Open Educational Resources

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CEMCA

QUALITY HIGHER EDUCATION OPPORTUNITIES

Through

OPEN EDUCATIONAL RESOURCES

Edited by
Manas Ranjan Panigrahi

Quality Higher Education Opportunities through
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Commonwealth Educational Media Centre for Asia
New Delhi

The Commonwealth Educational Media Centre for Asia (CEMCA) is an international organization established by the Commonwealth of Learning (COL), Vancouver, Canada, to promote the meaningful, relevant and appropriate use of ICTs to serve the educational and training needs of Commonwealth member states of Asia. CEMCA receives diplomatic privileges and immunities in India under section 3 of the United Nations (privileges and immunities) Act, 1947.

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Copy Editing: Mr. B. Natarajan, Deputy Registrar (Retired), Publications, IGNOU, New Delhi

ISBN: 978-81-88770-35-9

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Printed and published on behalf of Director, CEMCA by Mr. Dalip Kumar Tetri, Advisor (Administration and Finance), CEMCA, 7/8 Sarv Priya Vihar, New Delhi -110016, India.

Contents

Foreword

Access to educational materials is essential to improve the quality of teaching and learning at all levels of education. Production and reuse of educational materials have always been a challenge due to the cost, time, permission and licensing fees to reuse copyrighted materials. Realising the importance of open course-ware, the UNESCO organised a Forum on the Impact of Open Courseware for Higher Education in Developing Countries in 2002, which coined the term open educational resources (OER). In 2012, the Commonwealth of Learning and UNESCO with support of the William and Flora Hewlett Foundation, organised the World OER Congress that resulted in the 2012 OER Paris Declaration that urged the governments to promote OER by releasing teaching, learning and research materials with an open licence. In this regard, within the mandate of Six Year Plan (2015-21), the Commonwealth Educational Media Centre for Asia (CEMCA), is engaged in assisting Higher Education Institutions to adopt Open Educational Resources (OER) through the development and implementation of institutional OER policy. During 2015-2018, CEMCA provided continuous support to Open Universities of Bangladesh, India and Sri Lanka for development and implementation of OER policy; capacity building of teachers and academics; creation and use of OER; and providing access through OER repositories to enhance quality teaching and learning reducing cost. These efforts are showing encouraging results and need to be shared.

This volume shares Open Educational Practices through implementation of institutional OER policy. It emphasises the need for having appropriate policies, and showing best practices and experiences towards the learning for sustainable development. I am sure this will help all higher education institutions and commonwealth governments to adopt OER for development. The sharing of best practices may help in their replication at other institutions for the overall benefit of the students irrespective of their location. This is in tune with COL's agenda of reaching all with quality resources for learning leading to sustainable development.

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Preface

The emergence of open content in 1998 and the release of 50 higher education courses via MIT's OpenCourseWare in 2002 were foundational moments in the sharing of educational content via the web. MIT's innovative course-sharing mechanism prompted UNESCO to organize a 'Forum on the Impact of OpenCourseWare for Higher Education in Developing Countries' in 2002, at which the term 'Open Educational Resources' (OERs) was coined. The UNESCO Forum has since been considered a major landmark in the history of the OER movement. Speaking on the occasion, Prof. V S Prasad, the then Director of the National Assessment and Accreditation Council and India's representative at the Forum, had observed: 'The OpenCourseWare concept is based on the philosophical view of knowledge as a collective social product; and so it is desirable to make it a social property'. It is necessary to understand what OER are in order to appreciate their potential impact on educational systems. An OER is any teaching, learning and research material that is available in the public domain, or with an open licence, free of the cost to reuse, remix and redistribute the material while retaining its rights. The word 'open' is of critical importance here – it refers not merely to the availability of the resource but to what one is allowed to do with the material. Copyright law provides for licensing any new knowledge generated, and it is within these same parameters that authors use a specific type of open licence to allow full or limited use of the original materials created by them. With this background, the Commonwealth Educational Media Centre for Asia (CEMCA) initiated a programme **"Improving Quality of Teaching & Learning Resources using OER in Higher Education"** to engage with Higher Education Institutions in Commonwealth Asia over the three years during the period 2015–2018. In the process several events were organised in Open Universities of Bangladesh, India and Sri Lanka for development and implementation of OER policy; capacity building of teachers and academics; creation and use of OER; and providing access through OER repositories. CEMCA in collaboration with Krishna Kanta Handiqui State Open University (KKHSOU), Guwahati conducted a panel discussion in the International Conference during 16-17 December 2017 on *"Developmental Interventions and Open Learning for Empowering and Transforming Society".* In the panel discussion, CEMCA supported projects and its outcomes were discussed broadly by the partner institutions and showcased the development in learning through OER. This publication is based on the papers presented by the partners in the conference.

There are six chapters included in this resource book as practices and implementation of OER in higher education for wider dissemination with the hope that higher education institutions and organisations in Commonwealth Asia will take steps to develop strategic plans for OER use in teaching and learning. Chapter I: *Open Educational Resources for Quality Learning* discusses concepts, benefits, the quality concerns and indicators, and concludes with suggestive continuum of models to make the quality of OER to the required level and meet the challenges. Chapter II: *Open Educational Resources (OER) Impact on Students at Bangladesh Open University* focuses on reviews of existing OER policies of the country in general and BOU in particular. This chapter reports that the students using open educational resources as the primary course material in their courses of studies. The majority of students reported that the course readings were equal to or better than print SLMs, and responded positively to the variety of learning materials. Most students agreed they would be willing to use resource in the future. Chapter III: *Open Educational Practices at Uttarakhand Open University: From Policies to Implementation,* the author present a detailed description of the implementation of the OER from policy formulation to implementation and Open Educational Practices in the university. Chapter IV: *Developmental Interventions through Open Educational Resources (OER): A Case Study of Odisha State Open University* reflects that the build-up of a platform for acceptance of Open Educational Resources policy in the educational system of OSOU through both course writers and coordinators considering Self Learning Materials, video lectures and audio clips is the base for qualitative materials. In this case study an attempt has been made to understand the impact of developmental interventions undertaken by the Odisha state Open University through OER. Chapter V: *Open Educational Resource Repository: An Initiative of Netaji Subhas Open University* describes the issues relating to the institutional OER policy development and use of OER repository of NSOU Kolkata. It also reflects on the access to the OER for better quality learning. Chapter VI: *Access to Vocational Education through OER and ICT: An Evaluation* focuses on some of the recent initiatives taken by the university that ensures inclusive and equitable quality education and promotes lifelong learning. It also highlights the impact of the CEMCA intervention for quality improvement of the course content and delivery system of the two vocational courses, viz. Pre-primary Teachers' Education-Montessori (Diploma) and Tailoring and Dress Designing (Advanced Diploma).

The chapters in this publication will assist informed educational leaders, higher education teachers and higher education institutions to drive development and implementation of Open Educational Resource in teaching and learning.

I take this opportunity to thank all the Higher Education Institutions specially the Open Universities in Commonwealth Asia who participated in the events organised by CEMCA. I also thank all partners and collaborators, viz., Bangladesh Open University, Odisha State Open University, Netaji Subhas Open University, Uttarakhand Open University, and Open University of Sri Lanka for hosting the events and supporting successful implementation of the CEMCA programme **"Improving Quality of Teaching & Learning Resources using OER in Higher Education".** I also extend my heartiest thanks to the Krishna Kanta Handiqui State Open University (KKHSOU), Guwahati for collaboration and support to organise the panel discussion in the International conference. I remain indebted to Dr. Shahid Rasool Director and Team CEMCA for their support, motivation and valuable advice to improve and complete this work. Special thanks are also due to all the contributors for their acceptance to include their work in this resource book. As always, we look forward to receiving your comments and suggestions for improving our work at CEMCA.

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Chapter - 1

Open Educational Resources for Quality Learning

Manas Ranjan Panigrahi

Abstract

Learning is a lifelong process for every individual that can accomplish through different educational resources. Traditionally access of different educational resources was too difficult and record and disseminate so on. Information and Communication Technology (ICT) is now playing an important role for the dissemination of sustainable quality learning resources worldwide (Pal and Panigrahi, 2013). OER currently most often used is "digitized materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research". OER includes learning content, software tools to develop, use and distribute content, and implementation resources such as open licenses. It is also refers to accumulated digital assets that can be adjusted and provide benefits without restricting the possibilities for others to enjoy them. Camilleri & Tannhäuser (2012) also stated OER as "teaching, learning and research materials in any medium, digital or otherwise that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions". The limited restrictions are further described by Wiley (2009) in a 4R-framework of four rights: i.e. 1. Reuse: the right to reuse the content only in its unaltered form; 2. Revise: the right to adapt, adjust, modify, or alter the content itself; 3. Remix: the right to combine the original or revised content with other content to create something new; 4. Redistribute: the right to make and share with others copies of the original content, your revisions, or your remixes. All the 4Rs giving rights of OER open. Evidences show that OER is a boon to the teaching learning world and became a necessary social infrastructure due to its access without cost. However, the premature death of many OER initiatives mandates our further attention to the quality dimensions and the solution to the challenges that grew along with this movement. Researches around the world are optimistic about the growth of OER's efficiency, relevance and potential to promote creativity. This paper explores the benefits, the quality concerns and indicators, and concludes with suggestive continuum of models to make the quality of OER to the required level and meet the challenges.

Introduction

Learning is a lifelong process for every individual. It can be accomplished through different educational resources. Traditionally, access to different educational resources, its recording and dissemination was difficult. However, Information and Communication Technology (ICT) is now playing an important role for the dissemination of sustainable quality learning resources worldwide (Pal and Panigrahi, 2013). ICT is defined as a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information. These technologies are computers, the Internet, broadcasting (radio and television), and telephone (Blurton, 2002). After the advent of ICT, the teaching and learning processes have virtually got revolutionised globally.

Although learning resources are often considered as key intellectual property in the global educational world, more and more institutions, academia and individuals are sharing digital learning resources over the internet openly and free of cost, as Open Educational Resources (OER). OER are often published on the internet within a repository. Repositories may be institutional, government funded, charitable or commercial, with most repositories offering a step-by-step guide to release (Hemingway, Angell, Hartwell and Heller, 2011). Digital teaching, learning, research resources in the public domain or released under intellectual property licence permit free use/repurposing by educators, students, self-learners and others (Chaney and Menn, 2013). Currently, most often used definition of OER is "digitized materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research". OER includes learning content, software tools to develop, use and distribute content, and implementation of resources such as open licences. It also refers to accumulated digital assets that can be adjusted and provides benefit without restricting the possibilities for others to enjoy them (OECD 2007). As described by Wiley (2006), the term "learning object" was coined in 1994 by Wayne Hodgins and quickly entered the vernacular of educators and instructional designers. As per the history of OER, learning objects popularised the idea that digital materials can be designed and produced so that they can be easily reused in a variety of pedagogical situations.

Camilleri & Tannhäuser (2012) also stated OER as "teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open licence that permits no-

cost access, use, adaptation and redistribution by others with no or limited restrictions". The limited restrictions are further described by Wiley (2009) in a 4R-framework of four rights i.e. 1. Reuse: the right to reuse the content only in its unaltered form; 2. Revise: the right to adapt, adjust, modify, or alter the content itself; 3. Remix: the right to combine the original or revised content with other content to create something new; 4. Redistribute: the right to make and share with others copies of the original content, your revisions, or your remixes. All these 4Rs giving rights of OER open.

Role of OER in Teaching and Learning

The issue of learning content is open courseware, i.e., educational material organised as courses and typically distributed as PDF files, as well as smaller chunks of learning, often referred to as learning objects. The content may involve websites, simulations, text files, images, sound or videos in digital format, some only for use and others open for adaptation and reuse also. Although no definite statistics are available, there is a rapid expansion in the number of OER projects, as well as the number of people involved and the number of resources available.

Digital information has become a social infrastructure and with the expansion of the internet, network infrastructure has become an indispensable part of social life and industrial activities for mankind. Every day, new internet applications and more efficient ways of doing existing tasks are being discovered. Although most internet applications are concentrated on a more efficient or cheaper way of performing existing tasks, the applications in education are mostly concerned with the sharing of scarce resources available in one location, with many other locations (Pishva and Nishantha, 2008). As society moves further into the "Knowledge Age" everyday workplace practices are being increasingly changed and shaped by new and advancing technologies (Zurita and Nussbaum, 2004). In this fast changing information age, even a DVD player after 5–10 years in the market has become history, and YouTube and MTvU have taken its place (Berk, 2009). Globally students now tend to spend considerable amount of time on social media tools such as Facebook, YouTube, Twitter, blogging, wikis, Ebay, etc. (Dubose, 2011). Today's 'Net Generation' of students is so sophisticated with technology that they have been branded as digital natives (Prensky, 2001). 'Digital' is their native language. They are 'native speakers' of the language of computers, video games, and the Internet. To match with this fast changing world

scenario, the classrooms of the 'Net Generation' students should also be upgraded to enable tapping of their multiple intelligences and learning styles. OER will be playing an important role in the future in dissemination of learning resources. The advantages of use of OER are many, viz., i.) Grab learners' attention; ii.) Focus concentration; iii.) Generate interest; iv.) Create a sense of anticipation; v.) Energise or relax for learning exercise; vi.) Draw imagination; vii.) Improve attitudes toward content and learning; viii.) Build a connection with other scholars, educators and instructors; ix.) Increase memory of content; x.) Increase understanding of subject/content; xi.) Foster creativity; xii.) Stimulate the flow of ideas; xiii.) Foster deeper learning; xiv.) Provide an opportunity for freedom of expression; xv.) Serve as a vehicle for collaboration; xvi.) Inspire and motivate; xvii.) Make learning fun; xviii.) Set an appropriate mood or tone; xiv.) Decrease anxiety and tension on scary topics; and xx.) Create memorable visual images.

OER will expand access to educational resources to more learners, more of the time. In particular, adult learners, students who work full time, and other non-traditional students stand to benefit from open resources because they are available for independent, self-directed study (EDUCAUSE, 2010). Open resources are one way to address the rising costs of education, and they also have the potential to facilitate new styles of teaching and learning. Giving faculty the ability to pick and choose the individual resources they want to use and to modify those resources and "assemble" them in unique ways – promises greater diversity of learning environments. However, quality may be a concern for the users.

Quality concerns and indicators in OER

Quality of OER can be described by the following interdependent issues: i) Efficient to achieve educational goals set, ii) Relevant education in addressing the needs of the community and the environment, iii) Promote creativity and innovations. However, it can also describe quality in terms of: *Technical efficiency* (referring to teaching learning and pedagogical issues that focus on inputs, teaching skills/methodology, organisation of school, (curriculum content), and OER quality measures to be fulfilled continuously without interruption (ethical and professionally efficient teachers, curriculum (equitable, student centered, address country's need, maintain international standards), efficient organisation and management system, availability of relevant educational support, adequate learning time).

Advocates of the open movement should consider actions for improving access to and usefulness of existing resources. The rapidly growing number of learning materials and repositories makes it important to find the most relevant and highest quality resources. *Metadata* (descriptive information about the resources) may improve the function of search engines, but adding good quality metadata to resources is difficult and time consuming.

Alternative approaches such as automatically generated metadata and folksonomies are being tested, but whether these are scaleable solutions remain to be seen. *Quality* can be improved in many ways. There is a troublesome imbalance between the *provision* of OER and its *utilisation*. The vast majority of OER is in English and based on Western culture, and this limits their relevance and risks consigning less developed countries to playing the role of consumers. However, a number of projects now exist in developing countries to develop OER based on their own languages and cultures.

Since the concept of OER builds on the idea of reusing and repurposing materials, *interoperability* is a key issue. Learning resources need to be searchable across repositories and possible to download, integrate and adapt across platforms. Software applications developed at different points in time and by different developers should be able to operate together. Open standards make this possible.

Quality improvement of OER can contribute a lot to the knowledge society as well as also develop certain standards that can produce many learning resources. Particularly OER quality demands proper use of the 4Rs – i.e. Reuse, Revise, Remix and Redistribute process.

The quality indicators are the way forward of guidelines to create and develop of the standards of OER. There are three kinds of 'openness' that cover a range of academic functions, from production to organisation to distribution, and their development and use in the academy offer great potential for shaping practices in teaching, research and management. Whether a matter of structure (*Open Sources*), protocols for informational organisation (*Open Access*) or pure content (*Open Content*), the core principle undergirding all these forms of 'openness' is that we have a better information environment where the possibility of sharing is maximised (Fisher, 2006). If we will consider these as the three pillar of OER then these are also contributing towards the quality indicators. Open Source is a legal framework for the licencing of technology, wherein the rights of owning an artefact (such as a

software package) entail rights not only to use it but also to be able to know and change the rudiments of its design. While there are many Open Source variants, the core notion is that one's created intellectual property has a structural design that is transparent, such that it can be freely (without constraint or cost) manipulated or altered, generally towards the goal of improved versions of the design. Open Access is the organising and presenting of freely-available scholarly materials on the Internet (and presumably any successor mode of information repository and delivery), according to a set of principles and protocols developed in information science. The original focus was on 'grey' materials such as pre-prints and e-prints; some new electronic journals now fit under this rubric (Bailey, 2005). Open Content is any unrestricted scholarly materials on the Internet, irrespective of whether they follow Open Access protocol or even fit the format of text-based media. Such materials include dissertation archives, teaching resources, interactive tools, general and specialised repositories, and materials supplementary to published articles such as illustrations or video and audio recordings.

Quality is a dominant issue in educational literature. Those publishing OER may be concerned that their output is of a quality that reflects their professional capability and may feel that their reputation may be damaged by publishing OER, particularly where their resources do not 'translate' well to a virtual environment. The quality of repurposing and the adaptation of resources have been noted by commentators (Boulos; Marimba; and Wheeler, 2006). Practitioners also appear to be concerned to ensure that the OER they access online and use in teaching is of good quality. The literature notes that few repositories provide quality control measures, and even where these exist, this issue may still be of concern (Littlejohn A). One solution is employed by MERLOT (Multimedia Resources for Online Learning and Teaching) where material is subjected to professional review. However, this has slowed down the release of resources so much that it has been described as 'a crisis in OER'. Certainly, delaying access to OER is contrary to the inherent philosophy and in itself may mean that resources are not up to date. It has been suggested that peer review and user communities might have possible ways to resolve some concerns regarding quality (Larsen and Vincent-Lancrin, 2005). However, it could also be argued that the perceived quality of a resource depends on the context in which it is being used, and users should therefore make their own judgement regarding its value and appropriateness. An alternative interpretation of the quality issue is that OER will in fact raise the quality of teaching resources. Organisational investment and control, the desire to maintain professional reputation and ongoing updating and repurposing by

the OER community could be seen as effective in ensuring high-quality resources (Hylén, 2006). A number of ideas are coming out from the several literatures about the quality of OER.

Paul Kawachi, (2013) discussed in his paper about identification of OER quality assurance indicators that is observed from various literatures. More than 30 frameworks of quality dimensions were discovered in the literature, and 15 of these were of sufficient merit and relevance to be then explored in detail to extract dimensions and sub-dimensions of quality related to learning materials. These frameworks are those reported by Achieve (2011), Bakken & Bridges (2011), Baya'a, Shehade & Baya'a (2009), Binns & Otto (2006), Camilleri & Tannhäuser (2012), CEMCA (2009), Ehlers (2012), Frydenberg (2002), Merisotis & Phipps (2000), Khan (2001), Khanna & Basak (2013), Kwak (2009), Latchem (2012), McGill (2012), Quality Matters Program (2011), and SREB–Southern Regional Education Board (2001). After this in-depth study of these literatures and discussion with OER experts he suggested major five quality dimensions for OER with reference to educational objectives, i.e., the Cognitive Domain, Affective Domain, Meta-cognitive Domain, Environment Domain, and Management Domain. Briefly the five Domains and their respective coverage are summarised in Table 1. Together these constitute a full comprehensive model of learning to serve as the basis of OER quality Framework here.

Table 1: Comprehensive Descriptions of Five Domains Framework

Sl. No.	Domains	Respective Coverage
1.	Cognitive Domain (Content)	content knowledge, content skills, and reflective critical thinking skills to be learnt
2.	Affective Domain (Students motivation)	motivations, attitude and decision to initiate performance, learner independence and autonomy
3.	Meta-cognitive Domain (Student autonomy)	understanding how the task is performed, and the ability to self-monitor, evaluate and plan own future learning
4.	Environment Domain (Assess)	localisation, artistic presentation, language, multimedia, interactivity, and embedded links to other content
5.	Management Domain (Packaging)	discoverability, tagging, including for time management, transmissibility, business models

Source: *Paul Kawachi, (2013): http://cemca.org.in/ckfinder/userfiles/files/OERQ_TIPS_978-81-88770-07-6.pdf*

On the basis of the five-domain quality framework a shorter framework entitled TIPS was created, where the acronym TIPS is used to provide the top-level categorisation of criteria, i.e., (T) Teaching and Learning, (I) Information and Content, (P) Presentation, and (S) System (Kawachi, 2013). At the same time this quality framework was giving proper direction to develop open educational resources. It also helped to develop a guideline for preparation of quality educational materials for the students, teachers and researchers. These guidelines by Kawachi (2013) include 65 criterias.

Challenges and Limitations of OER: Focus on issues of the developing world

OER can be seen as offering an affordable and credible solution to the growing disparity in education between developing and developed countries. Although the open resource revolution is growing, there are some challenges that may stifle the further progress of the movement. In this paper, three challenges will be dealt with: the copyright issues; how to assure quality in open content; and how to sustain OER initiatives in the longer run.

Copyright issues

Copyright is the right of the originator to control the publication and replication of work. Academia was mostly unaware of the copyright licensing even though the publication, consumption and distribution are known to them, when they were publishing in the print media. Internet and other digital media have changed this. According to McCracken (2006), having access to publishing and production tools, and by licensing access to a digital, ephemeral product rather than a physical object such as a book or print, researchers as well as teachers now interrelate with licensing as never before. And for the most part they seem either unprepared or unwilling to engage with cumbersome licensing procedures.

Mostly academics are happy to share their creative works, but without losing the credit or their rights. Although some people release work under the public domain, it is not unusual that authors would like to retain some rights over their work. The RoMEO project in UK made a survey in 2002–2003 among 542 researchers about what kind of rights they wanted to retain (Gadd, 2003). A majority (over 60%), were happy for third parties to display, print, save,

excerpt from and give away their papers, but wanted this to be on condition that they were attributed as the authors and that all copies were done verbatim. 55% wanted to limit the usage of their works to educational and non-commercial. The RoMEO report concluded that the protection offered to research papers by copyright law is in excess of what is required by most academics.

Open licening is a solution to the copyright worries of academicians. It offers a way out for controlled sharing with some rights confined to authors. There are several open content licences such as Creative Commons and the GNU Free Documentation Licence which introduces a certainty and clarity in the process of obtaining permission to use the work of others. They also offer a reduced administrative burden of clear rights before use. Hence this is particularly useful in the educational context where users have little or no inside knowledge of the mechanisms used by the media industries. Finally, open licences establish a body of works licensed as "open content" that may be freely shared. While these benefits are making them attractive, the right holders do not have a case by case control. Instead, a 'broad-sweep' control over their works, puts a shadow on open licensing. Another shortcoming to be mentioned is the waiving of moral rights to make derivative works. Even with these shortcomings, the international open license is growing as evident from the bulk volume of objects delivered under the Creative Commons license. A recent comparison of seven Australian universities underpins previous international research showing that relying solely on voluntary deposits by academics of research articles to OA archives will result in approximately 15% contribution (Sale, 2006). Criteria to deposit the works of authors in an open archive should be tied with a policy to support authors to fetch more. Support to authors can be achieved by professional recognition and profile enhancement through OER contribution (Downes, 2007). Teachers need to feel that their efforts to develop OER will be recognised and rewarded in the same way as other academic outputs are valued (Lee et al., 2008).

Quality assurance

The inherent problem with the enormous digital resources available in the world is also applicable for OER. Consumers may be having great access to the digital world of information through this mode, but still the problem of judging their quality and relevance is there. The issue of quality assurance is

fundamental and cannot be treated at depth in this paper. Instead a few different approaches to deal with the issue are listed as:

Branding is one of the approaches. Before releasing the resources on to the web, through internal check the institutions make sure of the quality. Users have confidence in the brand/the institution's prestige that will be at stake if quality is not there. However, this internal quality check is not open and hence the users may not follow it.

Yet another approach is ***peer review*** of the resources. As described in the section on OA, this technique is one of the most used quality assurance processes in academia. Being a well-known and well understood routine, this may be an acceptable quality assurance for the consumers. There are also other arguments for using peer review schemes to guarantee the quality of resources in a repository. Taylor (2002) argues the process can be used to come to terms with the lack of a reward system by giving recognition and reward to the creator of a learning resource, as well as a dissemination method. Furthermore, there is a need for making the review decisions credible, and for that purpose, an open peer review according to agreed criteria is well suited, Taylor claims.

A third ***quality management*** approach is to let individual users decide on whatever ground they like whether a learning resource is of high quality, useful, or good in any other respect. User rating/comment on the resource or describing how they have used it, or by showing the number of downloads for each resource on the website may generate a trust in the users. This is a bottom-up approach often used on Internet based market places, music sites, etc., the validity of which is not dependable. However, such an approach would be justified in that quality is not an inherent part of a learning resource, but rather a contextual phenomenon wherein the learning situation decides whether a resource is useful or not. Therefore it is the user who should be the judge.

Sustainability of OER

The abundance of OER attempts has created competition for funding. Some projects are having funding but this will end after few years, because these are only start-up funds provided by the institution. Therefore it is imperative to seriously consider how it can be sustained in the long run. There are different kinds of OER providers and sustainability models. Hence there is a need to

discover different approaches that might be useful in a particular context. Two different approaches – the institutional model and the community model – are discussed here as ideal types at each end of a continuum, where a lot of models could be invented.

The competition among institution based OER is growing. Hence they need to develop a strong brand, user communities, frequent site usability and augmented quality of the resources offered. Community "marketing" is important for the institutional OER initiatives for several reasons:

- Enables users to form strong connections with the website;
- Institution can learn from the community about what works and what does not work on the website;
- Gives possibilities for rapid diffusion;
- Strong communities influence user behaviours – users come back to the repository.

Institutions launching OER programmes might also need to look into different revenue models for long term stability and viability of their initiative. To this end, some alternative models identified by Dholakia; King; and Baraniuk (2006) might be considered:

- Replacement model, where OER replaces other use and can benefit from the cost savings which is a result of the replacement. It was noted though that this model has a natural limit since it can only generate the same amount of resources as it replaces.
- Foundation, Donation or Endowment model, where the funding for the operations is provided by an external actor such as Foundations. This model was primarily seen as a start-up model that will most probably not be viable in the long run. It might be transferred into a Government support model that could be a long-term option in some (mostly European?) countries but not others.
- Segmentation model where the provider, simultaneously with resources for free, also provides "value-added" services to user segments and charges them for these services – such as sales of paper copies, training

and user support, ask-an-expert services, etc. This model, together with the conversion model, is among the most used in the education sector.

- Conversion model, where "you give something away for free and then convert the consumer to a paying customer".

- Voluntary support model is based on fund-raising campaigns. Another version of this model is the Membership model where a coalition of interested parties – organisations or individuals – is invited to contribute a certain sum as seed money or on an annual basis.

- Contributor-Pay model where the contributors pay the cost of maintaining the contribution that is made available free by the provider makes available for free. This model is used to give OA to scientific publications and might work also for OER.

The alternative approach to building an OER programme with a strong institutional backing is the community model. This is more of a grass roots activity where individuals contribute with their time, knowledge and resources on a voluntary basis. In this model, production, use and distribution are decentralised, compared to the institutional model where at least production and distribution are centralised. From a community perspective, one might take an alternative view on the over-all concept of sustainability. From this standpoint, it is not enough to look at the advantages and disadvantages of different revenue or funding models–one should not only look at who pays for the resources but also who creates them, how they are distributed and how one can work with them. Some of the aspects to consider are:

- Technical considerations such as discoverability of the resources;

- The kind of openness and constraints on access and use that is given to users;

- Different content models (the possibility to localise content) and issues of licensing;

- Different staffing models and incentives for people to contribute resources;

- Alternative workflows to the traditional design-use-evaluation model, to models without a clear distinction between production and use or between the user and the producer. The concept of coproduction is important here.

- Maintenance and updating of resources.

Since the community model builds on voluntary work and enthusiasts, sustainability is not so much a matter of financial resources as of dismantling barriers that hinder the community to flourish and grow. Tentative actions could be to find alternatives to the existing IPR regime and changing the mind set of donors not only to include funding to institutional OER initiatives but also to loosely composed communities. Authors (e.g., Geith & Vignare, 2008; Atwell, 2007) suggest that publicly funded organisations have a responsibility to share and disseminate information for the benefit of all. It should be their ethics to the knowledge community. For individual academicians, this is their ethics – to participate in a community of practice around OER in which sharing of resources and expertise is expected and valued (Lee et al., 2008).

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Open Educational Resources (OER) Impact on Students at Bangladesh Open University

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Abstract

This paper reports on findings from a study conducted with students using open educational resources as the primary course material in their courses of studies. The study took place at Bangladesh Open University (BOU), only distance education institute in the country. Students were assigned the OER when the University developed it as part of a CEMCA funded project initiative. Two research instruments were employed to collect qualitative data from students: a survey and one-on-one interviews with a smaller student sample. Both survey and interview items asked students how they engaged with the OER as the primary self-learning course materials (SLMs). Students shared feedback about the overall organization of the OER, methods used to access the OER and ease of use, benefits and challenges, and differences and similarities to using print SLMs. Results indicate that the majority of students were able to access the OER with more ease than print SLMs handed in the Regional Centres (RCs), Sub-Regional Centres (SRCs), and Study Centres (SCs). A small proportion of students encountered minor usability issues, but the most gain access to the OER via internet. The majority of students reported that the course readings were equal to or better than print SLMs, and responded positively to the variety of learning materials. Most students agreed they would be willing to use resource in the future.

Introduction

In Bangladesh, government provides students with free textbooks for all school learners (from Grade 1-10) and similarly, Bangladesh Open University (BOU) uses self-learning course materials (SLMs) for the students of most of its educational programmes. But, normally, the print SLMs is not timely delivered because of maintaining government's purchase procurement process which is assumed time consuming and bur compulsory. In 2014, the University authority decided to curate alternative delivery of course materials which consisted of openly licensed resources and SD cards to supplant

traditional delivery of textbooks. In line with this the University with the help of Commonwealth of Learning (COL) came out with an OER Policy 2014 and after a long span of time it implemented OER Repository with CC-BY license in 2017 under the technical and financial support from the Commonwealth Educational Media Centre for Asia (CEMCA) – regional counterpart of the COL. Before, the University used the open accessed materials for students. This paper reports on findings from a study conducted as a part of project work of "BOU-CEMCA Joint Initiative Project on OER Policy and Implementation of Blended Approach through eLearning at Bangladesh Open University" from July 2016 to May 2017 with students who used the BOU OER Repository site for their courses of studies.

Objectives

The aim of this paper is to learn how OERs are useful in place of print SLMs for BOU students and has impacted students' academic experiences. This study achieves the following objectives:

- to assess the BOU OER site in relation to 'views' which witnesses the range of uses of the materials;
- to ascertain students' attitudes and experiences with OERs represented in the broader scope of existing OER Repository at BOU;
- to address challenges have essentially put BOU OER practitioners and advocates at the nexus of OER discourse; and
- to identify the barriers, if any, to OER adoption in BOU; and

Literature Review

When Open University came into existence distance education shifted in open and distance learning (ODL) which normally used print, radio-TV broadcasts and limited contacts (face-to-face tutorial services). Open University normally are famous for implementing open-door academic policies 'such as 'Open Admission', say, no age barrier, cost-effective, need-based, and relied on print, radio-TV and more recently, internet. Web technology provided opportunity for making the materials available for free use what is terms as 'open as free'. These open accessed materials are restricted to copyright and then, open educational resources (OER) is developed to provide "5 Rs of Openness:"

Retain, Reuse, Revise, Remix, and Redistribute (Wiley et al., 2014). OER has been very content-centered approach and Cronin (2017) finds that "Using OEP for teaching" was constructed showing four dimensions shared by open educators: balancing privacy and openness, developing digital literacies, valuing social learning, and challenging traditional teaching role expectations. This is illustrated in the figure 1 prepared based on Cronin (2017). In this way, OER has been part of life of the open educators and their students.

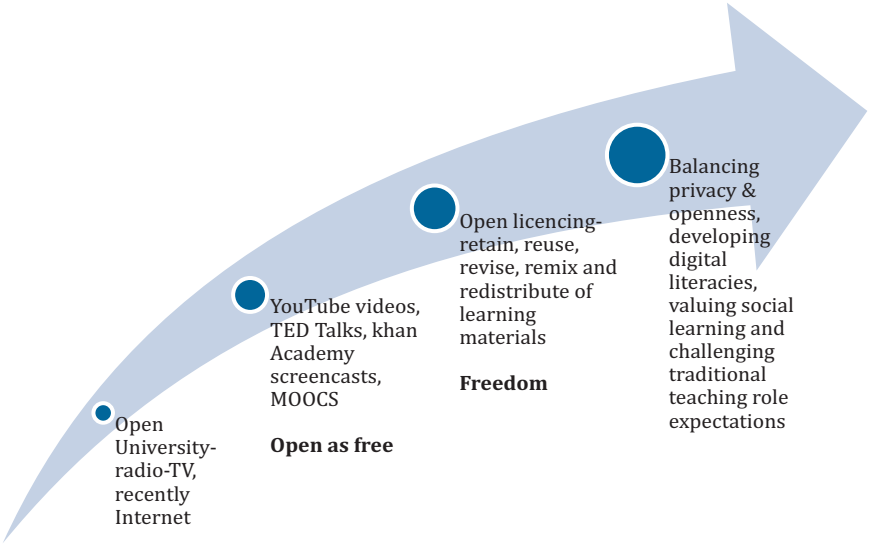

Figure 1: Openness Paradigm Shift

OER has been new and still growing because some of the institutes not yet started their OER initiatives. Therefore, much advocacy initiatives are required for OER development around the globe and in Bangladesh. On the other hand, some countries are advanced in the adoption of OER and have been very successful. In this way, OER literature is categorized into two: they are - OER advocacy literature and OER adoption literature.

OER advocacy literature

Normally, advocacy initiatives come from the activists. For instance, in Bangladesh, NGOs and development partners did advocacy initiatives for non-formal education (NFE) and finally, government, in response, started ministerial interventions and mainstreamed the NFE issues. Likewise, OER

advocacy literature has been actively contributed to since the inception of the OER movement. This is simply the advocacy initiatives taken by the agencies such as communities, development organizations and educational networks. In this regard, it is necessary to mention that UNESCO, William and Flora Hewlett Foundation, and COL have sponsored OER advocacy initiatives (seminar, conferences and workshops) at various levels in different countries and as result, some of countries formulated policy and some already implemented with the help of their policy recommendations. Initially, supporters of the OER took the advocacy initiatives and contributed in OER development. Afterward, OER practitioners added value in the OER advocacy literature. African countries are champion in this respect. They particularly focused on best practices for adoption and implementation of OER initiatives. They track the conditions of OER adoption, and provide strategy recommendations to funders and the greater OER community of OER strategists, advocates, and purveyors of OER programs/initiatives. For example, OER Africa is a ground-breaking initiative established by the South African Institute for Distance Education (SAIDE) for supporting higher education institutions across Africa in the development and use of Open Educational Resources (OER) to enhance teaching and learning (OER Africa, 2017). Allen & Seaman (2014) states that one of the barriers to OER adoption is faculty perceptions about the time required and level of difficulty finding and evaluating OERs. In line with this, COL initiated capacity building on OER issues for BOU faculties and came out with the BOU OER Policy 2014. But the policy took a long time to implement. McAndrew (2013) finds that OER advocacy initiatives have been helpful to provide strategies and context for OER program implementations, but most of the advocacy reports failed present deep examination in the post adoption phase. UNESCO (2011) and Wiley et al. (2013) reported that OER advocacy literature shows that students are much less represented; therefore, students' participation in activities to support OER development. BOU's OER policy hibernated for long and this is only because of lack of participation by faculties (teachers, tutors) and students to support OER development at the University. Therefore, adoption of OER is the next stage of the advocacy initiatives. Next section discusses the OER adoption literature. To utilize OER could be an economically feasible way for educational institutions to meet the challenges of modern technology and increasing demands for higher education. But, the transition from a teacher-to-student, textbook based pedagogy, to a flexible learning environment must be supported by the educators and it means that most teachers will need

encouragement and support to take the step from conventional textbook/classroom education [Garrote (2012), Garrote-Jurado et al. (2014) & Valladares Rodriguez et al. (2014)].

OER adoption literature

OER adoption literature came into existence from 2011 after assessment of OER implementation programmes in various institutes. Slowly, the OER getting the integral part of blended approach. Bliss, et al. (2013); Young (2015); & Chae, (2015) find that researches on OER adoption are limited to faculty motivations, perceived barriers, benefits and incentives encountered OER-enabled programmes, and how it is evaluated. Most of the OER-enabled programmes are cost savings as a benefit, as well as easier access to the materials. Although, Pitt, et al. (2013) find very few negative student responses on using OER-enabled programmes and Affordable Learning, Georgia (2015) received negative feedback from the students as they cited problems with usability, organization, and the writing style of the resources included in the OER. This technology may have some problem, but no doubt it is growing fast and making the OER industry where Bangladesh has been the new member. Some of the departments and institutes already entered in the OER adoption with different operators, say, dspace and creative common (CC). For instance, BRAC University and Daffodil International University already placed their all publications in the OER repository with the operator–dspace–and BOU already implemented 'BOU OER Repository' (http://www.ebookbou.edu.bd/) using the open licensing under the attribution of the CC-BY of the operator – Creative Commons – which contains the buttons: one for SLM – eBooks – where all SLMS are deposited and another for – BOUTube – where all video materials are deposited.

Methodology

This study is intended to engage students and foster a more inclusive and equitable platform on which to consider big pedagogical initiatives like the creation/adoption of open educational resources. Objective is to bring students into the OER conversation is informed by the educational philosophy of Paulo Freire, the foremost advocate of critical pedagogy. This study uses two tools – one Focus Group Discussion (FGD) with 20 students for qualitative data using the checklist and one survey. 89 students in two Study Centers (Kalabagan Lake Circus Girls' High School and Dhanmondi Boys' High School)

under the Dhaka Regional Center of the BOU. Study includes the students of the SSC (Secondary School Certificate) programme (Grade 9-10) of the Open School. A total of 89 students took part in this study through questionnaire used Lekert scales to investigate attitudes towards BOU OER Repository and provided open ended responses for additional comments. Survey administrator – the first author – identified the students using smartphones with internet connection and frequent visitors of BOU OER Repository. Data were collected by a questionnaire which was designed by the first researcher (first author) and checked by CEMCA representative – the second author. A questionnaire with two sections, formed by questions about personal information and BOU OER Repository programmes was prepared and used. A total of 25 questions on attitudes with the following distribution of topics were asked: access to BOU OER Repository (1), attitudes towards accessibility and the devices for use of text (4), attitudes towards accessibility and the devices for use of video (6), attitudes to linking of text content (6), attitudes towards navigation (5), attitudes towards interaction with instructor and fellow students (5), attitudes to effectiveness of materials (6). 5 questions were about the personal information section (gender, age, grade, study center, living place). In questionnaire, there were five choices as "strongly agree", "agree", "neutral", "disagree" and "strongly disagree". These choices had values from 5 to 1. In this study, the analytics of BOU OER reform, as a realm of University, is conducted through such a process of qualitative research.

BOU OER Policy-Analyses

Vision 2021 and the promise of establishing a digital Bangladesh drew immense support from the people and that created positive grounds for the realization of power of ICT to achieve the sustainable development. In line, the country has been implementing ICT establishment projects such as A2i (access to information) through the Ministry of ICT which created an environment to implement the OER repositories in Bangladesh.

Framework for OER analysis

BOU OER Policy 2014 was hibernated for long and was not yet implemented. Judith & Bull (2016) find that the implementation of OER at the course level poses numerous challenges to education practitioners. To address these challenges, Trotter & Cox (2016) develop an analytical framework which called "OER adoption pyramid" (Figure 2).

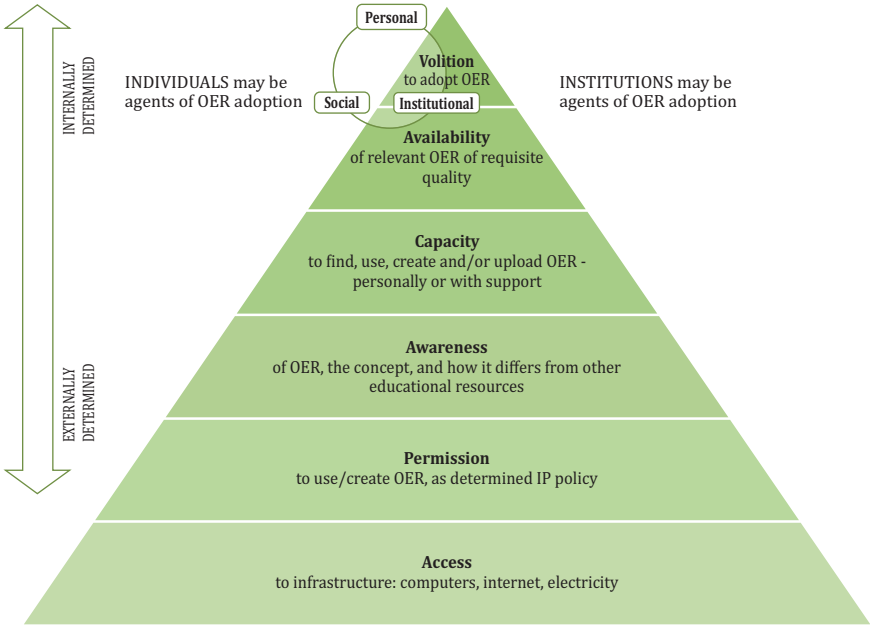

Figure 2: The OER adoption pyramid [Source: Trotter & Cox (2016)]

This figure illustrates that some external and internal factors that affect adoption of OER, they are: infrastructure access, legal permission, intellectual awareness, technical capacity, educational resource availability and individual (or institutional) volition. This framework has been used in this study to BOU operated in highly densely populated and unilingual country with a face-to-face teaching model. It is comparatively poorly resourced and mandated for "underprivileged". Therefore, this framework has been well described for this study. BOU uses internet for long and it has a complete Computer Department to provide all sorts of DBA (Database Administration) and PC support for adoption of internet. But, OER not yet adopted and it is for lack of legal permission and COL came up to develop the policy paper for BOU.

Development of the OER Policy

Holding a capacity building workshop on OER issues in 2014 with the help of the COL, BOU begin considering the implementation of an OER Policy. The workshop finished with the output of draft of 'BOU Policy 2014'. During the workshop, 34 participants representing the concerned schools of the BOU received the training and made active contributions to developing the OER

Policy. Essential knowledge on OER and open licences was presented and discussed by the participating specialists to deepen their understanding and practical skills. Wane Makintosh from New Zealand also delivered a lecture through online for the participants and he presented the lessons learned from the implementation of OER initiatives to inform the policy-makers. Prof Khandakar Mokaddem Hossain, PVC of BOU – the Policy-maker and he was enlightened on a framework on the development of OER policies and step-by-step guidance were provided to facilitate a needs analysis and to contextualize OER for BOU. The workshop not only built capacity of policy-makers in developing sector-wide OER policies, but also resulted in the first draft of the official OER Policy for BOU. 30th Academic Council approved the BOU OER Policy 2014 approved and in this way, legal permission for OER adoption came into existence.

Policy analysis

In2014, BOU OER policy came into existence and but, lack of strategies represent salient responses that impact the practical processes of OER implementation at the course level in BOU. The OER Policy didn't set up the vision, say, for 2020, 2015, to support the establishment of a sharing mechanism for the production. This may be the one of the reasons not to give drive for preparing the OER Master Plan target is to spread OER culture and empower both academic and officials of the University to produce and share high-quality OER online, further enhancing the access to digital content. The University already had the Open Accessed materials. But of the policy formulation, the University felt in terms of using OER, major activities planned so far include defining, designing and producing interactive e-books and established the BOU eLearning Center. The e-content standards were to be finalized. Through establishment of the eLeaning Center, the University decides for designing interactive e-books to support blended learning in the regular educational system. In addition, Government implements the National Education Policy 2010 and this policy states that 'Bangladesh Open University will be built up as a true digital university enriched by facilities of IT'. Through the one sentence policy has conferred huge tasks on BOU and in line with this BOU has been deploying technologies in the delivery of the programme. In addition, the education policy also puts emphasis on operationalizing the libraries through ICT by phases and thus opens up ways to access global knowledge (SoE, 2016). The policy has clear direction on OER and can be explored from the following statement cited in the Policy:

> *....enriched libraries will be set up in every college and university. All research journals will be collected through electronic subscription. All libraries of the country will be connected through networking so that any student can have access to the resources of other libraries. By phases, digital edition of books and journals will be made available. Recognizing the importance of the institutions, the structural format of the national library and archives will be reorganized and they will be brought under the digital system (SoE, 2016, p, 15).*

Therefore, OER has been imperative for BOU and as well for the nation. But, OER are not in place. The early signs of the OER Policy's implementation show that it has had a positive influence on a number of educational issues and contexts. The policy has a provision for working a high powered committee titled "Copyright Policy Standing Committee" to address any issues concerning the proper interpretation of this Policy consisting of the followings:

- *Chairman: Vice Chancellor*
- *Members:*
- *Pro-Vice Chancellor(s)*
- *Treasurer*
- *Legal adviser to BOU*
- *Deans of the Schools*
- *Two copyright expert (external) nominated by the academic council*
- *Director, Printing & Publications Division*
- *Registrar, he/she will be the secretary of the committee too*

The committee did not work at all and finally, a project is developed to meet the challenges mentioned in the suggested framework they are – intellectual awareness, technical capacity, educational resource availability and individual (or institutional) volition – to seek CEMCA support. The awareness of this philosophy began with the OER project implementation committee conducting several events and activities after the OER Master Plan was formed in the Project Profile (PP). During the project implementation, a variety of OER activities and events also took place, including workshops for teachers, administrators, and policy people. Purpose of the OER Policy states:

"This copyright policy is intended to provide clarification and guidelines for BOU academics, staff and learners regarding the ownership (copyright) of created works and the practices for the publication, use, reuse, remix and distribution of material.".

In response, in 2017, the Project with permission of the BOU Authority created an OER Repository (http://www.ebookbou.edu.bd/) under licensing of CC-BY of the Creative Commons. Policy decisions were available but lack of awareness, capacity building, and individual volition OER implementation was slowed.

BOU OER Repository

About 200 e-books have been uploaded in the OER Repository the policy launching ceremony (March 2014) and in the OER development seminar (April 2017). The final tasks in the implementation stage are: releasing of copyright through Creative Commons to secure open licensing, gathering OER materials, and making the OER available through a portal. Through the Project activities MBS programme is under process and this is, in fact, fully OER-enabled blended because every course is of 10 lesson notes, 10 PPTs and 10 video lectures and 10 face-to-face tutorial services. By continuing to promote the OER Policy and draw people's interest in participating in OER, the BOU can expect to see more transformation in the education sector in the near future. During the initial forming of the theoretical structure of the OER Policy, the OER committee should identify the challenges in producing and sharing OER. Survey with the students on attitude towards of the existing the repository site shall to identify these. The survey results are discussed below:

Results and Discussion

BOU provides students with the SLMs for each course mainly at the SSC and HSC programmes. Most of the time, University makes delay in the delivery of books in time. This is time the problem has been very acute. This is situation, learners has the option to use the e-books through accessing the BOU OER Repository.

Learners' attitude towards on use of OER repository for SLMs

Table 1 illustrates the attitude scales on the use of e-books as alternative source of required texts. In this section, students were asked to scale their attitude on alterative option for accessing required texts. Most of the students positively responded on accessing the BOU OER Repository (Mean value is 4.56and SD is 0.88). During interviews, students' most immediately noted their satisfaction with cost savings, and the additional convenience that OERs offered. When students talked about convenience, they often did so by voluntarily contrasting the OER to a printed textbook.

Tablets were less frequently used (mean 2.85 and SD is 0.87). Most of the students interviewed responded positively of using a combination of a laptop or desktop, and their phone. Students shared why they printed if they had done so (mean value 4.01 and 0.67). Still, reading on a smart phone was the next most common method.

Table 1: Learners' attitude towards on use of OER repository for SLMs (N=98)

Items	N	Mean	SD
I use BOU OER Repository of e-books for my studies	78	4.56	0.88
I print e-books out as hardcopy not handed in time	74	4.01	0.67
I read e-books on a personal laptop or computer	73	3.05	0.94
I read e-books on BOU computer	67	2.34	0.79
I read e-books on a tablet	78	2.85	0.87
I read e-books on a smart phone	75	3.61	0.87

The accessing via tablets has been low and negative responses and they used tablets rarely to never. This finding indicates that students owns smartphone rather tablet. The full distribution of responses also indicates that students use a combination of methods to access the course readings, and despite the prevalence of handheld and portable devices such as smart phones, most students commonly used laptops or desktops to do their reading. During interviews, students also shared how they accessed the OER on a daily basis.

Learners' attitude towards on use of OER repository for BOUTube

BOU uses radio-TV broadcasts and makes available the subject specific video lectures in the repository. In order to know the attitudes on the video lectures and the result is very positive (mean value 4.55 and the SD is 0.87) although they face difficulties in downloading the OER video resources. Students most frequently cited difficulties in downloading (mean value is 3.71 and SD is 0.97).

Table 2: Learners' attitude towards on use of OER repository for BOUTube (N=98)

Items	N	Mean	SD
I use BOU OER Repository of video lectures for studies	77	4.55	0.87
I experience difficulties in downloading resources	70	3.71	0.95
I watch video lectures on a personal laptop or computer	78	2.6	0.73
I watch video lectures on BOU computer	77	2.19	0.67
I watch video lectures on a tablet	78	2.73	0.78
I watch video lectures on a smart phones	69	3.62	0.69
Watching video lectures is not a challenge for me	81	3.99	0.40

Table 2 most of them have looked for videos. A special problem for the BOU participants is limited access to internet (mobile internet mainly) that makes it almost impossible to download video. It may be surprising to see how often video have been used by the BOU learners, considering the big problems with access to computers and internet, but this is possible by sharing via intranet and portable memory devices.

Learners' attitude towards OER characteristics of texts

The survey also asked students what it was like to locate materials from the OER. Students responded positively by reporting that it was very easy to retrieve the course materials from the OE repository. Students had a neutral response and one student found navigating the OER to be difficult. Students also chose from a variety of options to report whether they encountered any difficulties associated with accessing the OER materials.

Table 3: Learners' attitude towards OER characteristics of texts (N=98)

Items	N	Mean	SD
BOU e-books are linked to other learning materials	78	2.15	0.61
BOU e-books are formatted in PDF version	77	4.65	0.64
BOU e-books are easy to edit in the web	81	2.98	0.71
I can easily remix the BOU e-books	75	1.93	0.45
I can easily modify the BOU e-books	77	2.27	0.66
I can share the e-books to my friends through social media	77	3.74	0.98

Learners' attitude towards OER for learning experiences

Students also reported that the OER did not impact their class participation or their interest in the course. Students were most positive about the OER increasing their satisfaction with the learning experience, and their engagement with the course lessons in contrast to a traditional textbook.

Table 4: Learners' attitude towards OER for learning experiences (N=98)

Items	N	Mean	SD
Using the e-book site increased my interest in the subject	73	4.58	0.74
Using the e-book site increased my exposure to different ways of learning	77	4.19	0.40
Using the e-book site increased my satisfaction with the learning experience	77	3.45	0.90
Using the e-book site increased my engagement with the lessons	82	3.51	0.98
Using the e-book site built my confidence	85	4.52	0.85

The provision of high-performance digital devices and an effective communication network for the production and upload of digital content: for this, upgrades in network capacity and better devices are needed. Motivation to learn highest. This finding was nearly identical to their rating of the Course Quality. Both ratings were greater than 3.97 on a 5-point Likert-type scale. Fong and Kwen (2007) examined student motivation to learn and found that a positive motivation to learn was associated with higher academic achievement.

Impact

In addition to the structured questionnaire, two focus discussions were conducted using a checklist. Students have been found that they are well informed about the BOU OER Repository through their tutors about all of the course materials are available in one online location. They referenced the site as well organized, self-explanatory, and easy to navigate. Some of the students reported that they used to look for the old books from the former students of the same programme. Students found that the OER made no difference to their learning habits besides offering more accessibility and convenience. Of these two, one mentioned liking the ability to flip back and forth in a textbook instead of scrolling. A couple of students found the course readings to be far less overwhelming than a textbook because they could focus in on the important components. Another student mentioned her preference for watching videos, a learning habit she had developed independently by searching for BOUTube videos related to courses. Positive attributes of online learning materials. The research that has emerged to explore online and distance education in an effort to understand and improve high rates of student attrition, can inform the design of OERs. In a qualitative study conducted with distance education students with special needs, students offered several suggestions to improve the online education experience. They shared their priorities for instructors to make expectations clear, use rubrics, have a detailed syllabus with due dates, create directions with step-by-step instructions, and have a tutorial available on how to use technology functionalities like an online discussion board (Catalano, 2014). These suggestions are relevant to any learning context, but they offer important insight into what students' value in order to achieve success with learning materials. These suggestions are also consistent with students' positive feedback on the reliability and clarity of using the OER. Another important aspect of the study was the opportunity to learn more about how different learning materials impacted students. Based on the different materials offered on the OER, students were asked to rate how each of them supported their learning process, if at all. The responses were very positive, with the majority of students agreeing that each material supported their learning, suggesting that students liked being able to use a variety of educational materials. Students found the required assignments and required quizzes to be most supportive of their learning process.

Future Plans

BOU has to ensure the positive outcomes of the OER Policy through tackling challenges and preparing future plan of actions. The government's goal is to prepare students for the 21st century's technological and scientific advances. In line with this, school curriculum authority made the ICT courses compulsory to prepare citizens for dealing with the technology and knowledge challenges of the coming era with confidence and enthusiasm. To this end, various modern technologies have been introduced to schools and society as part of implementation of digital-Bangladesh agenda. Now it is for OER to make further impacts, following the footprint of BOU's digital policies. OER for e-books and video lectures are already made. In addition to this, more OER-enabled blended programmes will be incorporated in the BOU academic portfolio. In terms of lesson planning, e-lesson design, digital teaching aids, lesson activities, differentiation resources, higher order thinking resources, lesson starters and plenaries, assessment for learning tools, behaviour for learning tools and techniques, etc., collaboration should happen among teachers, students, and various educational players. Students across all levels especially secondary level and higher education are expected to form rich networks of knowledge creation and sharing. This practice will enrich and deepen their learning quality. Cronin (2017) finds that that research-informed policies and collaborative and critical approaches to openness are required to support staff, students, and learning in an increasingly complex higher education environment. Students depend on the OER to serve them just as well as and in the same capacity as a textbook. The findings of this research indicate that learners perceive themselves as highly motivated to learn and only somewhat positive in their perceptions related to OER. The current study provided an evaluation of attitudes towards OER and associated behaviors, and found that although students were unfamiliar with the term 'open educational resources'. But they got information from the tutors about e-books and tutors training on OER should ease the promotion of further training and activities. There is already a culture of localized sharing and borrowing of hard copy of the material, but for student to engage in open educational practices (OEP) beyond the institution, work needs to be done to explore the wider barriers. OEP is possible in Bangladesh as the learning materials for the formal schools are also available in the internet for free of use.

Conclusion

All the activities described in this paper have laid the foundation for success of BOU OER Policy 2014. First, because the OER Policy corresponds to the overall goals and aligns with other policies, it is less likely to encounter strong opposition that could slow down or even halt progress. Second, the OER CEMCA-BOU project is making efforts to further promote collaboration and transparency in adjusting the policy. Third, the OER Policy's commitment to provide quality materials, including monitoring and evaluation, should ensure the policy's success in meeting the national goals. Fourth, the Implementation Plan is practical. And lastly, the key beneficiaries in the OER Policy are becoming more involved through various events that the OER Project Implementation committee has organized. BOU is getting more mature through three decades of practices, lessons and innovations and such maturity is being well reflected in its OER Policy.

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Open Educational Practices at Uttarakhand Open University: From Policies to Implementation

Jeetendra Pande

Abstract

Soon after the emergence of the open courseware movement, in 2002 UNESCO coined the term Open Educational Resources (OERs) in a forum on the impact of open courseware on higher education in developing countries. Since then, the OER movement has gained much momentum and a global movement towards collaboration in the development and sharing of content has developed worldwide. Uttarakhand Open University (UOU) has embraced the OER approach and started following Open Educational Practices (OEP) after adoption of OER policy by it. Using OERs, the University has developed 45 courses and released them under the Creative Commons licence. In addition, the University has conducted many OER sensitisation workshops, both for policymakers and stakeholders, in the last few years. This paper presents UOU's journey of adopting Open Educational Practices, from policy formulation to implementation.

Introduction

UNESCO first used the term OER in the year 2002 at a forum on the impact of open courseware on higher education in developing countries. The term Open Educational Resources (OERs) refers to any type of educational material that is in the public domain or available with an open licence, and this means that anyone can legally and freely copy, use, adapt and re-share it (UNESCO, 2002). OERs were originally conceived to support education but they are also being seen as an alternative to traditional textbooks in some countries. OERs are available in a variety of forms, including textbooks, curricula, syllabi, lecture notes, assignments, tests, projects, audio, video, animation, etc.

One of the reasons for the increasing popularity of OERs in a wide range of institutions has been the steady rise in textbook prices. The promise of OERs is based on a culture of sharing and learning, encouraging teachers and students alike to adopt existing educational resources and adapting and sharing them

with others to maintain the cycle of collaboration and continuous improvement. OERs offer equal access to knowledge to everyone and allow resources to be adapted for meeting accessibility needs, thus making them equitable. Predominantly digital, they are by nature accessible and being in the public domain, they are an economical teaching and learning tool. Some of the benefits and advantages of OER include:

- Improved access to learning materials;
- Increased access to resources in vernacular languages;
- Reduced cost;
- Support for lifelong learning;
- Curatable and customisable, to suit curricula;
- Enhanced accessibility to quality peer-reviewed material, resulting in curriculum enhancement;
- Improved dialogue with peers globally.

This paper reviews the journey of Open Educational Practices at Uttarakhand Open University, from policy formulation to its implementation. This section is followed by a literature survey of OER practices followed in different parts of the world. Section 3 presents UOU's OER initiatives. Section 4 discusses UOU's strategic response to the recommendations made in the 2nd OER World Congress on achieving Sustainable Development Goal 4 (SDG4). Section 5 discusses the successes, challenges and lessons learned from adoption of Open Educational Practices at Uttarakhand Open University. The paper concludes with few final remarks presented in Section 6.

Literature Survey on OER practices around the world

OER is best known as an 'open' movement and the general foundation is simple: information should be widely disseminated and freely accessible, in order to benefit not just the traditional learner but also the non-traditional and self-learner (Pena, 2009). OER are educational resources that are freely available on the web under an open license. The open license facilitates the adaptation and repurposing of educational contents in varied languages and cultural contexts, without the hurdle of seeking permission of the content owner. Open educational resources and open education practices have the

potential to lower costs and increase participation in higher education (Murphy, 2013).

The OER journey started with The University of Tubingen in Germany that published a video series of its lectures online in 1999. The timeline of some of the OER initiatives around the world is summarised in Table 1.

Table 1: Timeline of OER journey

Year	Event
1999	The University of Tubingen in Germany publisshes a video series of its lectures online in 1999.
2002	Massachusetts Institute of Technology's *Open Courseware (OCW)* initiative with 32 initial courses.
2003	China introduced *China Open Resources for Education (CORE)* in collaboration with MIT's OCW.
2006	• Salman Khan launched *Khan Academy* provides free access to K-12 level educational resources. • The Open University (OU) of UK also launched *Open Learn,* which is an open learning platform of OU and contains Self Instructional Material and other education resources through its website *Learning Space.*
2007	• Apple Inc. also joined the OER movement in 2007 and unveils *ITunes U* service which is an open and free educational platform constructed on the basis of iTunes that provides brand-new development conditions and ideas for the co-construction and sharing of OERs (Lu & Zhang, 2011). • University of Michigan Medical School launched initiative *dScribe,* that provides all pre-clinical curricula materials as OER.
2009	YouTube launched a free educational channel, *YouTube EDU* that consists of thousands of educational videos, including those from partners like Khan Academy, Stanford, and TED-Ed.
2011	*Codecademy*, an online interactive platform that offers free coding classes in 9 different programming languages, was launched to provide free OERs for learning computer programming.
2012	TED (Technology, Entertainment, Design), a non-profit media organisation, launched *TED Ed* to provide free access to top-quality educational videos from the world's top teachers to the masses.
2013	Stanford University launched *Stanford OpenEdX* to offer free online courses that draw more than 350,000 enrollments around the world.

OER's penetration in the developing world has been slower than in industrialised countries, with the exception of China, India, Japan, Vietnam and Indonesia (Kanwar, 2015). Indian government has supported OER initiatives in both policy and practice. In 2008, the National Knowledge Commission (NKC) called for a national e-content and curriculum initiative to stimulate the creation, adaptation and utilisation of OER by Indian institutions and the leveraging of OER produced outside India (Perryman & Seal, 2016).

The Indian government has started several innovative programmes, like SHAKSHAT (an academic portal), National Mission on Education through Information and Communication Technology (NMEICT), National Program on Technology enhanced Learning (NPTEL), OSCAR(Open Source Courseware Animations Repository), E-Grid (an educational portal of IIIT, Kerala that is supported by MHRD), etc., (Dutta, 2016). In 2014, India's first MOOC platform – SWAYAM – was announced by India's Prime Minister Narendra Modi in his Independence Day speech. Open educational practices (OEP) have also been nurtured, for example, through the Wikimedia India Chapter (http://wiki.wikimedia. in/) and Creative Commons India (https://wiki. creativecommons.org/wiki/India), in addition to the Karnataka OER (http://karnatakaeducation.org.in/KOER/en) and Subject Teacher Forum (http://karnatakaeducation.org.in/KOER/en/index.php/Subject_Teacher_Forum) Teacher education projects led by Indian NGO IT for Change (Perryman, 2013). Several institutions in India have initiated activities in the area of OER and are either developing their own policies or looking forward to guidelines from the Government of India. Apart from the open licence policy of NMEICT, some institutions that have some kind of OER policy include Indira Gandhi National Open University (IGNOU), Vardhaman Mahaveer Open University, Krishna Kanta Handiqui State Open University, Uttarakhand Open University, Odisha State Open University, Central University of Himachal Pradesh and the University of Hyderabad.

OER initiatives in Uttarakhand Open University

The OER journey of UOU started in 2011 when the University hosted a conference, in collaboration with CEMCA, where issues related to ICT interventions in distance education and open educational resources were presented and shared. The OER journey of UOU is summarised in Figure 1 .

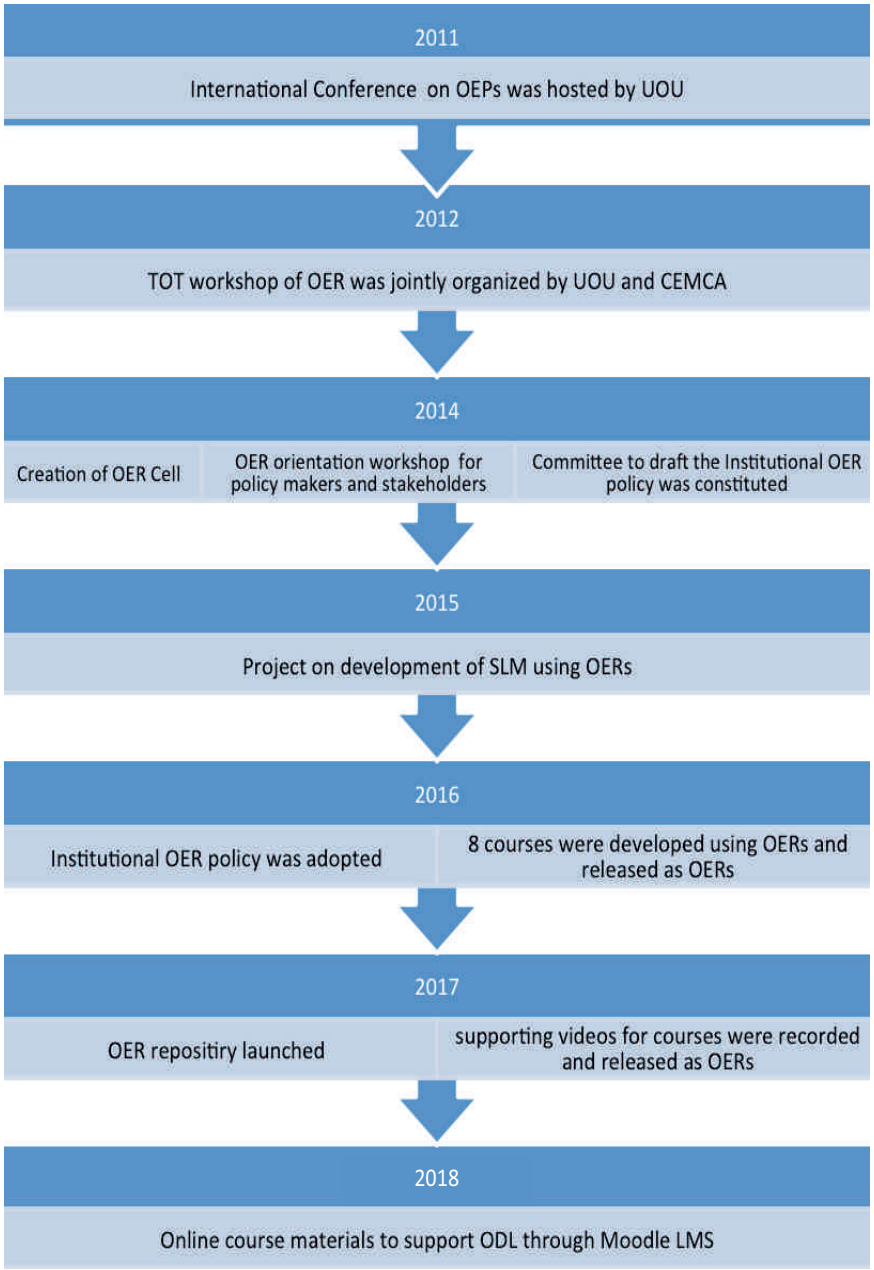

Figure 1: OER Journey of UOU

UOU's strategic response to SDG4

Based on the 2nd OER World Congress, Commonwealth of Learning (COL, 2017) has identified concrete actions to mainstreaming OER for achieving Sustainable Development Goal 4 (SDG4): Ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all. UOU's strategic responses to the recommendations for concrete action by educational institutions are as follows:

1. **Developed and implemented Institutional OER policy:** Realising the importance of OERs and the advantages offered by OER, UOU developed and implemented institutional OER policies in 2014 with the support of CEMCA. The purpose of this OER Policy is to:

    a) ***Make material available under Creative Common licenses:*** All material developed by the University is released on the university OER Repository site under Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. Moreover, material such as University/School blog contents, Lecture notes, Powerpoint presentations, Acts, Statutes and ordinances of the University etc. are released under Creative Commons Attribution-ShareAlike 4.0 International License.

    b) ***Support voluntary participation of Faculty and others in developing OER content:*** Faculty members of the University are actively involved in the development of OER content. The course material of Certificate of Computer Applications (CCA), Diploma in IT (DIT), Certificate in E-governance and Cyber Security (CEGCS) and Master of Computer Applications (MCA) are developed and released as OERs.

    c) ***Clarify publication rights and licensing issues:*** The SLM and the supplementary study material owned by the University contain full license information.

    d) ***Provide guidance in development and review of OER materials, prior to sharing them on a worldwide scale:*** As a matter of policy, only the material that is edited and approved by the Director of the concerned school is released as an OER.

e) ***Define collaborations within and outside the university with the intent to allow free access to the e-contents***: UOU has signed an MOU with other Universities, like IGNOU and Odisha Open University, for free sharing of e-content.

2. **Created institutional mechanisms for OER quality assurance:** Assuring the quality of OER helps build institutional reputation. It is important that OER released by educational institutions be educationally effective. To ensure this, Uttarakhand Open University has created internal mechanisms for quality assurance. The University's curriculum-based learning resources, developed through peer reviewing and strict quality assurance mechanism are inbuilt in the course development process and do not require further reviewing for uploading on the repository. All other contributions are peer reviewed within the department before uploading on the OER Repository.

3. **Created an institutional repository for OER:** While OERs are developed in institutions, it is necessary to share them effectively for wider use. This is possible only through the establishment of an institutional repository that allows easy discovery of OER by anyone, anywhere in the world. Uttarakhand Open University has developed an OER repository that is accessible at elearning.uou.ac.in. This portal has been developed with CEMCA's active support and contains SLM, supplementary reading material, video lectures, etc., both in English and Hindi. Very soon, UOU shall be migrating the OER repository to the dSpace platform.

4. **Regularly organising OER capacity-building programmes for teachers:** Building the capacity to understand, find and integrate OERs in teaching and learning is important for mainstreaming OERs. The capacity to curate and use OERs is as important as creating or remixing them. While most teachers are not involved in creating or remixing OER, everyone should be an effective user of available OERs. There are many resources available for training teachers about OER. Uttarakhand Open University have conducted 5 capacity building training programmes for its teachers on OER out of which 4 are organised with the support of CEMCA.

5. **Collaborate with other institutions to avoid reinventing the wheel:** The main objective of OERs is cost reduction through the use of openly

available materials. Economies of scale can be achieved through collaboration in content development. Uttarakhand Open University has used many OER resources offered by NPTEL, Saylor Academy, Wikibooks, Open Textbook Library, University of Minnesota's OER repository, individual website of David Evans, Portland State University, BC Open Textbooks, O'Reilly and Free Tech Books. UOU has also indigenously developed course SLMs for some of the courses, such as discreet mathematics and cyber security, and released them under creative common open licence. These courses are available at its repository elearning.uou.ac.in. As of now, fifty-three courses have been developed by fully or partially using OER.

6. **Taken steps to improve the institution's ICT infrastructure:** Using OER in teaching and learning, as well as developing OER in educational institutions depends on the availability of an accessible ICT infrastructure and internet connectivity. UOU is connected to internet through NKN and the University is planning to configure dSpace for its online repository.

7. **Developed accessible OER:** The University has developed OERs using accessible, editable formats and technologies to enable their use and reuse by people with disabilities. The Open and Distance Learning system does not require regular class attendance, therefore it is very popular among learners with disabilities and learning difficulties. Based on the recommendations of MacCann, 1996, the following steps have been taken to ensure easy availability of learning materials for people with disabilities:

   - ✓ The University has ensured that learning material is available through disk/website/repository. Most blind/visually impaired students use computer-based synthetic speech output as their primary means of accessing the learning materials. The learning material is available in editable format to facilitate the learners who require large prints, so that they can change the font size and style as per their needs.

   - ✓ Video lectures recorded in Hindi are used to supplement the course material. The videos contain subtitles to assist the learners with hearing disabilities.

- ✓ Learners with neurological disabilities often have difficulty with visual presentation because their visual memory may be 'scrambled': they may have trouble extracting meaning from text and graphics. However, they have less difficulty with aural comprehension. Therefore, an audiotape is easier for them to understand. UOU makes available audiotapes to its learners that are also broadcast through its community radio channel, *Hello Haldwani.*

- ✓ Many learners learn better with computers, particularly those with intellectual disabilities. Computer programmes that provide multi-sensory information are extremely motivating. They also provide a means of teaching learners with limited or no reading skills. However, the information is limited by what is visible on the screen. Learners may feel safer because they can go back and retrieve information. Online courses have been launched through its online Moodle platform, to assist learners.

Successes, Challenges and Lessons Learned

Successes

UOU has successfully managed to leverage the potential of OERs for enhancing the spread of quality education. This is important since UOU was setup with the mandate of disseminating quality higher education in the Indian state of Uttarakhand that has historically been faced with low levels of economic growth and development and is constrained by challenging geographical and climatic conditions. UOU's various achievements in just over a decade are:

- Development and implementation of an Institutional OER policy.
- Development of 45 courses using OERs and releasing them under creative commons licence.
- Creation of an OER repository.
- Configuring a Moodle LMS and mobile app for hosting supplementary video lectures that are recorded by the University faculty member and released under open licence.

Challenges

Despite UOU's tremendous efforts focused at deploying OERs, thus simplifying the task of disseminating necessary knowledge economically, the University finds itself short of the targets that it has set for itself internally due to a range of constraints pulling down its efforts. The more prominent of these challenges are:

- Sustainability
- Low level of OER acceptance: In general, people are wary of sharing knowledge and fear scrutiny.
- Lack of sufficient support from people championing the OER route.
- Loss of economic gain
- Identifying suitable OERs from among the plethora available in the public domain globally.
- Understanding the intricacies and fine print accompanying conditions that dictate the use of Open Licenses.

Lessons Learned

Given that UOU is a young entity, just over a decade old, the speed with which it has embraced and deployed OERs is remarkable. Moving at a fast pace has however made it commit time-consuming and costly errors, from which it has derived various learnings, some of which are:

- Cost saving is a myth: It requires more time and effort to develop SLM as OER as we need to be extra cautious about the quality and relevance of the material. But it is a huge saving on cost for the institution that adopts OERs and develops SLM.
- Alternate open licenses: Various options to the Creative Commons licence are available, such as Crown Copyright licence, GUI licence, etc.
- Most of the available OERs fail to meet UNESCO's guidelines defining OERs. Most repositories' content is in pdf or other uneditable formats. Use of open formats, such as MS Word, would ease revision and remixing of content.

Conclusion

Academics is a primary stakeholder in education and the stakeholders' positive attitude contributes to the success of any policy implementation. Therefore, the results of the study indicate that adoption and continued movement on the OER route will keep having positive and beneficial effects on higher education in the time to come. This would be especially satisfying for Uttarakhand that needs to deliver more with less financial resources in various areas pertaining to its people's development, among the primary ones being education.

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This is a pre-print of an article published in International Journal of Information Technology. The final authenticated version is available online at: https://doi.org/10.1007/s41870-018-0208-y]".

Developmental Interventions through Open Educational Resource: A Case of Odisha State Open University

Jayanta Kar Sharma

Abstract

Odisha State Open University, Sambalpur in a joint effort with the Commonwealth Educational Media Centre for Asia, New Delhi has built a platform for acceptance of Open Educational Resources policy in the educational system of OSOU through both course writers and coordinators considering Self Learning Materials, video lectures and audio clips as the base for qualitative materials. This case study tries to understand the impact of developmental interventions undertaken by the Odisha State Open University through OER. Traditionally distance education was limited in the number of people served because of production, reproduction, and distribution costs. This shift has significant implications, and allows distance educators to play an important role in the fulfillment of the promise of the right to universal education. New distance education technologies such as Open Course Wares, act as enablers to achieving the universal right to education. Through a typical model of open licensing, OER allows anyone to access, customize, and share digitally published educational materials for free, with the end result of advancing teaching and learning worldwide.

Introduction

The role of distance education is shifting. Traditionally, distance education was limited in the number of people served because of production, reproduction, and distribution costs. Today, while it still costs the university time and money to produce a course, technology has made it such that reproduction costs are almost non-existent. This shift has significant implications, and allows distance educators to play an important role in the fulfillment of the promise of the right to universal education. At little or no cost, universities can make their content available to millions. This content has the potential to substantially improve the quality of life of learners around the world. New distance education technologies, such as Open Course Wares, act as enablers to achieving the universal right to education. These technologies

and the associated changes in the cost of providing access to education, change distance education's role from one of classroom alternative to one of social transformer (Caswell, Henson, Jensen, & Wiley, 2008).

So, the National Knowledge Commission (2007) has also highlighted the importance of OER in widening the access of higher education. It has stated that "National Educational Foundation with one-time infusion of adequate funds must be established to develop a web-based repository of high quality educational resources. Open educational resources (OER) must be created online through a collaborative process, pooling in the efforts and expertise of all major institutions of higher education. The OER repository would supply pedagogical software for various programs run through ODE and be available for utilization by all ODE institutions. An enabling legal framework that would allow unrestricted access without compromising intellectual authorship must be devised for this purpose."

Odisha State Open University (OSOU), Sambalpur, in collaboration with the Commonwealth Educational Media Centre for Asia (CEMCA), New Delhi has developed a platform for acceptance of Open Educational Resources (OER) policy in the educational system of OSOU through both course writers and coordinators considering Self Learning Materials (SLM), video lectures and audio clips as the base for qualitative materials. In addition to it, incorporation of licensing process through Creative Commons will bring a new framework in the publication arena of the higher education system of India.

Therefore, the vision and mission of the Odisha State Open University is as follows:

Vision

- To strive for excellence in the field of Higher Education by using latest methods & technologies;
- To provide best quality materials supplemented by training, workshop, hands-on practices, contact programmes, using audio-video resources available through OER & MOOCS;
- Give emphasis on skill based vocational courses for promoting employment opportunities;

- Collaborate with the best Universities/Institutes/Centres of Excellence for advancement of knowledge and skills;
- Make full use of educational technologies;
- Adopt the best practices available in the field;
- Promote innovation in teaching, learning, training and research;
- Establish Centres of Excellence in different fields following Open & Distance Learning.

Mission

- Provide quality education at affordable costs;
- Reach out to people leaving in rural/remote locations in the State;
- Create awareness among the people of the State about their rights & duties and adopt scientific methods for socio-economic growth;
- Collaborate with all Government Departments/State Resource Centers/NGOs in all our endeavors to reach the unreached.

Conceptual Clarification: *OER Policy of Odisha State Open University*

Open Educational Resources are defined as teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open licence that permits no-cost access, use, adaptation and redistribution by others with no or limited restriction. Adoption of OER policy in the Odisha State Open University enables a learning environment for all the stakeholders of Odisha State Open University to create and use OER in the production of educational resources and enables them to share these under appropriate open licences.

The purpose of this OER Policy is to:

- Make materials available under the Creative Commons licences.
- Support voluntary participation of faculty and others in developing the OER content.

- Clarify publication rights and licensing issues.
- Provide guidance in development and review of OER materials prior to sharing them on a worldwide scale.
- Define collaborations within and without the university with the intent to allow access to the open content.

Applicability:

The OER policy is applicable to all content developers within the university and those engaged by the university for writing materials on short-term basis as subject matter experts. All types of learning materials are released in any physical or electronic format. In cases where the material is developed in collaboration/partnership with other institutions, the guidelines governing that collaboration as indicated in the MoU/ MoC will prevail.

The University supports free and open access to all educational resources and will make them freely available on OER Repository through Creative Commons Attribution – all contents it owns or co-owns with the following exceptions. All OER materials shared at the University OER Repository to the world at large will carry a disclaimer indicating that the material is for educational purposes only and that the university absolves itself of any practical misuse of the OER materials or their content. OER materials authored and published by faculty and staff of the university and others do not necessarily reflect the opinion of the university. All learning materials are published under CC licence  . Therefore, the choice of licence will be decided by the faculty concerned who has developed the material and shall be vetted by the internal OER Quality Review Board. Or all materials developed by it and having exclusive rights shall be released on the university OER Repository site under CC-BY-SA; For derivatives and reproductions of other CC licensed materials, the University will respect the CC provisions and the licenses therein. While sharing the materials of the University in appropriate licenses, it does not permit derivatives to use the University logo for differentiation from the original.

Being a responsible higher educational institution and to maintain its quality, OSOU has its own Quality Assurance and Review System regarding OER with following responsibilities:

- The University OER Repository strives to provide resources of the highest quality. The reviewing process will be carried out at different levels.
- University curriculum based learning resources developed through peer reviewing and strict quality assurance mechanism inbuilt in the course development process will not require further reviewing for uploading on the repository. All other contributions will be peer reviewed within the department before uploading on the OER Repository.
- The OER Board will adopt a set of quality assurance guidelines and indicators to help teachers focus on quality of OER.
- At the university level, an OER Board will be created to review policy as well as the production, delivery and access processes of OER.

Needs of OER @OSOU

The special features of ODL and OER are quite similar and supportive of each other. Both uses modern communication and information technologies, Wide choice of subjects, satisfying individual learner's needs, interests and abilities, no upper age restrictions along with longer time-range (1-5 yrs.) to complete certain courses of study – with credit accumulation facilities, Continuous Assessment System through TMA (Tutor Marked Assignments) or CMA (Computer-Marked Assignments), conducting Personal Contact Programme (PCP) through multi-channel delivery approach/Printed self-learning materials/tutors and academic counselors with supports of interactive periodical magazines, Audio-video Programmes, Telecast-Broadcast, Tele-conferencing (one way video – two and audio or two way video) and a dedicated website for providing information to learners. In such an environment, potential benefits of using OER can gear up the entire educational system as Open Educational Resources (OER) are free, can be used without asking permission from the author; allow the creation of multiple copies for distribution; are predominantly digital and therefore accessible through the Internet, are not bound geographically, are adaptable, allowing others to repurpose them for new uses; can support learning at one's own pace; allow access to huge amounts of data and information through OER repositories.

In terms of developing an OER Textbook platform, OER provide a cost effective set of teaching resources and their open nature encourages others to take copies and rework them to suit new contexts. Also being digital means that

they are distributed via the internet and are accessible from anywhere in the world. Being digital also means that in many instances they can be edited or enhanced using common software editing tools. When OER are organised to achieve a particular curriculum objective inside an OER Textbook, then learners have some control over how quickly or methodically they pace their learning. In spite of foregoing potential benefits, OER has few limitations by its nature. Users of OER face various challenges when it comes to harnessing these resources. Current frustrations for users of OER include sourcing of appropriate OER, understanding open licenses adaptation, requires new skills, traditional mind-sets predominate, Robust Internet connectivity and good ICT availability are essential to access and adapt OER and above all, mindsets and incentivisation of higher authority towards OER creation.

Initiatives taken by OSOU to promote OER

To promote OER, University has taken different kinds of initiatives of which the following are remarkable:

a. Training Programme on Open Educational Resources (OER) & Open and Distance Learning (ODL) organised by CEMCA, New Delhi in collaboration with OSOU, Sambalpur from 11 to 13 February, 2016:

b. Workshop on 'Technologies for Open Textbooks' organised by Commonwealth of Learning (COL) and hosted by OSOU, Sambalpur from 25 to 27 February, 2016

c. Sensitisation Workshop on 'Institutional Open Educational Resources' organized by CEMCA, New Delhi in collaboration with OSOU, Sambalpur on 5 October, 2016:

d. Workshop on 'Create and Repurpose of OER for Learning' organised by OSOU, Sambalpur in collaboration with CEMCA, New Delhi from 25 to 27 October, 2016:

The Commonwealth Educational Media Centre for Asia (CEMCA) supported the Odisha State Open University (OSOU), Sambalpur for the OER policy finalisation and implementation as developmental interventions in the improvement of qualitative Higher Education in the state of Odisha. The objective of the training programme is to design and develop the OER material for the students of the university. The Self Learning Materials (SLM) can be adopted, conceptualised and translated from some of the best

materials prepared by the best teachers from within the country and abroad. But when the hands on training, field work, practice teaching and other hands on activities will come, the local resource persons will be trained by the university so that with the help of this materials available through OER that are of international standard, they will be able to deliver at the local level. Objectives of this initiative are to understand and identify the developmental interventions through OER in the Odisha State Open University. The basic interest is to observe the developmental activities undertaken by the Higher Education Institution in the integration and implementation of the OER Policy and its impact over the HEI. To accomplish this motto, the study was undertaken principally by a subjective approach, gathering inside and outside information on the singular practice from a generally modest number of members. Information or data was assembled through meetings, centre gatherings, an online overview and workshops. Furthermore, quantitative information was gathered from online and offline resources during the workshops, and from a preliminary survey of members' integration of IT in general and aspects of their work on identifying with the reuse and sharing of resources in specific.

After conducting such workshops and sensitisation programme users, creators' participants have gained:

1. Awareness about the basic theoretical concepts and practices related to OERs within institutional context.
2. Competencies associated with academic practices related to OER and open licences.
3. Knowledge and skills in OER related functional areas including creation of quality assured course materials and search, find and reuse of OER materials to be integrated in course materials.
4. Awareness about the OSOU–OER policy adopted by the University and its expectations from the academic staffs, course development teams and the tutorial teams.

Potential Benefits of using OER in Odisha State Open University (OSOU):

The inclusion of OER in the educational system of OSOU has been benefitted by various segments, such as:

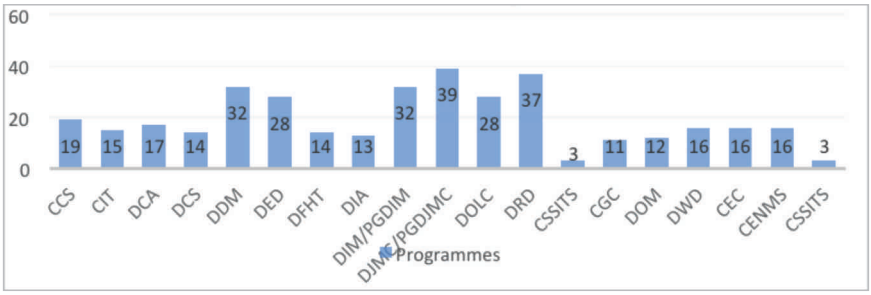
1. Single Repository of Learning and Teaching Resources as 'e-Gyanagar'

Teachers complain that apart from themselves, the students too can easily get distracted by non-curriculum resources on the Internet especially when searching for OER. The OER Textbook platform will allow a single repository of quality-vetted resources not requiring access to the wider internet. The platform also offers teachers a way around the problem of having to first source a large pool of appropriate OER. So, introduction of 'e-Gyanagar' as a single repository of Odisha State Open University (OSOU) has been able to make necessary solutions to the large pool of problems of teachers and students.

2. Solution of Cost effectiveness through Open licenses

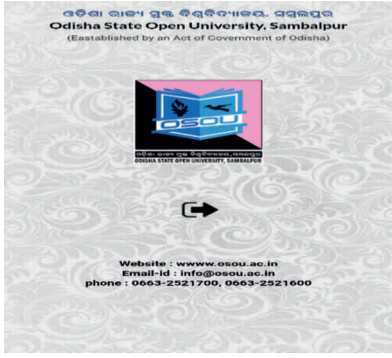
The OER platform dealing with Self Learning Materials (SLM), audio lessons and video lessons are extremely cost effective to develop, and they are significantly cheaper than purchasing traditional textbooks. This is partly true because of the OER open licences that negate subscriptions or purchases and partly because one person can develop the materials for a single subject and then share these widely with colleagues.

Figure 1: Programme wish SLM Status since last two years



3. Accessibility and affordability through Mobile App

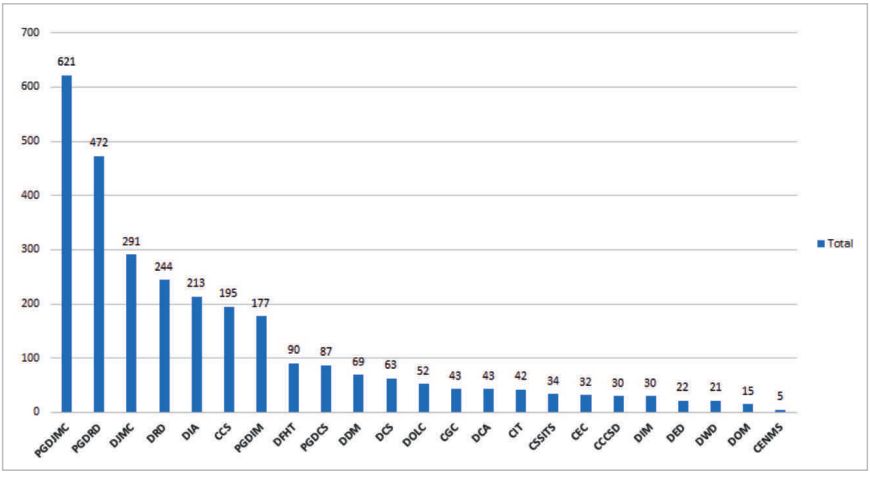
The gift of OER is the accessibility and affordability of higher education through the **Mobile App OSOU.** The mobile app is designed to ensure that all information and activities of the University can be accessed by its stakeholders anytime, anywhere. This has made transformation in the robust educational system through systematic arrangement and availability of Self Learning Materials (SLM) along with a platform of feedback that is to be more interactive with the students and the faculty; the students and the study centres; the faculty and the study centres.



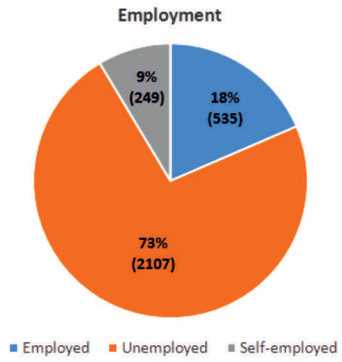
4. Development of opportunity for admission through e-Admission process

The introduction of Online Admission portal of the University as e-Admission process has remarkably proved the concept of 'Reach to the Unreached' within the limited resources of the institution. study centres; the faculty and the study centres.

Programme-wise admission Academic session 2017–18



Profile of Learners Academic Session 2017-18



Recommendations

Recommendations for overcoming challenges to OER in Indian Higher Education

As a result of the sequential development of the institution, the following recommendations may be taken care of as:

- All higher education institutions in India may adopt and implement the OER policy to get the benefit of OER;
- Licensing policy may differ in terms of forms and formats and from one course to another in the same institution;
- Creation of a Consortium of Open Universities of India (COUI) to create a platform for discussion and deliberation on issues of mutual interest and facilitate academic collaborations for design, development and delivery of online courses/MOOCs;
- HE Institutions may develop their own OER Repository on an appropriate platform by using FOSS based software;
- Organise more interactive and participatory workshops to make necessary awareness of the developmental concept of OER;
- Development of OER in regional languages may be encouraged to enhance the accessibility of the courses by the masses;
- Institutions may declare an interoperable metadata schema to organise OER materials in order to share OERs in the inter-university environment;
- Institutional OER repository's user interface should have user-friendly environment to retrieve required document;
- Creation of an LMS under OSOU to set off the process of academic collaboration for mutual benefit;
- Inclusion of Flow-Charts, video tutorials and screen shots for the description of processes involved in the application of LMS and CMS;
- Provision of more time for hands on training to develop the self-sufficiency of the participants in the application of ICT-enabled academic initiatives;

- Creation of curriculum-based teams from amongst the participants to design and develop online courses/OER for the courses being offered by OSOU;
- Inclusion of Case Studies pertaining to India or any South-Asian Country to make it more relevant to the Indian audience.

Conclusion

Thus, the present world demands creativity and innovation from all of us. A culture of learning needs to be developed so as to equip people to prosper in a rapidly evolving, knowledge-based world. A computer-enhanced learning environment can help make the much needed transition from just 'knowing' to 'sharing'. Through a platform like OER, the HEIs can outreach the goal of Universal education across the globe.

OER is a concept rooted in the belief that unrestricted access to education should be entitled to everybody. Through a common model of open licensing, OER allows anyone to access, customise, and share digitally published educational materials for free, with the end result of advancing teaching and learning worldwide. OER has limitless potential to expand knowledge among lifelong learners around the world. Believing in the capacity of OER, the reach and impact of open courseware needs to be extended by encouraging the adoption and adaptation of open educational materials around the world. In India, we are still in the nascent stages of using OER.

However, there have been recommendations, for the Government, at different platforms for developing a national e-content and curriculum initiative. Both should initially focus on the rapid production and acquisition of content in high need areas like agriculture, teacher training, basic and applied sciences and engineering, technical education, liberal arts and social sciences, communication skills, ethics and values, public health, and high end skills including management. Our projects should not be copied or modeled on the lines of those developed in other countries. Our model should be based on our needs such as multiplicity of languages and available resources. Also, more efforts would need to be made for 'Building Awareness, Voice, and Understanding' about the issue.

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Open Educational Resource Repository: An Initiative of Netaji Subhas Open University

Barnali Roy Choudhury

Abstract

Netaji Subhas Open University, Kolkata with supports of Commonwealth Educational Media Centre for Asia, New Delhi has developed an Open Educational Resources Repository as an implementation of Open Educational Resource policy. Open Educational Resources (OER) are the inevitable component of the educational system specially in ODL mode. With the advent of web and hardware component, it is much easier to develop/collect and disseminate educational materials for widening up the scope and coverages of teaching-learning process. This paper is going to concentrates on the issues relating to need of institutional repository, development of institutional OER repository, Institutional OER policy development and use of OER repository for further development of the educational system worldwide.

Introduction

Low cost of hardware and revolution of open source software geared up the Open and Distance Learning (ODL) environment. In the present scenario we have already encountered different types of educational technologies and tools in the open domain. Above all, the Open practice(s), in general, and Open Educational Resources, in particular, play a vital role to achieve equitable quality education for all. Likewise, other flavours of Open Innovations and Open Educational Resources are economically, legally, technically and socially free to access. Here economically free indicates available free of cost; legally free means materials are in the public domain or released with a licence that allows for **Reuse, Revise, Remix, Retain** and **Redistribute** (5Rs); technical issues means using of open standards, open software and open formats at the time of generating OER materials; and the term social issues means that if any educational material is available, then it has the provision to maintain academic integrity that is beneficial for the entire community. Open Educational Resources include syllabus of a full course, lab notes, study

materials, images, illustrations, maps, charts, case studies, lessons formatted for a learning management system, interactive exercises, practice problem sets, recorded lectures/events, assessment tools, multimedia/interactive tutorials, software. OER has its official roots in a forum entitled "Forum on the Impact of Open Courseware for Higher Education in Developing Countries" in 2002 organised by UNESCO and sponsored by the William and Flora Hewlett Foundation (Hewlett Foundation) where the exact term was coined. But history begins with the learning environment as the continuation of the declaration made by MIT when they released 50 higher education courses as open content just one year back to share knowledge in an open domain. So it is not a new concept nowadays. Since 2002, the Commonwealth of Learning (COL) and UNESCO portray their footprints consistently by promoting OER in order to strengthen the educational environment.

There are several provisions to access OER through aggregator or databases or from repositories globally like the *WOU OER Repository, OER Asia, OER Commons, OER Online Archive, Open Educational Resources (OER) Africa, GLOBE, Creative Commons, Copyright Licenses, OAsis : COL Open Access Institutional Repository, the Orange Grove, RRU Open Educational Resource. And in the Indian perspective, NROER is there and is a collaborative platform initiated by the Department of School Education and Literacy, Ministry of Human Resource Development, Government of India and managed by the Central Institute of Educational Technology, National Council of Educational Research and Training.*

Above mentioned repositories are continent specific by following general subjects. Looking into the consideration, educational materials that basically structured with subject specific syllabus and curriculum offered by institution(s). To handle such a situation, the intuitional repository may justify needs of learners in a university system, especially in distance education. Institutional repository is a system that collects, preserves, organises, and provides navigational access to scholarly communications of a community (Hockx, 2006). Institutional scholarly products may include study materials, faculty research outputs, student theses and dissertations, e-journals, datasets, and so on. Institutional Repositories facilitate a provision for an institution to showcase its scholarly output, introduce its efficiencies to the digital documents, and soothing crisis in scholarly communication (Gibbons, 2004).

Needs of Institutional repository for a university system are as follows:

- Collection, preservation and dissemination of subject specific educational materials.
- Providing free access to educational materials, lab-based practices and other research outputs of university within and outside the institution in 24X7 mode.
- Increasing e-visibility of the scholarly works produced at the institution to promote quality education.
- Maximising the impact of the university's research and teaching activities.
- Increased community participation in the learning environment.
- Motivates learners' behavior.

Due to the emergent trend towards digitally born educational materials and lack of appropriate scholarly content, management systems among universities have made digital repositories more important for the collection and dissemination of scholarly materials (Budapest, 2002; Chan, 2004; Lynch, 2003).

A digital repository is to be needed to handle a rich set of education material provided by the NSOU, and by keeping in mind about learners' point of view, for ease of access of the educational materials, NSOU developed its institutional Repository as Institutional Open Educational Resources Repository by declaring its educational materials as OER under the creative commons licence. For right execution of the initiative, CEMCA (Commonwealth Educational Media Centre for Asia), COL has raised their hand to support NSOU. CEMCA took initiatives to promote OER for equitable quality education for which they took lots of initiatives individually and with participation from UNESCO.

The Commonwealth of Learning (COL), in partnership with UNESCO and the Government of Slovenia and with the generous support of The William and Flora Hewlett Foundation, conducted follow-up surveys of world governments and key stakeholders. Regional Consultations on Open Educational Resources were also held. In announcing the 2nd OER Congress at

the UN, the President of Slovenia noted that the "globalization of the digital transformation is occurring so swiftly that it will have to be actively addressed by the United Nations and, in order to cope with social and technological challenges, it is necessary to start with the education of youth."

So, with the proactive supports of CEMCA, and COL, the Netaji Subhas Open University already built its institutional OER repository to cater its learners community with SLMs, audio-visual materials, and so on. To carry forward with the university motto, "To reach the unreached", the Netaji Subhas Open University took the initiative to launch its Open Educational Resource Repository with support of the Commonwealth Educational Media Centre for Asia (CEMCA), New Delhi. Advent features of ICT and the introduction of collaborative, participative and communicative Web 2.0 technologies learning environment have gone through a paradigm shift from printed to digital. Thus accessibility of resources is also increasing drastically in different forms and formats day-by-day. That is actually the important requirement of an Open and Distance learning environment. Apart from this, the learning environment of the 21st century is not simply about reaching more people, but about improving the quality, sustainability, granularity and diversity of educational opportunities. Thus, due to its natural characteristics, implication of OER is most comprehensive in open and distance learning (ODL) educational system.

Open Educational Resources (OER) are built on two convictions: that "knowledge is a public good" and that "the internet is a good way of sharing knowledge." NSOU gracefully agreed with such things and keeping view on the present technology-driven scenario, the University launched the NSOU-OER Repository to widen accessibility of educational materials along with the following objectives:

- ✓ Provide facility for lifelong learning.
- ✓ Make education affordable to the disadvantaged community in core rural areas.
- ✓ Contribute to the socio-economic development of the nation.

Before developing an institional OER repository, NSOU, Kolkata has adopted institutional **OER policy for ICT based student support** for 29 programmes throughout its academic sessions. Now the University is enriching its

institutional OER repository to open up good possibilities to promote better learning opportunities that are being fit with the **local contextual and cultural** needs. Objectives behind framing the OER policy are to ensure affordable and universally accessible teaching-learning resources in order to enrich learning experiences; make easily sharable materials with the provisions of open licensing systems like creative commons; update materials that can be edited, augmented, customised, combined and reformatted by anyone; amplify access of learning resources; assist with both teaching and learning free of cost or in less expense; support voluntary participation of faculty and others in developing OER content; and protect intellectual works from plagiarism. OER policy of NSOU is framed on the OER policy template framed by CEMCA. As per that format, NSOU has implemented policy issues as follows:

OER Creation	***Content contributors*** *to use, create and publish OERs to enhance the quality of the relevant resources with visible acknowledgment under predefined creative common licence. OERs, name of the copyright owner(s), author(s), date and Creative Commons licence should be declared and published properly.*
Knowledge Society	*Domain Expert, Faculty, Staff and student's community may frame knowledge society*
Content Developers	*Any person engaged in the development of teaching and learning materials used by the University.*
Copyrights	*© [NSOU][Year]. [Name of the resource]is made available under a Creative Commons Attribution-[specific]4.0 License [link of the cc license version]*
Open License	*Creative Common License to state the actual permission to 5Rs*
Policy Declaration	***Specific Policy Statements*** • *There may be different policy issues for different scholarly outputs of the NSOU.* • *Research papers, University Reports- CC-BY-NC-ND* • *SLMs- CC-BY-NC-SA* • *A/V Lectures, Lab-based hands on video materials – CC-BY-NC-SA*
Strategic Outputs	*To ensure inclusive and equitable quality education opportunities by repurposing of high quality open educational resources (OER) through institutional policies*

Scope/Applicability	*This policy applies to all publications of NSOU on course materials, and other academic publications created by the University subject to approval of the appropriate Authority of the University.*
Quality Assurance and Review System	*The OER Board will adopt a set of quality assurance guidelines and indicators to help teachers focus on quality of OER.*
Liability	• *All OER materials at the **NSOU OER** Repository shared with the world at large will carry a disclaimer indicating that the material is for educational purposes only and that the university absolves itself of any practical misuse of the OER materials or their content. OER materials authored and published by faculty and staff of the university and others do not necessarily reflect the opinion of the university* • *All learning materials published under CC licence should include the following information in the credit page* • *©[NSOU][Year]. [Name of the resource]is made available under a Creative Commons Attribution-[specific]4.0 License [link of the cc license version]*
Role of the Faculty/Teachers/ Content Developers	• *The faculty member responsible for development of a course shall be responsible for management and adoption of OER in the specific course.* • *In general, the concerned faculty should search for appropriate OER to adopt/adapt in a course, thereby reducing the cost of the course production, as well as reducing the time to produce such material, and improving.* • *e-student learning.* • *If no OER is available in a topic, then that part of the content should be developed either by internal faculty or by engaging an appropriate expert from outside as per the normal procedure of the University. When an external writer is engaged, the material should be reviewed, and appropriate copyright assigned to the University with indemnity to the University for Plagiarism, if any, so that the material can be released by the University under CC licence.*
Institutional Arrangements	• *Teaching-learning materials produced by the university shall be shared in a suitable online platform.* • *Central IT department shall be responsible for providing access to all the stakeholders, and maintenance of the platform.* • *Faculty and staff members engaged in OER development shall be regularly provided with capacity building opportunity by the IT department to familiarise the stakeholders of the opportunities and technical feasible options of the platform.* • *Regular update on Copyrights, OER and Open Licence shall be organised by the IT department to promote the use of OER.*

A glimpse of NSOU OER Repository

An institutional repository is a platform for identifying, collecting, managing, disseminating, and preserving educational resources created in digital form (Roy Choudhury, 2016). To search OER materials for free access to sustainable and quality educational materials to cater to the University motto "Meeting the Unmet", a single point federated search mechanism is needed. In view of this, a dynamic system is prerequisite to build such a repository where organisation of materials could assure the retrieval of required documents at the right time to the right person. Several software are available in the open domain and in the commercial domain for development of a Repository. Eprint, Greenstone, Dspace, DOKS Software, MYCORE Software, SOPS Software and Fedora are few of them. Among all of these software, Dspace is the most comprehensive one since this dedicated software is qualified through the conceptualised social- and technical-oriented qualified indicators (Atenas & Havemann, 2014) like Featured resources, Authorship of the resources, Keywords of the resources, Inclusion of metadata, Multilingual support, Inclusion of social media tools for sharing resources, Specification of the type of Creative Commons Licences per resource, Source code or original files available. Educational materials of NSOU are non-linear by nature because of several forms and formats of different kinds of materials. We need first to set the metadata schema. Dublincore metadata schema is incorporated with Dspace to manage the descriptive structure. Descriptive metadata can manage identification, selection, collection, linkages, usability and discovery of resources. This could easily help recognise the reuse, remix, redistribution of OER, clarity of rights, and resource discovery. Dspace has a strong controlled vocabulary and it only has the licence to redistribute two control vocabularies – Norwegian Science Index (nsi.xml) and Swedish Research subject categories for efficient information retrieval.

Netaji Subhas Open University hosted its institutional OER repository as NSOU-OER Repository. Through this repository NSOU is intended to empower its 4.5 lakh learners situated at West Bengal in a blended approach. In order to open up good possibilities to promote better learning opportunities that befit the local contextual and cultural leads in brief. This repository is mainly concentrating its focus on the strategic output of implementing OER to ensure inclusive and equitable quality educational opportunities by repurposing of high quality Open Educational Resources through institutional policies in

order to facilitate innovative, collaborative and interactive learning environment where learners set their own goals or own objectives rather than being restricted by the institution.

Netaji Subhas Open University is now catering to approximately 4.5 lakh learners with its 142 study centres by fostering flexible online admission facility. Six schools of studies have already been assigned to carry out the responsibility to conduct near about 55 courses (UG, PG, Diploma, PG Diploma & Certificate courses) in a blended approach to create learner-centric quality education. Syllabi includes full courses, course materials, Modules, Textbooks, streaming videos, syllabus, lab notebooks, study guides, images, illustrations, case studies, lessons, interactive exercises, practice problem sets, recorded lectures/events, assessment tools, software, etc. The university recently has adopted the Open Educational Resource Policy for its ICT supported programmes in order to enrich the capacities of learners, researchers and professionals by generating OER based on the syllabi of NSOU by following structure:

NSOU-OER User End

NSOU-OER repository is a robust platform with FOSS-based (Free and Open Source Software) architecture and federated search mechanism. The University generally offers technology embedded facilities like Website, On-line admission, E-mail, SMS alert, instant messaging, e-SLM e-Lecture Mobile-Learning, etc.

NSOU-OER repository is accessible from the OER Repository button of NSOU's home page < http://www.wbnsou.ac.in/index.shtml > or from direct URL <nsouoer.krc.net.in>. By clicking on this button, NSOU-OER repository home page is there. This repository consists of two search options – search NSOU-OER repository (centralized search service) and search other OER

repositories (Federated search service) to broaden search outside the NSOU repository. NSOU acknowledges CEMCA's contribution by sharing its logo in the home page of the repository here. This page also declares the adopted creative commons licence for each material available under this repository. NSOU releases all its document under the CC-BY-SA-NC licence.

Figure 1: NSOU-OER Home page

Services of NSOU-OER

NSOU-OER consists of the federated search mechanism for information retrieval and hence this platform is more than the OER repository. Rather it is an open platform that includes 10 reputed OER repositories of the world along with browsing category of open textbooks, open thesis and dissertation, open images, open videos, open courses and links of databases like connexion, Curriki and many more. This service broadly facilitates searching and browsing for university generated materials and for other materials available outside the university repository.

Institutional OER repository of NSOU is accessible by clicking on the Search NSOU OER repository option (as shown figure 2), where Educational materials of NSOU are available categorically.

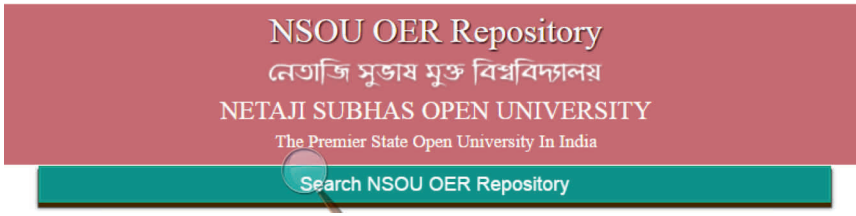


Figure 2: Search NSOU-OER

Browsing of NSOU-OER

NSOU-OER Repository facilitates browsing by Whole community, Author, Subject(s) and date of Issue. Figure 3 shown all options being catered by NSOU-OER.

Browsing by Category

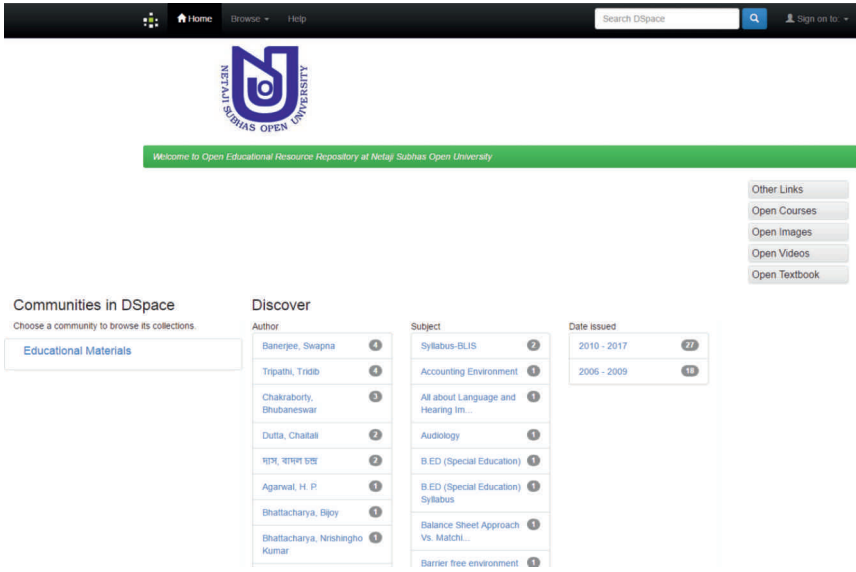


Figure 3: Browse NSOU-OER by category

Browsing by Communities and Collections of NSOU-OER

By clicking on the "Browse" button on the second top most option of the repository home page, all sub-communities of Educational materials will show up. The structure of community and sub community is as follows for each school of studies (School of Professional Studies, School of Education, and School of Vocational studies):

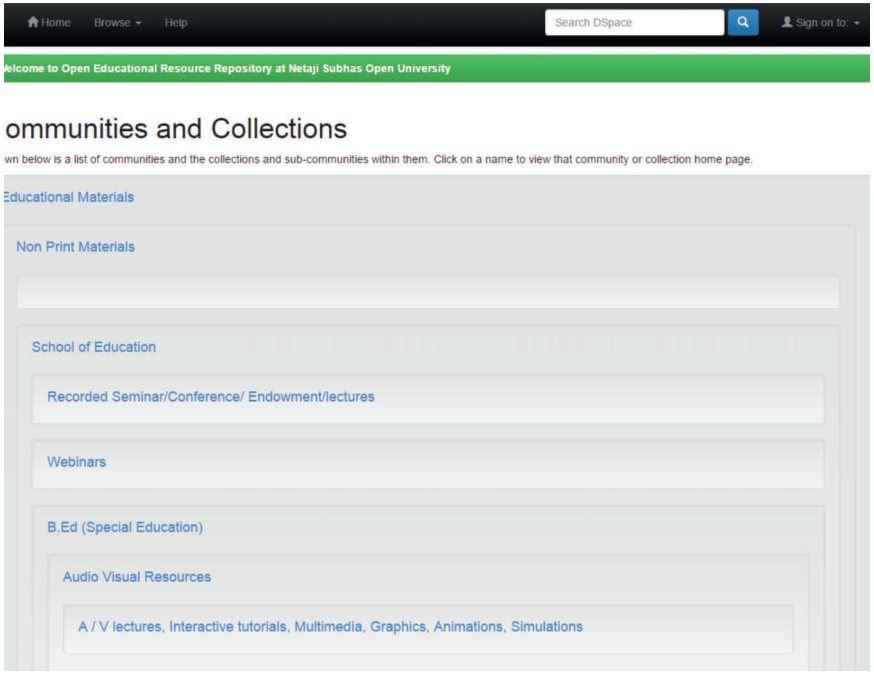


Figure 4: Browse by community& sub community

This community and collection of NSOU-OER is basically developed on the basis of the structural design (figure: 4)

Browsing by Author, Subject, and Date of publication

Along with the community and collection, this repository can be accessible by narrowing down its search option with author, subject and year of issue (figure: 5).

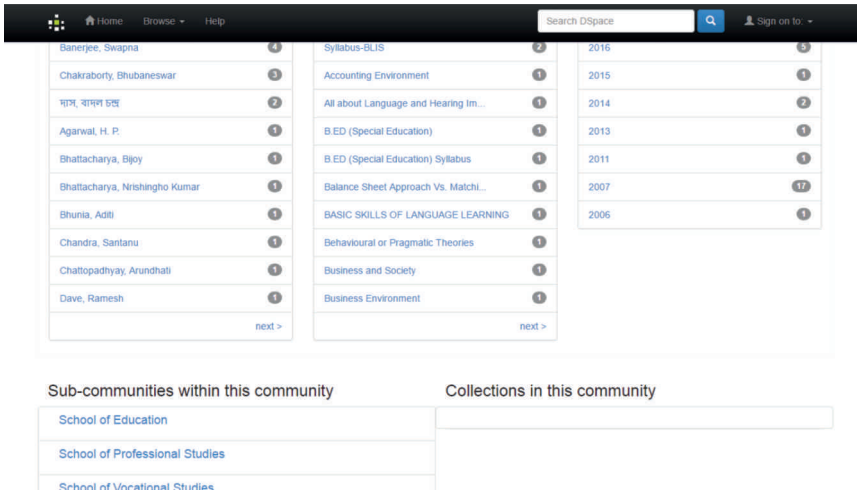


Figure 5: Browsing by author, subject and date of publication

Even user may browse by sub-communities.

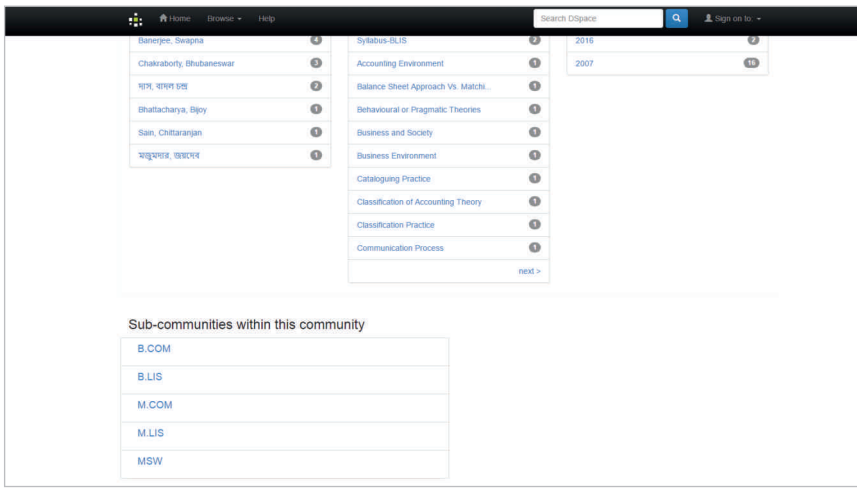


Figure 6: Browsing by sub-communities

Browse by item type is another relative browsing option in browsing option.

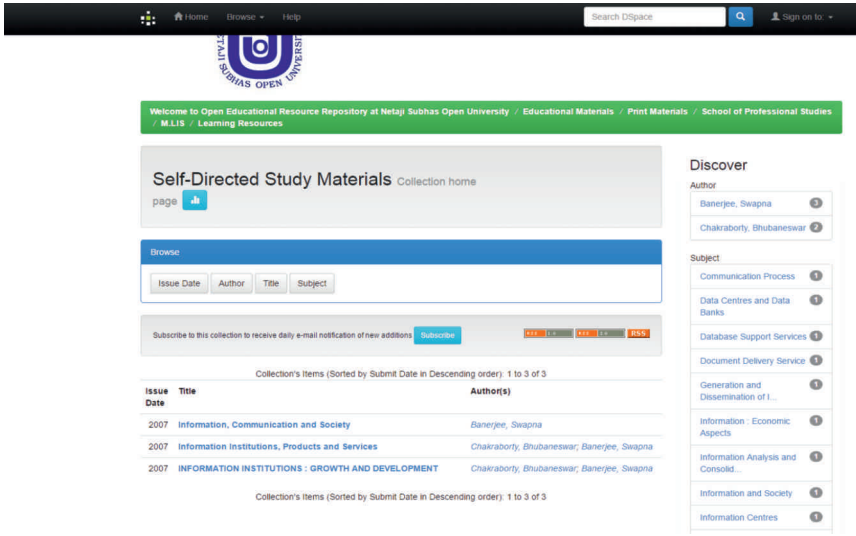


Figure 7: Browsing by item types

At the time of clicking on any collection of the repository, it will automatically retrieve related metadata and the full text as shown in figure 8 and figure 9 consecutively.

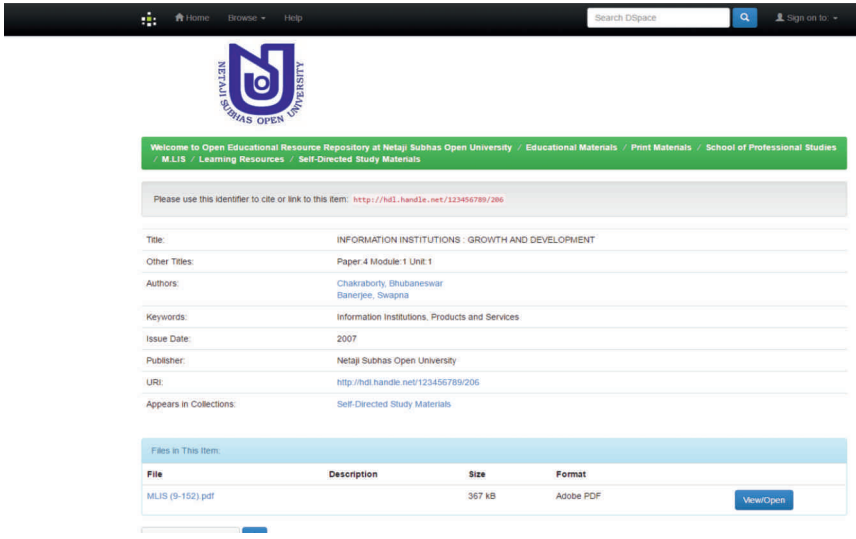


Figure 8: Full text access of an item and information related to metadata

UNIT 1 ❑ INFORMATION INSTITUTIONS : GROWTH AND DEVELOPMENT

Structure

1.0 OBJECTIVES

Modern libraries are information centres above all. Since the industrial revolution the nature and scope of library services have been profusely changed and extended the growth of information centres and libraries in special subject fields. Whether one calls this change revolutionary or evolutionary hardly matters; what counts is the degree to which such change will affect the library's role as an institution in society. This unit presents you the nature of information institutions and depict their growth pattern. This unit will enable you to identify the different types of information institutions and their specific role in the dissemination of information to individuals, groups as well as institutions who might require information in different forms and formats. You will also have a scenario of the future in the changing context of information

Figure 9: Full Text access

The browsing option of NSOU-OER repository facilitates users different options to retrieve required document(s). Users may browse NSOU-OER with the following options:

a) By Communities and Sub-communities;

b) By item type like print and non-print materials

c) By choosing different kinds of available educational materials.

d) By individual collection of NSOU-OER.

Now next section will state the search facility of OER repository.

Search facility of NSOU-OER Repository

Search facility of a system retrieves specific piece of data of users' query with the help of key words/search terms/search criteria. Users may filter their search query by choosing options which are clearly shown by the snap of NSOU-OER search interface (figure:10).

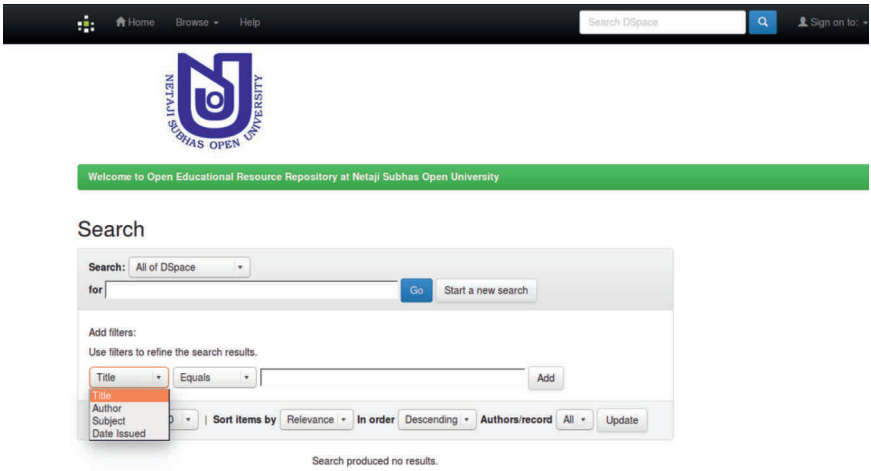


Figure 10: NSOU-OER search interface

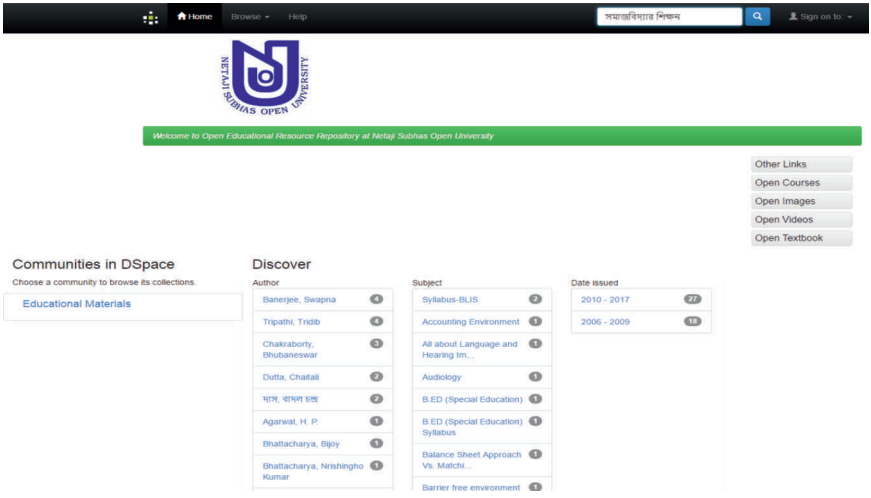


Figure 11: Search by key terms

Search Result

Search result contains specific approaches of users' query. In this repository, the user may retrieve required documents by giving proper search term like title, author, subject etc. Even they might be able to narrow down their search by choosing advance search option that basically works as a filter at the time of typing query.

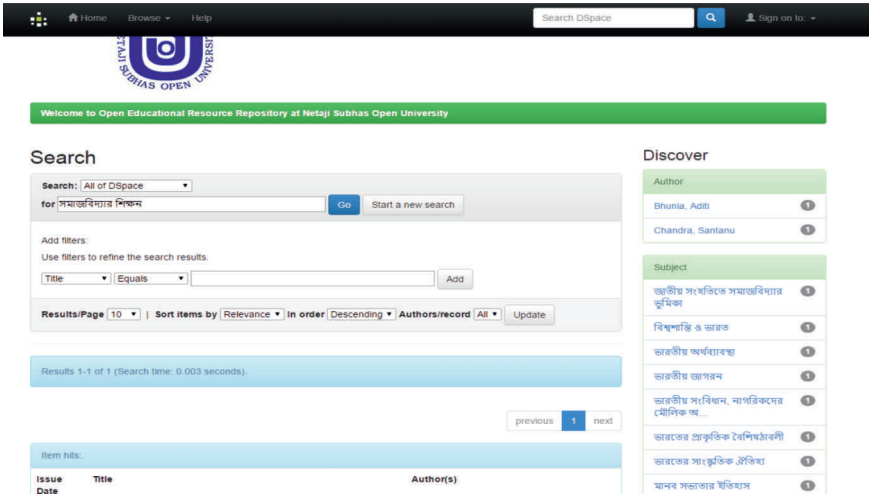


Figure 12: Search result

By clicking on search button it will automatically retrieve metadata of document along with full text document as shown in figure 13.

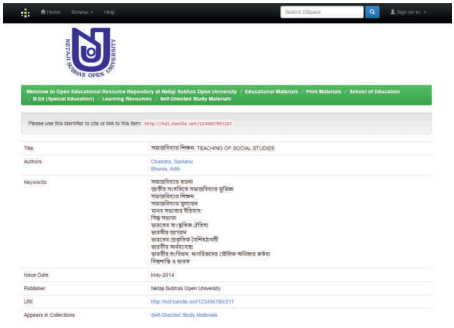


Figure 13: Metadata of Item

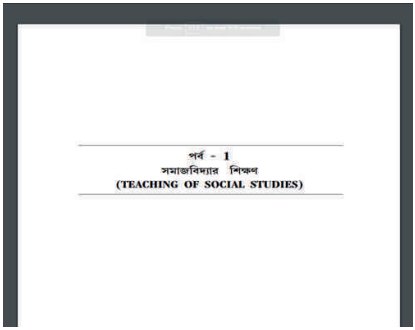


Figure 14: Full Text search result

The most comprehensive feature of this OER repository is its multilingual and multi-format retrieval. Search result of this repository includes text based materials, audio/video lectures in English and Bengali language. It has potentials to support different regional languages.

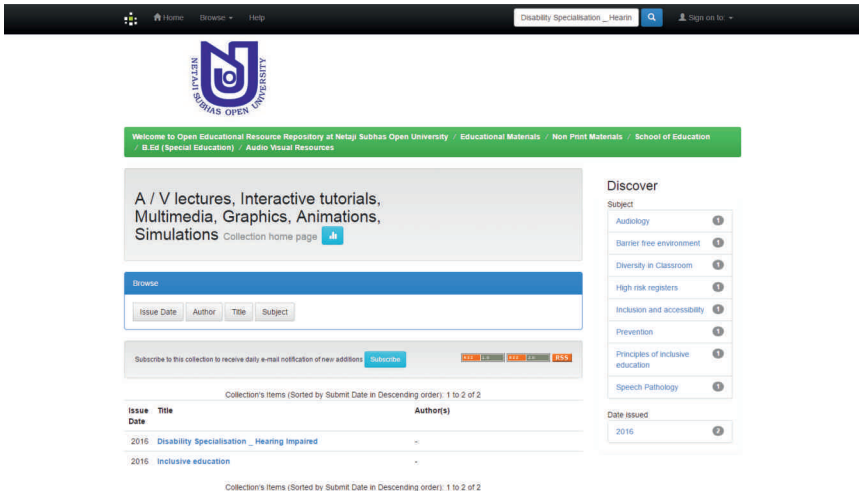


Figure 15: Text based and A/V lectures based search result

In case of Audio Visual Materials, files will automatically start downloading at the time of clicking.

What else does NSOU-OER do?

NSOU-OER is a reach platform with maximum open initiatives like links of Open courses, Open images, Open videos, Open textbook, Open databases, etc. These links may have broadened the scope and coverage of this pen platform beyond the university premise.

Figure 16: Other links of Open initiatives

Figure 17 is facilitating search of OER materials from the most popular and useful OER repository. Search queries will be forwarded to the source repository that enables users to opt full text documents from there.

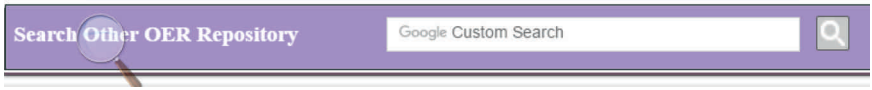


Figure 17: Search other OER repository

After typing a search term, search queries will be automatically directed to the source OER repository. The user may opt search results from other than NSOU-OER repositories.

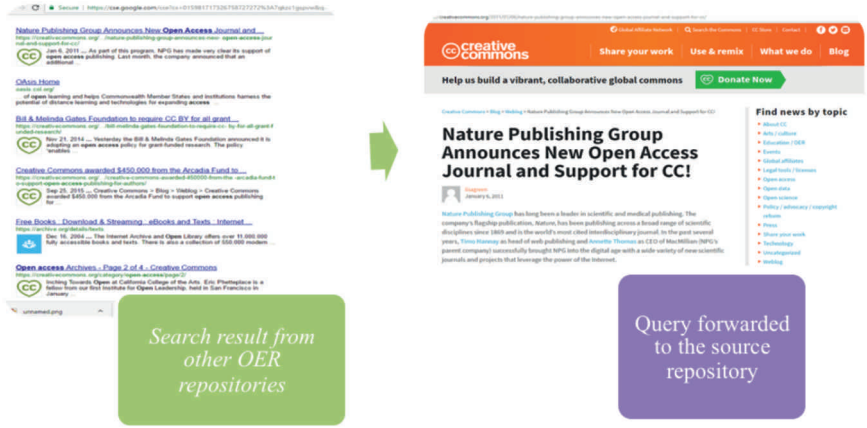


Figure 18: Retrieval of document from other repository

This robust and dynamic platform facilitates student to opt for maximum number of qualitative educational materials in order to support equitable education for all. Success of OER depends on its implementation and implications. Next section will be representing its usage analysis to measure user impacts on the basis of retrieved statistical data dated 23rd November, 2017.

Usage Analysis of NSOU-OER

Development of NSOU-OER is an ongoing process. As of May 2018, 3318 hits are there. More than 58 educational resources have been uploaded including study materials and audio/video lectures. More than 900 materials are yet to

be done after converting in OER compatible format (work in progress). Study reveals most visited documents are video lectures.

Figure 19 displays State-wise view/access of NSOU-OER repository. Hence among 9 states, most visited state is Kolkata then Bangalore in second position and Mumbai is in 3rd position.

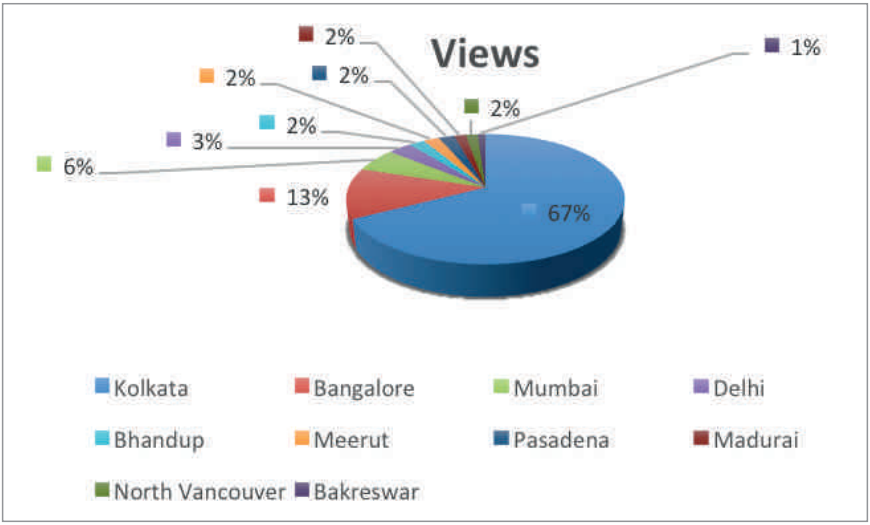


Figure 19: Top country view

Most of the users are from India with 70% views. And rest 30% are from other parts of the world including the United States of America.

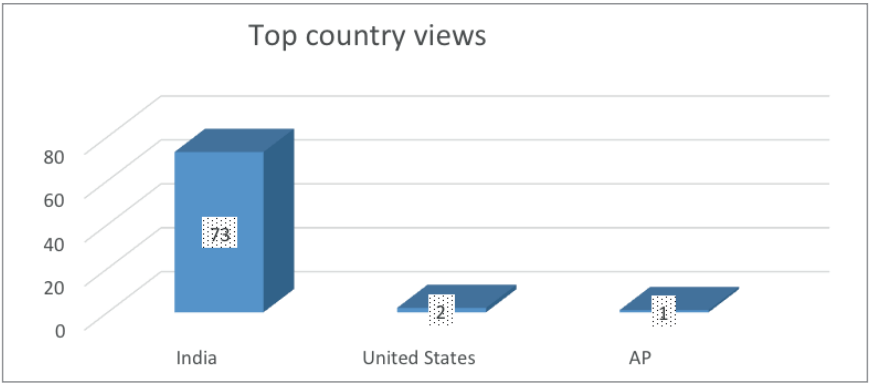


Figure 20: Top country views

70% views were made by the student community of Kolkata.

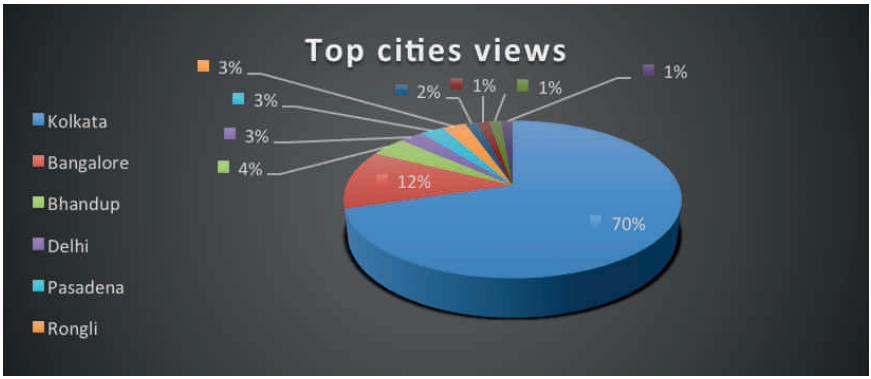


Figure 21: Top city views

Quality Assurance

By following the TIPS framework, three dimensional quality check is expected for NSOU OER materials. These are: i) Fit for Purpose, ii) Cost efficiency and iii) Transformative. Keeping this in mind, NSOU has a quality check policy mentioned in the follows:

Content level Quality assurance

The NSOU OER Repository strives to provide resources of the highest quality. The reviewing process is carried out at different levels. The curriculum based learning resources developed through peer reviewing and strict quality assurance mechanism inbuilt in the course development process will not require further reviewing for uploading on the repository. All other contributions will be peer reviewed within the department before uploading on the OER Repository. On the basis of the TIPS framework (http://cemca.org.in/ckfinder/userfiles/files/OERQ_TIPS_978-81-88770-07-6.pdf) the OER Board will adopt a set of quality assurance guidelines and indicators to help teachers focus on quality of OER (in process). TIPS quality assurance framework is there to support the development and use of OER that includes a set of 38 criteria that the board might consider at the time of judging the quality of OER. These criteria are grouped as follows:

- T - Teaching and Learning Processes
- I - Information and Material Content

- P - Presentation, Product and Format
- S - System Technical and Technology.

At the university level, an OER Board (constitutes the following members: Vice-chancellor, Chairperson of the Board Director/ Officer-in-Charge of the Schools of Studies Two OER experts nominated by the Vice-Chancellor) already has been created to review policy as well as the production, delivery and access processes of OER. Each and every resource must mention the licence in stipulated format as follows:

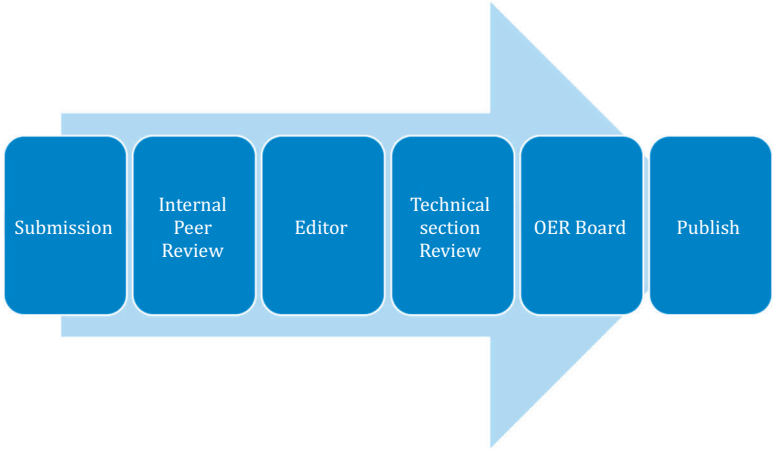
©[NSOU][Year]. [Name of the resource] is made available under a Creative Commons Attribution-[specific] 4.0 License [link of the cc license version], India

Reference, Proper citation

To maintain academic integrity and avoid plagiarism, each and every contributor has to acknowledge supported and used materials. It is better to use materials available in the open domain with open licence to create OER materials. Whether it is available in the open domain or one is using copyrighted materials (with prior permission to use), it is very important to manage resources in a proper and systematic way at the time of creating OER. It is mandatory to acknowledge actual responsible author(s) for using source(s) of each and every piece of information for a research work. Depending on subject specificity and publisher/publication, different types of citation styles are available in the educational domain. American Psychological Association (APA), the Chicago Manual of Style, Modern Language Association (MLA), etc., and even the IEEE, Nature have their own referencing style. NSOU mainly recommends the APA citation style 6th edition (http://pitt.libguides.com/content.php?pid=101667&sid= 764329) for the Social Science and Humanities stream and for the science stream it is the MLA 8th edition (http://pitt.libguides.com/citationhelp/ mla8thedition) is more expected.

Process of Submission for Publishing

Here is graphical representation of the entire publishing process. However, before publishing materials it should be confirmed that documents are generated and available in open format followed by open standards.



Conclusion

Implementation of OERs to ensure **inclusive and equitable quality education opportunities** ("Education - United Nations Sustainable Development," 2017). By repurposing of high quality open educational resources (OER) through institutional policies in order to facilitate an innovative, interactive and collaborative learning environment where learner's set their own objectives rather than be restricted by institutions.

- A model of low-cost OER platform using regional language for approx. 210 million Bengali learners worldwide.
- Ease of availability of educational resources from anywhere at any time by anyone.
- Using technological innovations in the distance learning environment to bridge the gap between learners and teachers.
- Make the university a model for state universities of India for learning practice and skill development to enrich the quality of education as per global standard.
- Sustainable improvement of resources in order to achieve excellence in the educational sector.

Recommendations

For sustainable development of OER movement, requirements of the system demand few recommendations:

1. Pan-Commonwealth OER Consortia to create a cross platform to maintain uniformity and resource sharing for optimal use of cost, time and manpower.

2. A National ICT Mandate for smooth running of the developed system.

3. National OER Mandate to enhance use of OER materials in order to reach democratisation of knowledge.

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Access to Vocational Education through OER and ICT: An Evaluation

Anirban Ghosh

Abstract

Netaji Subhas Open University (NSOU) was established in 1997 to offer the undergraduate and post graduate degree courses for the purpose of democratisation of higher education at affordable cost. The objective of the setting up of NSOU was to create a knowledge society. In the 21st century, if a person has knowledge and skill, she/he will have an edge over others in the job market. The University started to offer undergraduate courses and postgraduate courses in the year 1998 and 2000 respectively. It realised that only general education cannot fulfil the mission of the university. In order to minimise the gap between demand and supply of skilled workforce and also to promoter self-employment, the university introduced vocational courses with tailoring and dress designing to cater to the needs of the society in 2003. Subsequently, the number of vocational courses increased over the years. At present NSOU offers 19 vocational courses through a network of 34 study centres spread all over the state of West Bengal. Since 2014–15, the University is closely working with COL-CEMCA to popularise the vocational courses in the state and also for the qualitative improvement of the course delivery system like improvement in the content of the course materials, capacity building for the trainers, development of e-content, etc. The paper focuses on some of the recent initiatives taken by the University that ensure inclusive and equitable quality education and promote lifelong learning. This paper also highlights the impact of the COL-CEMCA intervention for quality improvement of the course content and delivery system of the two vocational courses, viz., Pre-primary Teachers' Education-Montessori (Diploma) and Tailoring and Dress Designing (Advanced Diploma).

Introduction

Skills and knowledge are the driving force of economic growth and social development for any country. Potentially the target group for skill development comprises all those in the workforce, including those entering

the job market for the first time, those employed in the organised sector and those working in the unorganised sector. India has set a target of skilling 500 million people by 2022. One of the greatest advantages for the Indian economy is the sustained growth of the workforce population. We have to convert the huge young population into demographic dividend. Harnessing the demographic dividend through appropriate skill development efforts would provide an opportunity to achieve inclusion and productivity within the country. The skill development initiatives help in employment generation, economic growth and social development. Skills mean employability and mobility. So a skilled person will have greater opportunity in the job market as well as her/his vertical or horizontal mobility will be easier.

At present skills base of the Indian economy is quite low as compared to other developed economies of the world. Many of the developed economies have 60 to 80% as skilled workers of the total workforce. Korea has as high as 96% skilled force. In case of India only 2% persons in the age group of 15–29 years have received formal vocational training and around 8% are reported to have received non-formal vocational training. 1976–77 saw the beginning of Vocationalisation of education. Little progress, however, could be made in the next 25 years. The traditional paradigm in which the cream of the students made the most of general education while the less talented ones opted for vocational education continued. 2006 onward, vigorous attempts have been made to integrate general and vocational education in view of the increasingly emerging national imperative that the child has a right to education and skill development geared to gainful employment when she/he grows up. Learners should be equipped with technical as well as basic communication skills to match the expectations of employees in terms of competency and performance. Hence, the need for continuous engagement with industry and hence, too, the need to take into account the conditions in which a person /employee performs because working conditions naturally have an impact on the employee's ability to deliver. All this leads us to the intertwined issue of standardization as competencies are observable and measurable. Thus, from an analysis of all the major issues involved emerges the converging point – the need to frame, to structure competency based curriculum. So we have to enhance the skill development infrastructure in such a way that all the persons who enter the workforce acquire relevant skills before entering the job market. But in the short run it will not be possible to develop adequate infrastructure to impart the skill development programme. Another major

problem is that the outgoing university graduates entering the job market lack employability.

The present scarcity of skilled labour can be addressed by the open and distance learning system (ODL). The ODL system, because of its inbuilt learner friendly feature and flexibility, has the potential to enable the learners to deal with the challenging and difficult task of acquiring skills. Through ODL methodology and with the help of Information and Communication Technology (ICT), Virtual Labortory, Virtual workshop, a greater number of persons can be trained with a specific skill. Apart from the electronic medium, different channels like a network of study centres, vocational centres and NGOs can be used for the vocational capacity building that in turn can help in social development. Public Private Partnership (PPP) may also be explored to impart vocational training. By ODL system through inclusive education, a larger number of people can be trained. With proper planning, the employability of the rural youth can be enhanced with region specific demand and modular based vocational training. This will expand the self-employment opportunity. The migration from rural area to urban area can also be minimised by providing proper vocational training through ICT meditated ODL system.

About the School of Vocational Studies (SVS) NSOU

Open and Distance Learning is increasingly becoming popular because of its flexibility and learner friendly approach, particularly to those who could not get access to the formal education system. Netaji Subhas Open University is not only imparting education as an alternative to the formal system of education, i.e., conventional courses, but also in areas such as vocational and non-conventional courses. This is the area where the distance education can be used extensively to provide education that can prepare the skilled workforce for society. The University is providing vocational and non-conventional courses so that the learners can engage themselves in income-generating livelihood. It is not possible for the formal education system alone to provide desired number of skilled workers. In such a situation, the School is giving the opportunity to upgrade the skill of the existing workforce as well as of the fresh graduates by providing seamless vocational education and a platter of pioneering courses non-conventional in nature.

The SVS offers 19 vocational courses through 34 study centres located throughout the state of west Bengal. All the courses are duly recognised by the University Grants Commission-Distance Education Bureau (UGC-DEB). The annual intake of the vocational courses is around 2000 learners.

Contribution of COL-CEMCA

Vocational Education plays a vital role in human resource development of the country by creating skilled manpower, enhancing industrial productivity and improving the quality of life. The objective of the vocational education is to create a workforce empowered with improved skills, knowledge and internationally recognised qualifications to gain access to decent employment and ensure India's competitiveness in the dynamic global labour market. It aims at increase in productivity of workforce both in the organised and the unorganised sectors, seeking increased participation of youth, women, disabled and other disadvantaged sections and to synergise efforts of various sectors and reform the present system. Skill development initiatives support employment generation, economic growth and social development process.

Taking into consideration the importance of vocational education and training, the Commonwealth of Learning-Commonwealth Educational Media Centre for Asia (COL-CEMCA) has come forward to join hands with Netaji Subhas Open University for the purpose of promoting vocational education and training in the State of West Bengal. Lot of joint initiatives have been taken by the University to increase the access to vocational education and to improve the institutional capacity for providing services to the students in an effective manner. The COL-CEMCA has extended financial support and expertise to undertake the following joint projects at the Netaji Subhas Open University.

i. Upgradation and alignment of syllabus of all Vocational Courses to NSQF (2014–2015)

ii. Development of blended course materials for Tailoring and Dress Designing (vocational course) (2015–16)

iii. Development of NSOU OER repository (2015–16), (www http://nsouoer.krc.net.in)

iv. Vocational Education & Training offering through Mobile Learning: An Innovative ODL Approach (2016-17)

v. Increase Access and Improve Institutional Capacity for Sustainable Development through Vocational Education and Training (2017-–2020)

The School developed the blended materials of two courses, viz., i) Tailoring and Dress Designing and ii) Pre-Primary Teachers' Education Montessori with financial assistance of COL-CEMCA. The students of these two programmes are given the printed SLMs and A/V lectures. All the SLMs and the A/V lectures are also available on NSOU OER Repository with the appropriate CC licences that have been developed with the help of COL-CEMCA. The School of Education (SOE) has also developed the blended materials (SLMs and A/V lectures) on Inclusive Education with the financial assistance of COL-CEMCA. The SOE has recently launched a certificate course on Inclusive Education.

All the vocational courses create new job opportunities at the urban and rural areas of the State. About seven thousand learners were trained during 2009 to 2016 in different trades out of which the tailoring and dress designing and Pre-primary Teachers' Education-Montessori are most popular. The University has developed e-SLMs and is uploading material including video lectures on its web portal/OER repository to facilitate anywhere anytime learning and reach out to even those who are left to fend for themselves. Under the 4th project, initiatives were taken to reach the remote students with the m-learning facility. It helps the students of remote areas without internet connectivity leading to education through individual handsets.

The on-line learning aims at increasing the knowledge, skills and productive capabilities of the learners in a global situation. Online learning is important not only for economic reasons but it has significant social benefits as well, by broadening access to high quality education and training opportunities to the various segments of our society. It has a potential to reduce the economic disparities caused by denial of education to the economically deprived sector offering them better work opportunities and income growth at all levels.

Now the University changes its delivery mode from only print materials to digital academic content. The students are now getting not only the print materials but also the digital form of SLMs (CD-ROM), SD Card for the offline mode and e-SLMs, A/V lectures for online mode of delivery. Since the

University is providing e-content through offline and online, the trainers should know the techniques and procedures to use the ICT in addition to their own subject/discipline. The trainers have to take the responsibilities for delivery of courses through the use of ICT, so that the students can take fullest advantage of personalised teaching-learning experiences effectively. The University conducts an orientation programme for the trainers every year under Training of Trainers' (ToTs) programme.

To reach-out to additional learners with more learner friendly packages, the School has taken up a project during the next three year (2017–20) for successful implementation of COL-CEMCA integrated higher education model with support of CEMCA. Following are the activities:

- Conduct baseline survey for feedback from the existing students.
- Create and develop e-content for all the vocational courses.
- Make available all the University resources on NSOU OER Repository with appropriate CC licence.
- Develop web portal, facilitating the trainees and employers to interact.
- Organise outreach programmes in rural areas to sensitise the potential learners.
- Organise job fair.

The purpose of all the activities is to increase the accessibility of the potential students in different vocational courses and also to improve the institutional capacity for the betterment of support services.

Vocational education has to be viewed from different multi-layered practices. One is of course the hands on training. The other is employment generation and sustainability, whether the training programmes can lead to wage employment or self-employment. If so, there has to be follow up measures to see what the trainees in a vocational programme have achieved and whether there has been a progress in terms of employability and income generation. Also whether any industry has employed any trainee who has completed the vocational course in a particular trade.

Impact of CEMCA's contribution

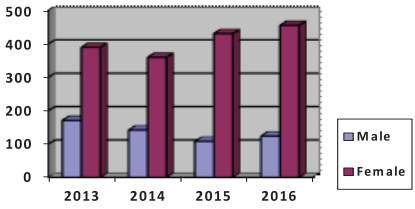
The Mobile application enabled to access the Learning Management System (LMS). The app is also enabled for Offline content viewing facility for the students using a micro SD card. It delivers high quality technology powered courses, using its powerful and hybrid mobile platform, thereby removing the need for a computer and a high-speed Internet connection for the students. Using the platform, students from even remote and rural areas of the country will be able to learn online for their diplomas on their smart phones. The students get access to their virtual classroom through their unique login ID and Password within the Student Portal. The entire student portal is also available on a mobile platform. Students get access to ticketing system and their e-mails through the same.

Table 1 clearly shows that since 2013 the enrolment in both the courses has increased significantly. It also shows that both the courses are more popular among the females than the male students. Since, these are workshop/practical based courses, the intake capacity per centre is fixed. But due to intervention of COL-CEMCA towards the ICT adoption, the enrolment has increased steadily. During 2014–15, lot of initiatives like upgradation of syllabus, development of e-content, and development mobile app had been taken up and this increased the enrolment in the said two courses. So the joint projects with COL-CEMCA has influenced student accessibility in vocational courses.

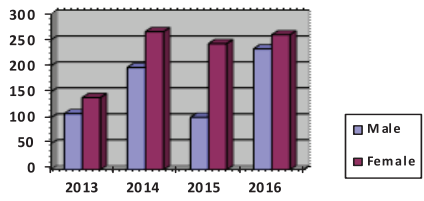
Table 1: Enrolment on the CEMCA supported courses.

Courses/ year of admission	2016		2015		2014		2013	
	M	F	M	F	M	F	M	F
Diploma in Pre-primary Teachers' Education- Montessori	124	456	108	431	142	360	171	390
Tailoring and Dress Designing	233	260	101	243	197	266	108	139

M= Male and F=Female



i) Pre-Primary Teachers' Edn.



ii) Tailoring & Dress Designing

Mobile learning (M-learning) through mobile phones can make use of the learning management system that is already available through internet. Where the internet accessibility is limited, mobile phones can also facilitate the learning process on offline mode through micro SD cards. Without any restrictions, the students can now access the learning resources anywhere in the world where internet is available. The University launched the M-learning project on a pilot basis for its vocational ToT programme namely the Diploma in Pre-Primary Teachers' Education (DPTTE-M) and Advanced Diploma in Tailoring and dress designing courses. Since 2013 the enrolment has steadily increased in the above two courses.

During the last 4–5 years, the University has been taking up a lot innovative initiatives for the students enrolled in vocational courses. A survey was conducted among the students to investigate the mobile learning benefits including ICT support and to analyse the students' perception on mobile learning. Under the project the structured questionnaire was circulated among the enrolled students to examine their attitude and self-efficacy about the M-learning and online ICT support.

The study shows that almost all the students enrolled in this particular course use mobile phones and majority of these mobile phone have numerous features like pictures, video, games, instant messaging and internet. Even some low-end mobile phones have these features that enable them to be used in education, research, reading, etc.

Table 2: Attitude towards M-learning

Items	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
A mobile device can help me to attain more ideas in learning	80.0	6.5	5.0	5.0	3.5
A mobile phone is helpful for my learning	22.5	70.0	2.5	3.5	1.5
I feel bored using a mobile device	xx	2.5	7.5	2.0	85.0
I love to use a mobile device in learning activities	15.0	30.0	12.5	25.0	17.5
I can use my mobile device without the help of others	87.5	5.0	7.5	xx	xx

Table 3: Learners' self-efficacy of M-learning

Items	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
I can download a figure from the internet using a mobile device	77.5	15.0	2.5	5.0	xx
I can log on to the website on my mobile device	78.5	17.00	2.0	2.5	xx
I can check a hyperlink to enter another website using my mobile phone	60.0	25.0	5.0	7.5	2.5
I can use a mobile device to discuss with peers about the learning materials	6.5	68.5	12.5	7.5	5.0
I can take pictures on my mobile device to show the related information	92.5	5.0	2.5	xx	xx
I think mobiles are very ideal for learning	71.0	11.0	9.0	6.5	2.5

Tables 2, 3 and 4 exhibit how the students are efficient in using their mobile phones. In Table I, it is interesting to note that the most of the respondents are not bored in using their mobile devices but they are least interested to use the device for learning purpose though they thought that the mobile devices could be used for learning new ideas.

Today's young generation is very technology savvy and use their mobile phones for various purposes in day-to-day life. They are now using the devices to download the universities A/V lecture and also the content that is available online in the OER Repository. Specially for the students who live in the remote places, this initiative really helps them and the students are motivated to get their lectures and course content through the online and offline modes.

Table 4: Learners' attitude towards A/V lectures in the SD Card/Repository

Items	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
A/V lecture is a good use of technology for learning at a distance	48.5	28.5	11.0	4.0	8.0
A/V lectures motivate learners to learn effectively	38.5	29.0	19.0	6.0	7.5
Pictures, diagrams and graphics in the A/V lectures enhance learning	31.0	57.5	7.5	4.0	xx
Video animation makes the A/V lecture attractive and understandable	45.0	32.5	10.0	6.0	6.5

The University tried to motivate the students to use their mobile devices for their learning purpose. To facilitate the anywhere any time learning, the university developed the A/V lectures and digitised course materials for the students of the teacher training programme. The university encouraged the students to use the mobile phones to have experiences of anywhere any time learning. These A/V lectures and digitised course materials were distributed in a Micro SD card among the students. Where the internet connectivity was not available, specially in rural areas, the students took advantage of the offline mode, i.e., they used the Micro SD card. The same content (A/V lecture and course materials) is also available on the university website/Repository and this can be accessed online any time anywhere. The study shows that there is positive impact of mobile technology by which the educational content can be delivered both by online and offline modes.

The survey was conducted to examine the impact of COL-CEMCA's project on the learners of pre-primary teachers' education-Montessori and tailoring and dress designing courses. The result in Table III is very encouraging. The students are very happy to have the experience of hearing the lectures from eminent teachers in the field through online and offline mode. It is not necessary to attend the face-to-face counselling to hear the particular lecture. If they wish, they can also hear the particular lecture for numerous times to understand the subject. The A/V lectures of the University are becoming very popular among the students as well as the teachers. For the practical components of the vocational courses, face-to-face discussions are arranged in the study centres where the trainers demonstrate/discuss the matter with the learners at the particular study centre. It helps the learners to understand what the content is in the A/V lectures.

Role of Multimedia Courseware

The multimedia courseware includes both print and non-print media of academic resources. After the adoption of the OER policy, both the print and non-print course materials of the vocational courses of the university are released under the CC licence, CC-BY-NC-SA. The multimedia delivery of courses also involves the F2F teaching, online chatting, etc. It offers free and immediate access to digital materials including previous years' question papers, A/V lectures, lesson plans, e-SLMs, etc., facilitating personalised learning. The teachers can also track the individual learner about his/ her progress in a particular course.

Goal 4 of the Sustainable Development Goal (UNDP) is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. COL-CEMCA Higher Education Integrated Model has been developed to achieve Goal 4 of the SDGs. This is an application based model that includes capacity building of the teachers, development of OER, strengthening the student support mechanism, reaching the marginalised population, linkage with industry to sustain the skill development programmes, providing employment, promoting entrepreneurship with the skills to become financially independent. The OER developed for the vocational courses are very popular to the learners specially to women learners who cannot attend the F2F classroom teaching regularly. Since both the courses under study are practical based and job-oriented, the multimedia courseware helps the learners to acquire the skills and knowledge in the subject domain to make them employable.

Conclusion

We cannot ignore the potential of technologies to improve access to education and skills training. Learning must lead to sustainable development that includes economic growth, equity and environmental conservation. Today, integration of ICT and OER into the academic programme is a necessity to increase access. If we are to meet the challenges of both quality and quantity in imparting skills, we must take an innovative approach to education – the brick and mortar approach will not be sufficient. The development of OER and the potential of Massive Open Online Courses (MOOCs) in the vocational courses have been discussed. The impact of new technology is being felt a necessity across the courses. The development of new ICT is already having a major impact on the teaching-learning process of both the conventional and ODL modes. The advancement of ICT has brought new opportunities to restructure the teaching-learning process whether it is the ODL system or regular system. In the present century, we are living in the digital age. The distance is no more there. The accessibility is being facilitated by the ICT through OER, MOOCs, etc. In the 21st Century, both the systems of education are being converged by integrating the ICT in the teaching-learning process.

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