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Mapping the Landscape of MOOCs Research: A Bibliometric Analysis of Top 100 Cited Papers

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ABSTRACT

This study analysed the top 100 cited papers on MOOCs research to identify prolific contributors and factors influencing citation count. Bibliometric approach was employed to examine the objectives. Various aspects of the publications, such as publication year, accessibility, document type, research design, top contributors, collaboration patterns, and factors influencing citation count, were analysed. The study found that highly cited papers on MOOCs research from 2013 to 2016 consisted mainly of articles and conference papers. Open-access publications received more citations compared to subscription-based papers, and papers that applied a mixed method approach to research design received the highest average citation. The USA has produced the highest number of highly cited papers and R.F. Kizilcec, P.J. Guo, and J. Reich were the most prolific authors. This study aims to provide valuable insights to improve student engagement, retention rates, and access to education.

Keywords: Massive open online courses; MOOCs; Bibliometrics; Top cited papers; Citations; Research productivity

1. INTRODUCTION

The digital age has transformed education, and Massive Open Online Courses (MOOCs) have played a significant role in this transformation[1]. MOOCs offer free, high-quality courses that are easily accessible worldwide. More than 1,200 higher education institutions offer over 150,000 online courses[2]. Many renowned universities have partnered with platforms like Coursera, which has expanded MOOCs' global impact[3]. The COVID-19 pandemic has further accelerated online education adoption and underscored the relevance of MOOCs[4].

Despite the rapid expansion of MOOCs, there are still important questions regarding their development, impact, and global distribution. Existing studies have examined various aspects of MOOCs, such as research on MOOCs, which has covered many topics, including research themes, dropouts, trends, and gamification. Masalimova[5], *et al.* revealed that there is a continuous surge in the literature in the field of online learning and student engagement, online learning, and teaching are identified as the latest research trends in their study on identifying the research themes in online learning in higher education in BRICS countries. In their study of the evolution of MOOCs in engineering education, Turan and Yamliz[6] revealed learners' engagement, interaction, and feedback process as the major areas of research in the MOOCs domain. Reich[7] stressed on the importance of MOOCs, and Reich & Ruipérez-Valiente[8] discussed the "MOOC pivot", representing a shift and evolution in the MOOC landscape. The major challenge that emerged while implementing MOOCs was the retention rates[9]. Wang[10], *et al.* analysed the factors affecting the dropouts from MOOCs and they identified psychological, social, personal, course, and time-related factors as five interconnected factors that led to dropouts in MOOCs. The MOOC landscape has been continuously evaluated and developed over time. MOOCs are seen as a way to promote equity and reduce educational disparities, aligning with Sustainable Development Goal 4.

Many studies on MOOCs have been specifically conducted from a bibliometric perspective. Liu[11], *et al.* studied the scientific production of the MOOC literature over time to reveal various aspects such as prolific countries, institutions, research trends, and scientific collaborations. Irwanto[12], *et al.* conducted a bibliometric study to analyse the most productive institutions, countries, leading sources of publications and the most cited publications and they found that a gradual increase in the number of publications on

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MOOCs since 2012 but a sharp peak was seen in the year 2021. Li & Lee[13] explored the publication trends and the most prolific contributors, while Patino-Toro[14], *et al.* in their study discussed the introduction of innovative technologies such as gamification to enhance learners' engagement and retention rate in MOOCs. Sobral[15] examined the publication trends, most preferred journals, prominent organisations, and countries. Mishra[4], *et al.* conducted a scientometric study to predict the publication trends and identified remote teaching, assessment, and student readiness as the major research themes in online distance learning during COVID-19.

It was revealed from the literature review that there are many significant research studies on MOOCs, but a comprehensive analysis of the top-cited papers could not be traced. Thus, the present study analysed the top 100 highly cited papers in the field of MOOCs for the patterns in their publication practices, factors influencing citation counts, most prominent authors, and the trending research areas in this domain that hold significance in the academic world. The purpose of the present study is to provide valuable insights into MOOC research's evolution, impact, and global reach. A study of the top-cited papers will be of importance to the academic community in understanding the most influential papers in this area of research and can also provide a future direction for further research. To understand the evolution, and major players in MOOCs, the present research focuses on the following questions:

RQ1: How has the literature on MOOC research grown?

RQ2: What are the factors affecting the citation count in the top-cited papers?

RQ3: Who are the most prolific contributors to top-cited papers on MOOCs?

2. OBJECTIVES

The following objectives are framed to answer the above-mentioned research questions:

- To compare publication trends of the 100 top-cited papers based on accessibility;
- To analyse the various document types and the authorship patterns;
- To find out the research design employed in the top-cited papers;
- To examine the impact of authorship composition on citation patterns;
- To identify the top sources publishing highly cited papers on MOOCs;
- To identify the most prolific authors and countries on MOOCs research;
- To analyse the subject domains under which the MOOC research was published.

3. METHODOLOGY

The present study analyses the literature on MOOCs using the bibliometric approach, specifically focusing on the 100 top-cited papers in the Scopus database. Bibliometric analysis is a systematic method that applies statistical approaches to identify patterns in scholarly publishing and reveal relationships between published works[16]. The two main methods used in this process are performance analysis and science mapping[17]. A bibliometric analysis starts with identifying and selecting the appropriate literature[18]. Scopus and Web of Science are the two most popular databases employed for bibliometric research. Scopus has a larger selection of journals than Web of Science[19]. Therefore, for the present study, Scopus was selected to conduct an exhaustive search of all

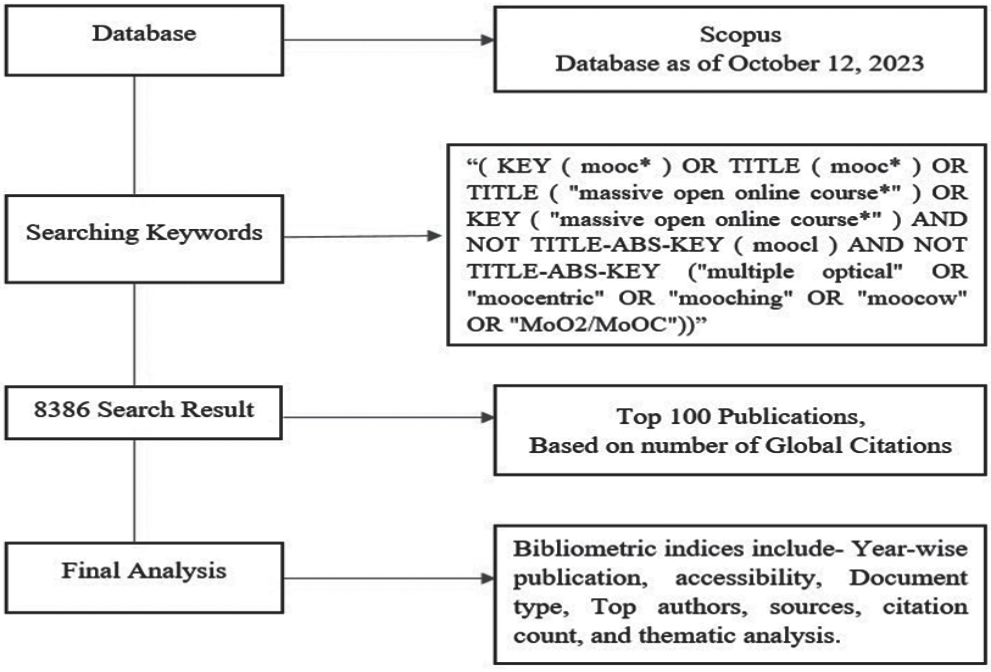

Figure 1. Flowchart of methodology adopted.

relevant literature in this field. The subsequent phase in bibliometric analysis involves formulating a search string that must be carefully constructed to guarantee the incorporation of all relevant scholarly literature. A search string was formulated to find relevant documents in order to accomplish the research objectives. The search query used in the present study was "(KEY (mooc*) OR TITLE (mooc*) OR TITLE ("massive open online course*") OR KEY ("massive open online course*") AND NOT TITLE-ABS-KEY (moocl) AND NOT TITLE-ABS-KEY ("multiple optical" OR "moocentric" OR "mooching" OR "moocow" OR "MoO2/MoOC"))".This search string resulted in the retrieval of 8386 documents from the Scopus database. To identify the top 100 most-cited papers, the retrieved documents were sorted according to their citation count, and the papers with the highest citation count were selected. The relevant information, including the authors' names, their affiliated country, the year of publication, the journal in which the papers were published, the accessibility of the papers, the keywords associated with the papers, and the citation count, were extracted and documented. As illustrated in Fig. 1, the review is based on a final data of 100 documents.

The extracted data of the selected papers was analysed using MS Excel and VOSviewer. Descriptive statistics, such as frequency, percentage, mean, and standard deviation, were used to summarise the data.

4. DATA ANALYSIS AND RESULTS

4.1 Brief Summary

Figure 2 shows the year-wise number of publications on MOOCs. The first publication on MOOCs appeared in the Scopus database in 2009 and since then, 8386 articles have been published on the topic, as of October 2023. There has been a consistent increase in the number of articles published each year, with the highest 972 papers appearing in the year 2019.

Table 1 presents a brief summary of the top 100 cited papers on MOOCs published in 50 different sources. Shortly after Dave Cormier and Brian Alexander coined the term for the first time in 2008[17], the first highly cited paper (a conference paper) was written by an Italian author and published in the International Review of Research in Open and Distributed Learning in early 2009. The top 100 cited papers on MOOCs appeared in the timeframe of 2009-2021. These 100 documents have 4466 references appended to them. A total of 248 keywords have been used by the authors in these top-

Table 1. Main information about data

Description	Results
Timespan	2009:2021
Sources (Journals, Books, etc.)	50
Average citations per doc	229.32
References	4466
Keywords plus (ID)	573
Author's keywords (DE)	248
Authors	293
Authors of single-authored docs	14
Single-authored docs	15
Co-authors per doc	3.43
International co-authorships %	21

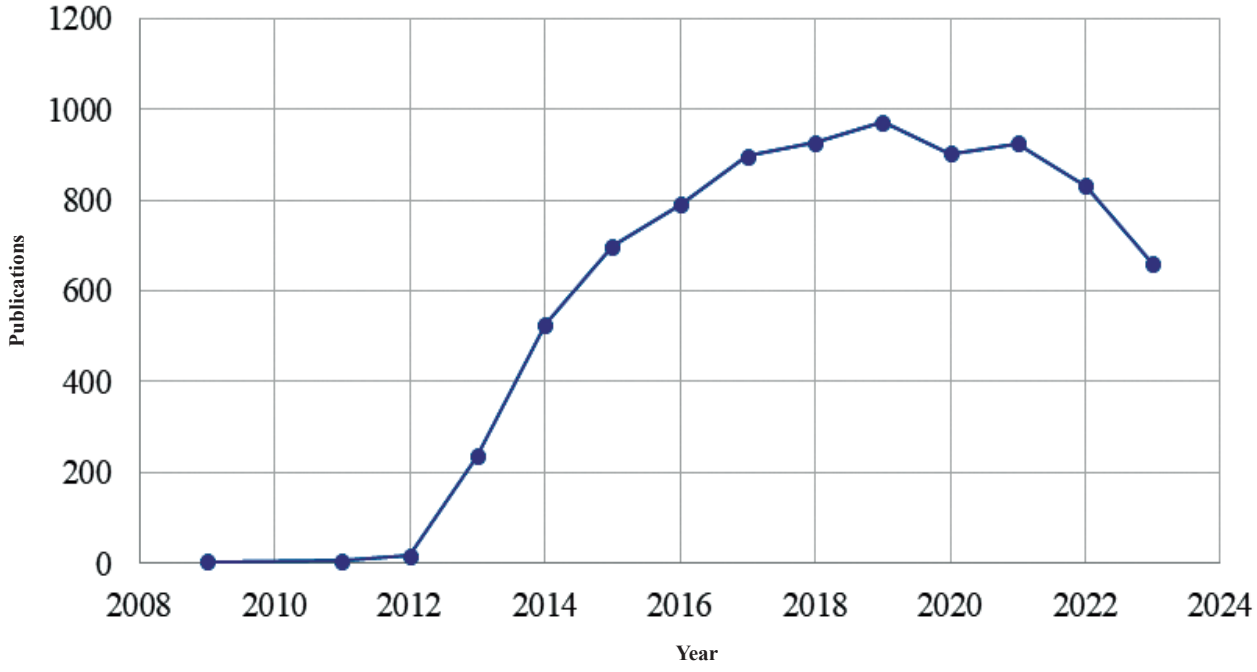

Figure 2. Year-wise number of publications on MOOCs.

cited papers. Collaborative research is evident through the involvement of 293 authors in these 100 papers, with the average number of co-authors per document being 3.43 and 21 % of this collaboration being international in nature.

4.2 Year-Wise Distribution of the Top-Cited Papers and Their Accessibility

Table 2 presents a comprehensive analysis of publication trends and citation patterns of the top-cited papers based on their accessibility.

These top-cited 100 publications received 22,932 citations with an average of 229.32 citations per paper. In terms of the number of publications and citations, 2013, 2014, 2015 and 2016 were the most notable years. Out of the top 100 cited papers, there were 57 Subscription-based publications receiving 12,305 citations (215.88 ACPP) and 43 Open-access publications receiving 10,627 citations (247.14 ACPP). Subscription-based publications exhibited consistent trends, whereas Open-access publications exhibited fluctuating publication numbers per year but maintained a higher average number of citations per paper.

Average Citations Per Paper Per Year (ACPPPY) was also calculated, offering a novel metric for assessing long-term citation impact. Open-access publications exhibit both higher ACPP and ACPPPY compared to subscription-based publications. This indicates the potential of open-access models in receiving greater academic impact.

4.3 Citation Difference Between Open Access and Subscription-Based Papers

Table 3 presents the results of a two-tailed Mann-Whitney test, conducted to examine whether there was a significant difference between the citations received by the open-access papers and subscription-based papers. This test is an alternative to the two independent sample t-tests where equal variance is not assumed. There were 57 observations in subscription-based papers and 43 in open-access papers. The test revealed that citations received by the open-access papers (Median = 213, n = 43) are significantly higher than the subscription-based papers (median = 160, n = 57), U= 929, z = -2.065, p = 0.039. The mean rank of open-access and subscription-based papers were 57.4 and 45.3 respectively, this suggests that open-access papers received significantly higher citations than subscription-based papers.

4.4 Document Type

A total of 8386 documents were indexed in the Scopus database on MOOCs, out of which 4140 were the conference proceedings. Among the top 100 cited papers, Article was the most prevalent document category with 68 publications (see Table 4), receiving an average of 220.94 citations per paper. Conference papers, though fewer in publication count (23 papers), received a higher average citation (248.70) per paper, indicating their significance in disseminating novel research findings. Remarkably, the Reviews (5 papers) received an impressive average of 279.20 citations per

Table 2. Year-wise publications and citations of subscription based and open-access papers

	Subscription			Open-access			Total publications				
Year	**TP**	**TC**	**ACPP**	**TP**	**TC**	**ACPP**	**TP**	**TC**	**ACPP**	**ACPPPY**	**Citable year**
2009	-	-	-	1	251	251.00	1	251	251.00	16.73	15
2011	-	-	-	3	846	282.00	3	846	282.00	21.69	13
2012	1	220	220.00	-	-	-	1	220	220.00	18.33	12
2013	8	1780	222.50	5	1636	327.20	13	3416	262.77	23.89	11
2014	10	3058	305.80	11	2388	217.09	21	5446	259.33	25.93	10
2015	10	1899	189.90	9	1863	207.00	19	3762	198.00	22	9
2016	9	1898	210.89	7	1754	250.57	16	3652	228.25	28.53	8
2017	5	1163	232.60	2	809	404.50	7	1972	281.71	40.24	7
2018	9	1560	173.33	1	305	305.00	10	1865	186.50	31.08	6
2019	2	296	148.00	4	775	193.75	6	1071	178.50	35.7	5
2020	2	293	146.50	-	-	-	2	293	146.50	36.62	4
2021	1	138	138.00	-	-		1	138	138.00	46	3
Total	**57**	**12305**	**215.88**	**43**	**10627**	**247.14**	**100**	**22932**	**229.32**	**-**	**-**

TP=Total Publications, TC=Total Citations, ACPP=Average Citations Per Paper, ACPPPY= Average Citations Per Paper Per Year

Table 3. Mann-whitney test.

	Mean rank				
Variable	**Subscription based**	**Open access**	***U***	**z**	**p**
Accessibility	45.3	57.4	929	-2.065	0.039

paper, revealing their role in synthesising knowledge and attracting scholarly attention.

Authorship patterns provide additional nuances. Articles and conference papers have an average of 3.44 and 3.78 authors per paper respectively, indicating collaborative research. Conversely, review and short survey papers have a lower average author per paper, suggesting focused contributions.

4.5 Research Design

Table 5 presents the evolution of research design used in highly cited papers on MOOCs and their impact. The data shows that the Non-Experimental Research design, which has shown consistency since 2009 to 2021,has been used in nearly half (48 %) of the publications, with an average of 227.75 citations per paper. The Theoretical Framework approach appeared more in the early stages of MOOC literature, but declined later on. However, studies that employed a Mixed Method approach (qualitative and quantitative) received the highest average citations (321.44) per paper.

4.6 Top Sources

The 100 top-cited papers appeared in 50 sources including Journals, Conference Proceedings, and Book Series. Journal was the most prominent kind of source with 77 articles, followed by, 22 Conference Proceedings, and the remaining one as Book Series. Table 6 shows the top sources that have published the highest number of top-cited papers on MOOCs. It was found that 10 sources have published 55 papers. In the top 10 sources, 7 were Journals and 3 were Conference Proceedings. Computers and Education was the leading journal that has published the highest (15) number of top-cited papers, accounting for an average of 257.2 citations per paper. Followed by it is the International Review of Research in Open and Distance Learning with 11 publications receiving an average of 309.6 citations per paper. It was also noticed that the conference proceedings received a higher average citation (355.44) per paper than the other sources in the list of top sources.

4.7 Most Prolific Authors

Table 7 displays the most prolific authors in the top 100 cited papers on MOOCs. A researcher's influence is typically assessed through metrics like publication count, citations received, and the h-index. Table 7 identifies the most prominent contributors with at least 3 papers. R.F. Kizilcec was the most prominent author with 6 highly cited papers receiving 1859 citations with an average of 309.83 citations per paper. All of his publications were multi-authored. Remarkably, R.F. Kizilcec was the first author in 5 of his papers. P.J. Guo and J. Reich follows with having 4 papers each. Guo published all the papers as conference proceedings, 3 co-authored with J. Kim, achieving a high average of 486.67 citations per paper. Reich's 4 papers are in the journal named Science. All the authors listed in the table have received more than 1000 citations for their papers, indicative of their significant contributions, although with notable self-citations suggesting their continued research work on the topic. Among the top seven authors listed in table 7, three are from the United States, and one each from Hong Kong, South Korea, Canada and the United Kingdom.

Table 4. Document type of top 100 cited papers

Document type	TP	TC	ACPP	SD (ACPP)	TA	AAPP
Article	68	15024	220.94	129	234	3.44
Conference paper	23	5720	248.7	220	87	3.78
Review	5	1396	279.2	193	11	2.2
Short survey	2	331	165.5	65.8	3	1.5
Editorial	1	305	305	-	7	7
Letter	1	156	156	-	1	1
Total	**100**	**22932**	**229.32**	**155**	**343**	**3.43**

TP=Total Publications, TC=Total Citations, TA=Total Authors Appeared, ACPP= Average Citations Per Paper, AAPP= Average Authors Per Paper, SD= Standard Deviation

Table 5. Research design trend of the top 100 cited papers

Research design	2009-13	2014-17	2018-21	TP	TC	ACPP
Experimental research	2	6	0	8	1408	176
Non-experimental research	6	31	11	48	10932	227.75
Qualitative research	6	12	4	22	5004	227.455
Mixed method	0	7	2	9	2893	321.444
Case study	0	2	1	3	560	186.667
Theoretical framework	4	5	1	10	2135	213.5
Total	**18**	**63**	**19**	**100**	**22932**	**229.32**

TP=Total Publications, TC=Total Citations, ACPP= Average Citations Per Paper

Table 6. Top 10 sources publishing the 100 top-cited papers

Source	Publisher	TP	TC	ACPP	Q	Citescore
Computers and education	Elsevier Ltd	15	3858	257.20	Q1	23.8
International review of research in open and distance learning	Athabasca university	11	3406	309.64	Q1	5.6
Computers in human behavior	Elsevier ltd	5	1201	240.20	Q1	17.8
British journal of educational technology	Blackwell publishing ltd	4	773	193.25	Q1	13.8
Communications of the acm	-	4	743	185.75	Q1	-
Science	American association for the advancement of science	4	722	180.50	Q1	59.0
Acm international conference proceeding series	-	3	1157	385.67	-	-
Internet and higher education	Elsevier ltd	3	641	213.67	Q1	16.6
L@s 2014 - proceedings of the 1st acm conference on learning at scale	Association for computing machinery	3	1538	512.67	-	-
L@s 2015 - 2nd acm conference on learning at scale	Association for computing machinery	3	504	168.00	-	-
Total	**-**	**55**	**14543**	**264.42**	-	-

Table 7. Most prolific authors

Author	TP	Single author	Multi-author	TC	TC without self-citations	ACPP	Country
Kizilcec, R.F.	6	-	6	1859	1736	309.83	United States
Guo, P.J.	4	-	4	1665	1640	416.25	United States
Reich, J.	4	1	3	722	676	180.50	United States
Hew, K.F.	3	1	2	1053	1039	351.00	Hong Kong
Kim, J.	3	0	3	1460	1438	486.67	South Korea
Littlejohn, A.	3	0	3	1005	976	335.00	United Kingdom
Schneider, E.	3	0	3	1003	964	334.33	Canada
Total	**26**	**2**	**24**	**8767**	**-**	**337.19**	**-**

4.8 Most Prolific Countries

Table 8 and Fig. 3 reveal the most prolific countries producing top-cited papers on MOOCs (≥ 3 papers in the top 100 cited papers). 38 countries have contributed to the 100 top-cited papers, out of which the top 10 countries are listed in Table 8. Out of these top 10 countries, the United States contributed 46 papers, followed by the United Kingdom and Australia with 12 and 11 papers, respectively. The authors from these 10 countries have acted as principal authors in 59 publications.

4.9 Country Collaboration

Figure 4 illustrates the inter-country collaboration among the countries. A total of 38 countries have contributed to the top 100 most cited papers on MOOCs, of which only 30 have engaged in collaboration. The United States was the most collaborating country, followed by the UK, Australia, and Canada. The figure shows that there are eight collaboration clusters.

4.10 Authorship Pattern

Table 9 illustrates the relationship between authorship and citation count. This analysis underscores the intricate relationship between authorship composition and citation impact. 80 % of publications have up to 4 authors per paper. Single-authored publications (15) yield an average of 246.40 citations per paper. Two-authored papers (19) received an average of 245.00 citations per paper. The highest average citation per paper (291.17) was for the papers having 3 authors. However, as the author count increased further, citation averages gradually decreased. Single-authored, two-authored, and three-authored publications outperformed the average ACPP (229.32) of the total 100 papers.

4.11 Subject Categories

Table 10 provides a comprehensive overview of the subject categories under which the top 100 cited papers on MOOCs were published. Due to the multidisciplinarity

Table 8. Most prolific countries

Country	TP	First author	TC	ACPP
United States	46	25	10034	218.13
United Kingdom	12	9	3886	323.833
Australia	11	6	1847	167.909
Canada	8	5	1692	211.5
China	7	3	1583	226.143
Hong Kong	5	3	1538	307.6
South Korea	3	3	933	311
Spain	3	1	461	153.667
Taiwan	3	3	424	141.333
Turkey	3	1	403	134.333

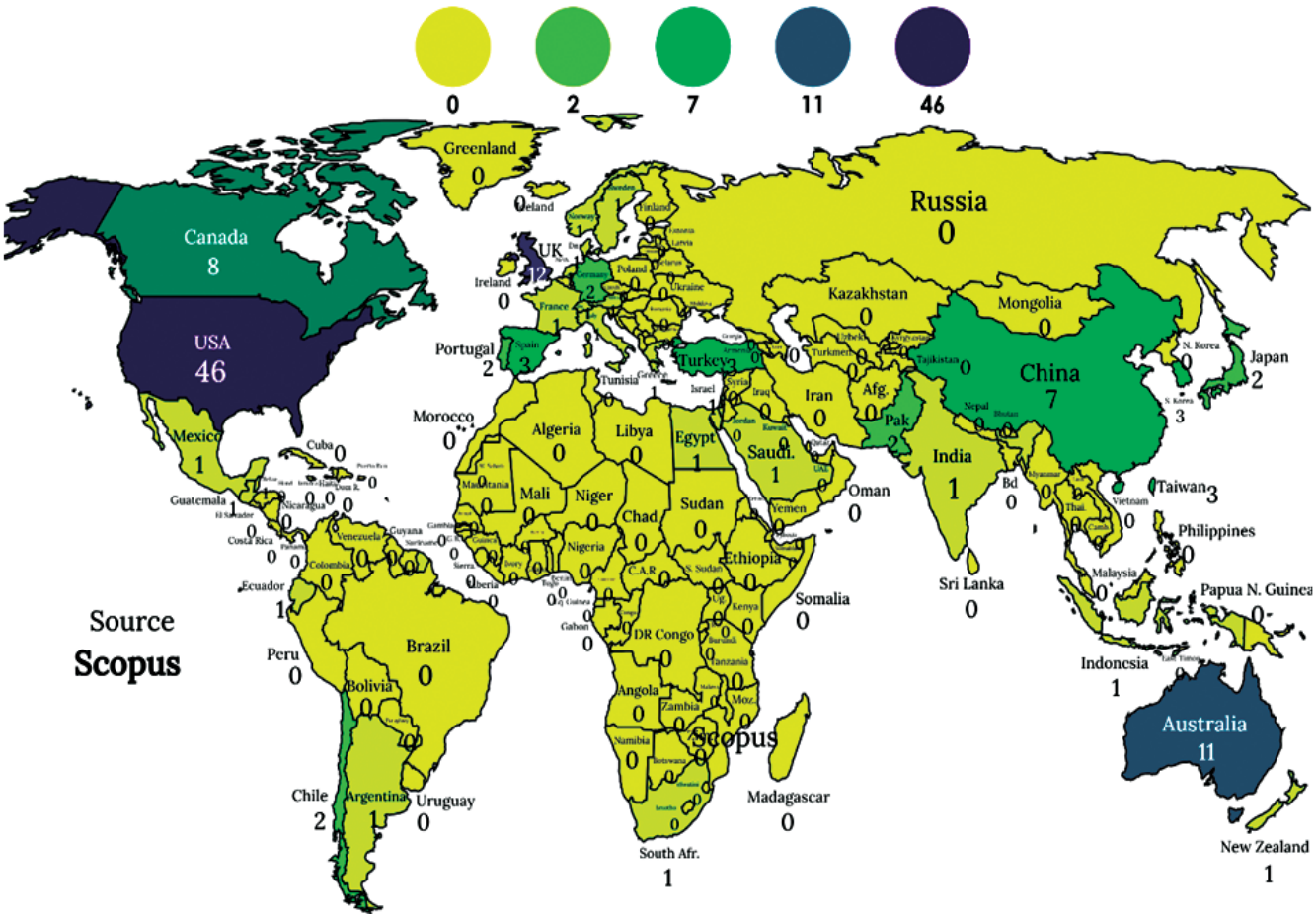

Figure 3. Most prolific countries.

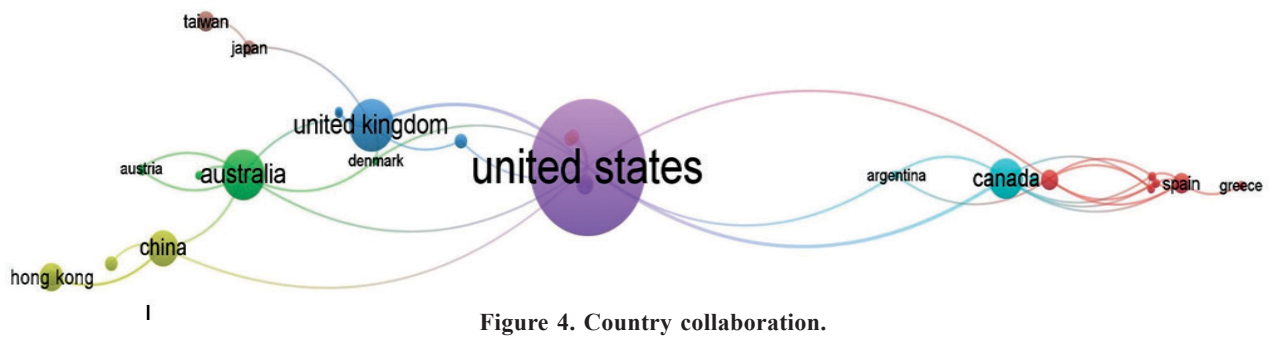

Figure 4. Country collaboration.

Table 9. Authorship pattern

No. of authors	TP	Authors appeared	TC	ACPP
1	15	15	3696	246.4
2	19	38	4655	245
3	24	72	6988	291.17
4	22	88	4071	185.05
5	4	20	680	170
6	9	54	1610	178.89
7	4	28	741	185.25
8	2	16	354	177
12	1	12	137	137
Total	**100**	**343**	**22932**	**229.32**

TP=Total Publications, TC=Total Citations, ACPP=Average Citations Per Paper

Table 10. Subject-wise distribution of top 100 cited papers on MOOCS

Subjects	2009-2015	2016-2021	Total		
	TP	TP	TP	TC	ACPP
Computer science	34	31	65	14883	228.97
Social sciences	29	27	56	12869	229.80
Engineering	3	7	10	1553	155.30
Arts and humanities	1	4	5	1203	240.60
Multidisciplinary	3	2	5	878	175.60
Psychology	1	4	5	1203	240.60
Decision sciences	-	3	3	590	196.67
Business, management and accounting		2	2	579	289.50
Mathematics	1	1	2	252	126.00
Medicine	1	1	2	305	152.50
Pharmacology, toxicology and pharmaceutics	1	-	1	126	126.00
Total	**58**	**42**	**100**	**-**	**-**

of research, papers may fall under more than one subject category. The table reveals that Computer Science emerged as the most prolific field, with the highest number of top-cited papers and consistent publication growth, with 34 papers (from 2009 to 2015) and 31 papers (from the year 2016-2022) and a total of 65 papers were published under this subject category. These papers amassed 14883 citations, with an average citation per publication (ACPP) of 228.97. The Social Sciences subject category had 56 publications among the top-cited papers.

5. DISCUSSION

Based on the research questions of the present study, the discussion section addresses four primary concerns, viz. exploring how the literature on MOOC research has evolved, what factors affect the citation count in top-cited papers, and who are the most prolific contributors to these papers.

RQ1: How has the literature on MOOC research grown?

The literature on MOOCs has grown over time since 2008. Dave Cormier and Brian Alexander introduced the term "MOOC". In 2009, two conference articles were published on the topic, and one of those papers is among the top 100 most-cited papers. These two conference papers, published in 2009, show the academia's interest in this new area of research. These initial studies laid the foundation for subsequent research, demonstrating the initial interest and exploration surrounding MOOCs. These findings align with the pioneering work of Zancanaro and Domingues[20], highlighting MOOCs' early exploration. However, the period between 2013 and 2016 is a crucial phase in developing MOOC literature. This era is pivotal in shaping the course of MOOCs, indicating significant advancements and the establishment of MOOCs as a prominent area of study. These findings echo previous research, highlighting the significance of this period.[12,15] Till now, a total of 8,386 papers have appeared on the MOOCs, but the period from 2017 to 2021 has the maximum number of articles published on the topic.

Among the top 100 cited papers, 'article' was the most prevalent document category (68 papers). 'Conference papers', although fewer in number (23 papers), exhibited a higher average citation per paper, emphasising their essential role in disseminating innovative research findings. Despite being fewer in number, 'review papers' have the highest average citation per paper emphasizing their

crucial function of consolidating existing knowledge and attracting academic interest.[17,19] These top-cited papers have been published in 50 different sources, encompassing journals, conference proceedings, and book series. Computers and Education has the highest number of top-cited papers, followed by the International Review of Research in Open and Distance Learning. Non-experimental research design was in nearly half of the publications, indicating interest in empirical investigations that aim to unravel the practical implications of MOOCs. During the early stages of MOOC literature, there was a strong inclination towards theoretical frameworks, which reflected the need to establish conceptual foundations. Research studies that utilised both qualitative and quantitative approaches had the highest average citations per paper. Froehlich[21], *et al.* also highlighted the importance of mixed methods to fully understand the complex aspects of MOOC research.

RQ2: What are the factors affecting the citation count in the top-cited papers?

Factors influencing the citation counts of top-cited papers revealed important insights. Document categories play a pivotal role in determining citation count. Notably, articles and conference papers have dominated among the top 100 cited papers, but the average citation per paper was highest (279.2) for the review papers. As far as conference proceedings are concerned, they received 248.7 average citations per paper, followed by articles with 220.94 citations per paper. The presence of review papers among the top-cited papers suggests the importance of critical analysis and synthesis within the MOOC research landscape.

The study indicates that open-access publications received significantly higher citations than subscription-based ones. This highlights the importance of making research easily accessible and the potential of open-access publishing to increase its visibility and impact. The practical implication is clear: researchers and institutions should consider open-access options to maximize the dissemination and impact of their work.

The study also shows that the number of authors of a paper affects its citation impact. Papers with a single author received an average of 246.40 citations per paper. Collaborations of three authors had the highest average of 291.17 citations per paper. However, as the number of authors increase, than the average number of citations decreases gradually.

RQ3: Who are the most prolific contributors to top-cited papers on MOOCs?

Identifying the most prolific contributors to top-cited papers on MOOCs provides valuable insights into the field's intellectual leadership. As indicated in Table 7, R.F. Kizilcec was the most prolific author with six highly cited papers, indicating substantial contributions to MOOC research. Closely following are P.J. Guo and J. Reich with four publications each. All the three authors are from the United States. It is worth noting that some authors exhibit notable self-citations, suggesting their continued engagement and ongoing research in the field. This commitment to the topic underscores these prolific authors' dedication and enduring impact on MOOC research. The practical implication here is the recognition of key contributors and their work, which can guide researchers and institutions in identifying experts and thought leaders in the MOOC domain for collaboration and mentorship.

6. CONCLUSION

The present study on the top 100 cited papers on MOOCs research highlights the distribution of highly cited papers, the factors that influence citation counts, the top contributors and the most promising research areas on the topic. The study findings are valuable for academics, policymakers, and anyone interested in the field of MOOCs. From 2013 to 2016, a significant number of highly cited papers were published that had a profound impact on MOOCs, offering new learning prospects for students and the potential to revolutionize education. The study has identified key factors that contribute to citation counts, such as the type of document and its accessibility. Articles and conference papers were the most cited documents, and open-access publishing is crucial for reaching a broader audience. R.F. Kizilcec, P.J. Guo, and J. Reich were the most prolific researchers, introducing innovative concepts and methodologies that have advanced MOOC research. These insights are beneficial for policymakers and educators, as they can improve student engagement, retention rates, and access to education. However, it is worth noting that the study focus only on the top 100 cited papers and may have excluded essential work with lower citation counts. Overall, this provides a useful guide for anyone interested in MOOC research and it is hoped that this study will encourage further exploration and innovation, ultimately leading to more accessible and equitable education for all.

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