



Access Trend of Open Educational Resources in the Context of Library: a scientometric overview

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Abstract

Open Educational Resources (OER) increase the accessibility of learning as they reduce the cost of learning objects for each type of learner. OERs can support libraries in their mission of providing democratic education. This study used scientometric techniques to analyse research output on OER regarding the library of the last thirteen years (from 2010 to 2023). Scopus database was used to extract publications' data for the study. The study shows different scientometric parameters like year-wise, country-wise, subject-wise, accession-wise (open access and non-open access literature), and type-wise distribution of literature, authorship, highly cited, and most "cited by" literature. Year-wise growth in publications showed variation and the highest publications were during COVID-19: 2020 and 2021. The study showed that open-access publications had more citation count than non-open-access publications. The keywords network visualisation was presented using VOS viewer.

Keywords: Bibliometric, Library, OER, Open education, Open educational resources, Scientometric

1. Introduction

Open Educational Resources (OER) are defined as openly licensed and freely accessible educational materials that can be used, adapted, and shared. Therefore, it gives solutions to the challenges of access, affordability, and quality in education. The goal of OER is to make information freely available, therefore increasing educational possibilities for previously underserved groups of society and thereby equalising access, and for that librarians work in a wide range of disciplines. (Maharaj, Upadhyay, & Trivadi, 2021; Biswas, Brar, & Bhabal, 2022; Biswas, & Das Biswas, 2022; Biswas, & Das Biswas, 2023) OER has garnered significant attention from researchers, educators, and policymakers worldwide. Libraries, with

their mission of supporting education and facilitating access to information, play a pivotal role in utilising and disseminating OER to its institute.

In the recent past, during world crises like the Ukraine war and COVID-19 years of 2020 and 2021, the foundations have been actively started to make the provision of educational services at universities, particularly distance education, dynamic and multidimensional educational services. It became necessary to integrate electronic library resources with distance learning platforms to ensure unhindered access for students and teachers (Kolesnykova, Gorbova, & Shcherbatiuk, 2022). In such times libraries play a key role by supporting and motivating in development of educator



copyright knowledge and digital skills for the teaching and learning process (Thompson, & Muir, 2020).

This study aims to conduct a scientometric analysis of research trends in the Open Educational Resources context to libraries; this paper seeks patterns, trends, and areas of focus within the scholarly literature.

2. Literature review

Several studies have examined scholarly communication and educational resources. Zancanaro, Todesco, and Ramos (2015) analysed 544 papers on Open Educational Resources (OER) from 2002 to 2013, using Web of Science, Scopus, and OER Knowledge Cloud data. They highlighted OER's growing importance in educational research and its alignment with the Open movement. Schopfel and Prost (2020) investigated 1,606 Scopus papers from 1999 to 2018, employing scientometric techniques to study grey literature usage in global scientific publications, particularly in medical and health sciences. Malik and Khan (2024) focused on 22 years of Library and Information Science research in India, using Web of Science and Scopus data, and analysed by Biblioshiny, CRExplorer, Orange, and VOSviewer. Their findings emphasised Indian scholars' consistent exploration of open access and digital libraries. Gopal and Sudhier (2022) conducted a scientometric analysis of bioinformatics research in India from 2008 to 2017, detailing highly cited papers, funding agencies, and influential journals and authors. Lastly, Lee and Smith (2017) explored the OER movement in higher education, highlighting how a community of practice among academic librarians in British Columbia supported OER adoption, fostering sustainable resources for faculty interactions.

3. Objectives

- To examine the year-wise growth in the research documentation of the OER context to library from 2010 to 2023
- To recognise authors' collaboration and the most prominent authors
- To study subject-wise distribution, geographical distribution, contribution of funding agencies, and institutions
- To examine the accession-wise (open-access and non-open access) citation counts of publications
- To expose the network between keywords and explore the current research trends related to the OER in terms of the library
- To visualise the impact of research output through the study of the most "cited" documents and most cited- "cited by (references)" the selected documents.

4. Methodology

This study proposed scientometric techniques to analyse dynamics in scientific productions of research output in OERs context to library within 2010 to 2023 years. Its quantitative techniques were used to classify research output through citations, sources, publications, keywords, authorship and co-authorship, among other criteria. The term "Open Educational Resources" was used in the title, abstract, or keyword fields to search articles for this study from Scopus on 29th November 2023. A total of 832 kinds of literature were extracted using the term "Open Educational Resources". This research output was confined to using the term "library" in the search button and limiting the years from



2010 to 2023 for the present study. This final search has resulted in a total number of 75 documents, which constituted the research front of the present study. VoSviewer software was used for author keyword analysis and Excel was used to analyse the extracted data. Collected 75 research works were analysed and synthesised. After owing all the desired data, the final report was drawn by presenting the analyses of the material, and the results were obtained.

5. Data analysis

General bibliographical data of research works on OERs context to the library:

Table 1: General bibliographical data of OER related to the library

Bibliographical Data	Frequency
Total number of literatures	75
Journals	53
Authors	160
Institutions of authors	98
Funding Agencies	9
Countries	21
Author keywords	153
Used References	1708
Languages	6

5.1 Year-wise growth of research output of OER related to library

Chart 1 illustrates the growth of OER-related research from 2010 to 2023. The peak in publications occurred in 2020, followed by 2021. Notably, no literature was published in 2014. The earliest publication, "Explore Web services for open educational resource sharing platform," appeared in conference proceedings, while "A user-centred approach to open educational resources" marked the first journal publication (Ubiquitous Learning). Most publications were in journals, with the fewest in book series. In 2020, literature spanned journals, conference

proceedings, books, and book series.

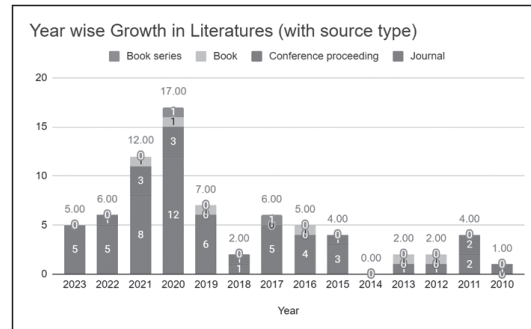


Chart 1: Year-wise growth in documents of OER related to the library

5.2 Distribution of publications related to "OER in terms of the Library" by their types of sources

Table number 2 shows that a maximum number of documents were published in journals and followed by conference proceedings. It also reveals that very few literatures were published in book and book series.

Table 2: Types of sources vs. number of literature on OER in terms of the library

Type of Source	No. of Literatures	%
Journal	53	70.67
Conference proceeding	14	18.67
Book	5	6.67
Book series	3	4

5.3 Subject-wise distribution of the research output of OER related to library

Research output in OER related to library field is a total in number are 75. Research works on Open Educational Resources regarding libraries from 2010 through 2023 were from different fifteen subjects.

**Table 3: Subject-wise distribution concerning library in context of OER**

Sl. No.	Subject	No. of Documents	%	Total Citations	Average
1	Social Sciences	65	86.67	343	5.28
2	Computer Science	17	22.67	70	4.12
3	Arts and Humanities	11	14.67	7	0.64
4	Engineering	9	12	15	1.67
5	Business, Management and Accounting	4	5.33	15	3.75
6	Decision Sciences	2	2.67	8	4
7	Physics and Astronomy	1	1.33	3	3
8	Nursing	1	1.33	8	8
9	Medicine	1	1.33	12	12
10	Mathematics	1	1.33	0	0
11	Materials Science	1	1.33	3	3
12	Energy	1	1.33	3	3
13	Economics, Econometrics and Finance	1	1.33	0	0
14	Chemistry	1	1.33	2	2
15	Chemical Engineering	1	1.33	2	2

The highest number of publications were related to Social Science (87.67%), followed by Computer Science (22.67). Arts and Humanities (14.67%) were in third position while Engineering and Business, Management & Accounting were placed in fourth and fifth positions. Research in the OER context of the library is multidisciplinary. Social science was the most cited subject among all fifteen subjects followed by computer science. But on average, Medicine and Nursing had fewer publications but had high citations in comparison to other subjects.

5.4 Country-wise distribution of research output of OER in terms of the library

Table 4 (a): Country-wise distribution of documents in OER related to the library

Rank	Country	Total literatures	%
1 st	United States	29	38.67
2 nd	India	7	9.33
2 nd	Nigeria	7	9.33
3 rd	United Kingdom	6	8
4 th	Undefined	4	5.33
5 th	Spain	3	4
	Brazil	3	4

Table 4 (a) shows that USA is leading the table followed by India and Nigeria.

**Table 4(b): Publications on OER in terms of library from India**

Authors	Title (citations)	Source title	Affiliations (Funding agencies)	Document Type
Maharaj N.G., Upadhyay A.U., Trivadi M.J.	SWOT Analysis of the Role of Open Educational Resources in Future Education with Special Reference to Open University Library and Librarian (0)	Library Philosophy and Practice	Babasaheb Ambedkar Open University, M.S.University (Ministry Of Education)	Article
Parmar S.S., Kumber R.	School Libraries as Promoters of Open Educational Resources to Galvanize Education: An Exploratory Study (0)	Library Philosophy and Practice	Central University of Gujarat (-)	Article
Thanuskodi S.	Challenges and opportunities of open educational resources management (0)	Challenges and Opportunities of Open Educational Resources Management	Alagappa University (-)	Book
Upneja S.K.	Contribution of library professionals and libraries in open educational resources in Indian scenario (3)	DESIDOC Journal of Library and Information Technology	Gopichand Arya Mahila College (-)	Article
Prince G., Hariharan G.	Innovative use of open educational resources in the higher education libraries: Cost-benefit analysis (0)	Innovations in the Designing and Marketing of Information Services	Mar Eprahem College of Engineering and Technology, Marthandam College of Engineering & Technology (-)	Book Chapter
Dutta I.	Open educational resources (OER): Opportunities and challenges for Indian higher education (20)	Turkish Online Journal of Distance Education	Bhopal Maulana Azad National Urdu University (-)	Article
Das A.	Emergence of open educational resources (OER) in India and its impact on lifelong learning (27)	Library Hi Tech New	Jawaharlal Nehru University (-)	Review

Table number 4(b) shows that majority of this seven were articles by types and one document was related to book type. Only one funding agency, the Ministry of Education funded for SWOT analysis of OER regarding to Open University Library. It can be seen that three publications are cited and others had 0 citation count. A review paper by Das A. on OER's emergence and impact on lifelong learning in India, had the highest citation count. All of them had different affiliations. A

total of 9 universities made efforts in the research of OER related to library.

5.5 Language-wise distribution of documents on OER related to the library

The maximum number of research works in the OER context to library is in English (93.33%) language, followed by Spanish language (4%). The least number of literatures was in Ukrainian, Portuguese, German, and Chinese languages respectively.

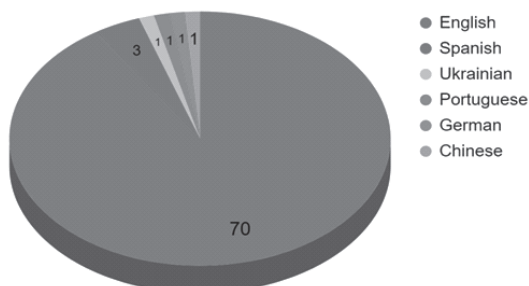


Chart 2: Language-wise distribution of documents on OER related to library

5.6 OA literature on OER in context to the library

Table 5: Citation count of the OA publications on OER related to library

Access types	No. of Literatures	Total Citation counts
Non-open access	46	169
All Open Access	29	197
1. Gold open	1. 9	
2. Hybrid Gold	2. 5	
3. Bronze	3. 8	
4. Green	4. 17	

Table 5 displays the breakdown of open-access versus non-open-access literature in OER. A small number of hybrid documents indicate limited journal options for open-access publishing. Open-access literature (29 documents) received 197 citations, while non-open-access literature (46 documents) garnered 169 citations. Green literature predominated among open-access types, correlating with higher citation counts.

5.7 Institutions wise contribution for the research on OER related to the library

During 2010 to 2023, 98 institutes contributed to OER research in libraries. Among them, five institutes including Ukrainian State University of Science and Technologies and Utah State University had 2 publications each, while the remaining 93 institutes each had 1 publication. Additionally, Purdue University Libraries, UCLA Library, and others contributed a total of 5 publications to the field..

5.8 Funded research work on OER in terms of library

A total of 9 funding agencies were funded for research in the OER context of the library. The maximum number (67) of research works had no funding agencies.

5.9 Prominent journals related to research on OER in terms of library

Between 2010 and 2023, 75 papers appeared across 56 journals. "Library Philosophy and Practice" led with the most papers, while 45 journals had just one publication each. Notably, "Open Learning" garnered the highest citations (29), followed by "Library Trends" (19) across 3 papers. Interestingly, despite its high publication count, "Library Philosophy and Practice" received fewer citations than journals like "Serials Librarian," "Open Learning," and "Library Trends," which published fewer papers but garnered more citations, as indicated in table 6.

**Table 6: Top three journals which published documents on OER in context to the library**

Rank	Journal	No. of Documents	Total Citations
1	Library Philosophy And Practice	5	6
2	University Library At A New Stage Of Social Communications Development Conference Proceedings	4	6
3	Serials Librarian	3	9
	Open Learning	3	29
	Library Trends	3	19

5.10 Authorship pattern and collaboration of authors in the research output of OER context to the library

Between 2010 and 2023, 160 authors contributed to 75 pieces of literature. Among them, 7 authors published two documents each, while the remaining 153 authors contributed one literature each. Eleven authors were from India, making up 4% of the total author count. Table 7 lists authors with multiple contributions, including four authors from the same affiliation who published two documents each.

Table 7: Authors contributed 2 (more than one) literature on OER related to the library

Author	Affiliation
Trufelli, L.	Consiglio Nazionale delle Ricerche, Italy
Saccone, M.	
Reggiani, L.	
Puccinelli, R.	
Ogunbodede, K.F.	University of Africa, Toru-Orua, Nigeria
Kolesnykova, T.O.	Ukrainian State University of Science and Technologies, Dnipro, Ukraine
Geuther, C.	K-State Libraries, Manhattan, United States



5.11 Key-words by authors of publications on OER context to the library

Figure 1 shows 24 keywords that had a maximum number of link strengths and were divided into 7 clusters. It also highlights that Open Educational Resources, OER, Open-Access, Higher education, academic libraries,

institutional repository, and copyright were used more times than the other keywords. In figure- 1, the size of the keyword circle is directly proportional to the keywords' occurrences. Keywords other than Open Educational Resources and OER in figure 1 are related to education, repositories, and libraries.

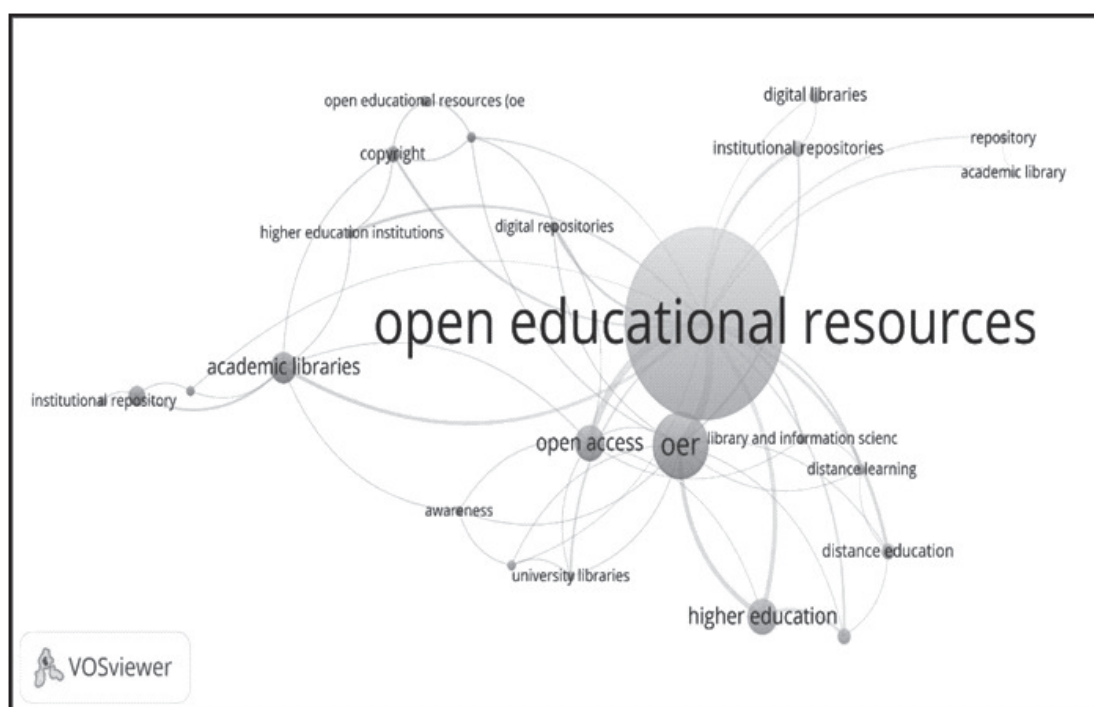


Figure 1: Network visuals between most used keywords in research works on OER related to library

5.12 Highly cited documents on OER in terms of library

Citations of any document show its

impact, so more citations show high global visibility and a positive trend related to the document's research area.

**Table 8: Most cited documents on OER related to library**

Sr. No.	Article	Citation Count	Journal	Accession	Year
1	Open Pathways to Student Success: Academic Library Partnerships for Open Educational Resource and Affordable Course Content Creation and Adoption	29/360	Journal of Academic Librarianship	OA	2017
2	Emergence of open educational resources (OER) in India and its impact on lifelong learning	27/360	Library Hi Tech News	NOA	2011
3	Enhancing Teaching and Learning: Libraries and Open Educational Resources in the Classroom	26/360	Public Services Quarterly	NOA	2016
4	Opensource digital library on open educational resources	21/360	Electronic Library	NOA	2019
5	Open educational resources (OER): Opportunities and challenges for Indian higher education	20/360	Turkish Online Journal of Distance Education	OA	2016

(OA: Open Access, NOA: Non-Open Access)

5.13 "Cited by" publications on OER related to the library

A total of 75 documents on OER related to the library had cited 284 documents and all of them have a total of 1116 citations. Table

number 9 presents the 7 most cited papers from the "cited by" (references) of selected documents for this study. Of the most cited 7 documents, three were written as review papers and three were written on Open Educational Resources.

Table 9: Most cited papers from the references of selected documents on OER related to the library

Sr. No.	Author	Title	Year	Source	Cited by
1.	Chabot, Lisabeth & et al.	2016 Top trends in academic libraries: A review of the trends and issues affecting academic libraries in higher education	2016	College and Research Libraries News	53
2.	Mc Greal, Rory	Special report on the role of open educational resources in supporting the sustainable development goal 4: Quality education challenges and opportunities	2017	International Review of Research in Open and Distance Learning	53
3.	Spolaôr, Newton & et al.	A systematic review on content-based video retrieval	2020	Engineering Applications of Artificial Intelligence	47
4.	Ramirez-Montoya	Challenges for open education with educational innovation: A systematic literature review	2020	Sustainability (Switzerland)	37
5.	Zancanaro, Airton & et al.	A bibliometric mapping of open educational resources	2015	International Review of Research in Open and Distance Learning	35



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5. Discussion

Between 2010 and 2023, research output on OER related to libraries totalled 75 documents, showing varied annual growth. The highest number of publications occurred in 2020, contrasting with a low point in 2014. From 195 countries worldwide, 21 contributed to OER research in libraries, spanning seven languages, predominantly English. India ranked second with seven research works, highlighting a disparity compared to the United States. OA documents were fewer but garnered more citations overall than non-open access ones, with green access documents leading among OA types. Papers discussing openness in education received the highest citations, particularly those on "Open Educational Resources." Social sciences contributed the most documents on OER in libraries compared to other disciplines. While "Library Philosophy and Practice" led in total document publications, "Open Learning" achieved the highest total citation count.

6. Conclusion

This study utilised scientometric techniques to examine publications concerning Open Educational Resources (OER) in terms of libraries, aiming to identify their profile and conceptual groundwork. Data from Scopus was analysed. Out of 832 initial results related to OER, 75 were selected, which were related to the library. OA documents are 38% (29) of the total number

of documents and had 58% (197) citation counts which shows increased accessibility likely leads to higher visibility and citation rates, as researchers can easily discover and cite relevant open-access content simultaneously it also implies a lack of concern among authors regarding where to publish. The discrepancy in citation counts between open-access and non-open-access documents underscores the importance of open-access content in encouraging knowledge dissemination.

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