Mapping the Landscape of Hindrances: A Systematic Review and Bibliometric Analysis of Barriers to MOOCs

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ABSTRACT
The dynamic ascent of Massive Open Online Courses (MOOCs) is profoundly reshaping the global educational milieu, affording high-quality learning opportunities to individuals with internet access. Despite its transformative potential, MOOCs have yet to realize the anticipated expansion due to the formidable barriers they confront. This study offers a systematic review and bibliometric analysis of 1061 exclusive articles from the Scopus database, covering publications up to 2023, to provide a comprehensive analysis of the topic's current state. The bibliometric study conducted using VOSviewer yielded quantitative insights into the yearly patterns, influential articles, authors, journals, institutions, and countries related to barriers in MOOC research. In addition, co-occurrence and cited network analysis highlight the interconnectedness of research themes and collaborative networks. The findings will improve comprehension of barriers to MOOCs for all stakeholders involved and facilitate advancements for researchers and professionals.

Keywords: MOOCs, barriers, systematic review, bibliometric analysis, PRISMA framework, VOSviewer.

1. Introduction:

The educational landscape has been completely transformed with the advent of MOOCS (Kruse & Pongratz, 2017). Massive open online courses have revolutionized the field of education (Kumar & Al-Samarraie, 2018), providing unparalleled access to various courses and learning possibilities (Panzeri, 2017). Digitalization of education has encompassed educational institutions, from elementary schools to universities. While the potential benefits of MOOCs are enormous, it is vital to understand and solve the many challenges that learners, instructors, and institutions confront when adopting and implementing these courses (Alemayehu & Chen, 2023). The objective of this study is to conduct a comprehensive evaluation of existing literature and do a bibliometric analysis to identify and analyze the obstacles that hinder the acceptance and implementation of MOOCs.

The MOOC landscape contends with many impediments, categorically affecting diverse stakeholders. Within the technological domain, challenges encompassing unreliable internet and broadband access (Ma & Lee, 2019; Rautela et al., 2022; Weinhardt & Sitzmann, 2019), deficient ICT skills (Gameel & Wilkins, 2019; Mishra et al., 2022), inadequate technological support (Schophuizen et al., 2018), the digital divide (Rautela et al., 2022; Singh & Kakkar, 2023), and device

compatibility issues (Celik & Cagiltay, 2023) collectively impede the seamless adoption and implementation of MOOCs.

Simultaneously, educators face a distinctive set of challenges, including skill gaps (Schophuizen et al., 2018), resistance to change among instructors(Naveed et al., 2017), limited interaction opportunities between instructors and learners (Gregori et al., 2018; Ma & Lee, 2020), constrained time for E-course development (Naveed et al., 2017), a sense of speaking into a void due to absent student presence (Hew & Cheung, 2014), poor course design (Kim et al., 2021; Wei & Taecharungroj, 2022), and insufficient student participation in online forums (Hew & Cheung, 2014).

Individuals' involvement is necessary for MOOCs to achieve their desired goals. However there are many barriers that the participants face during their MOOCs journey, such as lack of self-regulation (Kim et al., 2021; Kizilcec et al., 2017), time constraints (G. Chen et al., 2018), economic and financial challenges (G. Chen et al., 2018; Ma & Lee, 2020), diminished motivation (Duncan et al., 2022; Wei et al., 2021), limited awareness (Ma & Lee, 2020; Singh & Kakkar, 2023), and resistance to change (Stackhouse et al., 2020), all of which collectively impede their effective engagement in MOOC courses.

Furthermore, there are many institutional barriers such as resource constraints (Gregori et al., 2018; Ma & Lee, 2020), insufficient publicity (Ma & Lee, 2020), absence of a strategic vision (Gregori et al., 2018) and policy support   (Gregori et al., 2018; Naveed et al., 2017), institutional reputational concerns (Ruipérez-Valiente et al., 2022), inadequate infrastructure (Mishra et al., 2022; Rautela et al., 2022) and challenges related to recognition and accreditation (Chugh et al., 2023; Cilliers et al., 2023) which acts as hurdles in the MOOCs integration into traditional educational institutions. This extensive investigation illuminates the complex and diverse nature of obstacles within the MOOC ecosystem, offering a nuanced comprehension for instructors, learners, and institutions.

MOOC barriers have gained considerable academic attention. Many scholars have carried out literature reviews on different specific barriers to MOOCs. (Wang et al., 2023) performed a bibliometric study on 74 papers published between 2014 and 2022 to determine the factors contributing to high dropout rates in MOOCs. The variables contributing to the dropout rate in MOOCs include personal, social, course-related, psychological, and time-related factors and unforeseen hidden costs. (J. Chen et al., 2022) undertook a comprehensive systematic review to obtain a holistic understanding of dropout prediction using a machine learning technique, and three sorts of definitions of dropout are presented as a conclusion to this systematic review. Similarly, (Despujol et al., 2022) study created a thorough systematic literature mapping review under the guidance of human experts and machine learning approaches. 6320 resources consisting of journal papers, conference papers, and editorials published between 2008 and 2020 were the sample of their study. In addition, (Alemayehu & Chen, 2023) conducted a comprehensive assessment of 37 empirical research published between 2014 and 2020. These investigations focused on challenges related to learners and instructors. Poorly designed MOOCs, lack of preparation time, and inadequate instructor experiences were the primary instructor's obstacles to MOOC delivery. Factors that impede learner engagement include insufficient self-regulated learning (SRL) abilities, inadequate foundational skills, and economic barriers. One of the critical barriers to MOOCs is self-regulated learning, for which 66 studies published between 2010 and 2020 were analyzed by conducting a systematic literature review (Ceron et al., 2021). MOOCs encounter difficulty in having a low percentage of involvement in discussion forums. A discussion forum in MOOCs was explored by completing another literature review of 42 research published between 2011 and 2017 (He et al., 2018).

The previous reviews have only reviewed a few records, restricting the research results. Most systematic reviews analyzed articles dated before the year 2022. Most of the earlier articles applied systematic reviews instead of bibliometric analysis. (Wang et al., 2023) conducted a bibliometric review, they only focused on factors that lead to dropout from MOOCs. As such, previous research has not provided thorough results or a more in-depth analysis of barriers to MOOCs. A more comprehensive examination of different barriers and their interaction and impact on the acceptance and effectiveness of MOOCs is required, for which further bibliometric analysis is needed.

Compared to past research, this bibliometric analysis evaluated exclusively 1061 articles from the Scopus database from 2012 to 2023. Hence, it presents a current review of research trends on barriers to MOOCs in terms of the yearly publications and citations, the most often referenced papers, the most prominent sources, institutions, and countries, the most productive authors, and the distribution of keywords. This study is essential since no prior bibliometric research on barriers to MOOCs has been done as far as the author knows. Hence, this study aims to investigate the following research questions (RQ).
RQ1. What are the annual trends in publication?
RQ2. Which articles have the highest number of citations, highest-performing authors,

organizations, and nations?
RQ3. Which sources are the most productive?
RQ4. What is the current state of cited references and journals' co-citations?
RQ 5: What is the current state of co-authorship among writers and countries and the distribution of author keywords?

2. Methodology

A PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework was adopted (Moher et al., 2009). The PRISMA framework is a systematic methodology designed to assist researchers in conducting and documenting systematic reviews and meta-analyses. A four-phase flow diagram comprising identification, screening, eligibility, and inclusion and a 27-item checklist comprise the PRISMA framework. The checklist includes several components of the systematic review process, including the title, abstract, introduction, methodology, findings, discussion, and financing. Adhering to PRISMA principles helps ensure the complete and transparent reporting of systematic reviews, making it easy for readers to judge the study's validity and replicate the results.

The author devised a search strategy for this systematic inquiry to ascertain appropriate literature. This search strategy was adjusted to the SCOPUS database. The search keywords used were the following: "MOOC and Barriers," "MOOC and issues," "MOOC and obstacles," "MOOC and Challenges," "MOOC and difficulties," "MOOC and shortcomings," "MOOC and Limitations," and "MOOC and Problems." All the searches ranged from the year 2012 to 2023. All articles before 2012 were eliminated from the search.

The PRISMA statement (Moher et al., 2009) served as the foundation for the selection criteria. The search focused mainly on mapping available literature on Barriers to MOOCs in the academic areas of social science, Computer science, Engineering, Arts and Humanities, and Business Management and Accounting sectors. To preserve the quality of the review, the author included only articles. Conference papers, Book Chapters, and Review papers were omitted. Duplications were examined extensively, and a total of 233 duplicates were eliminated. Then, to ensure the caliber and applicability of scholarly content included in the review process, the abstracts of the documents were meticulously checked for analysis and purification of the articles. A comprehensive examination of every research article was carried out. The other exclusion criterion was limiting the paper's

publication in English alone. Five publications in non-English language were eliminated from the research.

Finally, the author selected 1061 papers after reviewing each item on the aforementioned inclusion and exclusion criteria for further analysis. The article selection process for the SLR is depicted in Fig. 1, adhering to PRISMA flow chart guidelines to ensure transparency and clarity in the study's methodology.
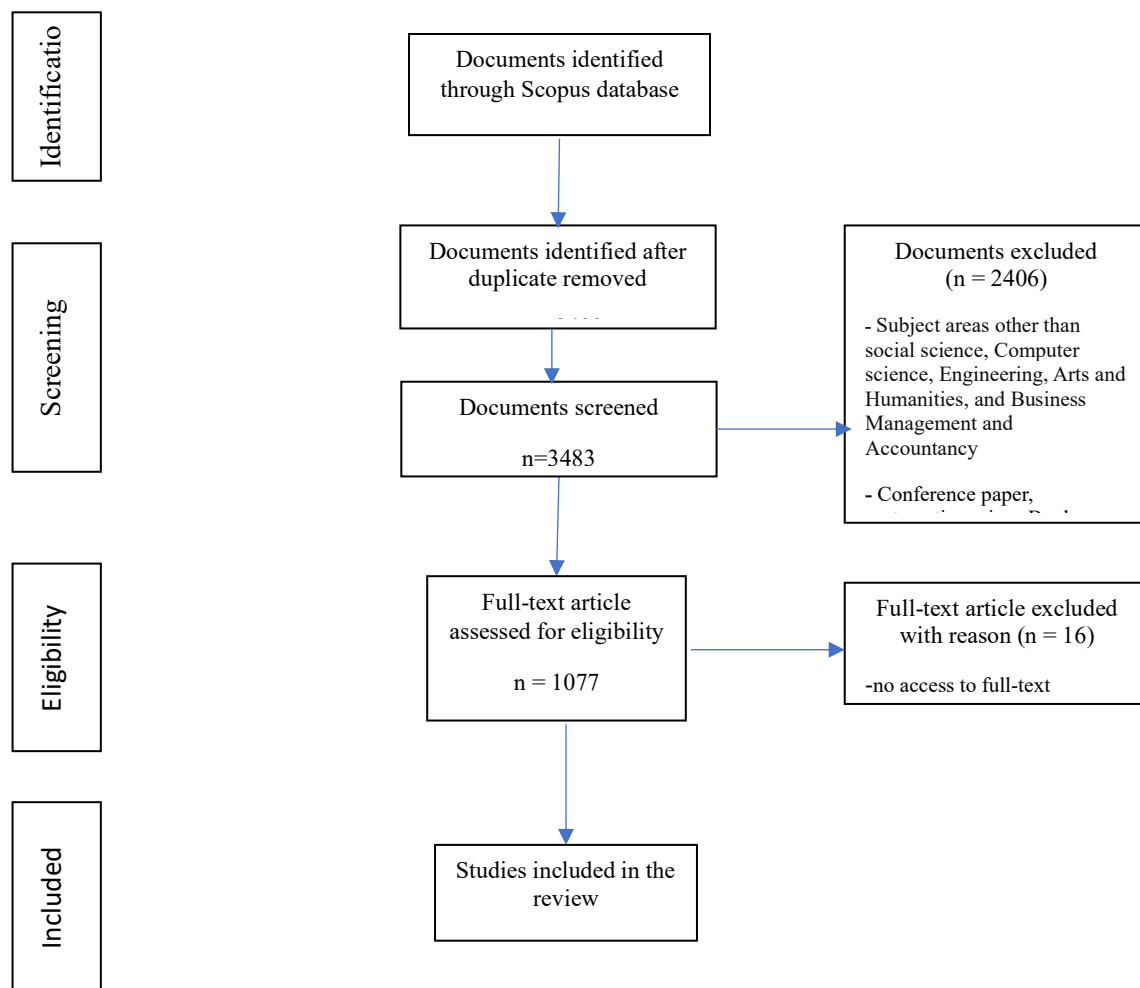

Fig 1: PRISMA flowchart of the identification, screening, eligibility, and inclusion of the studies in the systematic review. Adapted from (Moher et al., 2009).

3. Results and interpretations

The following sections provide the findings of a mapping and analysis of articles, authors, journals, organizations, and nations about barriers to MOOC topics. In addition, this section additionally presents the findings from analyses of co-authorship and country, keywords, co-citations on cited journals, and cited references.

3.1 Trends in publications annually

The year 2012 marked the publishing of the first work on the "Web in education" (Allison et al., 2012) in Scopus, according to the study of the yearly trends of publication Fig. 2. The growth of MOOCs literature related to its barriers can be divided into two phases. The first phase of MOOC-related barriers paper growth was from 2013 to 2015. This growth was fuelled by MOOC popularity. There was a decrease in the quantity of publications in 2016. The growth again picks up from the year 2016

to the year 2023. This can be termed as the second phase of the development of MOOCs literature. Numerous scholars and investigators have directed their attention towards the subject matter, resulting in a notable surge in the number of papers published within the Scopus database, approaching 158 in 2023.
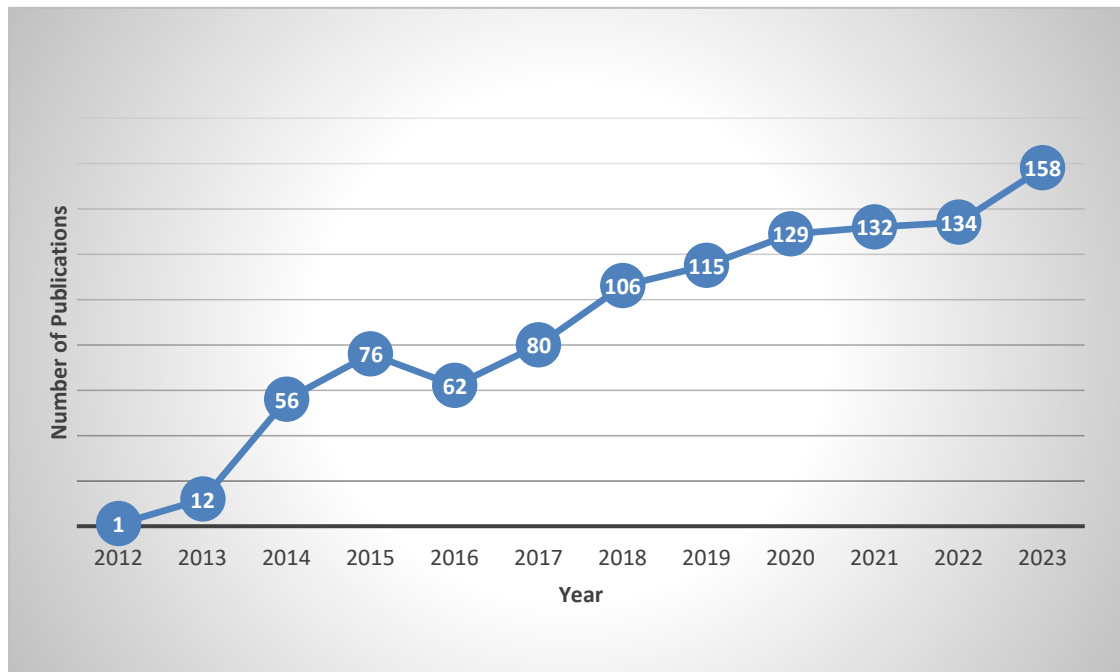

Fig. 2 Annual trends of publication

3.2 Publication and author mapping and analysis

This study reveals the papers that have received the highest number of citations in Scopus. Table 1 presents the Top 10 publications with the highest number of citations. "Peer and self assessment in massive online courses" (Kulkarni et al., 2013), the first most cited article with 243 citations, advances the field of online education and peer assessment research by presenting the first large-scale implementation of peer and self-assessment in a massive open online course (MOOC), introducing novel approaches to improve peer assessment and feedback, and providing insightful analysis and recommendations for further research in this area. The second most cited article, "Motivation to learn in massive open online courses: Examining aspects of language and social engagement" (Barak et al., 2016), accounts for 239 citations. It analyzes the motivation for learning in MOOCs via language and social interaction lenses. The third most cited article, "Will MOOCs transform learning and teaching in higher education? Engagement and course retention in online learning provision" (De Freitas et al., 2015), accounts for 228 citations. Problems with poor completion rates and student engagement in MOOCs are the main topics of this article, which also offers solutions to these problems, including gamification and social interaction. The fourth most cited article, "Designing for Deeper Learning in a Blended Computer Science Course for Middle School Students" (Grover et al., 2015), accounts for 226 citations. This paper pointed out that lack of teacher preparation and professional development, lack of curricular materials and assessments that support deeper learning and transfer, and lack of research on the effectiveness and impact of computational thinking interventions are some of the barriers to computational thinking and the fifth most cited article "Understanding the Massive Open Online Course (MOOC) student experience: An examination of attitudes, motivations, and barriers" (Shapiro et al., 2017) focuses on specific barriers namely lack of time, bad experiences or inadequate background in the subject, difficulties with the online and lack

of resources like insufficient internet connectivity, limited access to equipment and software and language barrier.

Table 1 Top 10 most significant articles about MOOC barriers

Rank	Title	Journal	*Authors*	Year	Citations
1	Peer and self assessment in massive online classes	ACM Transactions on Computer-Human Interaction	(Kulkarni et al., 2013)	2013	243
2	Motivation to learn in massive open online courses: Examining aspects of language and social engagement	Computers and Education	(Barak et al., 2016)	2016	239
3	Will MOOCs transform learning and teaching in higher education? Engagement and course retention in online learning provision	British Journal of Educational Technology	(De Freitas et al., 2015)	2015	228
4	Designing for deeper learning in a blended computer science course for middle school students	Computer Science Education	(Grover et al., 2015)	2015	226
5	Understanding the massive open online course (MOOC) student experience: An examination of attitudes, motivations, and barriers	Computers and Education	(Shapiro et al., 2017)	2017	223
6	Changing "Course": Reconceptualizing Educational Variables for Massive Open Online Courses	Educational Researcher	(DeBoer et al., 2014)	2014	201
7	What predicts student satisfaction with MOOCs: A gradient boosting trees supervised machine learning and sentiment analysis approach	Computers and Education	(Hew et al., 2020)	2020	192
8	Sentiment analysis on massive open online course evaluations: A text mining and deep learning approach	Computer Applications in Engineering Education	(ONAN, 2021)	2021	191
9	Explaining Chinese university students' continuance learning intention in the MOOC	Computers and Education	(Dai et al., 2020)	2020	160

	setting: A modified expectation confirmation model perspective				
10	Peer assessment for massive open online courses (MOOCs)	International Review of Research in Open and Distance Learning	(Suen, 2014)	2014	151

The most well-known articles about the research barriers for MOOCs are included in the Top 10 publications. The authors in the Top 10 are the most influential researchers in this discipline. Table 2 displays the names, publications, and H index of the most prominent ten authors. Jingjing Zhang is the most prolific author, authoring 11 articles during the specified search time. His h index score is 6. Carlos Alario-Hoyos published ten articles during the search period and became the second most productive author. His h index is 8. Xiaoyao Li also published ten articles, but his h index is 4

Table 2: Key authors on the topic of Barriers to MOOC research.

Rank	Authors	Publications	H index
1	Zhang J	11	6
2	Alario-Hoyos C	10	8
3	Li X	10	4
4	Kloos Cd	9	8
5	Wang Y	8	4
6	Chen X	7	2
7	Liu Y	7	3
8	Muñoz-Merino Pj	7	7
9	Watson Sl	7	6
10	Watson Wr	7	6

3.3 Journal mapping and analysis

Dzikowski states that a journal has a more significant influence when it has more published papers and citations (Dzikowski, 2018). Consequently, the present investigation analyzed the overall number of publications, citations, and average citations per article across all journals. Table 3 presents the top 10 relevant journals in the Barriers to MOOC discipline, organized by the number of publications.

The five journals with the highest number of publications are *International Review of Research in Open and Distance Learning* (48 publications), *International Journal of Emerging Technologies in Learning* (29 publications), *Computers and Education* (27 publications), *IEEE Access* (26 publications), *Sustainability (Switzerland)* (25 publications). This indicates that these five journals focus more on barriers linked to MOOCs. According to the "average citation per publication" indicator, the first is *Computers and Education* (79.85 citations per publication), followed by *Distance Education* (32.00 citations per publication), Computer *Applications in Engineering Education* (29.69 citations per publication), *IEEE Access* (17.08 citations per publication) and *Sustainability (Switzerland)* (13.36 citations per publication). These findings indicate that these five publications focused more on barriers encountered in MOOC research.

Table 3 Ranking of the top 10 journals on the topic of MOOC barriers

Rank	Journals	Publications	Citations	Average Citations/ Publications
1	International Review of Research in Open and Distance Learning	48	1909	39.77
2	International Journal of Emerging Technologies in Learning	29	213	7.34
3	Computers And Education	27	2156	79.85
4	IEEE Access	26	444	17.08
5	Sustainability (Switzerland)	25	334	13.36
6	Education And Information Technologies	21	201	9.57
7	International Journal of Continuing Engineering Education and Life-Long Learning	18	33	1.83
8	Computer Applications in Engineering Education	13	386	29.69
9	Turkish Online Journal of Distance Education	13	153	11.77
10	Distance Education	12	384	32.00

3.4 Mapping and analyzing institutions and countries

The study sample comprises 922 institutions from 67 countries. An institution's significance can be determined by its total publications and the average number of citations per publication. Table 4 shows the top 10 institutions in the Barriers to MOOCs field.

Table 4 Ranking the top 10 significant institutions in the subject of Barriers to the MOOCs study.

Rank	Institution	Country	Publications	Citations	Average citation/ Publication
1	Massachusetts Institute of Technology	USA	34	202	5.94
2	Universidad Carlos Iii De Madrid	Spain	28	146	5.21
3	Universidad De Valladolid	Spain	22	187	8.50
4	Pontificia Universidad Católica De Chile	Chile	18	155	8.61
5	Purdue University	USA	18	422	23.44
6	Central China Normal University	China	17	180	10.59
7	Beijing Normal University	China	16	454	28.38

8	The Open University	UK	15	287	19.13
9	University Of Michigan	USA	15	241	16.07
10	Dublin City University	Ireland	14	137	9.79

The Massachusetts Institute of Technology (MIT) in the United States has the top position in the field of barriers to MOOC (with 34 publications and 202 citations). The following two universities, Universidad Carlos Iii De Madrid (Spain) and Universidad De Valladolid (Spain), have, respectively, 146 and 187 citations and 28 and 22 publications. Table 4 shows that US institutions continue to lead the way, with China and Spain following. Three influential institutions exist in North America, four in Europe, and two in Asia. This illustrates how universities in North America and Europe assume critical roles in this area.

The author additionally evaluated countries to discover which country is particularly exceptional in the barriers to the MOOCs research field. The most prominent ten countries in this category are shown in Table 5. China has the most significant influence in the domain of Barriers to MOOCs, according to the statistics in Table 2 (229 articles and 3013 citations). Placing second and third, respectively, with 201 and 107 publications and 5786 and 2404 citations, are the United States and Spain. Asia and Europe continents account for the majority of the top 10 countries, followed by North America. The only country in the African continent is Morocco. Australia also contributes to the growing body of knowledge.

Table 5 Top 10 countries in the Barriers to MOOC research field

Rank	Country	Publications	Citations	Average citations per publication
1	China	229	3013	13.16
2	The United States	201	5786	28.79
3	Spain	107	2404	22.47
4	The United Kingdom	83	2005	24.16
5	Malaysia	49	547	11.16
6	India	48	388	8.08
7	Australia	39	1458	37.38
8	Morocco	32	178	5.56
9	Canada	31	833	26.87
10	Italy	30	244	8.13

3.5 Keywords analysis of research hotspots
The study sample consisted of 1061 papers with a total of 4783 keywords. To generate a visually analyzable keywords co-occurrence network in VOSviewer, the minimum number of keyword occurrences was set to 5. This threshold ensures that only keywords appearing at least five times are included in the network.

The keyword co-occurrence network analysis shown in Figure 3 uses colored circles to label the keywords, with the size of each circle corresponding to the frequency of the keyword's appearance in the titles and abstracts of the publications. Larger circles and text indicate higher keyword occurrences (Jan van Eck & Waltman, n.d.). This analysis reveals that the most frequently occurring keywords are: (a) "MOOC" (329); (b) "e-learning " (253); (c) "MOOCS" (229); (d) "massive open online course" (227); (e) "students" (139); (f) "education" (111); (g) "teaching" (107); (h) "curricula" (106); (i) "online learning " (106) and (m) "learning system" (103). In addition, it was feasible to detect seven groups of 276 keywords and 6079 connections, resulting in a combined link strength of 13992.
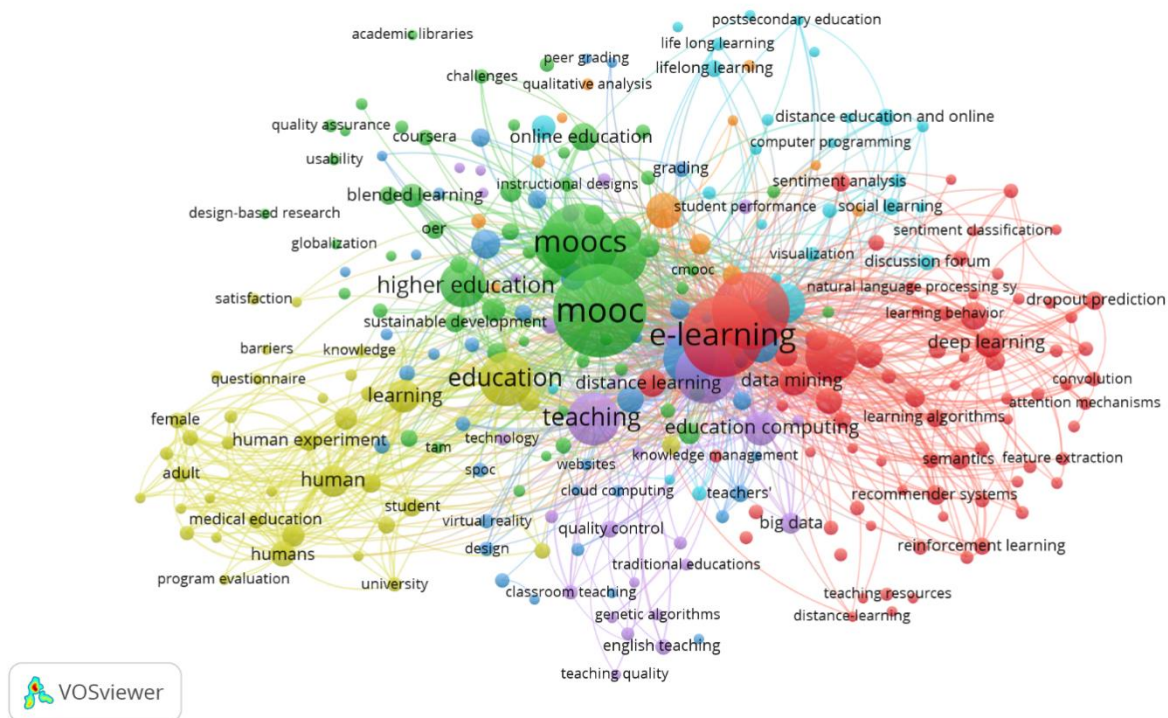

Fig. 3 The co-occurrence network of keywords connected to Barriers to MOOCs publication.

3.6 Analysis of co-authorship by country

Country co-authorship analysis involves examining the nations with the most impact in a particular field of research and their level of collaboration (Martins et al., 2022). Figure 4 displays the country co-authorship network for articles on Barriers to MOOCs. The size of the nodes depicts countries with significant impact. The links show how institutions in various countries collaborate; the thickness and distance between nodes of the links indicate how collaborative the countries are (Jan van Eck & Waltman, n.d.). There exist 96 nations where these databases are available. After considering a minimum of 5 documents threshold in a country, 47 countries met the threshold (Aluvalu & Gite, n.d.).

The five countries with the most publications are China (229), the United States (201), Spain (107), the United Kingdom (83), and Malaysia (49). Likewise, the United States (5786), China (3013), Spain (2404), the United Kingdom (2005), and Australia (1458) are the top five nations in terms of citation counts. The US (84), Spain (78), China (70), the UK (44), and the Netherlands (34) are the nations with the greatest total link strength values.
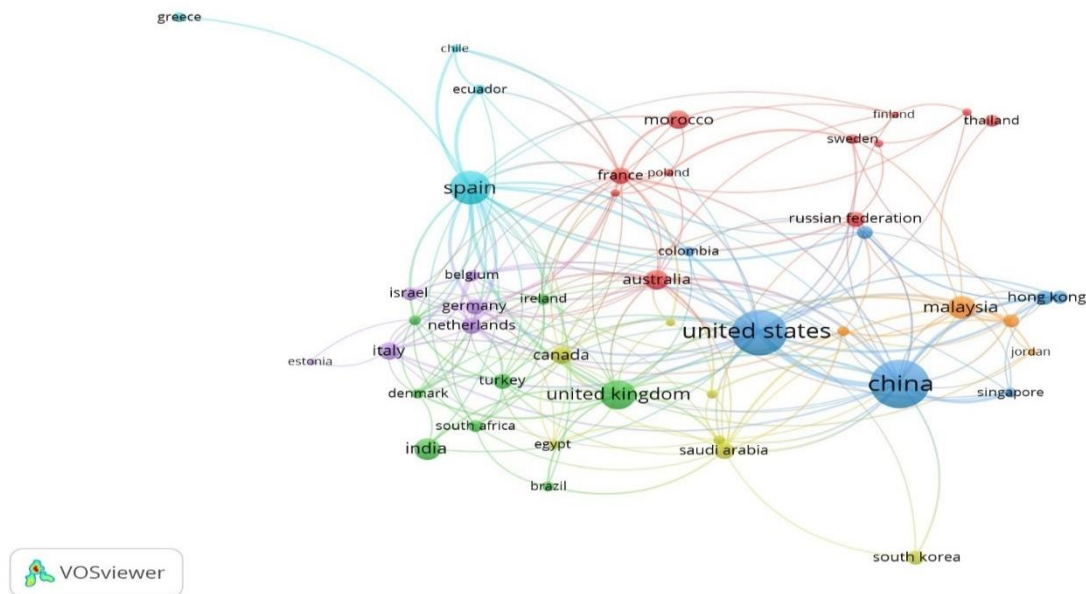
Fig. 4 The country co-authorship network of Barriers to MOOC- related publication

3.7 Co-citation analysis on cited references

A co-citation analysis was conducted on the references cited to grasp the structure of cited works in MOOC barriers comprehensively. The study obtained a set of 40424 cited references. By applying a criterion of 15, indicating that a cited reference must have at least 15 citations, 22 references were identified for co-citation analysis of cited references.

Based on the analysis of Figure 5, it can be observed that the largest nodes are those belonging to Margaryan et al. (Margaryan et al., 2015), McAuley et al. (McAuley et al., 2010), Hone et al. (Hone & El-Said, 2016), Yuan et al. (Yuan et al., 2013), and Hew et al. (Hew & Cheung, 2014). Upon examining the highlighted papers, it becomes evident that these are the original writings about the MOOC model, instructional quality, retention aspects, motivation, and challenges for instructors and students in higher education.
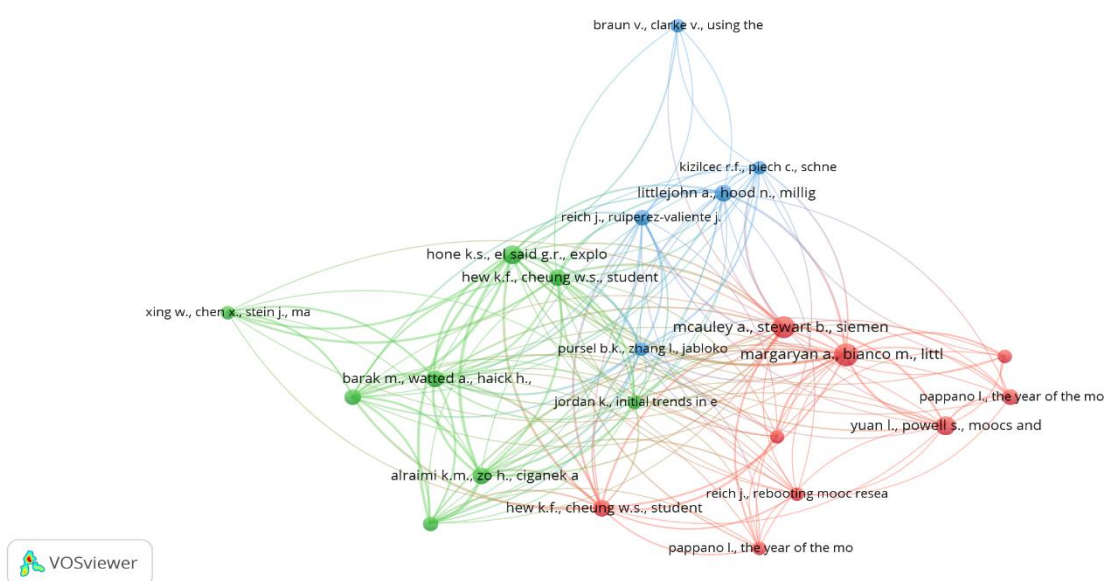

Fig. 5 The reference co-citation network of Barriers to MOOCs related publications

3.8 Co-citations analysis on the cited journals

Co-citation analysis of sources is obtained by considering the threshold of 20 citations per source. Out of the 20155 sources, only 175 met the threshold.

Therefore, in Figure 6, the network of co-citations of the journals consists of 175 nodes. It states that the node's size is directly related to the journal's amount of activity, namely the number of papers published on a specific topic. The proximity of the nodes allows us to analyze the frequency of citations between publications. The closer the nodes are, the higher the frequency of citations (Martins et al., 2022). The journals "Computers and Education (970 citations)," The International Review of Research in Open and Distributed Learning (416 citations)," "Computers in Human Behavior (326 citations)," "The Internet and Higher Education (331 citations)," and "British Journal of Educational Technology (321 citations)" are the ones that have the most significant number of citations.

Four distinct clusters can be observed: a blue cluster of journals in the computer and education field, a red cluster representing journals in educational research, a green cluster encompassing science and computer-related topics, and a light green cluster focusing on computer and human interaction. Through network analysis, it can be inferred that the close connection between the nodes representing the "Computers and Education" and "Computers in Human Behavior" journals, as well as the "British Journal of Education," indicates a higher frequency of citations between them.
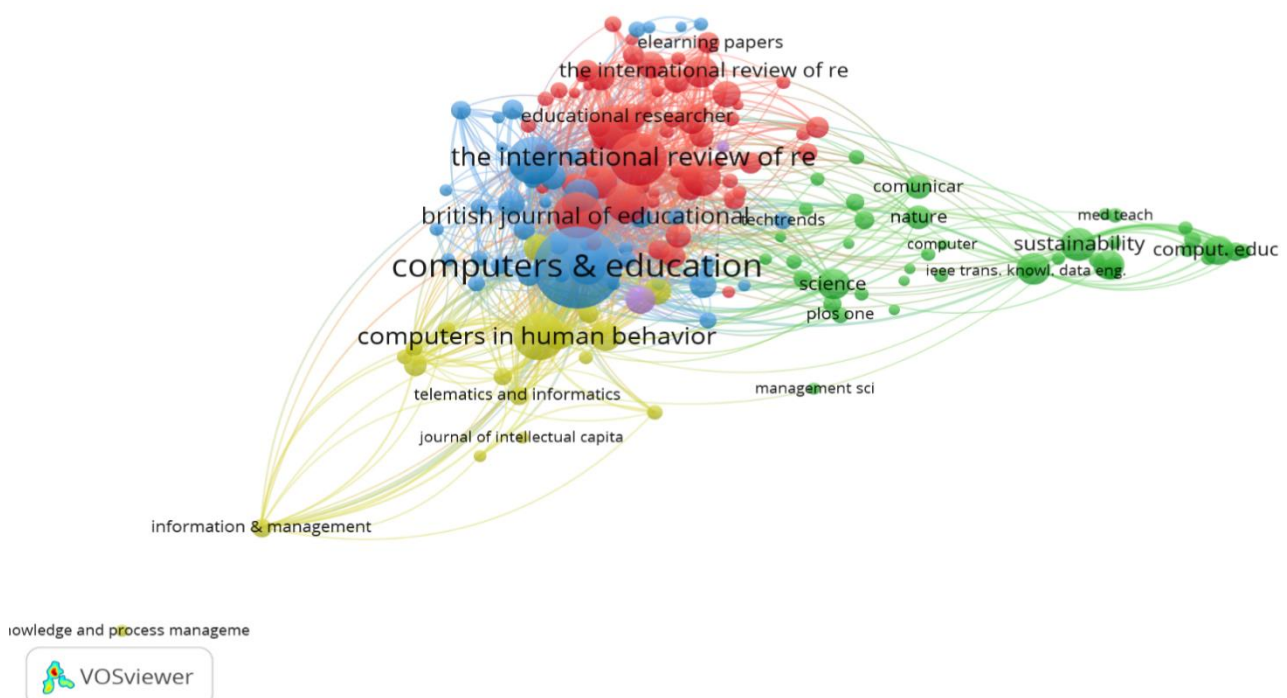

Fig. 6 The journal co-citation network of MOOCS barriers-related publications

4. Discussion of the results

This research aimed to execute a bibliometric analysis of publications related to barriers to MOOCs. "Web in education" was the first paper published in Scopus. Two phases of MOOC-related paper growth were observed from the year 2013 to the year 2015 and from the year 2016 to the year 2023. The growth in the second phase was far more than in the first phase as MOOCs became more popular, leading to an exponential increase in published articles.

"Peer and self assessment in massive online classes," "Motivation to learn in massive open online courses: Examining aspects of language and social engagement," and "Will MOOCs transform learning and teaching in higher education? Engagement and course retention in online learning provision" are the top three cited papers and "Jingjing Zhang," "Carlos Alario-Hoyos" and "Xiaoyao Li" are top three authors based on their number of publications in the related field.

"International Review of Research in Open and Distance Learning," "International Journal of Emerging Technologies in Learning," and "Computers and Education" are the leading publications in terms of the highest number of published papers. Similarly, The Massachusetts Institute of Technology, Universidad Carlos III de Madrid, and Universidad de Valladolid are the three leading institutions with the highest number of published papers. Further, China, The United States, and Spain are the three countries that have published the most documentation on barriers to MOOC-related issues. Still, regarding citations, the USA, China, and Spain are the top three countries.

The keywords that categorize a research paper are among its most essential elements. Through evaluating the articles in the research sample, it was found that the top five keywords were "MOOC," "e-learning," "MOOCs" "Massive open online course," and "students," with a total of over 1000 occurrences. Given that papers often include numerous keywords, it is necessary to determine the strength of the association among these terms. The keywords with the strongest connections are "MOOC" with "e-learning," "MOOC" with "students," and "MOOC" with "education."
The study sample's average citation count is 17.85, indicating that every article on barriers to MOOCs is cited more than 17 times. Most of the most frequently cited papers were published between 2013 and 2017. Recent research has not received as many citations as it should have despite a decade of increased publications. Computers and Education, International Review of Research in Open and Distance Learning, and IEEE Access are the journals that have received the most citations on barriers to MOOCs.

It was also possible to identify three clusters based on the research sample analysis to group the publications that have published studies on barriers to MOOCs: one with a focus on "computer-education interaction," another more focused on "distance learning," and a third which includes multidisciplinary journals that list "Education" as one of their topics.

5. Conclusions

Barriers to Massive Open Online Courses have been extensively discussed in academic journals throughout the years, although the comprehension of current research still needs to be made more explicit. This study employs bibliometric analysis to investigate and reveal the evolution of barriers to MOOC development from 2012 to 2023. Bibliometric analysis is a robust research tool that may help scholars, researchers, and policymakers explore a subject in great detail from an all-encompassing perspective. We reviewed 1061 exclusive articles from the Scopus database to identify significant publications, authors, journals, organizations, and countries related to the Barriers to the MOOCs topic.

The results demonstrate that the barriers connected with MOOCs are significant, and their importance has increased significantly since 2016. Over the past three years, more than 424 papers have been published on this topic, accumulating over 18,944 citations since the first paper was released in 2012.

Practically speaking, the nations that focused the most on the subject mentioned above were the USA, China, and Spain. This trend is also evident in the organizations whose members have published the most, with American and Chinese universities taking the top places. Interestingly, the nations most

cited publications on the hurdles to MOOCs issue were the USA, China, Spain, the UK, and Australia, respectively.

Elsevier's "Computers and Education," a first-quartile journal, has received the most citations. The top 10 journals published 232 papers on Barriers to MOOCs, constituting 21.87% of the entire collection of journal articles used in the study. Many researchers have devoted considerable time and effort to understanding various barriers to MOOCs to formulate a theoretical foundation. These researchers consider MOOCs to be the next big thing that will change the educational system. However, an analysis of the published paper proves that the goal is yet to be achieved.

5.1 Limitations and future research

Although this study on bibliometric analysis of the literature on Barriers to MOOCs offers valuable insights into the subject's current state, a more thorough examination of the methodology reveals certain shortcomings. First, this study exclusively relied on the Scopus database as its sole information source. While Scopus includes a wide range of articles, it only consists of a limited number of journals focusing on barriers related to MOOC themes. The information from other renowned databases, such as WoS, would have added more insight into the current topic. Second, data collection in this work is limited to Articles to maintain high publishing quality. Future studies can extend the scope of bibliometric analysis by including other types of publications besides articles (review papers, conference papers, books, and book chapters) and grey literature like government reports, policy statements, theses, and dissertations. Third, since this sample study had selected articles published in English only, future research can include articles in other languages to broaden the research scope. Fourth, COVID-19 was a significant disruptor in education around the world. It has added many barriers to MOOCs, which need a thorough investigation in future research. Fifth, future studies might involve a qualitative analysis, such as a focus group, conducted by specialists in MOOCs to provide their insights on the results obtained and potential future advancements. Finally, the bibliometric analysis of this paper was performed by employing VOSviewer software. Other software like CiteSpace, Gephi, and NVIVO can perform bibliometric analysis. This software gives researchers slightly different cognitions and interpretations of the same content.

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