International Journal of Library & Information Science (IJLIS)
Volume 6, Issue 5, September–October 2017, pp. 17–26, Article ID: IJLIS_06_05_003
Available online at
http://www.iaeme.com/IJLIS/issues.asp?JType=IJLIS&VType=6&IType=5
Journal Impact Factor (2016): 8.2651 (Calculated by GISI) www.jifactor.com
ISSN Print: 2277-3533 and ISSN Online: 2277-3584

USE OF OPEN EDUCATIONAL RESOURCES: INDIAN SCENARIO

Raysh Thomas
Guest Librarian, Mar Thoma College for Women, Perumbavoor, Kerala, India

ABSTRACT

With tremendous developments in ICTs, the education system of today has been enriched by various OERs. The optimal utilization of opportunities provided by the technological developments presents a profound challenge for education systems and has serious implications involving cost, access, equity, pedagogy and quality. The paper discusses various opportunities and challenges presented by the use of OERs in the education system of today. The various meaningful initiatives taken in India aiming at proper utilization of ICTs are also highlighted. The paper also discusses the role of libraries in promoting the use of OER's in educational institutions.

Key words: Library, Open resource education.

Cite this Article: Raysh Thomas, Use of Open Educational Resources: Indian Scenario. *International Journal of Library & Information Science*, 6(5), 2017, pp. 17–26.
http://www.iaeme.com/IJLIS/issues.asp?JType=IJLIS&VType=6&IType=5

1. INTRODUCTION

ICTs have provided powerful tools for dissemination of knowledge over a wide spectrum. This makes it very useful for improving access and equity in the entire education sector. ICTs can be leveraged to complement the formal education system as well as the distance education system at all levels. The use of OERs holds great promise of improving the access to and the overall quality of education for the developed as well as the developing countries. The educators are creating and using digital content for teaching and learning. The access to quality content is possible only for those who attend higher education institutions or those who can afford to purchase the instructional material. The OER movement aims to make this content available for free use for enhancing educational opportunities for hitherto unreached sections of the society thus leading to equalizing of access . OERs can play a vital role in the existing scenario of distance learning by improving quality, access, reach and also providing competitive edge and recognition globally. There is a tremendous growth in the number of OER projects across the world. In India also a number of meaningful initiatives are being taken up to embed the OERs into the educational environments of today by Indian universities. The Indian Government has played a proactive role by providing impetus to the growth of OER movement in the country through various national policy initiatives. A large number of national policymaking bodies such as National Knowledge Commission (NKC),

University Grants Commission (UGC) and other advisory bodies are providing the support to the movement in the country for improving access to quality education.

The paper is based on secondary data collected from various sources. The paper also discusses various OER initiatives taken up in India by different institutions. It also reflects on some of the initiatives at a Nation Open University. The paper analyses the challenges associated with the development and use of OERs in distance learning institutions in a developing country like India.

2. CONCEPT OF OERS

The Open Education Resources (OER) have emerged as a useful means for providing high quality education to the masses. OERs and MOOCs are at the forefront of the open education movement and have become significantly important in education systems across the world. As mentioned by Olcott (2013, p.15) with unprecedented growth of open education systems, content and innovations, "we are on the brink of a brave new world for education". The various developments in digital technologies have played a catalytic role in the open education movement.

The term OER was first used at the UNESCO forum on the potential of open courseware for higher education in developing countries in the year 2002. The William and Flora Hewlett Foundation, defines OER as "teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge" (Atkins, Brown & Hammond, 2007). According to OECD (2007), OER is said to include:

- Learning Content: Full courses, courseware, content modules, learning objects, collections and journals.
- Tools: Software to support the development, use, re-use and delivery of learning content including searching and organization of content, content and learning management systems, content development tools, and online learning communities.
- Implementation Resources: Intellectual property licenses to promote open publishing of materials, design principles of best practice, and localization of content.

The OER movement commenced with the Massachuetts Institute of Technology's (MIT) Open Course Ware (OCW) initiative which made the content from MIT's courses freely available on the web (Hylen, 2006). This was followed by similar initiatives by Stanford, University of Pennsylvania, University of Michigan, Utah State University, and so on (Conrad,2013). In the last decade the movement has grown tremendously worldwide. There exist a number of initiatives such as Open learn by UKOU, Open Learning Initiative by Carnegie Mellon University, Connexions, Creative Commons and Internet Archive, Peer to Peer University (P2PU), Udacity, Coursera, Wikieducator, and OpenStudy, to mention a few. OERs have received recognition from international organisations, such as UNESCO, COL, OECD, World Bank and the European Commission; with these organisation being involved in promotion, standardization and policy development (Kursun, 2014; Knox, 2013). The growth of the OER movement has been stimulated by funding from philanthropic organisations such as Hewlett Foundation, Mellon Foundation, and also international organizations such as UNESCO and COL.

The basic idea underlying the concept of OER "is the freedom to share knowledge and that knowledge should be legally, socially, and technologically open" (Torres,2013., p. 82).

The Cape Town Open Education Declaration (2007, para. 2) states that, This emerging open education movement combines the established tradition of sharing good ideas with fellow educators and the collaborative, interactive culture of the Internet. It is built on the belief that everyone should have the freedom to use,customize, improve and redistribute educational resources without constraint.As mentioned by Mishra (2013, p. 125), "the importance of OER stems from the fact that these resources are seen as "fundamental to the knowledge society and economy". Major motivations for engaging in OER identified and categorised by McGill, Falconer, Dempster, Littlejohn & Beetham (2013) are:

- building reputation of individuals or institutions or communities
- improving efficiency, cost and quality of production
- opening access to knowledge
- enhancing pedagogy and the students' learning experience
- building technological momentum

The open education movement is driven by a shared belief that education should be free and there should be no legal constraints on collective use of knowledge. Use of OERs in educational institutions leads to improved access, enhanced pedagogy, and increased sharing between educators. OERs are characterised by "openness" which renders it free to reuse, revise, remix and redistribute, also referred to as 4Rs (Wiley, 2009). Open licensing, a distinguishing feature of OERs, sets it apart from other resources and enables the user to use and reuse content according to individual needs. Hylen (2006) argues that OERs enable wider dissemination of knowledge, collaborative problem solving, quality improvement, increased development, and diminishing of societal inequalities.

3. USE OF OERS IN DISTANCE EDUCATION

In distance education scenario of today, there is a paradigm shift towards more personalized and collaborative learning. The use of OERs holds great promise of improving the access to and the overall quality of education for the developed as well as the developing countries. By international standards, the GER in higher education in India (i.e. percentage of people of enrolled in higher education institutions) is quite dismal at 14% for post graduate level. Distance education system in the country constitutes 12.5% of the total enrolment in higher education (MHRD, 2013). Distance education in India caters to a wide range of learners with varied learning styles, preferences, with heterogeneous cultural backgrounds, economical status and geographical locations. The ODL system (University Grants Commission, n.d.) aims at

- enhancing the gross enrolment ratio
- democratization of higher education to large segments of the Indian population
- reaching out to the unreached • providing opportunities for up-gradation of skills and qualifications
- meeting the demands of lifelong learning

In India, at present there are 15 open universities - one national university and 14 state open universities. Besides, there are about 200 dual mode university providers of higher education and 12 open schools including one national institute of open schooling. The education scenario in India is facing many problems that need to be addressed. There is a paucity of high quality teachers, inadequate infrastructure, lack of well-equipped libraries and good quality learning resources. Certain recent trends in ICT and its use in education as well as distance education have a strong influence on the use of OERs (Butcher, 2011) in educational institutions:

- expansion of the range of teaching and learning strategies
- increased transfer of data through networks which have expanded geographical boundaries
- easy access to learning resources
- collective sharing and generation of knowledge
- digitization leading to issues of intellectual property and copyright.

The inherent principle of distance education is to reduce spatial, geographical, economic, and demographic boundaries to provide easy access to higher education. This is in consonance with the aspirations of the OER movement. It is extremely important for ODL institutions to keep pace with changing times and use the digital technologies to meet the rising educational needs. The National Knowledge Commission (National Knowledge Commission, 2007) has also recommended increasing the amount of OER and Open Access (OA) to address these pressing problems. The widespread availability of high quality educational resources is imperative to change the paradigm of teaching for the better and improve the overall quality of education. OERs can help the distance education institutions to bridge the gap between non-formal, informal and formal learning thus providing learning opportunities to those unable to use more traditional offerings .

The open and distance learning institutions have a long tradition of creating learning resources for independent learners who have time constraints and a range of needs and experience (Butcher, 2011). OER initiatives in ODL institutions could be particularly beneficial because of their alignment with the traditional instructional objectives and practices of the distance learning institutions. MIT (a campus based institution) made its course available as open courseware in an attempt to position itself in the distance education and e-learning environment.

4. OERS IN INDIA: PRESENT SCENARIO

India embraced OER by the year 2007, with support from government and external funding agencies (James & Bossu, 2014). India is an active player in the OA movement with a large number of OA electronic journals, OA repositories and open source software-based digital repositories. Some of the open access initiatives have contributed largely to the creation, utilization and expansion of OER in India. These are as follows:

Digital Library of India (http:// http://www.dli.ernet.in/ /) is a collaborative project of over 21 institutions in India and is currently hosted by IISc (Indian Institute of Science),Bangalore. It provides access to a digital collection of rare non-copyrighted books collected from various libraries in India. The project which was started in 2000,aims to archive all the significant literary, artistic and scientific works of mankind and to preserve digitally and make them available freely for every one over Internet for education, study, appreciation, and for future generations. It is also a partner to the Million Book project led by Carnegie Mellon University.

National Digital Library (NDL) (http://www. ndl.iitkgp.ac.in/ /) is an initiative of IIT Kharagpur and aims to provide free access to digitized educational content in English and other Indian languages on a common platform. The project, started in 2015, and aims to bring under its fold 100 educational institutes and provide access to a collection of one million digitised books and journals in the first phase.

National Knowledge Network (NKN) (http://nkn.gov.in/) is an initiative that aims to connect all educational institutions, universities, research institutions, libraries, laboratories, healthcare, and agricultural institutions across the country through a high bandwidth network.

Established in 2010, on the recommendations of the NKC (2007), it marks a step towards creation of a knowledge society.

Shodhganga (http://shodhganga.inflibnet.ac.in/) is a digital repository of Indian theses and dissertations, set up by INFLIBNET (Information and Library Network)Centre in 2010. This repository provides easy access to theses and dissertations submitted in Indian universities by doctoral and other research students.

Vidyanidhi (http:// http://eprints.uni-mysore.ac.in/ /) This Open Access Institutional Repository, set up in April 2013, aims to cover scholarly publications covering journal articles, conference papers, books, book reviews, presentations, reports and patents since the establishment of the Varsity in 1916.The repository can be accessed by anybody, submission of documents to this archive is limited to the UoM research community. Interested users can freely download and use documents as most of them are directly accessible and full-texts downloadable, if the publication is in open access or if their institution has the accessibility to the concerned journal/publisher. 'Request Copy' forms can be used for documents to which direct full-text download is restricted due to publisher embargo.

ShodhGangotri (http://shodhgangotri.inflibnet.ac.in/) is a repository of Indian Research in Progress. This is an initiative by the INFLIBNET Centre which was started in 2011.

EPrints@IISc (http://etd.ncsi.iisc.ernet.in/) is the first open access digital repository, set up in 2001, by the National Centre for Scientific Information (NCSI) for providing access to research output by the IISc (Indian Institute of Science)research community.

A large number of initiatives aimed at promoting the use of ICT at all levels of education have been taken up. Premier educational institutions in the country have taken up collaborative initiatives for providing their educational resources through web portals. Majority of these initiatives are supported by the Government of India.Some of these are at a pilot stage while others are fully operational. Some of the major initiatives operating at a national level in educational institutions are as follows:

National Programme on Technology Enhanced Learning (NPTEL) (http://nptel.ac.in/): This is a joint initiative of the seven Indian Institutes of Technology (IITs) (IIT, Bombay; IIT, Delhi; IIT, Guwahati; IIT, Kanpur; IIT, Kharagpur; IIT,Madras; and IIT, Roorkee) and the Indian Institute of Science (IISc). The project was funded by Ministry of Human Resource Development (MHRD). It aims to enhance the quality of engineering education in the country by providing easy access to curriculum based video and web courses in engineering and sciences. Online web and video courses are provided for free, whereas certification programmes are offered for a nominal fee. The courses are modularised into core concepts and add-on topics. The materials are offered under a Creative Commons (CC BY-SA)license and are so designed that they can be customised for creating courses for varied contexts.

Consortium for Educational Communication (CEC) (http://cec.nic.in/Pages/Home.aspx): CEC is an inter-university centre set up by the University Grants Commission (UGC). CEC with the help of about 21 Educational Multimedia Research Centres (EMRCs) produces educational (audio/ video/ web-based) programmes on syllabus-based topics for dissemination through TV, Edusat, and Internet. These programmes are archived in a Learning Object Repository (LOR)and the Digital Video Repository (DVR) to provide easy access to these educational resources.

Project Ekalavya (http://ekalavya.it.iitb.ac.in/): This is an open source educational initiative by the Indian Institute of Technology, Bombay, for content development in Indian languages. It is an endeavour to provide an interactive platform for the creation, absorption, dissemination, and usage of knowledge. The project provides innovative channels of communication between the seekers and givers of knowledge.It is manifested in several programmes like eGuru (providing online mentorship to engineering students), eOutreach (repository of high quality educational material),and eContent (proving quality content in Indian languages).

Project OSCAR (Open Source Courseware Animations Repository) (http://oscar.iitb.ac.in/): Project OSCAR is an initiative by Indian Institute of Technology, Bombay. It is a large repository of web-based, interactive animations and simulations, referred to as Learning Objects (LOs), for teaching various concepts in science and technology. LOs are on topics in various subjects at the Undergraduate and Postgraduate levels. The project also aims to provide training opportunities to students in developing LOs, managing the back-end of the repository, and conducting educational research.

National Mission on Education using Information and Communication (NMEICT) (http://www.sakshat.ac.in/): NMEICT was launched by the Ministry of Human Resource and Development (MHRD) in 2009. Its web portal is Sakshat — that provides one-stop access to e-content, e-journals and e-books. The aim is to leverage the potential of ICT, in providing high quality personalized and interactive knowledge modules over the internet/intranet for all the learners. All educational materials are offered under Creative Commons (CC-BY-SA) license.

National Repository of Open Educational Resources (NROER) (http://nroer.gov.in/home/repository): NROER, by Ministry of Human Resource and Development (MHRD) and Central Institute of Educational Technology (CIET), National Council of Educational Research and Training (NCERT), is a learning repository for open educational resources. The repository provides a platform for creation and use of localised content available in variety of formats. The repository offers digital resources such as videos, audio, interactive media, images, wiki pages, and documents, for all school subjects and grades in multiple languages. Content on the repository is released under a Creative Commons license.

Agropedia (http://agropedia.iitk.ac.in/): Agropedia is an online knowledge repository, serving as one-stop hub for information related to agriculture in India.The portal, designed as an agricultural Wikipedia provides localized content in multiple Indian languages. It hosts wide range of agricultural information organized in the form of knowledge objects (text, image, audio, and video), and knowledge models represented using concept mapping tools. The project is developed by IIT Kanpur in collaboration with a number of institutions, with support from by Government of India through the National Agricultural Innovation Project (NAIP)of the Indian Council of Agricultural Research (ICAR). The platform provides space for interactivity, sharing of best practices, news updates, and online library (gyandhara) with certified content.

eGyanKosh is a knowledge repository to store, index, preserve, distribute, and share the digital learning resources developed by the ODL institutions in the country. This repository offers online access to around 3000 courses of IGNOU and 2,000 video lectures. The video programmes are provided through a YouTube channel established for eGyanKosh. There is also a wiki for collaborative content generation.

e-PG Pathshala Project (http://epgp.inflibnet.ac.in/): This is an initiative of UGC for providing free access to standardized e-textbooks for postgraduate courses in different universities of the country. The project is taken up under NME-ICT and involves development of High quality, curriculum-based, interactive e-content in different subjects across all disciplines at postgraduate level.

National Council of Educational Research and Training (NCERT) (http://www.ncert.nic.in/): NCERT has made available school textbooks and reference books online through its website to ensure easy and free access by teachers and learners.The books are in Hindi, English and Urdu. The e-books are available as flipbooks and can also be downloaded on the mobile phones. The material is provided under copyright notice with restrictions on further distribution and re-use.

*National Institute of Open Schooling (NIOS) OER project(http://oer.nios.ac.in/):*NIOS has taken up an OER project for providing easy access to educational materials for Vocational programmes at the level of Secondary and Sr. Secondary (+2) levels. The project is carried out in partnership with state level institutions and organizations.

SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds): Swayam platform is an initiative by MHRD, to provide free Massive Open On-line Courses (MOOCs) on all kinds of subjects. It is an Indian Open Source platform based on Open edX for providing blended MOOCs in native Indian languages. Microsoft has been selected as the technical partner for the project. Online courses on SWAYAM platform shall be made available by various partner institutions identified by the National MOOCs coordinator. The project aims to launch 2,000 massive open online courses (MOOC) for over 30 million students this year.

5. OPPORTUNITIES AND CHALLENGES IN THE USE OF OERS

The OERs have provided opportunities for changing teaching-learning practices. New collaborative learning practices are emerging. The easy and free availability of quality materials facilitates the educators towards developing and learning new pedagogical models. Certain advantages of OERs in educational systems in developing countries as cited by Kanwar, Kodhandaraman, and Umar (2010) include:

- helping developing countries save course content development time and money,
- facilitating the sharing of knowledge,
- addressing the digital divide by providing capacity-building resources for educators,
- helping to preserve and disseminate indigenous knowledge, and
- improving educational quality at all levels.

Despite the OER moment's rapid growth and its benefits to learners, educators and institutions, there remain a number of urgent issues that need to be resolved for OER to flourish (James & Bossu, 2014). The development and use of OERs itself faces significant challenges . The OECD study (2007) exemplified certain impediments to the use of OER which are also true to the Indian scenario. These are:

- Technical barriers such as lack of broadband access.
- Economic barriers such as inadequate resources to invest in the required hardware and software.
- Social barriers such as a lack of the skills needed to use technology.
- Policy-oriented barriers such as the lack of clear policy in institutions regarding OER.
- Legal barriers such as the time and expense associated with gaining permission to use.

6. LIBRARY INVOLVEMENT WITH OER

Libraries are responding to the high costs of textbooks by becoming actively involved in the OER movement. As strong advocates for providing patrons with free or low-cost access to information, libraries are quickly seizing the OER opportunity. Programs such as Temple University's Alternate Textbook Project provides funding to faculty who opt to replace costly textbooks with library-licensed or open content and has saved students over $300,000 since 2011 (Bell, 2015). Spearheaded from Temple's project, University of Massachusetts Amherst's Open Education Initiative, another faculty incentive program, has saved students over $1,000,000 in potential textbook costs (Billings et al., 2012; Lederman, 2014). These libraries are extending their roles on campus by piloting textbook projects, often with administrative units such as the Provost's Office, to reduce textbooks costs for students.

Another major role libraries play in the OER movement is finding high quality open course materials along with library licensed content for both students and faculty members (Bell, 2015). Rebecca A. Martin (2010) argues that more libraries need to provide this "value-added" service for their faculty and students, saving both time and money. Finding quality OER can prove time-intensive and challenging, and, as many in the literature assert, more training for librarians may be needed (Martin, 2010; Mitchell & Chu, 2014; Okamoto, 2013). As Mitchell & Chu (2014) point out, librarians are well positioned to take on the role of mediating between faculty, as the creators of OER and course material, and students, as the users of course material.

Libraries too, benefit from and provide expertise on OER, in particular through the libraries' institutional repositories (Martin, 2010; Mitchell & Chu, 2014;Okamoto, 2013). Since librarians are already skilled at managing and promoting access to collections, encouraging faculty to submit their publications in the institutional repository is yet another way libraries can help students reduce costs by making supplemental materials freely available while also promoting their faculty's work .Some libraries are also involved in creating OER, working alongside students and professors as facilitators (Okamoto, 2013). At USU, the open textbook project included partners from across the institution—including the University Press and the Extended Campus—but the Valley Library spearheaded the effort (Sutton & Chadwell, 2014). UCLA's Special Collections department worked with a freshmen course, and, in the span of ten weeks, helped to curate the course's collaboratively authored textbook, mainly comprised of special collections documents and the students' writings (Miller & Montoya, 2013). Academic libraries, with their experience in intellectual property, preservation, teaching, and technology, are particularly well-positioned to fill a central role in the OER movement (Kazakoff-Lane, 2014). Librarians are continuing to explore pivotal ways in which to implement OER on U.S. college campuses and, in turn, provide cost saving and educational benefits for students.

7. CONCLUSIONS

The OER phenomenon has revolutionized the way information is used and disseminated. It has led to an emergence of creative participation in the development of digital content in the entire education sector. A number of innovative initiatives aimed at providing easy access to educational resources have been taken up. Many Open Universities have taken up initiatives to make their educational resources available in the public domain. However, OER practices in India are currently in an initial stage of development and a number of issues need to be considered. But the potential for growth of the OER phenomenon in India cannot be denied and more such initiatives should be encouraged in the open and distance learning systems in India.

REFERENCES

[1] Cape Town Open Education Declaration (2007). *Cape Town Open Education Declaration: Unlocking the promise of open educational resources.* Cape Town: Open Society Institute. Retrieved from http://www.capetowndeclaration.org/read-the-declaration

[2] Centre for Economic Development (CED) (2009). *Harnessing openness to improve research, teaching and learning in higher education.* Washington, D.C. Retrieved from: http://www.ced.org/pdf/Harnessing-Openness-to-Improve-Research-Teaching-and-Learning-in-Higher-Education.pdf

[3] Conrad, D. (2013). Assessment challenges in open learning: Way-finding, fork in the road, or end of the line? *Open Praxis,* 5(1), 41-47.

[4] DeVries, I. (2013). Evaluating open educational resources: Lessons learned. Procedia - *Social andBehavioral Sciences,* 83, 56 – 60.

[5] Dhanarajan, G. & Abeywardena, I. S. (2013). Higher Education and Open Educational Resources in Asia: An Overview. In G. Dhanarajan & D. Porter (Eds.), *Open Education Resources: An Asian Perspective* (pp. 3–18). Vancouver: COL-OER Asia.

[6] Hylen, J. (2006). *Open Educational Resources: Opportunities and Challenges.* Paris: OECD-CERI. Retrieved from http://www.oecd.org/edu/ceri/37351085.pdf

[7] Hylén, J. et al. (2012). *Open Educational Resources: Analysis of Responses to the OECD Country Questionnaire.* OECD Education Working Papers, No. 76, OECD Publishing. Retrieved from http://www.oecd.org/dataoecd/5/47/37351085.pdf

[8] James, R. & Bossu, C. (2014). Conversations from south of the equator: Challenges and Opportunities in OER across Broader Oceania. RUSC. *Universities and Knowledge Society Journal,* 11(3). 78-90. DOI: http://dx.doi.org/10.7238/rusc.v11i3.2220

[9] Kanwar, A., Kodhandaraman, B., & Umar, A. (2010). Toward sustainable open educational resources: a perspective from the global south. *American Journal of Distance Education,* 24, 65–80.doi:10.1080/08923641003696588

[10] Knox, J. (2013). The limitations of access alone: Moving towards open processes in education technology. *Open Praxis,* 5(1), 21–29.

[11] Kursun, E., Cagiltay, K. & Can, G. (2014). An Investigation of Faculty Perspectives on Barriers, Incentives, and Benefits of the OER Movement in Turkey. *International Review of Research in Open and Distributed Learning,* 16(6), 15-32. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1914

[12] McGill, L., Falconer, I., Dempster, J .A., Littlejohn, A. & Beetham, H. (2013). Journeys to Open Educational Practice: Executive Summary. UKOER/SCORE Review Final Report. Retrieved from https://oersynth.pbworks.com/w/file/fetch/67270310/briefing%20paper%20summary.V2.pdf

[13] MHRD (2013). All India Survey on Higher Education. New Delhi: Government of India.

[14] Misra, P. K. (2013). Pedagogical quality enrichment in OER-based courseware: Guiding principles.54 Use of Open Educational Resources Open Praxis, 5 (2), 123–134.

[15] NKC (2007). National Knowledge Commission: Report to the Nation 2007. Government of India. Retrieved from http://www.knowledgecommission.gov.in/recommendations/oer.asp

[16] OECD (2007), Giving knowledge for free: the emergence of open educational resources. Retrieved from: http://www.oecd.org/dataoecd/35/7/38654317.pdf

[17] Olcott Jr, D. (2013). Access under siege: Are the gains of open education keeping pace with the growing barriers to university access? *Open Praxis,* 5(1), 15–20. Retrieved from http://openpraxis.org/ index.php/OpenPraxis/article/view/14

[18] University Grants Commission (n.d.) Distance Education. Retrieved from http://www.ugc.ac.in/deb/pdf/ODLwhatwhyandhow.pdf

[19] Van der Merwe, A.D. (2015). *The attitudes of high school teachers to open education resources: A case study of selected South African schools*. OE Global Conference 2015. Retrieved from http://conference.oeconsortium.org/2015/wp-content/uploads/2015/01/Alex-van-der-Merwe.Open-education-conference-paper.pdf

[20] Venkaiah, V. (2008). *Open Educational Resources in India: a study of attitudes and perceptions of distance teachers.* Retrieved from http://wikieducator.org/images/d/d7/PID_386.pdf

[21] Wiley, D. & Hilton III, J. (2009). Openness, Dynamic Specialization, and the Disaggregated Future of Higher Education. International Review of Research in Open and Distance Learning, 10(5).Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/768

[22] Wiley, D. (2009). *Defining 'Open'* [blog post]. Retrieved from http://opencontent.org/blog/archives/1123

[23] Bell, Steven. (2015). Start a textbook revolution, continued: Librarians lead the way with open educational resources. *Library Issues*, *35*(5).

[24] Billings, M.S., Hutton, S.C., Schafer, J., Schweik, C.M., & Sheridan, M. (2012). Open educational resources as learning materials: Prospects and strategies foruniversity libraries.

[25] Lederman, Diane. (2014, April 17). UMass students, library, others want morefaculty to take advantage of open source material to save students costs. Retrieved from ww.masslive.com/news/index.ssf/2014/04/umass_students_library_others.html .

[26] Martin, R. A. (2010). Finding free and open access resources: A value-added service for patrons. *Journal of Interlibrary Loan, Document Delivery & Electronic Reserves*, *20*(3), 189–200. http://doi.org/10.1080/1072303X.2010.491022

[27] Miller, K. E., & Montoya, R. D. (2013). Teaching and learning Los Angeles through engagement with UCLA library special collections. *Urban Library Journal*,*19*(1). Retrieved from http://ojs.gc.cuny.edu/index.php/urbanlibrary/article/view/1425

[28] Mitchell, C., & Chu, M. (2014). Open education resources: The new paradigm in academic libraries. *Journal of Library Innovation*, *5*(1), 13–29.

[29] Okamoto, K. (2013). Making higher education more affordable, one course reading at a time: Academic libraries as key advocates for open access textbooks and educational resources. *Public Services Quarterly*, *9*(4), 267–283. http://doi.org/10.1080/15228959.2013.842397

[30] Kazakoff-Lane, C. Environmental Scan and Assessment of OERs, MOOCs and Libraries. *2014-03-20]. http://www. ala. org/acrl/sites/ala. org. acrl/files/content/publications/whitepapers/Environmental% 20Scan% 20and% 20Assessment. pdf*.

[31] S. Santhi and Dr. M. Nagarajan , Awareness and Use of Open Access Journals Among The Faculties of Engineering Colleges In Puducherry: A Study , India . *International Journal of Library & Information Science* , 5 (1), 2016 , pp. 79 – 89

[32] S. Santhi and Dr. M. Nagarajan . Impact of Open Access Resources on Teaching and Research in Engineering: with Reference To Faculty Members Working In Puducherry Region. *International Journal of Library & Information Science* , 4 (3), 201 5 , pp. 98 – 105 .