

RESEARCH ARTICLE	MOOC usage: A Review and Prospect
Savita Kulkarni	Doctor (PhD) Symbiosis Institute of International Business, Symbiosis International (Deemed University) Pune, Maharashtra, India Email Id: savita_kulkarni@siu.edu.in ORCID: 0000-0003-3274-0110
Shubhasheesh Bhattacharya	Doctor (PhD) Symbiosis Institute of International Business, Symbiosis International (Deemed University) Pune, Maharashtra, India Email Id:shubhasheesh.bhattacharya@siib.ac.in ORCID: 0000-0003-4955-6758
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Abstract The purpose of this research is to investigate the combined impact of main components of massive open online courses (MOOCs), such as MOOC kinds, instructional design, and learner-related characteristics, on actual MOOC usage, which has never been looked into before. The technology acceptance model (TAM) of learning is used to determine this influence. Literature from 2008-19 has been reviewed. Journals indexed/abstracted in Scopus, EBSCO, and Google Scholar are shortlisted for the current review. In total, 75 research papers are critically analyzed. Based on the objective of the evaluation, 37 relevant documents are presented in the form of a review matrix. Even though MOOCs have witnessed a tremendous rise in enrolling numbers, engagement, and completion after enrolment is a problem, which influences the platform's overall utilization. Little study has been done in the field of use (Fianu, Blewett, Ampong & Ofori, 2018). High learner dropout (Saadatdoost, Sim, Jafarkarimi, & Hee, 2015) is an ongoing issue in MOOCs. Therefore, this review attempts to fill up this research gap by establishing whether essential aspects of MOOCs, in a combined way, could improve actual MOOC usage. A new research framework using TAM of learning proposes that the combined impact of essential aspects of MOOCs would help to improve actual MOOC usage. This framework would guide to revolutionize educational technologies, particularly MOOCs. The review would create an awareness among learning and development professionals and course developers to consider these essential aspects of MOOCs together while designing course content to improve the overall use of the platform.	

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Introduction

Rapid technological developments resulted in various online learning resources such as open educational resources and information and communication technology (ICT) technologies (OER). MOOC platforms were created as a result of this. Several institutions in North America began offering online classes in 2008. (Liyanagunawardena, Adams, & Williams, 2013) and Cormier and Alexander introduced the concept of MOOCs (Parr, 2013) [1]. Coursera, edX, Udacity, and UdeMy are major platforms offering MOOCs. 'Stephen Downes and George Siemens' inaugural MOOC, 'Connectivism and Connective Knowledge,' was given at the University of Manitoba. (Fini, 2009). Subsequently, learners across Europe and Asian countries started using this platform. The growth of OER led to the expansion of MOOC platforms in developing countries such as India. However, a study found that learner use of OER is minimal, and the scope to improve it exists (Bacsich, Phillips, & Bristow, 2011). After the United States and Canada, India is one of the nations with the most MOOC users. (vandeOudeweetering & Agirdag, 2018) [2].

Researchers have conducted various types of studies related to the development of the MOOC platforms, their instructional approach, learner skills, and characteristics, etc. However, little effort has been made to improve the actual use of MOOC platform courses. This paper attempts to study the combined impact of essential aspects of MOOC on actual usage. It has proposed a new research framework for the same with the help of TAM of learning [3].

The current review reviews studies related to MOOC design features, types, learner-related aspects such as (skills, characteristics, challenges, context) and actual usage.

In the literature, MOOC comes in various types, for example, tiny open online courses (TOOCs), miniature private online courses (SPOCs), xMOOCs, and cMOOCs (Yousef, Chatti, Schroeder, Wosnitza, & Jakobs, 2014). TOOCs have supported collaboration and interactivity (Bernhard & Bittel, 2016) and SPOCs have improved traditional classroom learning (Bansal & Singh, 2015) [4]. The instructional design quality studies have found poor-quality course design impacting course scores (Margaryan, Bianco, & Littlejohn, 2015). Another study has focused on the association between MOOC features such as videos, discussion forums, and learner use of MOOCs (Wang & Baker, 2015). Credit transferability (Kolowich, 2013; Kop, 2011), high dropout rate, pedagogy (Saadatdoost et al., 2015), digital literacy issues, course structure, certification, and evaluation (Chatterjee & Nath, 2014) are some of the MOOC challenges requiring attention. In addition; research discovered how a learner's ability to self-regulate their learning in MOOCs is influenced by the setting (Hood, Littlejohn & Milligan, 2015). Independent research studies are carried out using course design characteristics and learner-related variables such as difficulties, context, and so on. Their combined influence, however, has not been studied in the literature. The current research is an attempt to determine this influence [5].

Literature Review**MOOCs**

Theorists have defined MOOCs using diverse approaches in the literature. Massiveness indicates the extent of the reach of the MOOC platform for its participants (Anderson & McGreal, 2012). Openness includes the freedom that participants get in the process of learning, irrespective of their location. Online indicates that courses can be accessed from anywhere via the Internet. In the literature, a MOOC is frequently referred to as "a platform which brings together people who want to learn, such as students, and an expert who wants to help them learn" (Liyanagunawardena et al., 2013, p. 4). MOOC is also characterized as a "free credit-free online course in which anybody may participate without

admission criteria or registration constraints." (Gaebel, 2013, p. 4). Both definitions reiterate the basic features of massiveness and openness. It is essential to study MOOCs as they apply the ICT to teaching and learning experiences (Singh, 2016) [6].

MOOC Usage

Initially, most studies in Information Systems (IS) utilized word system utilization as a dependent variable. In some instances, the phrase "intention to utilize" was substituted. "Using with the intent to use is an attitude, whereas using with the intent to use is a behavior." (Delone & Mclean, 2003, p. 23). In MOOCs, the term MOOC usage is interchangeably used as MOOC adoption and acceptance. Studies are conducted on continuous intention to use MOOCs (Jo, 2018). Some researchers have used usage in the form of participation and course completion (Fianu et al.; 2018), others have used it in terms of enrolments and receiving certificates (Jo, 2018). However, MOOC usage is not yet operationally defined in the literature. The current review attempts to explain MOOC usage as "The entire process from course enrolment to course completion and earning a course certificate" (defined by authors) [7].

MOOC Types

cMOOCs, xMOOCs, TOOCs, SPOCs, and blended learning are some of the several varieties of MOOCs. Yuan and Powell (2013) define cMOOCs as "connected and collaborative learning," whereas xMOOCs as "conventional" learning. cMOOCs are concerned with producing and generating knowledge, whereas xMOOCs are concerned with replicating it (Bernhard, 2013; Daniel, 2012; Gaebel, 2013; Rodriguez, 2012; Siemens, 2012; Stevens, 2013). From Kolb's (1984) four learning styles, the xMOOC approach follows the assimilator style, whereas the cMOOC process follows the experiential learning approach of constructivism (Anderson & Dron, 2011) [8].

However, a frequently used approach for MOOCs is the blended learning or hybrid model that integrates MOOC learning with the classroom approach. An Indian context study used a blended learning approach. It deployed the massively empowered classroom (an experimental structure). The peer-led collaborative learning sessions resulted in positive advances in learning outcomes (Cutrell et al.; 2015) [9].

Instructional Design

The instructional design of MOOC includes features, course content, assessments, and design principles such as pedagogical, technical. As mentioned earlier, learning theories, mainly Kolb's learning principles, have contributed to the development of MOOC pedagogy (Yousef et al., 2014). "To assist instructors, a conceptual framework called the 'MOOC canvas' is offered in the description and design of MOOCs." (Alario-Hoyos, Pérez-Sanagustín, Cormier, & Delgado-Kloos, 2014). One of the most essential elements of instructional design is watching recorded videos [10]. A study (Kim et al.; 2014) analyzed video watching patterns of learners. Longer videos, re-watching sessions, and tutorials had high dropout rates. Tutorials, play events, and re-watching sessions observed peaks indicating points of interest and confusion. "Through a field experiment, a research on a discussion forum looked into the impact of forum design on student activity and learning results. Forums have been discovered to be crucial for MOOCs, and a reputation system (which awards points for postings) can help to improve the forum experience" (Coetzee, Fox, Hearst, & Hartmann, 2014). A recently conducted study explored structure, interaction, and assessment as three instructional design components and their the Coursera course 'learning how to learn' had an impact on student control, accomplishment (feeling of progress), and efficacy.' A hierarchical regression analysis reported that all instructional design components were statistically significant predictors of factors mentioned above (Jung, Kim, Yoon, Park, & Oakley, 2019). Though studies are conducted on the design quality of MOOC courses, quality issues are yet to be resolved. MOOC course evaluation requires validation. Lack of proof through assessment criteria is a challenge (Daniel, 2012) [11]. Credit transferability is another challenge, as colleges and universities may not accept these courses unless associated with their program (Kolowich, 2013; Kop, 2011). Earlier studies such as Kalz and Specht (2013) pointed that the diversity of learners is not considered while designing MOOC-based courses. Others have pointed towards course alignment with learner objectives (Fourrage, 2015). Aligning systems based on learner needs and demographics could help to improve the instructional design quality of MOOC courses (Margaryan et al.; 2015). Also, there are challenges at the implementation level, such as sustainability, quality assurance, pedagogy, sense of community, and knowledge acquisition (Saadatdoost et al.; 2015) [12].

Learner-Related Aspects

Learner-related MOOC aspects include learner skills and characteristics, learner challenges, and learner context. Learner characteristics have learner educational level, course intentions, employment status, gender, motivation, demographics, while learner skill includes self-regulated learning, metacognitive skills, self-efficacy, and critical thinking (Kizilcec, Perez-Sanagustin, & Maldonado, 2017). Studies have talked about the learners having diverse talents and characteristics using MOOC courses. Self-regulated learning (SRL), for example, has been discovered to be an essential

predictor of MOOC learning success. SRL requires the ability to design, manage, and regulate learning processes (Kizilcec et al., 2017). Learner behavior was the subject of a MOOC study that looked at intrinsic desire and engagement in predicting MOOC success (Kizilcec et al., 2017). Another study looked into MOOC students' study techniques and how they related to their learning experiences. The community of inquiry model recognized three elements of the student learning experience: social, teaching, and cognitive (Kovanovic, Joksimovic, Poqueta, & Hennis, 2018) [13]. Another recent study looked into the significance of SRLs in MOOCs. The study included three phases of Zimmerman's SRL paradigm (forethought and preparation, performance monitoring, and self-reflection), with weekly SRL prompts inserted as videos. Those who viewed SRL prompt videos interacted with additional activities and followed the course structure. This study demonstrated the significance of learning analytics and SRL in MOOCs (Wong, Khalil, Baars, Koning, & Paas, 2019). A recent review-based study on MOOC use and its effectiveness proposed questions related to enrolment, self-regulation, and energy. The findings indicated that the goal establishment of students, their performance, and subsequent modifications in their regulatory strategies are essential for understanding the effectiveness of MOOCs (Weinhardt & Sitzmann, 2019) [14].

However, as mentioned earlier, reducing dropout rates and increasing retention and course completion are the most critical learner-related challenges identified in the literature. Learners have a dropout rate of up to 95% (Kay, Reimann, Diebold, & Kummerfeld, 2013). Studies have talked about the low completion rate of learners in MOOC courses (Balsh, 2013) and provided strategies to increase retention rates. One study has pointed towards high workload, complex course content, insufficient time, lack of sense of community, and social influence impacting retention rates (Zheng, Rosson, Shih, & Carrol, 2015). One study proposed an algorithm to predict student attrition in MOOCs. This algorithm signifies when a student is about to drop out and can provide instructors with steps to reduce erosion (Chaplot, Rhim, & Kim, 2015).

Another challenge at the platform level is its reach. MOOC critics point out providing MOOC access to a disadvantaged group of learners (Rodriguez, 2012; Waite, Mackness, & Roberts, 2013). Another study reiterated this finding stating that MOOCs are unable to achieve the goal of reaching disadvantaged students not having access to educational opportunities (Jordon, 2014) [15].

Learner context includes geographical location, culture, education background, etc. (Nordin, Norman, Embi, Mansor & Idris, 2016). Geography brings cultural differences, and cultural experience is essential in the process of learning. One research looked at learners from the United States and Arab countries to see how the area affected their ICT engagement, self-efficacy, and locus of control (LOC). "The effect of the area on MOOC participants' ICTs involvement was significant," according to the study's findings. The amount of involvement of MOOC learners with ICTs varies by nation, and the majority of these differences are significant" (Gameela & Wilkins, 2019). A study conducted in Malaysia focused on student's receptiveness and its relationship with anxiety and motivation. The study revealed that students were receptive and open to learning through MOOCs. MOOCs offered in the second semester reduced stress and improved explanation (Loh, Bakar, & Low, 2019). Studies conducted across different regions suggested learner openness to learn through the MOOC platform [16].

In the Indian context, various factors such as low gross enrolment ratios (GERs), poor quality of course content, and lack of skill-based education created a need to adopt online learning platforms like MOOC (Gupta, 2010; Prathap, 2014; Sheel & Vohra, 2014). Learner context also brings various challenges. For instance, Indian learners face issues in the execution of MOOC courses such as digital literacy issues, course structure, evaluation, etc. (Chatterjee & Nath, 2014). However, a study has found MOOCs supporting employability. "A study (Dillahun, Ng, Fiesta, & Wang, 2016) MOOCs have been identified that improve employability factors such as human and social capital, career identity, and personal flexibility." "Another research looked at the literature and found that MOOCs can help to narrow the gap in graduate capabilities" (Calonge & Shah, 2016). Indian organizational level study found that 53% of employers believe that a lack of skilled graduates is the leading reason impacting graduate recruitment (Kaka, Madgavkar, Manyika, Bughin, & Parameswaran, 2014). Then onwards, industry-specific studies started emphasizing the importance of adopting the MOOC approach to learning. It came into existence across industries in 2014 (Nielson, 2014). Albert and Sekhon (2015) identified seven critical factors positively influencing skill development through MOOCs [16]. These were 'content, context, curation, co-creation, communication, collaboration, competition, and certification.' Previously, several companies used MOOC courses to train their staff. "A cooperation between Khan Academy and Bank of America led in the production of branded, open, web-based courses to teach consumers about money management," according to Khan Academy." (Meister, 2013). "Udacity created the open education collaboration with AT&T and Google Inc. to build courses on technological skills based on corporate needs." (Kalman, 2014). Microsoft partnered with Intrepid (a learning technology provider) to provide a MOOC platform to their sales professionals. A study found that MOOCs used in corporate organizations can reduce dropout rates when a course is aligned with objectives, learner

engagement, and motivation (Fourrage, 2015). Vocational MOOCs were not only used for training but also for recruitment, marketing, and branding purpose (Beigi, Wang, & Shirmohammadi, 2015). The above research studies have shown that MOOC usage is independently studied with MOOC types, instructional design, and learner-related aspects. The combined impact of these critical aspects of MOOC on actual use is not yet learned. The current review attempts to establish this impact [17].

A Proposed Theoretical Framework

Earlier studies have established MOOC use with various other theoretical learning models. For instance, "a study used a unified model where TAM, task technology fit (TTF), MOOC characteristics and social incentive were combined to study MOOC retention intentions. "The TTF model has been shown to increase "perceived usefulness," "perceived ease of use," and "intention to use" (Jo, 2018). MOOC learning has also been investigated using other learning models such as human capital theory (HCT) and diffusion of innovation (DOI) theory. Another study "investigated the elements that influence students' decisions to utilize MOOCs using the theory of planned behavior (TPB) and self-determination theory (SDT)" (Wu & Chen, 2017). A recent study looked at MOOC "continuance intention to use," intending to find characteristics that might help MOOC completion rates in the future (Lu, Wang & Lu, 2019).

Based on the review's objective and suitability, the original TAM is used in the current study to establish the combined impact of essential aspects of MOOC on actual usage. Davis (1989) developed the TAM by combining the theories of reasoned action (TRA) and planned behavior (TPB) (Fishbein & Ajzen, 1975). The 'technology-enhanced learning (TEL) approach in higher education is known as MOOC. TEL often uses TAM. "When it comes to new technology, TAM offers two perspectives: perceived usefulness and perceived ease of use. It has an effect on the desire to utilize that technology as well as the attitude (evaluative predisposition to act) toward doing so." (Davis, 1989). It determines actual usage in the order of beliefs-attitude-intention [18]. Another researcher has regarded "The degree to which a person experiences a good or negative emotion linked to MOOCs is defined as their attitude toward utilising MOOCs" (Wu & Chen, 2017). In the current framework, attitude is used as learner feelings. 'According to the concept of perceived usefulness, "the degree to which a person believes that adopting a specific technology would enhance his or her job performance." According to the concept of "perceived ease of use," it is "the degree to which a person thinks that using a given system would be free of effort." Another study looked at the relationship between intention and behaviour in greater depth. According to Fishbein and Ajzen (2010), "intention is determined by three essential elements: an individual's attitude toward the activity, perceived norm (an individual's perceived social pressure to conduct or not perform the intended behaviour), and perceived risk." "In addition, the purpose is through behavior predictor of behavior." "Perceived behavioral control" is defined as "a person's perception of whether or not they are capable of or have control over the behavior of a planned behavior." (Henderikx and colleagues, 2017) [19]. Based on TAM, the current review offers a new research framework. Its goal is to respond to the following research questions:

1. Is there a relationship between MOOC type and instructional design (hence referred to as external factors) and "perceived usefulness" and "perceived ease of use"?
2. Is it true that "perceived utility" and "perceived ease of use" aid in the formation of "intention to use" MOOCs?
3. Do learner-related features (a new variable) and attitude (here referred to as learner emotions) act as mediators in the connection between external factors and "intention to use"?
4. Does intention influence actual MOOC usage?

In summary, the review proposes a research framework indicating that actual MOOC usage is determined by the combined impact of essential aspects of MOOC (MOOC types, instructional design, and learner-related elements).

RESULTS

The review results are represented in the matrix below (Table 1). The matrix includes the article title, adopted journal/conference name, author name, and findings. Also, it has analyzed these research articles with the help of a concept matrix to get a synthesized view on essential aspects of MOOC and MOOC usage. Also, results are presented in the form of journal and conference-wise distribution of articles (refer to Table 2).

TABLE 1. Review matrix

S.N.	Article	Journal/Conference	Author & year	Methodology	Findings	Important aspects of MOOC			
						MOOC types	Instructional design	Learner related aspects	MOOC usage
1	"Factors affecting MOOC usage by students in selected Ghanaian universities"	"Education Sciences"	Fianu et al; 2018	Quantitative	There is a huge growth in MOOC enrolment numbers. However, participation & completion after enrolment is a matter of concern. "Implementation of MOOCs has seen poor participation or usage. Little research has been done in the area of usage" (p.3). Learner motivation and course design both influences usage and completion. In order to improve learning, Ghana university students used MOOCs. It studied the factors impacting MOOC adoption and use with the help of survey. UTAUT model is used. "Findings have shown MOOC usage intention is influenced by computer self-efficacy, performance expectancy and system quality. MOOC usage is also influenced by facilitating conditions, instructional quality and usage intention" (p.1).	—	✓	✓	✓
2	"Content or platform? Why do students complete MOOCs?"	"MERLOT Journal of Online Learning and Teaching"	Wang & Baker, 2015	Quantitative	To help designers to develop suitable MOOCs as per learner needs, this study has conducted learner motivation survey and correlated it with the students completing the course. The results showed "course completers tend to be more interested in the course content, whereas non-completers were more interested in MOOCs as a type of learning experience" (p.1).	—	✓	✓	—
3	Context Counts: How learners' contexts influence learning in a MOOC	Computers & Education	Hood et al; 2015	Quantitative	"This study examines how a learner's current role and context influences their ability to self-regulate their learning in a MOOC. The study compared the self-reported self-regulated learning behaviour between learners from different contexts and with different roles. Significant differences were identified between learners who were working as data professionals or studying towards a higher education degree and other learners in the MOOC" (p.1).	—	—	✓	—
4	"Exploring the determinants of MOOCs continuance intention"	"KSII Transactions on Internet and Information Systems"	Jo, 2018	Quantitative	"This study presents an extended research model that combines information system (IS) continuance and task-technology fit models. This study researches previous literature, revealing factors of continuous use after accepting MOOCs from the learner's perspective, and analyzes the model empirically" (p.1).	—	—	✓	✓
5	"Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model"	"Computers in Human Behavior"	Wu & Chen, 2017	Quantitative	This study has proposed a unified model where TAM, TTF, features of MOOCs and social motivation are integrated to explore continuance intention for using MOOCs. The results showed "integrating TAM for adoption and TTF model for utility provides a comprehensive understanding of the behaviors related to this context" (p.1).	—	—	✓	✓
6	"Understanding key drivers of MOOC satisfaction and continuance intention to use"	"Journal of Electronic Commerce Research"	Lu et al; 2019	Quantitative	"The drivers of MOOC satisfaction based on expectation-confirmation theory (ECT) and the influence of satisfaction on user behavior is examined. A research model proposed the relationships among confirmation, usefulness, interest, flow, satisfaction, and 'continuance intention to use', and 'intention to recommend' was developed and tested. Data was collected from 300 subjects. Findings showed that flow and interest are important variables that enhance MOOC satisfaction based on ECT" (p.1).	—	—	✓	—
7	"MOOCs in higher education - Unleashing the potential in India"	"IEEE conference on MOOCs, Innovation & Technology in Education (MITE)"	Chatterjee & Nath, 2014	Qualitative	The authors have studied various aspects and strategies for MOOC implementation. Problems related with implementation and their possible solutions have been discussed.	—	✓	✓	—
8	"Understanding In-video dropouts and interaction peaks in online lecture videos"	"ACM Conference on Learning"	Kim et al; 2014	Qualitative	"This paper has used 862 videos data and analyzed in-video dropouts and peaks in viewership and student activity, in four Massive Open Online Courses (MOOCs) on edX. Longer videos, re-watching sessions (vs first-time), and tutorials (vs lectures) saw high dropout rates. Tutorials (vs lectures) and re-watching sessions (vs first time) led to more frequent and sharper peaks" (p.1).	—	✓	✓	—
9	Instructional quality of MOOCs	Computer & Education	Margaryan et al; 2015	Quantitative	76 randomly chosen MOOCs design quality was analyzed. Majority of MOOCs scored poor on many designs. Instructional design quality was found to be low.	✓	✓	✓	—
10	Do MOOC platforms support employability?	"ACM conference on Computer Supported Cooperative Work & Social Computing"	Dillahunt et al; 2016	Quantitative	Using three dimensions of employability, it was found "while most of participants were optimistic about the potential for MOOCs to improve their employability, there was very limited tangible evidence of employment mobility from taking MOOCs" (p.1).	—	—	✓	—

S.N.	Article	Journal/Conference	Author & year	Methodology	Findings	Important aspects of MOOC			
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11	"Self regulated learning strategies predict learner behavior & goal attainment in MOOC"	Computer & Education	Kizilcec et al; 2017	Quantitative	SRL was investigated across 6 MOOCs. Personal course goals were predicted by goal setting and strategic planning and help-seeking was having relationship with lower goal attainment.	—	✓	✓	—
12	"Understanding student motivation, behaviors, and perceptions in MOOCs"	"18th ACM Conference on Computer Supported Cooperative Work & Social Computing"	Zheng et al; 2015	Qualitative	"This study identified learning, motivations, learning patterns, and other factors appear to influence student retention. Study proposed that the issue of retention should be addressed from retention as a problem and also retention as an opportunity" (p.1).	—	—	✓	—
13	"Should your MOOC forum use a reputation system?"	"17th ACM Conference on Computer Supported Cooperative Work and Social Computing"	Coetzee et al; 2014	Quantitative	A field experiment investigated impact of forum design on student activity and learning outcomes on edX platform. Use of forum is associated with improved grades and retention. Reputation systems resulted in faster response time and increased number of response per post but had no significant impact on grades, retention.	—	✓	✓	✓
14	"Blended learning in Indian colleges with massively empowered classroom"	"Proceedings of 2nd Association for Computing Machinery (ACM) Conference on Learning"	Cutrell et al; 2015	Mixed method	Videos from online course with peer-led sessions was combined in blended learning for undergraduate technical students in India. Randomized controlled trial (RCT) indicated that interventions led to performance improvement.	✓	✓	✓	—
15	"Evaluation grid for xMOOCs"	"International Journal of Emerging Technologies in Learning"	Khalil et al; 2015	qualitative	A live experiment was conducted on 15 randomly chosen courses. A brief literature review and an evaluation grid for xMOOCs was conducted.	✓	✓	—	—
16	"Initial Trends in Enrolment and Completion of Massive Open Online Courses"	"The International Review of Research in Open and Distance Learning"	Jordan, 2014	Qualitative	"The paper explored the factors affecting enrolment and completion. Enrolment numbers were found to be decreasing over time and were positively correlated with course length."	—	✓	✓	—
17	"Pedagogic orientations of MOOC platforms: Influence on course delivery"	"Asian Association of Open Universities Journal"	Wong, 2015	Quantitative	"Pedagogic orientations of MOOC platforms result showed course differences in terms of their duration, learning activities, assessment, social interaction and instructors' participation. Pedagogic features highlighted in each platform were realized in their courses" (p.49).	✓	✓	✓	—
18	"The advance of MOOCs"	Education and Training	Clarke, 2013	Qualitative	"The purpose of this paper is to analyse the MOOCs rapid development and implications for business education. Also, critically examining the educational and business models of the MOOCs, to assess their present scale and scalability, and to explore the responses of the universities to this challenge" (p.1).	✓	✓	✓	—
19	"Exploring MOOC from education and information systems perspectives: A short literature review"	Educational Review	Saadatdoost et al; 2015	Qualitative	This article has presented a short review where MOOCs is defined and summary of relevant theories is provided. Some relevant issues are discussed.	✓	✓	✓	—
20	"Blending active learning in a modified SPOC based classroom"	"IEEE 3rd International Conference on MOOCs, Innovation and Technology in Education (MITE)"	Bansal & Singh, 2015	Quantitative	To explore the potential of SPOCs, it was offered as a university course. as modified SPOC was offered and applied techniques of active learning in classroom were used. Surveys were conducted and progress was monitored. It was observed that online resources in the form of videos, would enhance learning.	✓	—	✓	—

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21	"Predicting student attrition in MOOCs using sentiment analysis and neural networks"	"Proceedings of Artificial Intelligence for Educational Applications"	Chaplot et al; 2015	Qualitative	Student attrition in MOOCs was studied using 'sentiment analysis'. Based on 'artificial neural network', proposed algorithm showed importance of student sentiments. This algorithm beats the state-of-the-art algorithm in terms of 'Cohen's kappa'.	—	—	✓	—
22	"The technological dimension of a MOOC: The case of the CCK08 course tools"	"The International Review of Research in Open and Distance Learning"	Fini, 2009	Quantitative	"This paper focuses on the technological aspects of one MOOC, the Connectivism and Connective Knowledge (CCK08) course, in order to investigate lifelong learners' attitudes towards learning network technologies. Findings from a survey of CCK08 participants showed that the course attracted adult, informal learners, who were not concerned about course completion. Time constraints, language barriers, and ICT skills affected the participants' choice of tools" (p.1).	✓	✓	✓	—
23	"When it comes to MOOCs, where you are from makes a difference"	Computer and Education	Gameela & Wilkins, 2019	Quantitative	Current study focused on 'self-efficacy' and 'locus of control' skills among MOOC learners from 5 different regions. Their engagement with ICTs was studied. There were significant differences among these diverse region learners.	—	—	✓	—
24	"Influence of instructional design on learner control, sense of achievement and perceived effectiveness in a super-size MOOC course"	Computer and Education	Jung et al; 2019	Quantitative	"The study explored influence of components of instructional design on learner control, sense of progress in achievement of learning goals and perceived effectiveness. It was found that all components of design and interaction between student and content, structure, assessment were significant predictors of learner control and progress."	—	✓	✓	✓
25	"Connectivism: Learning theory of the future or vestige of the past?"	"International Review of Research in Open and Distance Learning"	Kop & Hill, 2008	Qualitative	Current learning theories are highlighted. In this paper, connectivism is critically analyzed. This connectivism is explored in terms of learning theory and as teaching approach in 21st century.	✓	✓	✓	—
26	"The challenges of Connectivist learning on open online networks: Learning experience during a MOOC"	"International Review of Research in Open and Distance Learning"	Kop, 2011	Mixed method	"Current study investigates learner autonomy, presence and critical literacies. It is studied challenges may prevent learners from getting quality learning experience in active connectivist learning."	✓	✓	✓	—
27	"Examining communities of inquiry in massive open online courses: The role of study strategies"	Computer and Education	Kovanovic et al; 2018	Mixed method	The relationship between discrete learning strategies and student learning experience was investigated. Community of inquiry model outlines 3 dimensions - teaching, social, and cognitive presence. "Limited users, selective users, and broad users were identified as different groups of users/students having unique study strategies."	—	✓	✓	✓
28	"Systematic literature review on self-regulated learning in MOOC"	Australasian Journal of Educational Technology	Lee et al; 2019	Qualitative	This study offered a systematic review of empirical research on SRL in MOOCs. SRL was found to be positively influencing MOOC learning. Motivational regulation strategies and metacognitive regulation strategies were identified as SRL strategies	—	✓	✓	—
29	"A systematic study of the published literature 2008-2012"	"International Review of Research in Open and Distance Learning"	Liyanagunawardena et al; 2013	Mixed method	A systematic review categorised MOOC literature in eight different areas such as "concept, case studies, educational theory, technology, etc."	✓	✓	✓	—
30	"Investigating students' receptiveness towards MOOC and its relationship with anxiety and motivation among students at Taylor's university"	"International Journal of education, psychology and counselling"	Loh et al; 2019	Quantitative	"The purpose of this study was to investigate students' receptiveness towards MOOC (Massive Open Online Course) and its relationship with anxiety and motivation among Malaysian students. Descriptive statistic showed that students were receptive to learning. Pearson's correlation coefficient indicated that there was a high negative correlation between students' anxiety and motivation as well as receptiveness towards learning" (p.237).	—	✓	✓	✓

Article	Journal/Conference	Author & year	Methodology	Findings	Important aspects of MOOC			
					MOOC types	Instructional design	Learner related aspects	MOOC usage
The concept of openness behind c and x-MOOCs"	"Open Praxis"	Rodriguez, 2013	Mixed method	In this paper, earlier findings related to cMOOCs and xMOOCs got extended. "Openness" as a concept was highlighted with differences.	✓	✓	✓	—
Modelling the notions and dimensions of MOOCs"	"Asian Association of Open Universities Journal"	Sembiring, 2018	Mixed method	Quality massive open online courses (QMOOCs) dimensions were explored. The quality measures related to MOOCs were enriched.	—	✓	—	—
How do online learners study? The psychometrics of students' clicking patterns in online courses"	"PLOS One"	Tellakat et al; 2019	Quantitative	Website navigation of college students was tracked and their study strategies were explored. Their clicking patterns within online learning management system was explored. Consistent correlation was observed in studying course content outside of class and higher grades. It was found that "studying at any time except in the late night/early morning hours was strongly correlated with grades. Students with higher Scholastic Aptitude Test (SAT) scores made higher grades but accessed course materials at lower rates than those with lower SATs" (p.1).	✓	✓	✓	—
MOOCs as accelerators of social mobility? A systematic review"	"Educational Technology and Society"	VandeOudeweeterin g et al; 2018	Qualitative	31 empirical studies were evaluated to examine benefits of MOOCs to socially privileged compared to underprivileged groups. "The literature has pointed out specific formal barriers that might make MOOCs less accessible for underprivileged learners. In addition, enrollment demographics displayed that the majority of MOOC learners are well educated, employed and from developed countries. Finally, the literature suggested that privileged learners could be more likely to complete a MOOCs" (p.1).	—	—	✓	✓
Revolutionizing training and education? Three questions regarding massive open online courses (MOOCs)"	"Human Resource Management Review"	Weinhardt et al; 2019	Qualitative	"The instructional effectiveness of MOOCs is primarily anecdotal and overarching statistics revealed that the vast majority of students drop out before completing these courses. Current paper raised 3 questions regarding the same - 1) Who enrolls in MOOCs and why do they enroll? 2) Are students self-aware and able to self-regulate their learning in MOOCs? 3) Are MOOCs effective and how can we maximize their effectiveness?" (p.218)	—	✓	✓	✓
Exploring sequences of learner activities in relation to self-regulated learning in massive open online course"	Computer and Education	Wong et al; 2019	Qualitative	"Weekly SRL prompts were embedded as videos. Qualitative analysis was used to explore the differences. SRL- prompt viewer's interaction was more in terms of course activities compared to non SRL-prompt viewers."	—	✓	✓	—
MOOCs, graduate skills gaps, and employability: A qualitative systematic review of the literature"	"International Review of Research in Open and Distance Learning"	Calonge & Shah 2016	Qualitative	Literature is analysed to reduce graduate skill mismatch. It reviewed areas such as higher education and graduate skill gap, employability etc. It helped to identify gaps in the literature.	—	✓	✓	—

✓ tick sign indicates that a study has incorporated that particular aspect of MOOC

— dash sign indicates that a study doesn't incorporate that particular aspect of MOOC

Methodology

Research Design

The structured literature review is conducted using Webster and Watson's (2002) approach. A "review matrix" was created, and it helped to derive organized information from the literature. The process involved the following steps:

1. Scopus, EBSCO, and Google Scholar search resulted in 1335 abstracts published during 2008-2019 using 'MOOC' and 'MOOC in India' as keywords.
2. The search was further refined based on the following criteria –
 - a. Studies based on essential aspects of MOOC such as instructional design, types, learner related aspects
 - b. Studies based on MOOC learning and usage
3. Around 75 research papers were shortlisted for the review based on the above criteria.

A review matrix has incorporated around 37 research articles. These articles are published in renowned journals and conferences and related to the objective of the current review paper, i.e., relevant studies related to essential aspects of MOOC and usage are incorporated. In the report, other articles are cited about other areas such as learning theories, MOOC learning, adoption of MOOCs in industry, learning analytics, etc. [20].

TABLE 2. Journal and conference-wise distribution of articles

Journal Name	No. of papers per Journal	Conference Proceedings	No. of papers per Conference
Education Sciences	1	"IEEE conference on MOOCs, Innovation & Technology in Education (MITE)"	2
"MERLOT Journal of Online Learning and Teaching"	1	Association for Computing Machinery (ACM) Conference on Learning	2
"KSII Transactions on Internet and Information Systems"	1	"ACM conference on Computer Supported Cooperative Work & Social Computing"	3
"Computers and Education"	7	Proceedings of Artificial Intelligence for Educational Applications	1
"Computers in Human Behavior"	1		
"Journal of Electronic Commerce Research"	1		
"International Review of Research in Open & Distance Learning"	6		
"International Journal of Emerging Technologies in Learning"	1		
"Asian Association of Open Universities Journal"	2		
Education and Training	1		
"Australasian Journal of Educational Technology"	1		
Educational Review	1		
"Educational Technology and Society"	1		
Human Resource Management Review	1		
International Journal of Education, Psychology and Counselling	1		
Open Praxis	1		
PLOS One	1		

Discussion

The above matrix observations reveal that 13 studies are conducted on MOOC types such as cMOOC, xMOOC, TOOCs, blended approach, etc., while 27 studies have focused on the instructional design of MOOCs. Learner-related

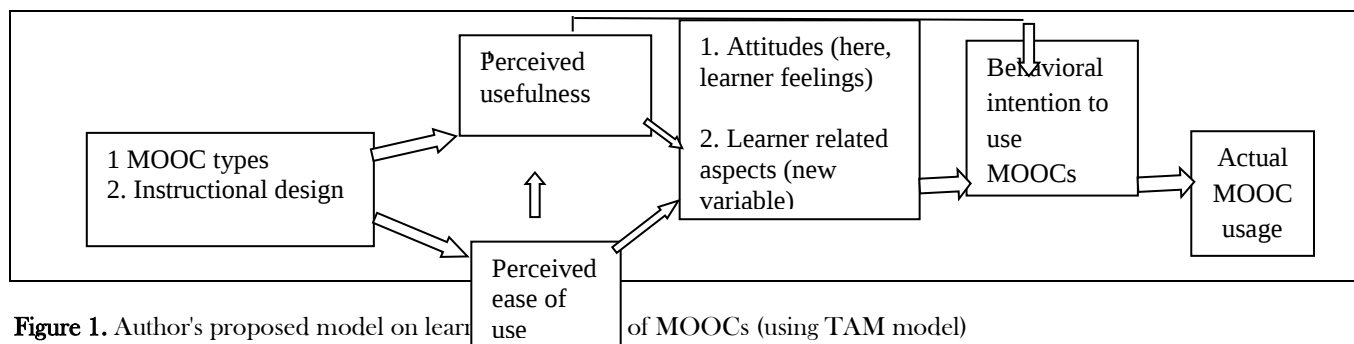
aspects are studied in almost 35 studies. This finding reveals a sufficient number of studies conducted on MOOC types, instructional design, and learner-related elements but has not measured usage. Independent MOOC usage is researched in only 9 meager research studies. A single study does not measure the combined impact of essential aspects of MOOC (types, instructional design, and learner-related factors) on actual MOOC usage. For instance, the specific type of MOOC, learner-related aspects like (skills, characteristics, context, challenges), course design impact MOOC usage.

This review matrix helps to identify the distribution of articles based on journals and conferences. Also, it provides information regarding adopted methodologies as per the article. Journal and conference-wise distribution of 37 research articles indicate that there are 8 articles published as a part of International conference proceedings. 'Computers & Education' and 'International review of research in open and remote learning' are two journals that have just been published the highest papers on essential aspects of MOOC and MOOC usage (refer to table 2). Among 37 reviewed articles, 14 used a qualitative method, 17 used quantitative methodology, while 6 used a mixed-method approach. These figures reveal that majority of research articles have adopted a quantitative methodology approach. This brings scope for MOOC usage research using a mixed-method method (refer to table 1).

Review matrix has helped to analyze important aspects of MOOC and MOOC usage studies. In learner-related parts, studies are conducted on learner motivation, satisfaction in various learner contexts (including location, culture, demography, education, etc.). In MOOC types, mainly cMOOCs are taken up. Learner and platform implementation challenges are studied. Learner dropouts, instructional design, SRL, attrition studies have used quantitative methodology while learner retention, employability, enrolment, completion issues used a qualitative approach for the analysis. Seminal work on quality MOOCs is conducted where notions and dimensions of QMOOCs were studied. Some literature review-based studies are also undertaken. Some combined studies are undertaken on instructional design and learner-related aspects. However, very few studies are conducted on actual MOOC usage, for instance, factors influencing MOOC adoption and use, continuance use, etc. (Fianu et al., 2018; Wu & Chen, 2017).

Therefore, the proposed framework tries to establish the combined impact of essential aspects of MOOC on actual usage. In the proposed framework (refer to figure 1), MOOC types and instructional design are external variables. Combining these variables, the phrases "perceived ease of use" and "perceived usefulness" are determined. "Perceived ease of use" may lead to "perceived usefulness," and "perceived usefulness" can lead to "intention to use," according to the original TAM and current paradigm. However, attitude (here defined as the sentiments of the learner) would be critical in determining actual usage. In the current framework, one more variable is added (i.e., learner-related aspects). It is proposed that learner-related factors and attitude (learner feelings) would determine the intention and actual usage. However, as per the original TAM, "Attitudes do not fully moderate the impact of perceived usefulness and ease of use on the action." (Davis, 1989). This implies that learner-related factors and attitudes are not considered (learner feelings). Both are essential variables but not sufficient. External variables (MOOC types, instructional design) are also necessary to determine intentions and actual usage.

Based on the proposed research questions, the current framework tries to establish that external variables (here MOOC types and instructional design) would determine perceived ease of use (means using MOOC platform is effortless) and perceived usefulness (means doing MOOC platform course would improve job performance). 'Perceived utility' can sometimes lead to 'perceived ease of use.' This 'perceived usefulness' can directly shape behavioral intentions. However, attitudes (learner emotions) and learner-related features (new variable) would moderate the link between intents and perceived usefulness and ease of use to some extent. This implies that various learner-related factors such as abilities, traits, environment, and obstacles will all play a role in determining intentions and actual usage. The learner's goal would then select the MOOC's fundamental use.



In summary, this framework tries to establish that these essential aspects of MOOC (types, instructional design, and learner-related aspects) together would determine and impact actual usage. Any single part independently would be unable to establish the impact.

Implications Of The Study

This review paper would benefit various stakeholders such as academicians, researchers, instructional designers, and learning and development professionals in unique ways. Academicians and researchers may extend MOOC research based on the proposed research framework. Also, they can modify and or empirically test it. There is also a scope for instructional designers and learning and development professionals to consider these MOOC aspects in combination while creating instructional designs as it would help to improve actual usage. This review paper has identified a gap in the literature and proposed a new research framework based on the TAM of learning. Using the concept matrix, the review has synthesized important aspects of MOOC and usage studies. It has broadened and enhanced the depth of ongoing research in MOOCs. Mainly, it has provided the direction for dealing with concern areas such as enrolments, dropouts, and retention. The collaborative study involving various MOOC aspects can be undertaken in future studies. Some research avenues in that direction are presented below:

Conclusion

Future Research Avenues

1. Customizing the instructional design of MOOC courses based on learner demographics and studying its impact on course effectiveness -

Studies conducted on the instructional design of MOOCs have raised concerns on the quality of course design (Margaryan et al., 2015; Sembiring, 2018). So, there is a need to conduct more studies on MOOC course content and pedagogy quality. Future researchers could look into offering customized course content based on learner needs, characteristics, and demographic backgrounds. They should study language issues to improve learner understanding and motivation. Also, relevant learning theories could be used to design the pedagogy of a particular course. A customized course content approach is likely to benefit MOOC course providers in terms of enhanced enrolments.

2. Exploring the use of MOOCs in higher education with diverse learner groups in the Indian context -

Studies have mentioned conducting context-specific studies (Clarke, 2013), dealing with course implementation challenges (Chatterjee & Nath, 2014). However, how to deal with these challenges as per the contexts is yet to be researched. Also, studies have talked about MOOC supporting employment (Dillahun et al., 2016) and MOOC bridging the skill gap (Kaka et al., 2014). However, more specific studies on how MOOCs could help in skill enhancement and employability are needed.

3. Studying patterns of course enrollments and dropouts among self-regulated learners -

This presents a future scope to study challenges such as course enrolments and high dropout rates with learners having SRL skills and find out whether SRL, identified as unique characteristics of MOOC learners, could reduce dropout rates and deal effectively with course enrolment challenges. Also, customization of courses would help to address issues such as course enrolment and dropouts.

MOOCs are a crucial technological innovation in higher education and would transform the learning experiences of learners worldwide. However, course completion is a matter of concern for educationists and researchers in the area. This review has investigated and established the combined impact of essential aspects of MOOC on actual usage with the help of a new research framework using TAM of learning. The study has provided direction for future researchers to consider these essential aspects of MOOC combined to improve actual usage, thereby improving course completion.

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