
Open Educational Resources for Redefining the Learning Horizons: An Evaluation

Muruli
Librarian
Power System Training Institute (PSTI)
National Power Training Institute (NPTI)
Bengalure, Karnataka-560070

Dr. T.K. Gireesh Kumar
Assistant Professor
Department of Library and Information Science
Banaras Hindu University, Varanasi, Uttar Pradesh-221005

Abstract: Open Educational Resources (OER) is commonly understood as the educational resources of open access in nature and are available at no charge. However there are certain policies which make a material OER. Hence, such resources reside in the public domain under an open licence or intellectual property licence granting permission to use and reuse it for free. OER also includes printed contents that are openly licensed. The education, being a significant phase of human life urges for the open learning where knowledge is open to everyone. OER would work well for teachers as well as for students and researchers in their teaching and learning ontogeny due to its inherent flexibility of the openly licensed resources. The ever extending sphere of open learning is self-evident with the rising numbers of OER platforms. This paper explores the potential of OER in the current learning situation. It investigates the importance of Open Access Resources and Open Educational Movement in the changed dimension of information scenario. The paper discusses major benefits and challenges of creating and adopting OER. Some renowned OER initiatives are also explored in the study. It further examines the importance of open licenses for OER and the role of Library and Information Centres (LICs) in promulgation of OER.

Keyword: Open Educational Resources, Open Education Movement, Open Licenses, OER Initiatives, Copyleft, CC SA

1. Introduction

The changed landscape of teaching and learning is indicating the need to keep pace with the enormous amount of information which is the result of constant research, exploration and investigative human mindset to do better in everything that one does. The paradigm shift from conventional mode to digital has turned the information creation, organization and diffusion into a rapid process. The enormous amount of information created is organized but locked for those who do not have a paid subscription and educational activities. The information

disparity is widening the information gap and so the concept of open source and open access. The open movement with aims of promoting educational technology, research, learning, and teaching is omnipresent and plays a vital role in the development of an education niche. Unlike the conventional methods, the mode of teaching and learning processes in such open access environment enable an aspirant to swiftly complete a course. The worldwide learning community has created the global classrooms which is based on technology and are growing towards openness of teaching and learning materials. However, availability of the supporting peripherals and the information technology infrastructure are mandatory for effective use of resources to eliminate such disparities.

2. Objective

- To recall the importance of open access resources and open educational movement in the changed dimension of information scenario
- To explore the potential of OER in the current learning scenario
- To identify the major benefits and challenges of creating and adopting OER
- To explore some reputed OER initiatives
- To examine the importance of open licenses for OER
- To discuss the role of LICs in creating and adopting OER to bring in better information equilibrium

3. Information as a Commodity

The information has become a pure commodity in the business of knowledge. Success of an individual or an organization today imperatively relies on how effective and efficient their information system is. The cost and access to course materials are the two major issue normally emerges as a concern in the education scenario. Modern information systems with a huge capacity to store and transfer vast amount of materials enable the easy access through the supporting technological aids. The quality of output is undoubtedly dependent on the quality of input. The information sources that our Library and Information Centres provide access to become the deciding factor of the quality output. With the ever growing horizons of science and technologies, anything that keeps one away from the needed information invariably creates obstruction in the creation of quality information. Ever shrinking monetary resources to be invested in organization and

diffusion of information make it next to impossible for the education institutions which can never manage to cover everything in the respective area.

4. Open Movements and OER

With the advent of computer technology and the internet during the beginning of 1980s, the concept of open movement emerged to facilitate access to different kinds of materials, information and the technological codes for free. Open education movement, open source movement, open learning, open access movement and open data movement are the results of such open movements emerged during the years to share freely the educational materials, softwares, online access to scholarly communications and research data respectively. OER is an extended part of Open Education (OE) that exists with the concept of sharing information educational sources to the maximum extent in the best interest of human development. The concept of OE has emerged from the technological development that has happened along the time. Open access to educational opportunities has always been a core defining characteristic of open learning which includes openness and flexibility in terms of time, place and pace of learning (Karunanayaka, 2017)

OER have been defined in various ways by different researchers but a key concept that it is accessible and free to use. According to Butcher, "Open Educational Resources (OERs) have been defined as "any educational resources (including curriculum maps, course materials, textbooks, streaming videos, multimedia applications, podcasts, and any other materials that have been designed for use in teaching and learning) that are openly available for use by educators and students, without an accompanying need to pay royalties or license fees" (Butcher, 2011). The basic feature of OER is that it comes with open licenses or is available in the public domain. UNESCO is commonly cited and defines OER as "any type of educational materials that are in the public domain or introduced with an open license. The nature of these open materials means that anyone can legally and freely copy, use, adapt and reshare them. OERs range from textbooks to curricula, syllabi, lecture notes, assignments, tests, projects, audio, video and animation" (UNESCO, 2016). Further UNESCO defined "OER are a strategic opportunity to improve knowledge sharing, capacity building and universal access to quality learning and teaching resources" (UNESCO, 2017). Bell said that "OERs are educational materials and resources that are publicly accessible, meaning that they are openly available for anyone to use and under some licenses to re-mix, improve and redistribute". Bell, 2018).

OER is a new idea that is coupled with new technology and it is vastly different than the traditional textbook/lecture format still used by much of Higher Education

(Leber-Gottberg, 2017). OERs are being effectively used for teaching as well as learning as these are made available via online platforms for free. OER has the potency to equalize the education and making the educational materials affordable and accessible to the aspirants and improve their learning outcomes. It has become a replacement for traditional classroom teaching and faculty interaction programmes, however enhancing the potential of both teacher and the learner. Such types of resources are either provided or funded by educational institutions or by non-profit organizations.

Open Educational Resources (OERs) are freely accessible reading materials available in the public domain to use and adapt for teaching, learning and research and development. They are generally available without any copyright restrictions. However, materials can also be available under open licenses. The contents either be created/owned by an individual or by an organization with an intention to support teaching and learning process and are free from financial and technical barriers. The term OER was coined in the Forum on OpenCourseWare held in 2002 by UNESCO. UNESCO defines OER as any type of educational materials that are in the public domain or introduced with an open license. The nature of these open materials means that anyone can legally and freely copy, use, adapt and re-share them.

According to Wiley, for an educational resource to qualify as "open," it must comply with what are known as "the five Rs of OER" such as retain, reuse, revise, remix and redistribute which is diagrammatically represented in Fig. 1

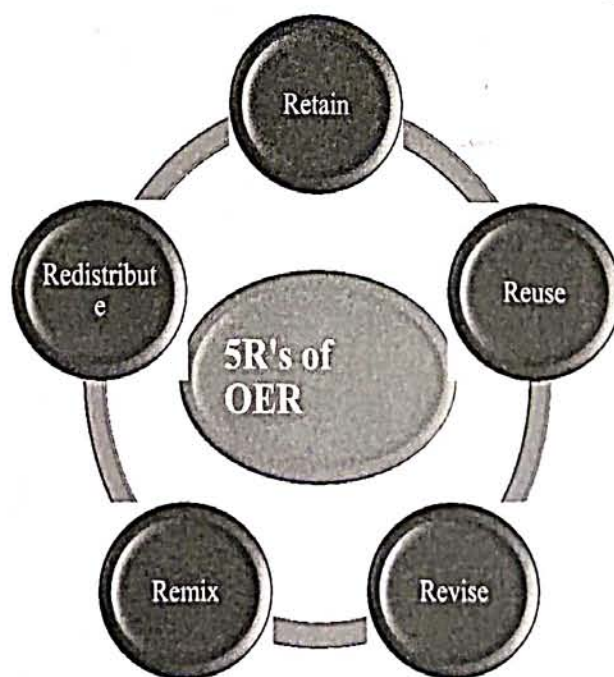


Fig. 1: 5 R's of OER

- 1) *Retain*: It facilitate the right to make, own, and control copies of the content including downloading, duplicating, storing and managing the materials
- 2) *Reuse*: Reuse gives the right to use the content in a wide range of ways such as in a class, in a study group, on a website or via video
- 3) *Revise*: Provide the right to adapt, adjust, modify, or alter the content itself such as translating the content into another language
- 4) *Remix*: Extend the right to combine the original or revised content with other material to create something new such as to incorporate the content into a mashup)
- 5) *Redistribute*: Giving the right to share copies of the original content along with revisions and also remixes with others such as give a copy of the content to a friend.

OER has the potential to grow, develop, utilize and access the most recent and newest information right at the faculty and students fingertips. Cost of prescribed course materials becomes a significant drawback for the aspirants, especially students who intend to pursue their educational process. OER provides better opportunities for the students to expand the horizon of their classroom beyond the specific study materials to facilitate different educational materials. The learning materials ranging from text books, lecture notes, streaming and instructional videos, audios, class lectures, assignments, modules, projects, videos, tests to software are included in OER. OER is one of those mechanisms which run together to achieve the open technology movement and open access movement (Fig. 2).

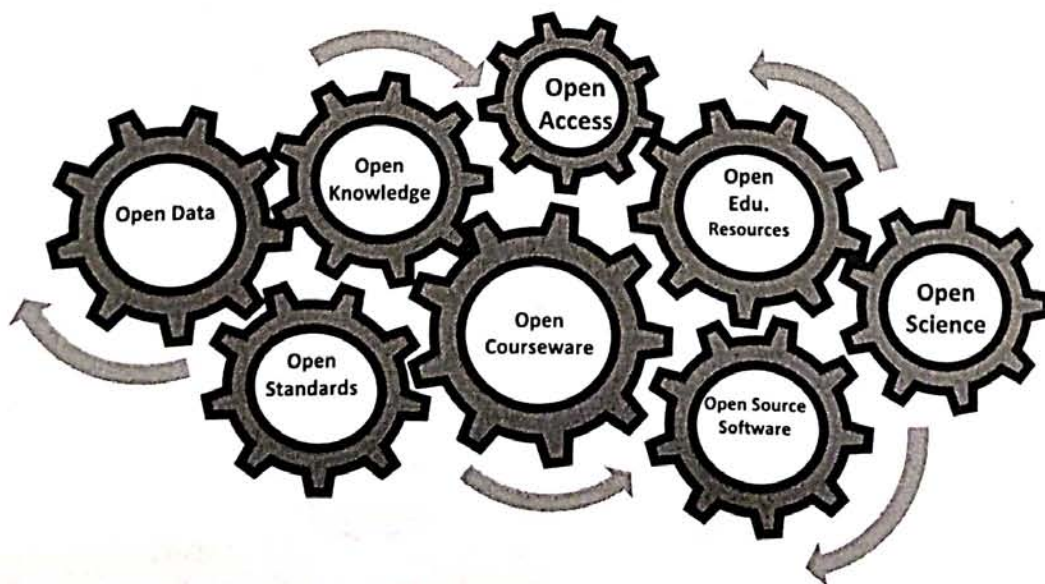


Fig. 2: Open Movements

5. Benefits of OER

- Highly cost effective as they facilitate group learning/individual learning on interactive medium in a multimedia environment
- Does not restrict access based on geographic, education and socio-economic background hence adoption enhances access to resources
- Gate way to profuse resources in diversified branches of human knowledge
- Possesses great deal of flexibility in as it runs according to the learner's timeline and also learning requirement
- Helps to ascertain and maintain global standards in organization of resources and learning process
- Provides more authenticity to the content as it is open to every individual learner and expert
- Learning process is mostly user driven as consumer here often becomes prosumer
- Endless opportunities to collaborate with every individual to bring in the most updated information in the field and this facilitates the worldwide confluence of perspectives on a given topic
- Ready to access, easy to share and can be preserved forever
- Provide ample opportunities for an educator to share knowledge, the educational materials and participate more broadly in their field to enhance their visibility to a wider audience.
- Act as an additional resource for learning and the movement towards OER has stimulated innovations in teaching and learning practices.
- Enhance quality of materials through peer review, user feedback and adapting and modifying resources
- Encourage engagements and facilitate better skill development

6. Challenges of OER

- Basic infrastructural requirements such as computer with an internet connection and communication accessories

- Inconsistency in quality control appears as there can be many providers and no adequate screening of content
- Cost involved in maintenance of technical aspects of the system and vulnerability to breakdown and malware
- The faster the obsolescence of technology the huger the squander of efforts, resources and time
- Often learning comes free but not the supporting materials which may be copyright protected
- Tailoring emerging trends and updating of audiovisual content accordingly becomes exasperating task
- Involves minimum cost, expertise and willingness to contribute which may hinder the scalability, sustainability and the larger accessibility.
- Lack of awareness of open licenses among authors and creators
- Usage of OER in teaching and learning environments has not been studied exclusively
- Lack of well defined policy for checking the quality of resources available in OER

7. OER Initiatives

The realization of how important it is to make the educational resources open access is so rigorous that the UNESCO World OER Congress proposed the governments to adapt open license to education materials which are publicly funded (UNESCO). Open access concept has gained greater familiarity among learners (Iqbal, 2017). Over a period of time many efforts have been made to build various OER platforms for creation, collection, organization and distribution of educational resources. Most of such initiatives evolved by individuals and interested communities. Efforts are happening at global level to bring out learning irrespective of geographical limitations. Open Learning at school level is incredibly on raise and collaborative efforts are being made by professional organizations to come up with extremely useful content. Areas like Mathematics, Science and Social Studies are at the centre of collection for upto K-12. The contents beyond college and university levels have included diversified branches of knowledge. Audio-visual and interactive content

are the most common features of content which facilitate experiential learning though the learning happens virtually.

In India, the National Repository of Open Educational Resources (NROER) is an initiative with government support which is devoted to the content development for school level. The initiative includes a huge collection of content related to various branches of knowledge in many Indian languages. With the concept of flip book format, textbooks of CBSE are made available online. The OER contents in multimedia are developed by SCERT, SIERT, CCERT, SIE, Vigyan Prasar, Gujarat Institute of Educational Technology, SIET and many other organizations (NEOER). Ventures initiated by non-governmental organizations and individuals have been proven to be equally professional as government funded ones. Online certification courses provided through MOOCs by the National Programme on Technology Enhanced Learning (NPTEL) have been developed by experts of IITs and IISc. The popularity of NPTEL MOOCs is evident with the 8 million learners who enrolled for the courses. The contents of most of the OER are used by learners as well as teachers. Ministry of Human Resource Development (MHRD), Government of India in collaboration with the supporting authorities like UGC and AICTE are encouraging the incorporation of MOOCs in the curriculum of semesters. Core professional experts from prominent organisations like NASA, The California Academy of Sciences, MIT are taking part in developing the content for Khan Academy (NPTEL), Governmental level initiatives such as e-PG Pathshala (an initiative of the MHRD under its National Mission on Education through ICT (NME-ICT) being executed by the UGC), SWAYAM (Study Webs of Active Learning for Young Aspiring Minds, a programme of the MHRD, GoI) etc. Platforms such as Teacher Education through School-based Support in India (TESS-India) have been a great support for teachers who want to nurture and perfect their teaching practice. The congregation of over 200 Indian educational experts have contributed to the development of the content on TESS-India. It even provides the search link on their website which brings traces of resources on OERs around the world (TESS-India). CK-12 aims to pair quality content with technology. The content is also available in translated versions of Spanish, Korean, Deutsche, Chinese, Greek and Polski (CK-12). The concept of personalised learning gaining greater importance as it helps to understand the needs and goals of each individual learner. OER with an option to personalized learning is becoming more prominent such as Gooru which provides dynamic instructional approaches and academic aid which intend to cater the needs of intense learning, individual interests, aspirations of learners (Gooru). The Institute for the Study of Knowledge Management in Education (ISKME) is one such OER which conducts social science research along with developing evidence based innovations to enhance knowledge sharing in education. ISKME promotes

student centred teaching and learning practices where it also aiding in policy making, designing and assessing of education contents and practice (ISKME).

MIT's Open courseware happened to be the first to offer open educational resources and India is one of the member countries in the initiative. Few initiatives on OER that have emerged worldwide is represented in Table 1.

8. Copyleft License for OER

The intention of every output of research is for the amelioration of mankind. Knowledge activities are intended for the public utility more than financial returns. The knowledge gap widens with the commercial publishers placing electronic walls which only unlock for subscribers. As the technology advanced electronic information systems are systematically managing to create the information disparity which did not so rigorously exist in printed sources (Pavlovic, 2010). An academic/research work reaches wide range of population than it being in closed access. Open sources software movement eventually became the cause for concept of OER. Models such as Open Data, Open Content, and Digital Rights are the extended parts of open access movement (Garcia-Penalvo, 2010). Instead of locking out information resources it is advisable to provide access, modification rights, and redistribution opportunities for commercial or noncommercial purpose at the discretion of author. The information disparity created by copyright is the reason for emergence of Copyleft concept.

Copyleft offers people the right to use copy and modify. Copyleft is a form of licensing that can be used to maintain copyright conditions for all works which can be governed by copyright law. The range of works may be from computer software to documents and art. Unlike the contents in public domain which are non-copyrighted, copyleft facilitates owners to apply copyright terms to their work with credit for one's work on every use (Muruli, 2017). Copyleft movement is more about users' rights to use and consume creative works rather than about the rights of authors (Dussollier, 2006).

Among the bunch of creative common licenses being used, Creative Common Share Alike (CC SA) falls under copyleft license. Unlike in copyright, a CC SA works as a grant of permission from one-to-all on specified considerations by the creator rather than the normal one-to-one use license, (Goss, 2007). Copyleft principles restrict using the work for proprietary or commercial purpose. A copylefted work, every time it is used and modified, is distributed freely for the further users. In the chain of usage, the entitlement of free use and re-distribution remain free from the first creator till the last user and there will not be any proprietary/commercial

intervention. With the principles of copyleft there exists GNU Free Documentation License which is meant for softwares. Among most of the OERs existing, the adoption of CC SA seems to be common.

Table 1: Some OER Initiatives in different parts of the World

Resource	Initiated by	Year of Est.	Content/Attributes
Gooru	Collaborative venture	1993	<ul style="list-style-type: none"> • a free personalised learning solution • helps teachers to find, remix, and share collections of web resources on any K-12 topic • Content in many Indian languages • Online quiz helps for instant feedback
MIT OpenCourse Ware (OCW)	Massachusetts Institute of Technology (MIT)	2001	<ul style="list-style-type: none"> • More than 2000 courses available online • Consist of various types of materials such as lecture notes, streaming videos of lectures, discussion topics, reading lists etc. • Global level initiative • India is one the international members
ISKME	Lisa Petrides	2002	<ul style="list-style-type: none"> • Aims to improve the practice of continuous learning, collaboration, and change in the education sector. • facilitates social science research, develops research-based innovations • assists policymakers, foundations, and educational institutions in designing, assessing, and bringing continuous improvement to education policies, programs, and practice • Supports open author-OER environment • Being instrumental in creation and sharing of essential information

NPTEL	Indian Institutes of Technology (Bombay, Delhi, Kanpur, Madras, Guwahati, Kharagpur, and Roorkee) in association with the Indian Institute of Science, Bangalore.	2003	<ul style="list-style-type: none"> • Collection of over 735 courses in web/video format has been provided in different branches of engineering and physical science, management science. • Indexing of content and keyword search developed for better accessibility. • Today it seems to be one of the major Indian OER at undergraduate and postgraduate levels.
Curriki	Sun Microsystems	2004	<ul style="list-style-type: none"> • Rich resources on various Arts, Education, Health, Mathematics, Science, Social Studies etc., • Knowledge to cater upto K12 and beyond • Knowledge base is built by teachers, parents, pre-service and new teachers and students. • Personalised learning through personal learning networks and learning communities • Adopts create common licenses
eGyanKosh	IGNOU, India	2006	<ul style="list-style-type: none"> • e=electronic, gyan= knowledge, kosh= repository • Collection of more than 30000 resources • Wiki for Collaborative content generation • Webcasting of Broadcast channels
CK-12	Neeru Khosla and Murugan Pal	2007	<ul style="list-style-type: none"> • 'Flexbook' concept for textbooks • Worldwide users • Contents on all branches of Mathematics and Science • Available in multiple languages

Khan Academy	Salman Khan	2008	<ul style="list-style-type: none"> • Available both on website and app • Wide range of subject from mathematics, statistics, science and engineering, arts and humanities to economics and entrepreneurship. • Content available over 28 languages • Funded by multinational companies
Standford Engineering Everywhere (SEE)	Standford University	2010	<ul style="list-style-type: none"> • Collection of courses offered • Lecture notes taught by Standford university professors • Offer introduction to Computer Science and advanced courses in artificial intelligence and electrical engineering • Consist of various types of course materials such as lecture videos, syllabi, handouts, homework and exams. • A Creative Commons license allows for free and open use, reuse, adaptation and redistribution of SEE material.
TESS-India	The Open University UK, - Government of India's Ministry of HRD - British Council -Save the Children India	2012	<ul style="list-style-type: none"> • aims to strengthen and transform teaching professional development and classroom practice. • Provides scalable approach to pre- and in-service teacher education and includes participatory child-centred pedagogy. • 200 freely available Open Education Resources (OER) in multiple languages. • Contents are CC-BY-SA licensed • Subject range-Science, Social Science, History and Law etc.,

OpenStax		2012	<ul style="list-style-type: none"> • non-profit ed-tech initiative based at Rice University • contains peer-reviewed, openly licensed textbooks • Includes textbook on different disciplines such as Mathematics, Science, Social Sciences, Humanities, Business etc
NROER	NCERT Department of School Education and Literacy, Ministry of Human Resource Development, Government of India.	2013	<ul style="list-style-type: none"> • Open courses for school level • OER mapped to school curricular • Device independent electronic text books • Contributions from institutions and individuals for collection

9. Role of LICs in Bridging the Gap

- LICs are positioned at the center of this whole process for their inherited role of collection, organization and distribution of knowledge. The LICs are shouldered responsibility of tailoring of ceaseless information emergence to the existing information system which only makes the system more meaningful and never a complete one. Public Private Partnership (PPP) is a feasible model to be adopted by authors, publishers in coordination with information centres. The collaboration of Government and non-governmental organisations, donor agencies, and corporate bodies will help to address the issues of digital divide which the targeted learning communities need initiatives with (Das, 2011).
- Awareness among the needy seems to be poor for the best utilization of available OERs. This needs for the LICs to explore, combine and propagate among the learning communities.

- Aggregation and creation of gateways of such resources have become the need of the day and information sector with proper framework can handle the information explosion.
- The need to bridge the gap between colleges/universities and industry is ever increasing and this can be handled well with the extended learning activities like workshops and hands-on training programs. Though some OERs have incorporated this concept, policies in this direction needs to be formulated in association with LICs.
- The unexplored areas of learning on OER platforms may be brought into the notice of experts in the related fields by LICs being instrumental in advocating the emerging needs.

10. Conclusion

The emergence of technology of modern times has taken the learning beyond the classroom. Virtual learning has redefined the concept of true learning which is never limited to textbooks and classroom. The concept of "Knowledge is open for every seeker anywhere" is made to be a reality and it is indeed a right of every learner to have access to knowledge. Since then the MIT launched the first large-scale OCW initiative around two decades back the growth and acceptance of OER globally across the discipline and various educational levels to support the teaching and learning process. It is equally an advantage for a student or an instructor or an institution in their endeavours to teach and learn. It enables effective learning opportunities for everyone which can be easily adapted and shared. However IT enabled infrastructure need to be adopted more for creating, distributing and promoting the OER. Further, educators who wish to share their contents should be facilitated with platform of OER. OER texts are developed by those knowledgeable in the field. Development and Implementation of OER need to be funded by the Government for longer time to ensure the quality and sustainability. Further, the usage of OER also has to be guaranteed in the largest possible way to bring greater value to the educational experience. Adoption of open licenses needs to be popularised among academic community for a promising learning environment in the days to come. With the advent of Information and Communication Technology (ICT) and Internet Technology (IT), open access movements and other new emergence of technologies have reshaped the landscape of the activities and services to be performed by the libraries. Hence it is the right time for each library to rethink and redefine their roles to stay relevant in the changing scenario.

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