Academic Research Journal of Science and Technology (ARJST)
International Refereed Peer Reviewed Journal eISSN **3048-9644**
Journal Vol 1, Issue 09, May 2025 https://doi.org/10.63300/

FUTURE DIRECTIONS IN OPEN EDUCATIONAL RESOURCES (OER)

HILDA MARY S [1], Dr. SANKAR P [2]
1.Research Scholar, Department of Library & Information Science,
Sree Narayana Guru College, Coimbatore
2.Librarian, Holy Cross College of Education – Trichy
Research Supervisor & Librarian,
Department of Library & Information Science,
Sree Narayana Guru College, Coimbatore

Received 20/05/2025
Accepted for publication 30/05/2025
Published 01/06/2025

Abstract

Open Educational Resources (OER) have been defined as educational content that is either in the public domain or has been released under an open license that enables no-cost access, use, adaptation, and redistribution. Nevertheless, the nature of educational content undergoes a transformation as a result of the introduction of new technology, which also affects the character of OER. The following paper examines the impact of four primary categories of technology on our understanding of OER: decentralized networks, artificial intelligence, open data, and cloud infrastructure. It is posited that these technologies will produce a model of dynamic and adaptive resources that will be generated at the instant of need and will depend on data sources and requirements that are constantly changing. They will be developed through distributed community-based processes and will advance a pedagogy that emphasizes student experiences over content transmission. As a result, the focus will transition from content publication and licensing to concerns regarding access and interoperability..

***Keywords**: OER, Future, Open Data, AI.*

1. Introduction

Historically, the design and distribution of learning resources, including course packages and computer programs, have been the foundation of online and distance education. Nevertheless, there has been an increasing inclination to leverage new Internet technologies and aggregate resources, which has resulted in the development of open educational resources (OER). OER is defined as teaching, learning, and research materials in any medium that are either in the public domain or have been released under an open license that allows for no-cost access, use, adaptation, and redistribution by others with no or limited restrictions. The sustainability of the OER concept has also been a topic of concern, as the production of course materials can be costly and students may not be willing to pay for. The focus of OER development shifted to commercial viability, with distribution models such as bundling, enclosure, or conversion.

The nature of digital resources and online learning has evolved, with the early web being characterized by pages and documents, while the later web 2.0 has emphasized user-generated content and social interactions. Students were able to generate and disseminate their own educational resources and engage in learning networks as a result of the development of MOOCs in 2008. The nature of OER is in a state of

upheaval as a result of the impact of four essential technologies: cloud technologies, open data, artificial intelligence, and content-based addressing. In order to influence the future of educational resources, the educational sector must adjust to these changes.

2. New OER Technologies

2.1 Cloud

Cloud hosting is the process of storing and accessing content on computers that are accessible via the internet, enabling collaborative or cooperative creation. This transition from content providers or publishers to collaborative resources is becoming increasingly significant. For instance, GitHub, a web-based article that discusses open educational resources, enables multiple individuals to contribute to the content by generating their own duplicates or modifications. This eliminates the distinction between author, publisher, and consumer, thereby altering the dynamics of open publishing and open educational resource publishing. An Internet connection is necessary to access cloud-stored content. While it is true that a significant number of individuals, particularly those in the global south, are unable to readily access cloud-based resources, access will continue to increase over time. Consequently, we will be investigating cloud environments and technologies to support open educational resources.

2.2 Open Data

Open data are datasets that are created and made available to the public, and are interoperable, reusable, and openly licensed. In the future, open educational resources will encompass virtual computers and functional programs that individuals can utilize to generate content, create their own applications, and distribute them via the cloud.Learning resources can be incorporated with open data, which is not directly exploitable as a learning resource, by means of application programming interfaces (APIs). The Government of Canada has established an API Store to host and publish APIs that enable developers to access and utilize government datasets and services for integration into applications or other services. Jupyter Notebooks are an example of this. They are online text-based notebooks that contain computer programs that can be executed on a computer. Real-time data visualization is enabled by the ability of these devices to access live data as they operate.

Graffiti, a program that allows instructors to animate a Jupyter notebook, combines the roles of the learner and the instructor, allowing them to practice and ruminate. This transforms the concept of an educational resource from inert to interactive, enabling both creation and consumption. An educational resource is a component of a 'headless website' or 'decoupled CMSs' environment, in which the database, web page, and programming environment are distributed across multiple locations, such as the cloud or a local area network. AI will be employed to manage business processes, assist with identity and security, provide student support, assess and provide feedback, and facilitate learning processes.

2.3 Artificial Intelligence

Research is being expedited and online learning is being improved by OpenAI and other types of AI initiatives. These initiatives provide open-source software tools and resources for the development of interactive instruction, learning modules, and courses. For instance, the Azure AI service from Microsoft generates an alt tag for images, which enhances their discoverability and accessibility. The capacity to generate learning resources without relying on publishers will be significantly improved by the pervasive

availability of AI, which will make these capabilities accessible to all. It is anticipated that education will also incorporate artificial vision, image recognition technology, voice and language processing, algorithms, and hardware. AI will be readily available to the general public as a service, with applications like Cognii that facilitate personalized deeper learning, intelligent tutoring, open response assessments, and pedagogically complex analytics. Magpie, which offers learning opportunities through challenges, and the complete automation of the creation of Open Educational Resources courses are examples of future applications that will facilitate community-based creation of open educational resources and provide interactivity.

2.4 Content Addressable Resources for Education

CARE, or Content Addressable Resources for Education, is a concept that employs distributed ledger technology to store and access digital resources on decentralized and distributed networks. The Interplanetary File System (IPFS) is an illustration of a CARE network. Instead of employing a URL, content-based addressing enables users to access resources based on their content. This system has been altered to mitigate vulnerabilities in location-based access protocols, including singular points of failure. Content-based addressing enables the creation of multiple duplicates of a resource on the internet, thereby diminishing the significance of licensing. A 'hash' of the content, which is a cryptographic version of the content, is generated by content-based networks to facilitate easier identification. The resource is associated with this distinctive hash value, and the search is conducted using this value. In order to ensure security, the recipient may apply the hashing algorithm to any content they receive in order to verify that the hash matches the requested hash.

3. Consequences

The future of open educational resources is being revolutionized by new technologies. New models will enable students to generate their own learning content and apply it to a variety of applications, thereby merging the production and utilization of these resources. This is evident in the development of Creative Commons open educational strategies, which are authored by multiple individuals and shared on GitHub. Licensing concerns will recede into the background, as the majority of resources are generated and utilized only once, utilizing current data and capable of being customized or adapted to the content consumer. The tools used to manipulate resources are derived from a shared pattern language of open access algorithms and tools. Decentralized networks distribute static components of learning resources, thereby bestowing a de facto license to reproduce content. Access restrictions on content are imposed by the government through access restrictions on the network as a whole, such as authentication.

Technologies such as encryption, hashing, and blockchain establish a record of ownership and provenance, thereby embedding access conditions that were previously established through licensing. The utilization of next-generation open educational resources will alter the nature of learning, relocating the focus from the content to the application or utilization of the resource. This transitions the learning process from practice and use to actual work environments, enabling students to acquire knowledge through practice and use.

Instructional design must transition from content-based learning objectives to fluid capacities and skills, emphasizing environments and experiences over content. This transition necessitates that instructors and designers acquire the ability to think dynamically, diversified, modular, and interoperating, utilizing user-friendly interfaces such as content management systems and next-generation interactive cloud technology. In order to facilitate this transition, it is necessary to apply and exercise on new leading design systems.

Cooperative co-creation, which involves multiple individuals and organizations working within a shared environment or infrastructure, is also a skill that designers and developers must acquire. This entails the collaborative development and sharing of resources in a public setting, also known as "open working." Examples of this include the philosophy of "open science," which promotes active participation and access to research communities while minimizing barriers. Internships, apprenticeships, sport development leagues, and co-op student placements are all examples of this principle. A change in mentality, knowledge, and skills will be necessary to implement this novel approach to learning and design.

Conclusion

Students are adapting to complex work environments with new technologies, leading to the development of dynamic, adaptive learning resources. These resources are created using AI-assisted learning design systems and constantly changing data sources. Students interact with data and algorithms, modifying resources and creating solutions to real-world challenges. The concept of 'open educational resource' is shifting from textbooks to data-processing networks, cloud services, and AI-assisted design. OERs support students' fluency in new challenges and technologies.

References:

1. Downes, S. (2019). A look at the future of open educational resources. *The International Journal of Open Educational Resources* , *1* (2).
2. Kimmons, R., & Irvine, J. (2023). Future Directions in OER. In *Distributed Learning Ecosystems: Concepts, Resources, and Repositories* (pp. 183-199). Wiesbaden: Springer Fachmedien Wiesbaden.
3. Luo, T., Hostetler, K., Freeman, C., &Stefaniak, J. (2020). The power of open: Benefits, barriers, and strategies for integration of open educational resources. *Open Learning: The Journal of Open, Distance and e-Learning*, *35*(2), 140-158.
4. Orzech, M. J., Zhang, J., Orzel, V., Sultana, S., Thompsell, A., Wood, J., & Yu, N. (2025). All about OER–Why, What, How, and So What: A Collective Case Study. *Journal of Educational Technology Systems*, 00472395241309876.
5. Richter, T., & McPherson, M. (2012). Open educational resources: education for the world?. *Distance education*, *33*(2), 201-219.
6. Tlili, A., Zhang, J., Papamitsiou, Z., Manske, S., Huang, R., Kinshuk, & Hoppe, H. U. (2021). Towards utilising emerging technologies to address the challenges of using Open Educational Resources: a vision of the future. *Educational Technology Research and Development*, *69*, 515-532.