

Open Educational Resources and Open Access Publishing in Higher Education: Policies, Challenges, and Collaborative Models

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Abstract

Open educational resources (OER) and open access (OA) publishing are transforming higher education by promoting equitable access to knowledge, reducing costs, and fostering collaborative innovation. While OER focus on openly licensed teaching and learning materials, OA ensures unrestricted online access to scholarly research. Together, they form an integrated open knowledge ecosystem aligned with global policy frameworks such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) OER Recommendation (2019) and the Budapest Open Access Initiative. This study critically examines institutional policies, sustainability strategies, and collaborative models that influence the adoption and long-term implementation of OER and OA in higher education. Using a qualitative, integrative review methodology, the study synthesizes literature published between 2002 and 2024, along with international declarations and institutional reports. The findings indicate that although OER and OA contribute significantly to affordability, visibility, and pedagogical flexibility, institutions face persistent challenges related to funding sustainability, version control, technological infrastructure, faculty engagement, and equity in access. Furthermore, financial models such as article processing charges (APCs) may reproduce inequalities in research dissemination. The study proposes a strategic institutional framework that integrates governance policies, repository development, digital infrastructure, quality assurance mechanisms, and collaborative consortia. It concludes that coordinated institutional commitment, policy alignment, and cross-institutional partnerships are essential to building sustainable and inclusive open knowledge ecosystems, particularly in developing country contexts. Findings highlight that while institutional support and collaborative ecosystems are critical drivers, issues of quality assurance, technological infrastructure, and long-term sustainability remain pressing concerns. A strategic blend of policy frameworks, partnerships, and innovative platforms is essential to strengthen the global OER movement.

Keywords: Open educational resources (OER), open access (OA) publishing, institutional policy, sustainability, collaborative models, higher education, digital repositories

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INTRODUCTION

The global education landscape is increasingly shifting towards openness and inclusivity. Open educational resources (OER)—freely accessible, openly licensed teaching and learning materials—are being adopted worldwide to reduce costs, improve access, and encourage pedagogical innovation. Similarly, open access (OA) publishing enables free and unrestricted access to scholarly outputs, ensuring the equitable dissemination of knowledge. Despite this growing momentum, institutions face challenges related to policy, sustainability, and technological infrastructure.

This study explores institutional policy frameworks, sustainability challenges, and collaborative platforms as integral components of OER adoption [1–5].

OER and OA publishing are two transformative concepts reshaping how knowledge is created, shared, and consumed in higher education. While distinct in scope—OER focuses on teaching and learning materials, and OA on scholarly research outputs—both share a core mission: to democratize access to knowledge by removing cost and access barriers rooted in traditional closed systems (Table 1).

- OER are defined as teaching, learning, and research resources that are free to use, adapt, and redistribute under open licenses (e.g., Creative Commons).
- OA publishing refers to making research outputs freely accessible online without paywalls, thereby enabling the wider dissemination of scholarly work [6–15].

Together, OER and OA form an ecosystem of open knowledge that supports equity, institutional efficiency, and global knowledge exchange.

DEFINITIONS

Open Educational Resources

As defined by the United Nations Educational, Scientific and Cultural Organization (UNESCO) (2019) [16], “open educational resources (OER) refer to teaching, learning, and research materials available in any format or medium that are either in the public domain or protected by copyright but released under an open license. Such resources allow users to freely access, use, modify, and share without cost.”

Open Access Publishing

According to the Budapest Open Access Initiative (2002) [2], “By ‘open access’ to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself.”

REVIEW OF LITERATURE

The concept of OER gained global recognition following the 2002 Forum on Open Courseware organized by UNESCO, which defined OER as teaching, learning, and research materials made freely available under open licenses. The formal definition was further strengthened in the UNESCO OER Recommendation (2019) [16], which emphasized access, adaptation, and redistribution rights. Wiley (2014) [17] conceptualized the pedagogical significance of OER through the 5R framework—retain, reuse, revise, remix, and redistribute—highlighting openness as a catalyst for collaborative and learner-centered education. Empirical studies [5] indicate that the adoption of OER significantly reduces textbook costs while maintaining or improving student learning outcomes, thereby supporting educational equity. Similarly, research has demonstrated that OER enhances faculty innovation by enabling the localization and contextual adaptation of teaching materials.

The open access movement evolved in parallel, with the Budapest Open Access Initiative (2002) [2] providing a foundational definition of unrestricted online access to scholarly literature. Subsequent declarations, including the Berlin Declaration (2003), reinforced the principle of free dissemination of research outputs. Suber (2012) [13] and Piwowar et al. [10] (cOAlition S) showed that OA publications tend to achieve greater visibility and citation impact than subscription-based articles. Policy-driven initiatives, such as Plan S, led by cOAlition S, have accelerated the transition toward mandatory open access for publicly funded research. However, scholars have noted that article processing charges (APCs) may create financial barriers for researchers from underfunded institutions [12], raising concerns about equity within OA models (Table 2).

AIM OF THE RESEARCH

This study aimed to critically examine the role of institutional policies, sustainability strategies, and collaborative models in advancing OER and OA publishing in higher education. This study seeks to develop an integrated analytical framework that connects global policy initiatives, such as those promoted by UNESCO and the Budapest Open Access Initiative, with institutional implementation practices. It further aims to identify key challenges related to infrastructure, funding, version control, and faculty engagement, and propose strategic recommendations for building sustainable and equitable open knowledge ecosystems.

Significance of Study

The significance of this study lies in its integrated examination of OER and OA publishing as interconnected components of an institutional open knowledge ecosystem. This study is significant for policymakers and institutional leaders because it provides a strategic framework for embedding OER and OA into university governance, performance metrics, and long-term planning. This highlights the importance of aligning intellectual property guidelines, repository development, faculty incentives, funding models, and digital infrastructure to ensure sustainability. For developing and resource-constrained institutions, this study offers context-sensitive insights into overcoming barriers such as limited technological capacity, funding inequities, and awareness gaps. By emphasizing collaborative consortia and shared platforms, it also demonstrates how institutions can reduce duplication, optimize costs, and enhance their collective impact.

RESEARCH METHODOLOGY

The research methodology of this study is qualitative and conceptual, based on an integrative review approach. Relevant literature was identified through systematic keyword searches in academic databases such as Scopus, Web of Science, and Google Scholar, along with an analysis of international policy documents from organizations such as UNESCO and the Budapest Open Access Initiative. Peer-reviewed articles, institutional reports, and global declarations published between 2002 and 2024 were included in this review. The collected sources were thematically analyzed and synthesized to examine policy frameworks, sustainability challenges, and collaborative models related to OER and OA in higher education.

Research Gap

Although a substantial body of literature examines OER and OA publishing independently, a clear research gap persists in understanding how institutional policy frameworks, sustainability mechanisms, technological infrastructure, and collaborative networks function as an integrated system in higher education. Existing studies largely focus on discrete dimensions such as cost reduction [5], citation advantage [10], licensing frameworks [17], and global policy advocacy by UNESCO (2019) [16] and the Budapest Open Access Initiative (2002) [2]. However, limited research synthesizes these elements into a unified institutional strategy model, particularly in developing countries, where infrastructural constraints, funding limitations, and cultural factors significantly influence implementation.

To address this gap, the present study adopts a qualitative, integrative review methodology aimed at synthesizing theoretical perspectives, policy documents, institutional case studies, and empirical findings into a cohesive analytical framework. This study is conceptual in nature and employs a narrative synthesis approach. Relevant literature was identified through systematic keyword searches using terms such as “open educational resources,” “Open Access publishing,” institutional policy, “sustainability,” “collaborative models,” and “digital repositories” across major academic databases (e.g., Scopus, Web of Science, Google Scholar), organizational reports, and international policy documents.

Key Features of Open Educational Resources

- *Open licensing:* OER are made available under open licenses (e.g., Creative Commons), which allow free use, adaptation, and redistribution with proper attribution.

- *Free access*: OER are freely accessible to learners, educators, and researchers without subscription or payment barriers.
- *5R permissions [17]*: OER typically allow users to:
 - *Retain*: Keep copies of the content.
 - *Reuse*: Use the content in various ways.
 - *Revise*: Modify or adapt the content.
 - *Remix*: Combine with other resources to create new materials.
 - *Redistribute*: Share the resources with others.
- *Diverse formats*: OER can be textbooks, lecture notes, videos, podcasts, simulations, datasets, or full online courses.
- *Adaptability and localization*: OER can be modified to suit different curricula, cultural contexts, and languages, making them flexible and inclusive.
- *Collaboration and sharing*: Encourages collaborative creation and improvement by educators, institutions, and learners.
- *Digital and print availability*: Although mostly digital, OER can also be printed, downloaded, and distributed offline, ensuring wider accessibility (Table 1).

Challenges in OER Sustainability and Version Control

Despite widespread adoption, OER initiatives face multiple challenges:

- *Sustainability*: Developing and maintaining high-quality OER requires continuous funding, technological infrastructure, and faculty engagement. Many projects collapse after the initial funding cycles.
- *Version control*: With frequent updates to curricula, ensuring the accuracy and currency of OER is complex. Inconsistent metadata and a lack of centralized version control systems limit trust and usability.
- *Quality assurance*: Concerns regarding academic rigor and peer-review processes persist, leading to hesitancy among faculty and students.
- *Equity and access*: Digital divides in bandwidth, hardware, and digital literacy limit the reach of OER in low-resource areas.

Table 1. Examples of open educational resources (OER).

Open textbooks	• <i>OpenStax (Rice University, USA)</i>: Provides free, peer-reviewed, openly licensed textbooks for higher education. • <i>BCcampus Open Textbooks (Canada)</i>: Offers open textbooks across disciplines, with faculty support for adaptation.
Courseware and MOOCs	• <i>MIT OpenCourseWare (MIT, USA)</i>: Free access to lecture notes, assignments, and exams from MIT courses. • <i>Swayam (Government of India)</i>: MOOC platform offering free online courses with certification options. • <i>OpenLearn (Open University, UK)</i>: Free courses and learning materials available globally.
Repositories and platforms	• <i>OER Commons</i>: A digital library for OER, offering resources across disciplines. • <i>MERLOT (Multimedia Educational Resource for Learning and Online Teaching)</i>: Curated collection of free learning and teaching resources. • <i>National Digital Library of India (NDLI)</i>: Offers free and open digital content for learners and educators.
Multimedia and interactive OER	• <i>PhET Interactive Simulations (University of Colorado Boulder)</i>: Free interactive math and science simulations • <i>Khan Academy</i>: Free video lessons, practice exercises, and personalized learning dashboards.
Open journals and research	• <i>Directory of Open Access Journals (DOAJ)</i>: Peer-reviewed open access journals across all subject areas. • <i>PLOS (Public Library of Science)</i>: Open access scientific journals.

MIT, Massachusetts Institute of Technology; MOOC, Massive Open Online Course; PhET; Physics Education Technology

Table 2. Some major open access (OA) initiatives in India.

Initiative	Launched by	Purpose	Website
National Digital Library of India (NDLI)	Ministry of Education, Government of India	Provides free access to millions of digital resources including books, articles, and learning materials.	ndl.iitkgp.ac.in
Shodhganga	INFLIBNET (UGC)	Repository of full-text Indian theses and dissertations (ETDs).	shodhganga.inflibnet.ac.in
Shodhgangotri	INFLIBNET (UGC)	Repository of research Summaries/synopses are prepared to maintain transparency and prevent duplication.	shodhgangotri.inflibnet.ac.in
ShodhShuddhi	MHRD and INFLIBNET	Plagiarism detection and prevention using URKUND software.	shodhshuddhi.inflibnet.ac.in
eGyanKosh	IGNOU	Digital repository of self-learning materials and courseware.	egyankosh.ac.in
e-ShodhSindhu	INFLIBNET (UGC)	Consortium providing access to e-journals, e-books, and databases for higher education.	ess.inflibnet.ac.in
Indian Academy of Sciences (IASc) OA Journals	Indian Academy of Sciences	Publishes open access scientific journals across disciplines.	ias.ac.in
MedKnow (Now Wolters Kluwer, India)	MedKnow Publications	Publishes open access medical and healthcare journals.	medknow.com
Vidwan	INFLIBNET (UGC)	Expert database and research networking tool for Indian researchers.	vidwan.inflibnet.ac.in

ETDs, Electronic Theses and Dissertations; IGNOU, Indira Gandhi National Open University; INFLIBNET, Information and Library Network Centre; MHRD, Ministry of Human Resource Development; UGC, University Grants Commission

BENEFITS AND TRANSFORMATIONAL IMPACTS

Despite challenges, open models offer substantial benefits:

- OER reduces cost barriers for students by replacing expensive textbooks with freely accessible alternatives, thereby increasing course affordability and inclusivity.
- OA publishing makes research accessible globally, including in low-resource regions that cannot afford subscription-based journals.
- The openness of resources encourages pedagogical innovation, allowing educators to remix and adapt the materials for local contexts.
- OA increases research visibility and citation impact, fostering knowledge exchange across disciplines.
- Collaborative consortia, such as the Community College Consortium for open educational resources, illustrate community-based support for OER adoption, training, and advocacy.
- Representative OER initiatives, such as OpenStax and MIT Open Course Ware, demonstrate how openly licensed textbooks and course content can be scaled globally (Table 2).

Collaborative models expand beyond individual institutions, enabling networks of shared practices, repositories, and support frameworks.

CONCLUSION AND RECOMMENDATIONS

OER and OA publishing represent a shift toward inclusive, equitable, and collaborative knowledge ecosystems in higher education. While policy frameworks and global initiatives have laid the groundwork, implementation challenges, such as technical barriers, awareness gaps, and sustainability concerns, remain significant. Overcoming these challenges requires coordinated institutional action, supportive policies, investment in infrastructure and skills, and a commitment to collaborative models that share resources, expertise, and pedagogical innovation. When successfully implemented, OER and OA have the potential to transform access to learning and research, empowering educators, and learners worldwide.

OER and OA publishing are reshaping higher education by promoting inclusivity, affordability, and innovation. However, challenges related to sustainability, version control, and quality assurance necessitate strategic solutions. Institutions should:

1. Develop clear policies with faculty incentives.
2. Establish sustainable funding models beyond pilot projects.
3. Implement robust version control mechanisms using open-source tools.
4. Foster international collaborations and utilize shared platforms.
5. Enhance digital literacy to bridge equity gaps.

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