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MOOCs in online higher education: A systematic review of empirical research from 2015 to 2023 in India.

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Abstract

Massive Open Online Courses (MOOCs) have revolutionized the landscape of online higher education, offering learners worldwide access to diverse courses from esteemed institutions. This article presents a systematic review of empirical research conducted in India between 2015 and 2023 on the development and impact of MOOCs in the country. The review highlights the key factors contributing to the popularity of MOOCs, including technological advancements, shifts in educational paradigms, and the need for accessible learning alternatives. The study categorizes the research into four key questions: platforms used for dissemination, research topics, research methods, data analysis methods, and data collection methods. The findings reveal a steady growth in the publication of MOOCs-related research, showcasing its increasing importance in the educational landscape. By addressing challenges, leveraging research findings, employing varied methodologies, and recognizing stakeholder perspectives, MOOCs can further contribute to the transformation of education in India and beyond.

Keywords: Massive Open Online Courses (MOOCs), Systematic Review, Higher education, SWAYAM, Empirical research.

Introduction

The development of MOOCs has brought about a significant transformation in the field of education, providing individuals across the globe with the opportunity to enroll in a diverse array of courses offered by esteemed universities and institutions. The emergence of MOOCs has been shaped by a range of factors, encompassing advancements in technology, shifts in educational paradigms, and the growing need for adaptable and easily accessible learning alternatives. Liyanagunawardena et al. (2013) conducted a study which highlights the substantial attention and popularity that MOOCs have garnered. This can be attributed to their capacity to offer education on a large scale, accommodating a considerable number of learners concurrently.

The digital revolution in India is significantly contributing to the advancement of the country and positioning it at the forefront of its trajectory towards becoming a developed economy. The advent of the digital revolution has resulted in significant changes across various sectors, including banking, education, commerce, agriculture, healthcare, rural development, financial inclusion, and numerous other domains. One of the primary areas of emphasis in the digital revolution in India pertains to higher education. In this domain, disruptive and innovative technologies are altering conventional approaches to teaching and learning, thereby facilitating India's transition into a 'Knowledge Economy'. The implementation of MOOCs is a significant catalyst for technological advancements in the field of education in India. This platform allows a multitude of learners to engage in open and free courses concurrently, without being hindered by geographical limitations.

MOOCs have also been recognized as a valuable tool in the context of the National Education Policy (NEP) 2020 in India. The NEP 2020, introduced by the Government of India, highlights the importance of leveraging technology-enabled learning platforms to enhance access to quality education. It emphasizes the need to integrate online learning into the education system to reach learners in remote areas and promote lifelong learning (NEP, 2020). MOOCs align perfectly with these objectives, offering a vast array of courses across diverse subjects and enabling learners to engage in self-paced, self-directed learning.

MOOCs, initially developed as connective-based courses and now referred to as c-MOOCs (Kesim & Altınpulluk, 2015), have gained significant traction among internet users. The popularity of these courses experienced a significant increase in late 2011, coinciding with the introduction of courses by Stanford University that garnered enrollments exceeding 100,000(Rodriguez, 2012). These courses were structured around video lessons, multiple-choice and numeric assessments, and online forums, subsequently classified as x-MOOCs (Liyanagunawardena et al. (2013). The MOOC movement has experienced continuous growth since its initial success, expanding annually over the course of eleven years. Shah (2021) reported that as of the conclusion of 2021, a substantial number of universities worldwide, totaling more than 950, provided an extensive array of courses, surpassing 19,400 in total. These courses managed to captivate an impressive enrollment figure of over 220 million learners, with the exclusion of China MOOC providers. Additionally, there are numerous platforms that offer MOOCs, ranging from large global and country-specific platforms to smaller niche platforms (Walker, 2018).

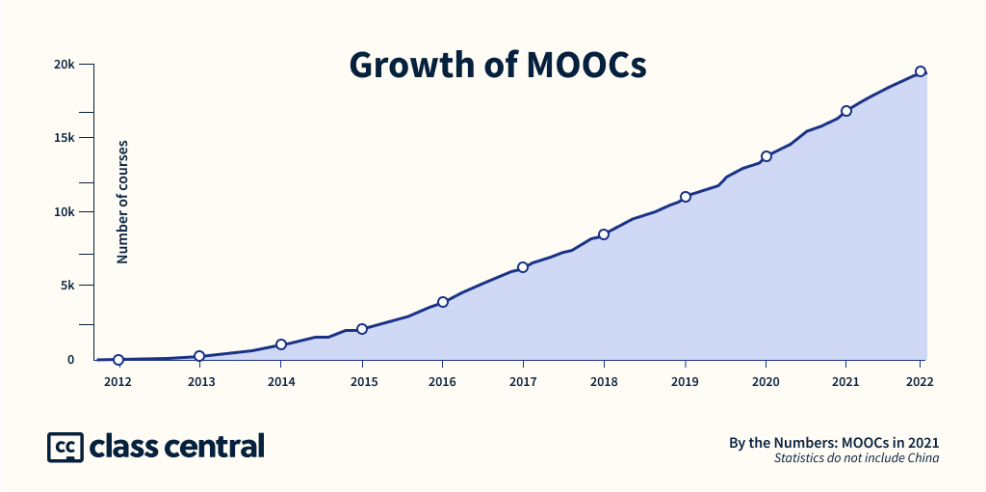


Fig.1 Growth of MOOCs

The enrollment of students in massive open online courses has witnessed a steady increase from 2012 to 2021. The graph illustrates the global proliferation of MOOCs, excluding the country of China. The anticipated repercussions of the global Covid 19 pandemic are projected to exert a substantial influence on the enrollment figures of massive open online courses, commencing in 2019. The outbreak and subsequent lockdown led to a significant number of professionals experiencing job loss, thereby affording them the opportunity to allocate their time and resources towards pursuing further education.

MOOCs have emerged as a significant catalyst in the domain of online education, fundamentally altering conventional learning paradigms and facilitating widespread access to top-tier education worldwide. Since their inception, MOOCs have witnessed a remarkable surge in popularity, attracting a vast number of learners from across the globe and generating considerable interest among educators, researchers, and policymakers. The objective of this article is to perform a comprehensive analysis of scholarly publications pertaining to MOOCs from the years 2015 to 2023. This review intends to provide insights into the progress, patterns, difficulties, and consequences within this rapidly evolving field. This endeavour seeks to provide insights into the advancements achieved during this crucial span of eight years.

Research Question

1. What number of research have been published to disseminate empirical MOOC research from 2015 to 2023 in India?
2. What are the research topics of MOOC studies published in the last eight years in India?
3. What are the categories of MOOC articles, research methods, data analysis methods, and data collection methods used in these empirical MOOC studies?
4. Who are the major stakeholders involved in research studies on MOOCs?

Data collection

The data utilised in this study were obtained from reputable sources such as Scopus and peer-reviewed journals. These sources were chosen based on specific criteria, as outlined in the work of Zhu et al. (2018). The studies included in this review were published between 2015 and 2023. Furthermore, it was required that the studies be

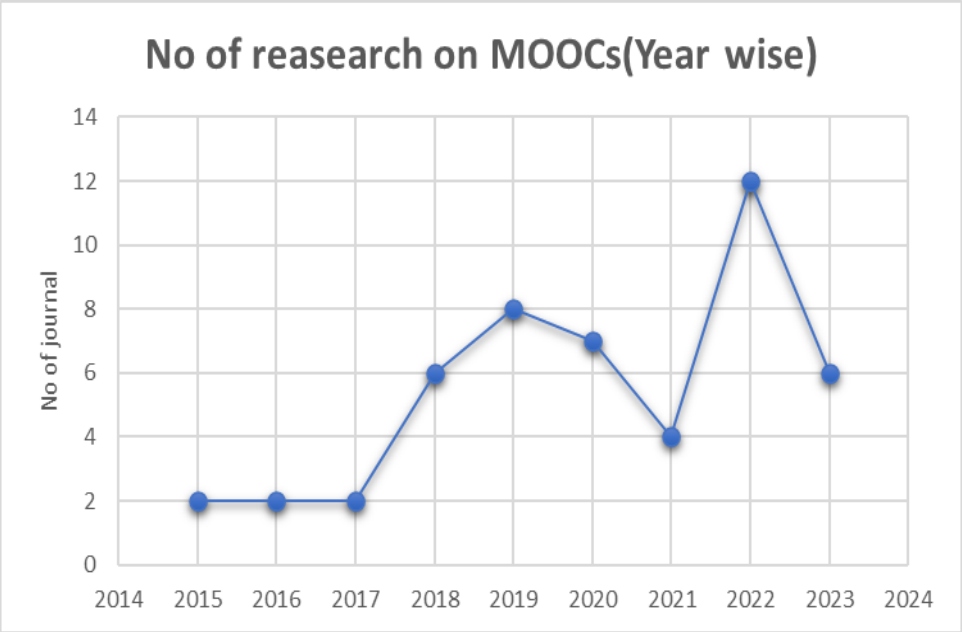
empirical in nature. In the first step of our study, we employed the terms "MOOCs" and "Massive Online Open Course(s)" as search criteria to filter titles, abstracts, and relevant literature. Furthermore, the research findings were disseminated through scholarly journals rather than alternative mediums such as book chapters, blogs, or magazines. Additionally, it is worth noting that these publications were exclusively in the English language. The decision to exclusively incorporate peer-reviewed journals was based on the understanding that these publications generally adhere to more stringent criteria in terms of research quality and reliability (Utah State University Library, 2020).

Data Analysis

Research question 1: What number of research have been published to disseminate empirical MOOC research from 2015 to 2023 in India?

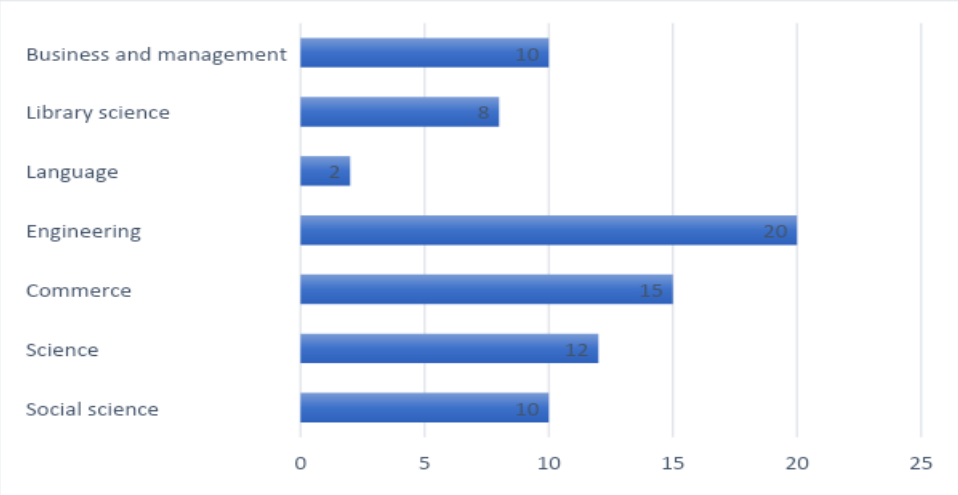
In this study, the authors select 50 MOOCs empirical studies (see Fig 2). Among these articles,
two articles (4%) in this review were published in 2015, two articles (4%) in 2016, two articles (4%) in 2017, six articles (12%) articles in 2018, 8 articles (16%) in 2019, 7 article (14%) in 2020, 4 article (8%) in 2021, 12 article (24%) in 2022 and 6 articles (12%) in 2023

Fig. 2 Number of Research Papers Published in Each Year (2005-2023)



The data presented highlights the distribution of journal works focused on MOOC (Massive Open Online Course) learning across various subject areas (see fig 3). Social Science accounts for 10 journal works (20%), investigating the impact and effectiveness of MOOCs in social science education. Science comprises 12 journal works (24%), exploring how MOOCs enhance science education and engage learners in scientific disciplines. Commerce encompasses 15 journal works (30%), examining the applicability of MOOCs in teaching business-related subjects. Engineering encompasses the largest number of journal works, with 20 studies (40%) dedicated to integrating engineering concepts and hands-on practices into MOOCs. Language has 2 journal works (4%), focusing on language learning and linguistics through MOOC platforms. Library Science comprises 8 journal works (16%), investigating the role of MOOCs in information science education. Lastly, Business and Management includes 10 journal works (20%), assessing the effectiveness of MOOCs in teaching business skills and career advancement. These subject-specific studies collectively contribute to our understanding of how MOOCs can be effectively utilized in various academic disciplines, enabling learners to access quality education and acquire valuable skills.

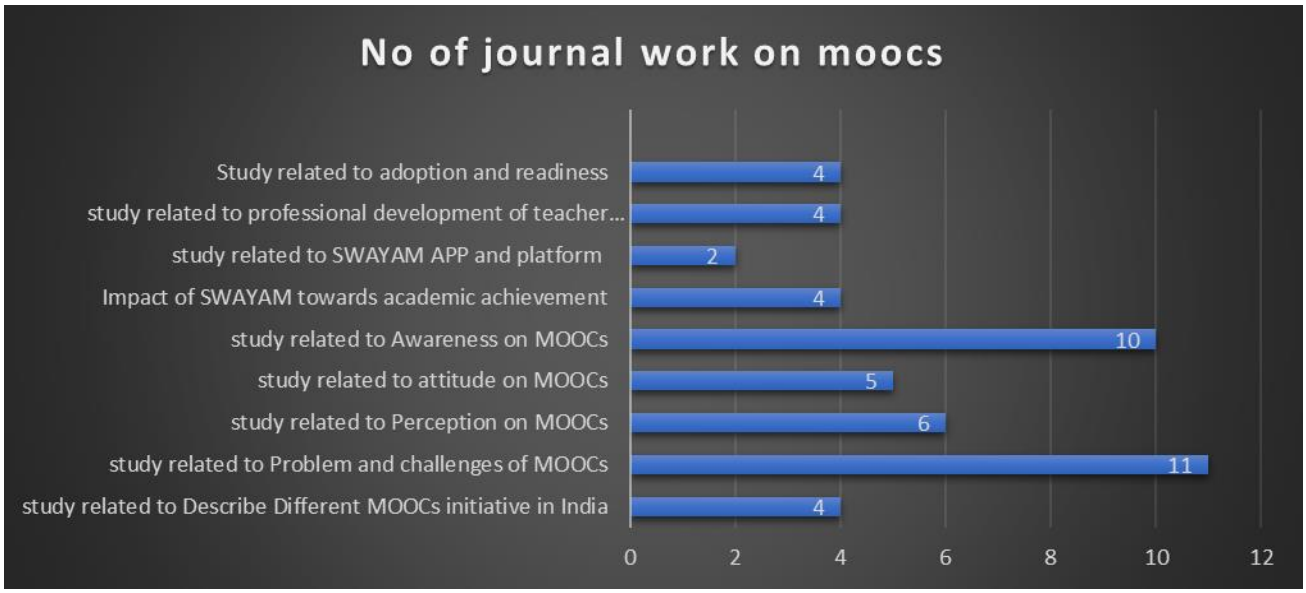
Fig. 3: Specific research topics of MOOC studies



Research question 2 : What are the research topics of MOOC studies published in the last eight years in India?

A comprehensive analysis was conducted on a sample of 50 academic journals, (see fig 4). which encompassed a wide range of topics related to MOOCs. A total of 11 articles (22%) focused on the problems and challenges associated with MOOCs, examining the obstacles that hinder their effective implementation. Additionally, 6 articles (12%) explored the perception of individuals towards MOOCs, investigating how they are perceived in the educational landscape. Another 5 articles (10%) delved into attitudes towards MOOCs, studying individuals' inclinations and beliefs regarding these online courses. Furthermore, 10 articles (20%) aimed to assess the awareness levels of learners, educators, and stakeholders regarding MOOCs, shedding light on the extent of their knowledge about the concept and its benefits. The impact of SWAYAM, an Indian MOOCs platform, on academic achievement was examined in 4 articles (8%), while the SWAYAM app and platform were specifically studied in 2 articles (4%), evaluating their features and user experience. Additionally, the professional development of teachers through MOOCs was the subject of 4 articles (8%), focusing on training, continuing education, and skill enhancement. Lastly, 4 articles (8%) investigated the adoption and readiness factors associated with MOOCs, assessing the preparedness of institutions, educators, and learners in integrating these courses into educational practices

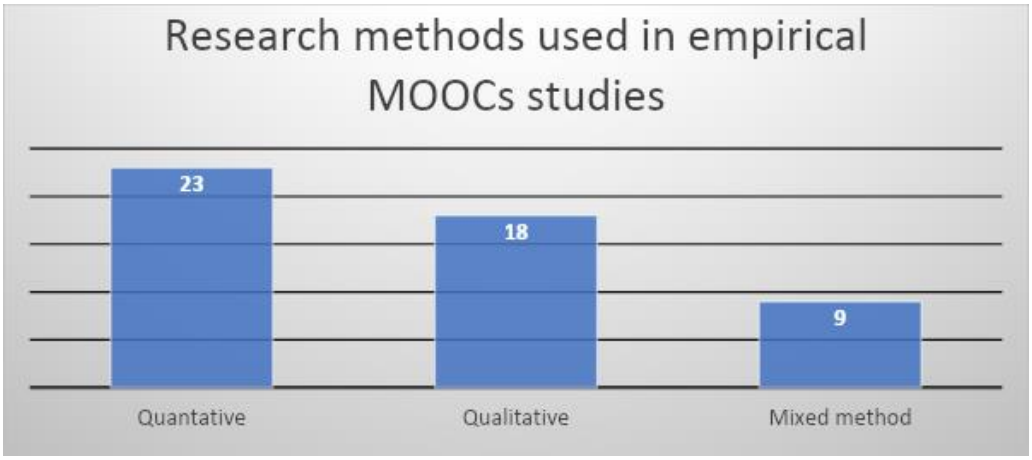
Fig.4. Major focus area on MOOCs studies (2015-2023)



Research question 3: What are the categories of MOOC articles, research methods, data analysis methods, and data collection methods used in these empirical MOOC studies?

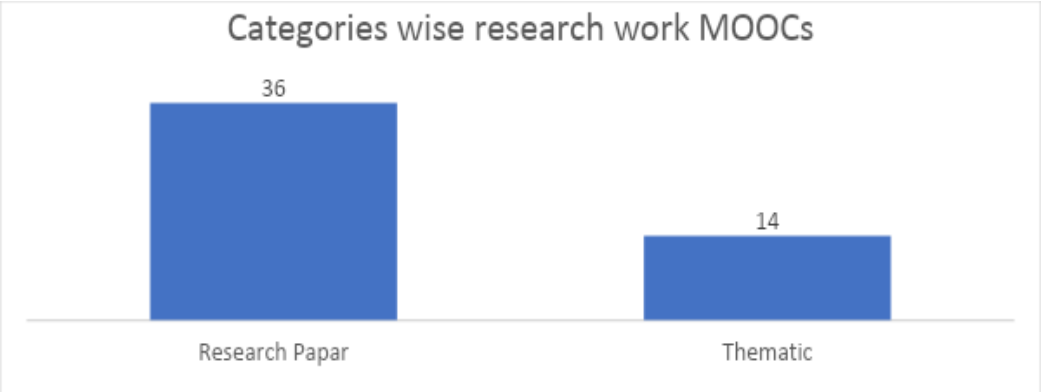
In this study, 50 studies were analyzed and a diverse range of research methods were employed. (see Fig. 5). Specifically, there are a total of 23 articles (46%) that employ quantitative research methods. These articles utilize methodologies such as surveys, experiments, or statistical analysis to examine different facets of MOOCs, including learner outcomes, engagement, performance, or the effects of interventions. Additionally, there are 18 articles (36%) that employ qualitative research methods. These articles utilize various research methodologies, including interviews, case studies, and content analysis, to investigate different facets of MOOCs, such as the experiences of learners, practices of instructors, or social interactions within these online learning environments. Furthermore, there are a total of nine scholarly articles (18%) that employ the mixed methods approach. These articles utilize a combination of research methods, including surveys, interviews, observations, and statistical analysis, to investigate various aspects of MOOCs, encompassing learner outcomes and experiences, instructional practices, and program effectiveness.

Fig. 5 Research Methods used in empirical MOOCs studies



The data presented classifies articles pertaining to MOOCs into two distinct categories: research papers and thematic articles (see fig 6). Out of the articles that were examined, a total of 36 articles (72%) can be classified as research papers. The aforementioned papers adhere to a well-defined structure and utilize rigorous research methodologies to present the findings of novel research on diverse facets of MOOCs. Their contributions to the field are characterized by the provision of empirical data, rigorous analysis, and significant findings, thereby facilitating the advancement of the knowledge base pertaining to MOOCs. In contrast, there are a total of 14 articles (28%) that have been categorized as thematic articles. The primary focus of these articles is to delve into distinct themes, topics, or concepts that are associated with MOOCs.

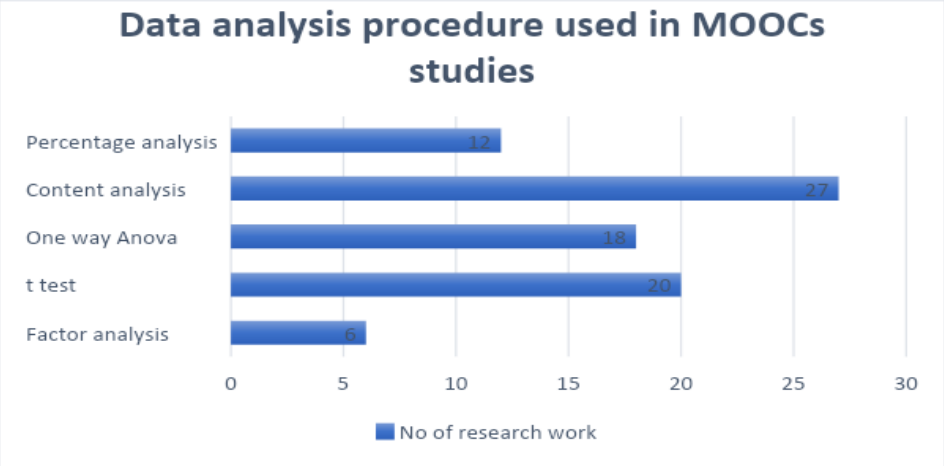
Fig. 6: Categories wise research work MOOCs (2015-2023)



The data provided reveals the prevalence of various data analysis procedures in the analyzed research works (see Fig. 7). Factor analysis is utilized in 6 studies (12%), allowing researchers to identify underlying factors within their data. T-tests are employed in 20 studies (40%) to compare means between different groups, while ANOVA

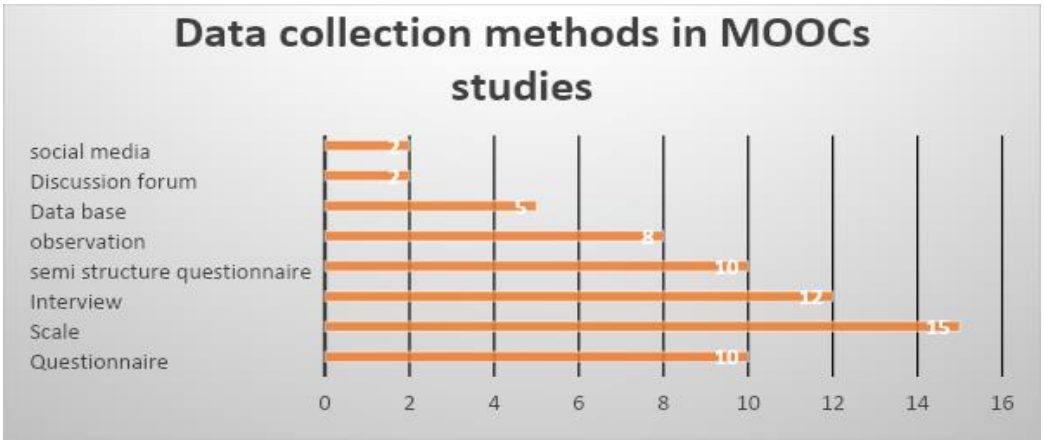
is used in 18 studies (36%) to compare means across multiple groups. Content analysis is a prominent data analysis procedure, appearing in 27 studies (54%), enabling researchers to analyze qualitative data. Additionally, 12 studies (24%) employ percentage analysis, which involves calculating proportions or percentages within a dataset, to summarize and present data effectively. These different data analysis procedures play a crucial role in examining and interpreting research data, facilitating a deeper understanding of the topics under investigation in the respective studies.

Fig. 7: Data analysis procedure used in MOOCs studies (2015-2023)



This graphical analysis offers a comprehensive examination of the research tools or methodologies utilised in articles that centre on MOOCs. Among the analyzed articles (see Fig 8), questionnaires are utilized in 10 studies (20%) to gather data on learners' experiences, perceptions, attitudes, or preferences. Scales are employed in 15 articles (30%) to measure constructs related to MOOCs, such as learner engagement, satisfaction, motivation, or perceived usefulness. Interviews serve as a research tool in 12 articles (24%), enabling researchers to explore in-depth qualitative data from learners, instructors, or other stakeholders. Semi-structured questionnaires are used in 10 articles (20%), allowing participants to provide additional insights or explanations related to MOOCs. Observation is utilized in 8 articles (16%) to systematically record learner behaviors, interactions, or activities within MOOC platforms. Database analysis is employed in 5 articles (10%), utilizing existing data repositories to examine learner progress, course completion rates, or other relevant metrics. Additionally, 2 articles (4%) utilize discussion forums to analyze learner interactions, while 2 others (4%) employ social media platforms to gather insights from public perceptions, experiences, or trends related to MOOCs.

Fig. 8: Data collection methods in MOOCs studies (2015-2023)

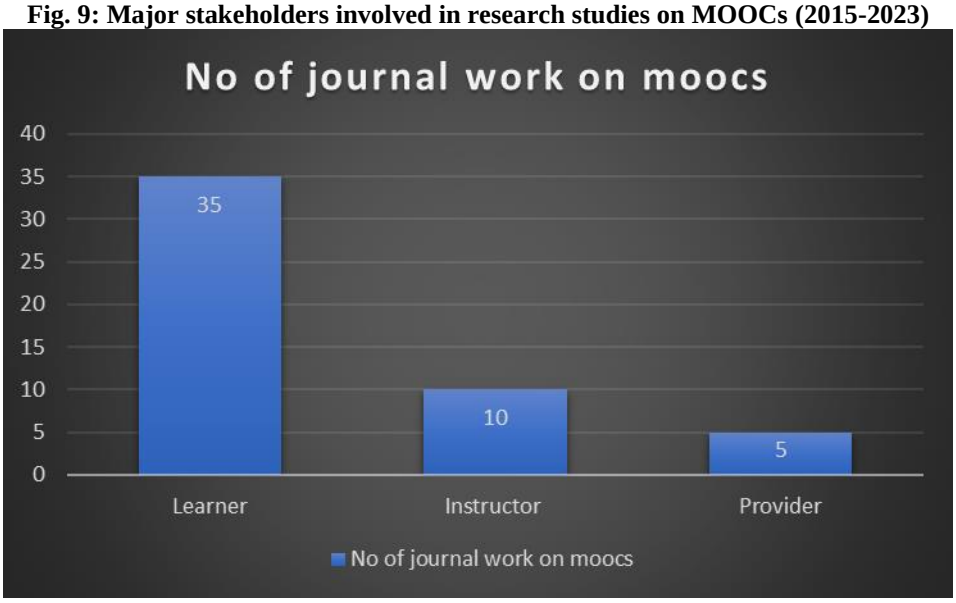


Research question 4: Who are the major stakeholders involved in research studies on MOOCs?

The data provided categorizes journal works on MOOCs based on the primary stakeholders involved in the research: learners, instructors, and MOOC providers (See Fig. 9). Among the analyzed journal works, 35 articles

(70%) focus on the learner as the primary stakeholder, investigating various aspects of the learner's experience within MOOCs. These articles explore learning outcomes, engagement, motivation, satisfaction, and barriers to participation, aiming to enhance the effectiveness and impact of MOOCs from the learner's perspective. Additionally, 10 articles (20%) center on the instructor as the primary stakeholder, examining their pedagogical approaches, instructional design strategies, and experiences in teaching MOOCs. These articles explore the challenges and opportunities for instructors in adapting to the MOOC format and their influence on learner engagement and outcomes. Furthermore, 5 articles (10%) focus on MOOC providers as primary stakeholders, exploring their perspectives and experiences in offering MOOCs. These articles delve into platform design, course development, business models, scalability, and quality assurance, aiming to provide insights into the challenges and strategies involved in providing effective and sustainable MOOCs.

Fig. 9: Major stakeholders involved in research studies on MOOCs (2015-2023)



Educational Implication

The review article offers significant insights into the research landscape pertaining to MOOCs and underscores various educational implications.

The findings underscore the necessity of addressing the challenges linked to the implementation of MOOCs. The scholarly articles centred on the issues, difficulties, and obstacles pertaining to the adoption of MOOCs provide insights into the specific domains that necessitate attention and enhancement. This information can be utilised by educators and policymakers to formulate strategies that effectively tackle these challenges. These strategies may involve measures to enhance learner engagement, address concerns pertaining to MOOC awareness, and overcome barriers to adoption.

Furthermore, the articles encompass a range of research topics that provide significant insights for forthcoming studies and the advancement of curriculum development. The aforementioned subjects, namely the influence of MOOCs on scholastic success, the enhancement of educators' professional growth, and the factors determining the preparedness for MOOC implementation, offer valuable perspectives on the domains where MOOCs have demonstrated efficacy or necessitate additional investigation. The aforementioned findings possess the potential to contribute valuable insights towards the development of curriculum and educational policies, intending to effectively harness the advantages offered by MOOCs across diverse subject domains and for professional growth.

Moreover, the research methodologies utilised in the examined articles offer valuable perspectives on effective research strategies within the domain of MOOCs. The utilisation of quantitative, qualitative, and mixed methods exemplifies the significance of incorporating a variety of research methodologies in order to acquire a comprehensive comprehension of the impact and efficacy of MOOCs. This underscores the importance for researchers and educators to incorporate various methods of data collection and analysis in order to produce reliable and significant findings.

Moreover, the allocation of research across diverse subject domains highlights the potential of MOOCs in multiple scholarly fields. The results suggest that MOOCs have the potential to be utilised effectively in various academic disciplines, including social science, science, commerce, engineering, language, library science, and business

management education. This implies that educators have the opportunity to investigate the incorporation of MOOCs within their respective fields in order to improve the quality of teaching and learning, broaden the availability of high-quality education, and facilitate lifelong learning endeavors.
In general, the review article highlights the educational implications that arise from various aspects. These implications underscore the significance of tackling obstacles, utilising research findings to shape curriculum development, utilising a range of research methods, and investigating the subject-specific applications of MOOCs. Through careful consideration of these implications, individuals in the field of education, policymakers, and researchers have the opportunity to augment the efficacy and influence of MOOCs within the realm of education.

Conclusion

The analysed publications offer insightful analyses of the Massive Open Online Courses (MOOC) landscape and shed light on a variety of implementation and impact issues. The research examines a wide range of subjects, such as difficulties and obstacles, student views, levels of awareness, and teacher professional development. These conclusions have major educational ramifications and can direct future efforts to increase MOOCs' capacity for providing high-quality instruction.
The study demonstrates the popularity of many research methodologies, such as quantitative, qualitative, and mixed methods, underscoring the value of using a variety of strategies to understand MOOCs completely. It emphasises how important it is for educators and researchers to think about different data collection and analysis strategies in order to get solid findings.
Further highlighting the potential of MOOCs in numerous academic disciplines is the dispersion of research across subject areas. The articles show how well MOOCs work for teaching business management, social science, science, engineering, language, and other subjects. This exemplifies MOOCs' adaptability and implies that they can be successfully incorporated into particular disciplines to improve teaching and learning experiences.
The fact that learners, instructors, and MOOCs providers have been identified as the main stakeholders in MOOCs research further emphasizes the need of taking into account their perspectives and experiences in the planning and delivery of MOOCs. Strategies to maximise learner engagement, boost teacher assistance, and improve the general quality of MOOC programmes can be informed by an understanding of the specific demands and difficulties experienced by various stakeholders.
The analysis's educational ramifications highlight how crucial it is to deal with problems, use research to inform curriculum design, use a variety of research techniques, and investigate subject-specific MOOC applications. Educators, decision-makers, and researchers may maximise the advantages of MOOCs in education by making educated judgments and advancements by taking these consequences into account.
Overall, the examined articles add to the growing body of knowledge on MOOCs and offer insightful information about how they are implemented, how they have an impact, and how they might be used.

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