost of internet connectivity, equipment, or additional resources, may hinder certain learners from fully participating in MOOCs.	(Chen et al., 2018; Ma & Lee, 2020)
52.	Motivation	The absence of intrinsic and extrinsic motivation in MOOCs might contribute to passive learning behavior, poor completion rates, and inadequate learning outcomes.	(Atiaja & Guerrero, 2016; Duncan et al., 2022; Kizilcec et al., 2017; Littlejohn et al., 2016; Tseng et al., 2022; Wei et al., 2021)
53.	Digital literacy	Limited digital literacy abilities might hamper learners' involvement with MOOCs, reducing their ability to navigate online platforms, get instruction materials, and interact successfully in online environments.	(Cagiltay et al., 2023; Weinhardt & Sitzmann, 2019)
54.	Lack of awareness	A lack of understanding of MOOC platforms, courses, and their probable influence on education might discourage individuals from considering these options.	(Ma & Lee, 2019, 2020; Singh & Kakkar, 2023)
55.	Belief	Learner belief in themselves that they can adopt MOOC and be successful.	(Bárkányi, 2021; Woon, 2019)
56.	Resistance	Resistance to change to innovative educational formats might limit the uptake of MOOCs since some individuals may reject the transfer from conventional educational environments to virtual ones.	(Al-Adwan, 2020; Ma & Lee, 2017)
57.	User experience	Poor user experience when accessing MOOC courses, such as technical glitches, poor navigation, or inadequate assistance.	(Shapiro et al., 2017; Zhao et al., 2020)
58.	Risk barrier	Perceived risks such as course quality, instructor knowledge, and data privacy may prevent users from participating in MOOCs.	(Ma & Lee, 2019)
59.	Image barrier	Negative perceptions or stigmas concerning MOOCs, such as their credibility, validity, and social acceptance, might dissuade individuals from exploring them.	(Dang et al., 2022; Ma & Lee, 2019)
60.	Lack of incentives	Learners may not feel inspired to engage in MOOCs if there are no incentives, such as certification of completion, digital credentials, or educational credits for finishing the course.	(Chaw & Tang, 2019; Hew & Cheung, 2014; Ma & Lee, 2019)
61.	Attitude	Attitudes regarding online learning, particularly their efficacy, ease, and value, strongly impact involvement with MOOCs. Positive attitudes encourage greater satisfaction and acceptance, while negative attitudes limit adoption.	(Ma & Lee, 2019; Shapiro et al., 2017)
62.	Low commitment	The self-paced nature of MOOCs needs a high level of dedication from learners. Without a solid commitment to study and time management, learners might struggle to stay motivated.	(Douglas et al., 2020)

63.	Bad previous experience	People with bad experiences with MOOCs or online learning may be discouraged from using these platforms again.	(Semenova & Rudakova, 2016; Shapiro et al., 2017)
64.	Online Format	Some learners may prefer conventional classroom instruction and may not be comfortable with the virtual environment of a MOOC	(Shapiro et al., 2017)
65.	Lack of energy or efforts	Learners may lack the energy and effort necessary to finish a MOOC.	(Shapiro et al., 2017)
66.	Lack of self-confidence	Learners who lack self-confidence may fail to complete a MOOC, as they might lack faith in their ability to succeed.	(Shapiro et al., 2017)
67.	Learning disability	Learners with learning difficulties may encounter significant challenges when engaging in and completing a MOOC.	(Shapiro et al., 2017)
68.	Cognitive ability	Learning a MOOC might be difficult for students with weaker cognitive capacities.	(Huang et al., 2023)
69.	Social status	A perception that MOOCs are a lower-quality alternative to traditional degrees could discourage some students from considering them.	(Huang et al., 2023)
70.	Emotional factor	Emotional issues, such as anxiety or sadness, might impair a learner's capacity to engage in and finish a MOOC.	(Deng, 2021; Huang et al., 2023)
71.	Learning behavior	Learner practices can affect their involvement and completion rates in a MOOC.	(Huang et al., 2023; Jin, 2023; Yang & Su, 2017)
72.	Having other priority	Learners may have competing commitments, such as employment or familial responsibilities, which might impede their ability to engage in and successfully finish a MOOC.	(Gregori et al., 2018; Hew & Cheung, 2014)
73.	Increased learner responsibility	MOOCs impose a higher level of obligation and liability on the learner, which could discourage specific learners.	(Rautela et al., 2022)
74.	Barriers of level of education	Individuals with lower educational attainment may encounter extra obstacles when engaging in and successfully finishing MOOCs.	(Oudeweetering et al., 2018; Semenova & Rudakova, 2016)
75.	Basic subject knowledge	Lack of expertise in particular subjects might impede comprehension and involvement with MOOC material, impairing the understanding of complex subjects.	(Gregori et al., 2018; Semenova & Rudakova, 2016)
76.	Perceived usefulness and ease of use	The usefulness and simplicity of utilizing MOOCs can significantly impact individuals' motivation to engage, as learners may be less eager to enroll or finish courses if they perceive them as unimportant.	(Aharony & Bar-Ilan, 2016; Pozón-López et al., 2021)
77.	Social support	People in MOOCs may become demotivated due to a lack of social support from classmates, family, or coworkers, resulting in loneliness and demotivation.	(Buyut & Abdullah, 2021; Gregori et al., 2018; Hsu et al., 2018)
78.	Technophobia	Technophobia is an aversion or fear of technology, which frequently shows itself as opposition to MOOCs and other online learning platforms because people feel overwhelmed by it.	(Khasawneh, 2023; Oluwalola, 2015)

79.	Social loafing	Learners put less effort due to the absence of an instructor, which can lead to a lack of engagement and participation in MOOCs and a lack of accountability and responsibility among learners.	(Sanz-Martínez et al., 2019)
80	Student's readiness	Students do not have the necessary time management, self-directed learning skills, or technological proficiency to succeed in MOOCs	(Alshammari, 2022; N. Z. Zulkifli et al., 2019)

Society and its prevailing culture profoundly impact the teaching and learning environment. The "socio-cultural" category of the author's proposed model contains eight unique barriers identified from relevant literature. These barriers are language, tradition, socio-economic inequalities, digital gender gap, localization of contents, cultural differences, access gap, and generation gap. Refer to Table V for comprehensive information regarding socio-cultural barriers.

Table V: Barriers in the literature pertaining to MOOC: **Socio-Cultural**

S. No	Barriers	Descriptions	Supporting Literature
81.	Language	MOOCs, primarily in English, can exclude non-native speakers due to language barriers, affecting their learning experience and engagement.	(Huang & Jew, 2024; Kop et al., 2011; Liyanagunawardena et al., 2013; Ma & Lee, 2020; Naveed et al., 2017; Shapiro et al., 2017; Weinhardt & Sitzmann, 2019)
82.	Tradition	Traditional educational practices and beliefs can hinder the adoption of MOOCs in higher education, as resistance to change and preference for conventional teaching methods may hinder their full acceptance.	(Al-Adwan, 2020; Dang et al., 2022; Ma & Lee, 2019, 2020)
83.	Socio-economic inequalities	Socio-economic disparities in internet connectivity, a lack of access to devices, and financial constraints exacerbate existing educational inequalities among learners from disadvantaged backgrounds.	(Gameel & Wilkins, 2019; Lambert, 2020; Morgan, 2023)
84.	Digital gender gap	Unequal opportunities in technology use and digital skills development may hinder women's access to online courses.	(Jiang et al., 2018; Wang et al., 2023)
85.	Localization of contents	The successful deployment of MOOCs in higher education may be hampered by the absence of locally tailored and culturally appropriate course material, which may fail to engage a varied population of learners.	(Liu et al., 2020; Ruipérez-Valiente et al., 2022)
86.	Cultural differences	Cultural diversity in higher education might impair the efficiency of online courses due to variances in learning methods, interpersonal norms, and educational expectations.	(Gameel & Wilkins, 2019; Liu et al., 2020; Tang, 2021)
87.	Access gap	The access gap in MOOC participation is mainly due to technological, internet connectivity, and digital literacy skills disparities.	(Gameel & Wilkins, 2019)
88.	Communication style	Online interaction in MOOCs can be challenging across cultures. Misunderstandings can arise due to different expectations around formality, tone, and use of humor in written communication.	(Riehemann & Jucks, 2018; Wu et al., 2021)

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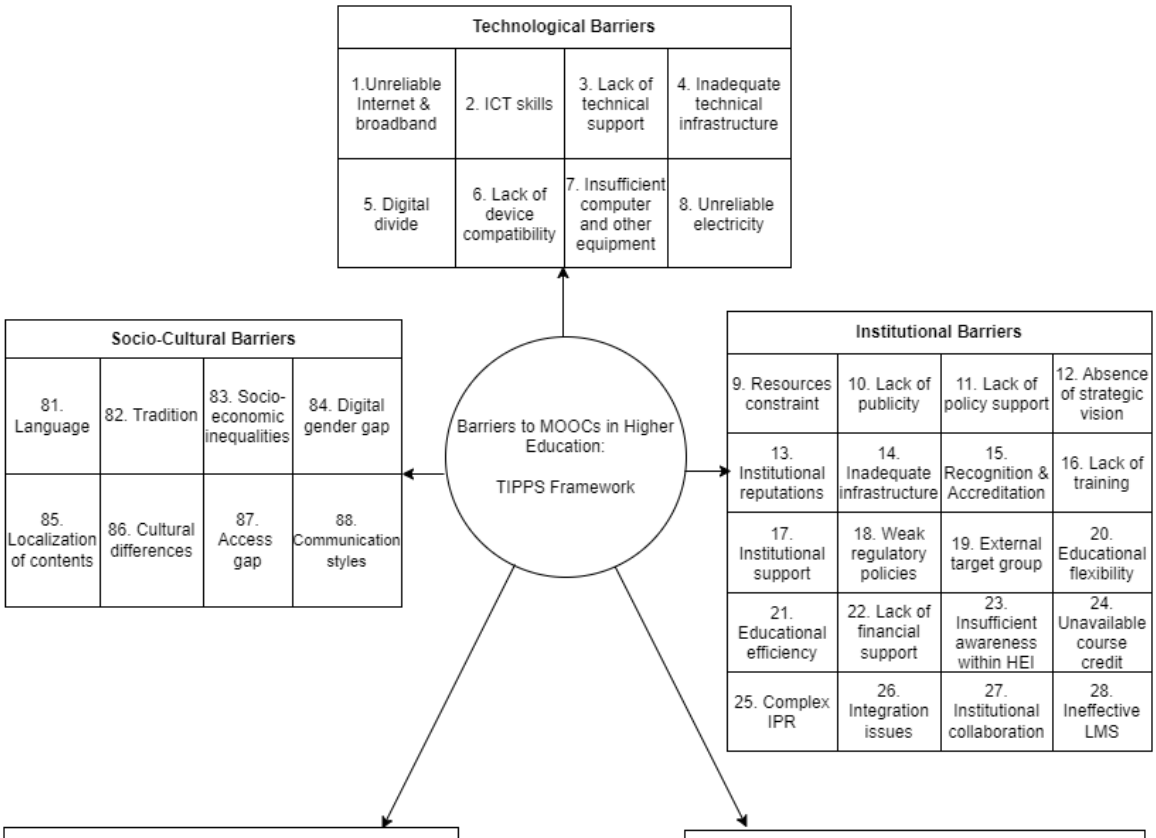
Figure 2 illustrates the TIPPS framework, a conceptual model synthesizing existing research. This framework aids both researchers and practitioners in placing their studies within a broader context and comprehending the interconnectedness of barriers to implementation success.



Technological Barriers			
1.Unreliable Internet & broadband	2. ICT skills	3. Lack of technical support	4. Inadequate technical infrastructure
5. Digital divide	6. Lack of device compatibility	7. Insufficient computer and other equipment	8. Unreliable electricity

Socio-Cultural Barriers			
81. Language	82. Tradition	83. Socio-economic inequalities	84. Digital gender gap
85. Localization of contents	86. Cultural differences	87. Access gap	88. Communication styles

Institutional Barriers			
9. Resources constraint	10. Lack of publicity	11. Lack of policy support	12. Absence of strategic vision
13. Institutional reputations	14. Inadequate infrastructure	15. Recognition & Accreditation	16. Lack of training
17. Institutional support	18. Weak regulatory policies	19. External target group	20. Educational flexibility
21. Educational efficiency	22. Lack of financial support	23. Insufficient awareness within HEI	24. Unavailable course credit
25. Complex IPR	26. Integration issues	27. Institutional collaboration	28. Ineffective LMS

Personal Barriers			
49. Lack of self-regulations	50. Time constraint	51. Economic / Financial problem	52. Motivation
53. Digital literacy	54. Lack of awareness	55. Belief	56. Resistance
57. User experience	58. Risk barrier	59. Image barrier	60. Lack of incentives
61. Attitude	62. Low commitment	63. Bad previous experience	64. Online format
65. Lack of energy or effort	66. Lack of self-confidence	67. Learning disability	68. Cognitive ability
69. Social status	70. Emotional factor	71. Learning behavior	72. Having other priority
73. Increase learner's responsibility	74. Barriers of level of education	75. Basic subject knowledge	76. Perceived usefulness & ease of use
77. Social support	78. Technophobia	79. Social loafing	80. Student's readiness

Pedagoical Barriers			
29. Lack of interaction with instructor & learner	30. Inadequate interaction with peers	31. Failure to understand the content	32. Inadequate background
33. Poor course design	34. Limited Feedback	35. Inappropriate online assessment	36. Dropout
37. No formal set of entry requirements	38. Skills gap among educators	39. Lack of Time to Develop Courses	40. Instructor resistance to change
41. Having a sense of speaking into vacuum	42. Inadequate participation in online forum	43. Ethical considerations	44. Redundancy
45. Faculty motivation	46. Faculty effort	47. Inflexibility in delivery mode	48. Pedagogical model

Figure 2.

88 Barriers in TIPPS framework (technological, institutional, pedagogical, personal and socio-cultural)

Conclusion

Higher educational institutions (HEI) in many countries have adopted MOOCs to offer flexible, high-quality education to large numbers of learners, thereby increasing the gross enrollment ratio (GER). University Grant Commission, a statutory and regulatory body for higher education in India, has mandated all HEI in India to deliver at least twenty percent of courses through the SWAYAM MOOCs platform. However, the adoption and implementation of MOOCs in higher education is challenging. There exist many barriers that hinder its adoption, and thus, a comprehensive understanding of the diverse barriers is required.

To date, no comprehensive framework effectively brings together the literature on the barriers to adopting and implementing MOOCs in higher education. Through a qualitative analysis of MOOC literature published between 2012 and 2023, the proposed TIPPS framework seeks to organize knowledge about adoption and implementation barriers related to MOOCs. By reviewing 278 sources, the author identified 88 unique barriers to MOOC adoption and implementation in HEI and categorized them under the proposed TIPPS framework (i.e., technological, institutional, pedagogical, personal, and socio-cultural). The 88 identified barriers under the TIPPS framework consist of eight technological, twenty institutional, twenty pedagogical, thirty-two personal, and eight socio-cultural barriers.

The TIPPS framework has been created to better support vital educational stakeholders in understanding the barriers preventing MOOC uptake and implementation in HEI and contextualizing contemporary domain activity.

Limitations and future research

There are certain limitations in this study, as with any other research**.** First, although much effort was put into incorporating diverse articles, review papers, conference papers, books, and book chapters, the authors do not assert that the TIPPS frameworks contain all the barriers to MOOCs in higher education. Over time, new barriers can be further identified and added to the TIPPS framework**.** Secondly, the TIPPS framework cannot remain static since the educational landscape constantly evolves. Thus, the existing barriers can be modified or deleted based on changing circumstances to depict the reality of contemporary times. Third, the TIPPS framework consists of eighty-eight barriers to MOOCs in higher education; the author could not identify which barriers are most important or least important. The author suggests that future studies can be on the rankings of the barriers identified by the TIPPS framework. Fourth, although many barriers to MOOCs in higher education have been enumerated, this study does not mention any strategy to overcome them. Future research can be about strategies to overcome such barriers**.** Lastly, further effort is necessary to utilize the TIPPS framework in practical settings fully. However, identifying the distinct 88 barriers and classifying them into T/I/P/P/S (Technology, Institutional, Pedagogical, Personal, and Socio-Cultural) categories helps education stakeholders by emphasizing the current significant barriers to MOOCs in higher education

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