

A Study on the Adoption and Integration of OER Materials in Self-Instructional Course Development

Mohan Menon
DISHA Global Trust, Kochi
mohanbmenon@gmail.com

Vasant Bhat
Regional Institute of Education (NCERT) Mysore
bhatvd@yahoo.co.in

Rama Mathew
Formerly with University of Delhi, Delhi
ramamathew@yahoo.co.in

Phalachanadra Bhandigadi
Wawasan Open University, Penang
bphala@gmail.com

Abstract

Creation of large number of Open Educational Resources (OERs) and adoption and integration of such resources for classroom teaching and creation of new learning materials are expected to impact on creation of quality learning materials with relatively low cost. There is wide agreement that OER materials can be harnessed to produce educational materials within a given instructional context. However in spite of a few studies on reusability of open educational content in different contexts, there is insufficient information and understanding about the processes involved in OER integration and contextualisation. This paper reports part of the findings of Sub-project-7 of a meta-project viz. Research on Open Educational Resources for Development (ROER4D) that investigates into the operational processes involved in the development of self-learning materials by integrating available OER resources in developing a 5- credit (200 hours study) course on 'Research Methodology in Education' at post-graduate level. The operational processes related to the web search and use of OER reported in the project are findability of relevant OER materials, levels of reusability by course writers and cost-time efficiency achieved by the use of OER. These qualitative data on these variables were captured in the form of log records, written reflections, individual and focus group discussions, semi-structured and unstructured interviews, etc. Findings of the study show that there is adequate availability of relevant OER resources of varied types and formats for the given course. It is also found that there are a number of factors including mainly subject content expertise, subject specific pedagogy, OER awareness, OER reuse skills and understanding of local learning environment which positively influence the effective reuse and integration OER and the ways constituting the integration process are adoption, remixing, adaptation, re-creation and new creation

Introduction

The challenge of inadequate training and learning resources in education, particularly teacher education, led to the creation of several OER collections and repositories in Sub-Saharan Africa and South Asia. However, very few accounts of how OERs are being used are yet available (Atkins et al., 2007). The process of OER use in different educational contexts is still not fully understood. Added to this, the definition and operational

techniques underlying OER are not universally agreed upon. Wiley (2009) argues that while the use of OER is often considered as ‘assembly’ meaning ‘combining resources as if Lego bricks for reuse with a new audience’ - open licences allow for more fine-grained modifications to be made through ‘remixing’ OER. According to Wiley (2009) the potential for ‘remix and reuse practices are little understood, poorly supported, and yet to occur in a widespread fashion’. The present study taken up as part of ROER4D meta-project coordinated by the University of Cape Town and funded by IDRC, involves investigation into the processes involved in reusing online OER for developing an entire course for offer in an e-Learning environment as part of OER implementation in the Wawasan Open University (Menon, 2012).

It is evident from the review of available literature in the field that the use of OER in course development is still an area not fully explored. While the OER movement has succeeded in the creation of a large number of open resources, many of them with Creative Commons (CC) licences, here are not many studies that have probed the effective use of OER in course development. The Thakrar *et al*(2009) study has only considered the use of OER resources with a full open licence in a context where the OER development process itself included the participation of a number of teacher education institutions as a consortium. The findings of Coughlan *et al* (2013) have provided some insight into different types of *reusing and remixing* OER, but only within the limited context of two courses which are delivered as OER. In both these cases the reuse of OER has been studied while adopting a fixed set of open resources. They have not explored the reuse and remix of OER searched from a wide range of online resources available under varied levels of open licencing. Okada *et al* (2010, 2012) in their studies mainly focused on the collaborative creation of open educational content and developed a set of ways to reuse OER. Petrides, *et al* (2010) reported a study where one of the aspects investigated was the different ways in which course developers used OER but did not focus on this aspect to the extent envisaged by the framework developed by Okada (2010).

The Study

Research Questions and Objectives

The present study is expected to contribute in finding some answers regarding the ways in which OERs with different levels of openness or relaxations of use with or without an open licence can be reused while a new course is being developed reusing a large number and variety of resources. The research questions the project addresses are the following:

1. To what extent were the course developers able to search and find relevant OER materials?
2. What are the competencies required by the course developers for effectively integrating OER in the development of course materials?
3. What are the different ways in which the OER materials have been reused?
4. Will course materials developed by integrating OER be more cost-efficient?

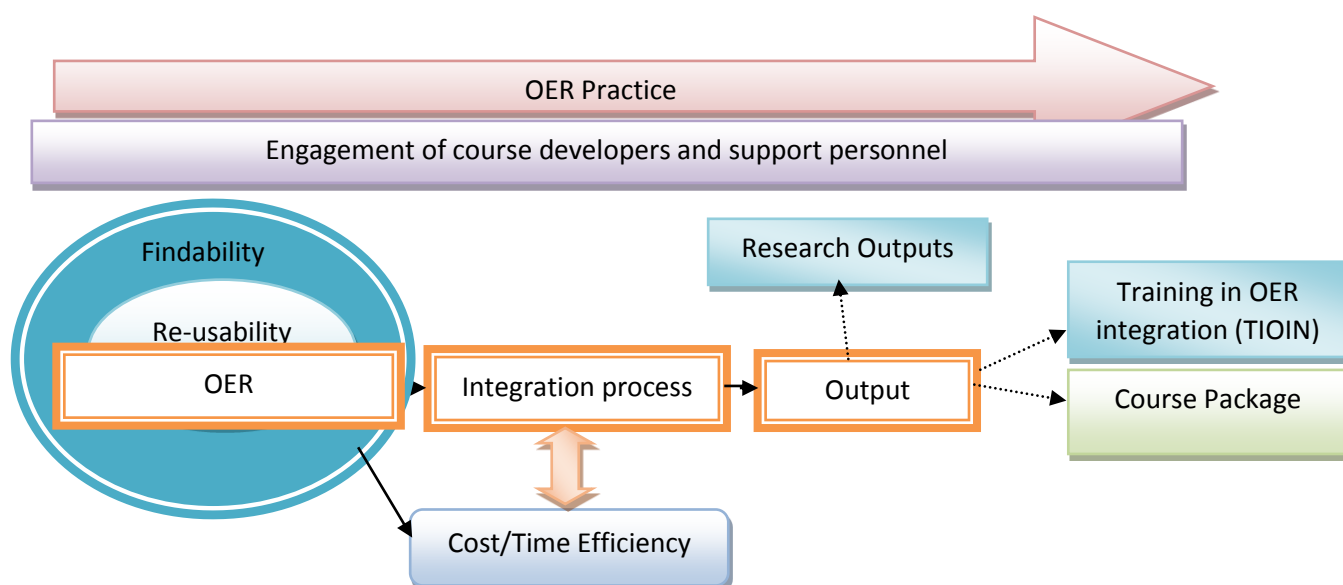
The present study has the following specific objectives:

1. To study the *findability* of course writers in searching for and identifying appropriately licenced online multi-media OER materials to suit the curriculum of the selected course
2. To identify the various *levels of reusability* for developing a new course
3. To study the *cost/time efficiency* of developing an e-Learning course with various levels of reusability

Conceptual Framework for the Study

Figure-1 presents the conceptual framework of the study. In addition to the research findings the outputs envisaged initially for reuse by practitioners and researchers were only the Course Package on Research Methodology’ and standardised Tools on ‘Attitude towards OER’ and ‘Users’ Perception of Quality of the Course Materials’. However, a third output emerged during the tryout of the course materials. This was a training design on OER integration (TIOIN).

Figure-1: Conceptual framework of the study



Methodology

In this project an exploratory case study approach was adopted to understand and critically reflect on the issues, problems and challenges involved.. Research Methodology in Education (RM) was identified as the course with 5 independent modules for attempting OER integration. The case study design is generally used for in-depth investigation of a problem in one or more real-life settings (case sites) over an extended period of time. In this a mixed approach involving collection of both qualitative and quantitative data using a combination of tools including log records, interviews, personal observations, focus group discussion and by administering different tools such as questionnaires and rating scales. Tools developed and standardised for use for data collection included a Log format for search and find data by the OER search team; Reflection scale for search and find data by the course developers, questions for focus group discussion and interviews with the course developers, guidelines for narratives by course developers, facilitators, and the search team members.

The two categories of samples identified using purposive sampling technique are *OER Search Group* of four persons (all female) from within the University and *Course Developers Group* of 5 course content experts with teaching experience (2 male and 3 female) in the area of ‘Research Methodology in Education’

The initial draft of five modules of the course were prepared in two course development workshops of 5 days each in Kochi, India and Penang, Malaysia. Three research team members and two instructional designers facilitated the work of the course writers. The course modules developed were further reviewed and are being finally edited. The course package will be available with CC-BY-SA licence.

Analysis of Data

The study looked at the extent of findability of OER from course developers perspective on 8 aspects viz, availability, variety (multimedia), variety (text), relevance, openness, quality, communication friendliness of the materials and format suitability. Both quantitative and qualitative data collected were analysed.

Both qualitative and quantitative data were obtained through different tools and a variety of sources were. The analysis of both qualitative and quantitative data for the were done adopting the triangulation approach using three types viz. methods triangulation, triangulation of sources and analysts triangulation. Denzin (1978) and Patton (1999). William Tibben (2013) demonstrate the effectiveness of using triangulation in case study research.

Data Analysis and Findings

In addition to data obtained from Log records, responses on a findability rating scale and focus group discussions each author and facilitators gave their narratives on their experiences. As sample, extract narratives showing reflections and observations of three course developers are given in Table-1.

Table-1: Sample extracts from narratives of course developers (emerging codes are indicated in brackets)

<p>Extract from Course Developer-1: Initially I felt that I missed quite a bit of the orientation to writing through the OER approach (OCA & ORE), but I caught up later. I think that there are mainly two</p>
--

components to this work: one is the access to relevant materials on the internet and two, the ability/skill to adapt other OER materials (ORE) to our need/purpose (LLE). As for the first one, although I had lots of materials to start with, until I learnt to make sense of how I can re-use/purpose/fashion it (ORE). I was very tempted to write my own as I have been teaching the content for many years (SCE). My own repertoire in the area wasn't too bad given my several years of handling this course face-to-face (CSE & LLE), but realized that other materials in variety of media can only enhance the quality of presentation (QE) and would help in catering to the needs of all learners (LLE)

Extract from Course Developer-2: I needed two kinds of resources to suit the needs of the instructional design (CSP & LLE) and the conducive pedagogy (CSP) for such a subject two kinds of resources, one on explanations on the logic of an analysis procedure and the second on illustrations and exercises for practice. My good understanding of the subject content (SCE) and my long teaching experience (CSP) would have helped in identifying the relevant content without much difficulty. And I was well oriented in OER related concepts (OCA) and also had some experience of reusing OER (ORE). Some parts were largely written by me (NCR) with some inputs from OER materials and these were easily available. More than one resource can be used for the same content (MIX), the textual part could be reused with alterations/ adaptations (ADA) but the video/audio material could not be due to the fact that it required additional technical skills which I did not possess (ADO & ADA).

Extract from course developer-3: The strategies used for development of resource based course material is largely linked to the model as adopted a situated learning design, as evolved by the group (CSP & LLE). This decision was important and did give the required guidance at the time of OER use. The group was adequately given orientation by the organiser on how to locate and use the existing web-based resources (OCA & ORE). I was already aware of OER concepts (OCA). The workshops organised gave me sound footing on locating the relevant web-based resources to accomplish the task on developing the module (OCA & ORE). It was also a challenging task to ensure that these materials meet the standard norm to be characterised as OER and free from copyright (ORE). It is always essential that the writer of the module has acquired necessary competencies on understanding of the subject matter and also has specialisation thereupon (SCE). Understanding of how to transact this content in a teaching situation (SCP) to suit the needs of a group of learners (LLE) is very necessary. The resource person engaged in writing such module should have positive mind set and mastery on using new technology, especially competencies on locating right type of web-based resources (ITS).

Findings

Objective-1: Findability

Findability data were collected from three sources viz. log records of the search team, narratives of the authors and observations and interviews/focus group discussions conducted by the research team. The log record of OER search and find team providing data about three attributes of the OER materials discovered for the study- the format types, license types and time taken to search and download relevant web resources. Majority of the resources were in HTML format (64.57%) followed by PDF format (22.78%). This finding was well corroborated by the authors who also performed further search for identifying the appropriate resources for their modules. They also indicated the scarce availability of audio and video resources.

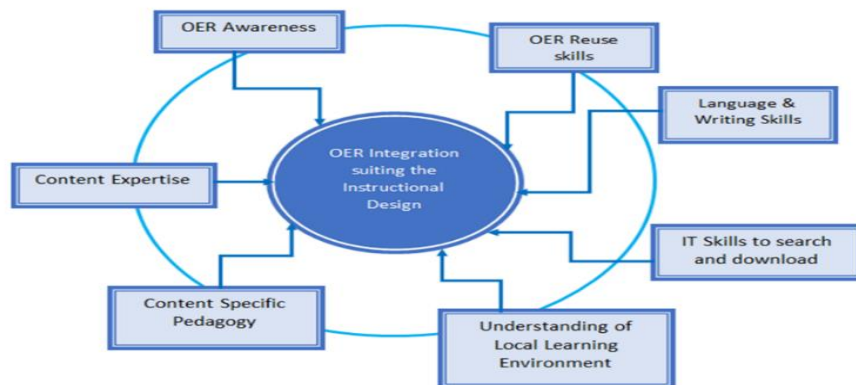
Sufficient availability of OER materials (77.64%) with CC-BY, CC-BY-SA and CC-BY-NC-SA was reported by the search team which indicated the flexibility and freedom for authors for reusing them with modifications. Only 2.1% of the resources were with 'non-derivative' license. A similar finding was reported by course developers in their responses. Similarly both the search team as well as the authors reported very high findability of OER materials from the web in relatively short time. The search team reported that over 80% of relevant OER materials could be searched, discovered and downloaded in 20 minutes or less time in each case, of which over 55% resource downloading took less than 10 minutes.

What seems to be emerging as findings with regard to this objective is that the Search team could identify a number of websites and resources in the relevant content area. Findability of relevant resources was also high as reported by all five course developers. The research team members could locate a number of relevant materials for the five modules. The focus group discussions with the course developers revealed that all were not knowledgeable about different Creative Commons licenses prior to the course development activity. Prior knowledge about OER related concepts and adequate skills in search and find OER resources would have further reduced the time for finding the required resources.

Objective-2: Reusability

A triangulation of findings from the content analysis of the reflections and observations of the course developers obtained from focus group discussions and interviews as well as the narratives of the course developers, facilitators and instructional designers shows the emergence of 7 competency areas which would facilitate the effective findability and integration OER materials to develop a quality assured course material. These are presented in Figure-2:

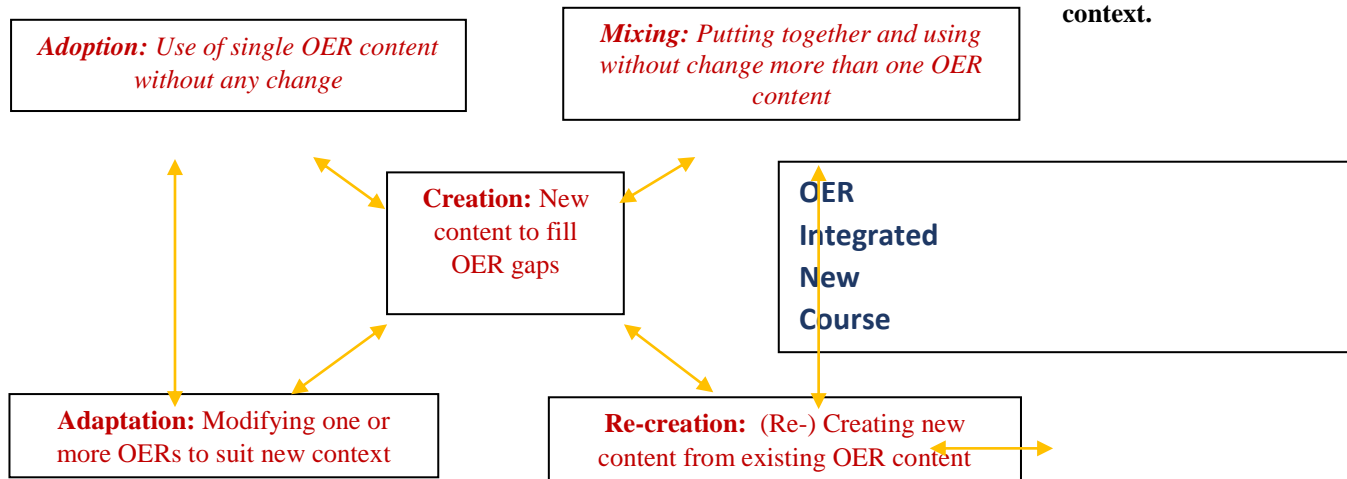
Figure-2: Competency Areas required for OER Integration



The finding emerging from the narratives and interviews also show that the re-use of OER and localizing them for a new learning environment is a complex process involving a number of sub-processes. Figure-3 presents the 5 areas of sub-operational processes that constitute the OER integration for course material development.

Figure 3. Emerging model of OER Integration for

a given context.



Objective-3: Cost/time Efficiency

The initial indications of evidence regarding *cost/time efficiency* is that when a large chunk of OER text materials are available it becomes easier and less time consuming to use these materials and contextualise them. A good understanding about the instructional design and experience of writing materials also helped in completing the materials faster. When the OER used are a large number of smaller reusable learning objects (RLOs) it took more time to integrate them and develop the materials. If all the OER materials are collected in advance for each concept or section of the modules by experienced and competent persons, the course writers seemed to be faster in integrating them for developing the materials. All course developers felt that it took initially more time to reuse the OER objects but with better understanding of the process the time gradually reduced. All course developers were unanimous in their view that appropriate reuse of OER materials surely enhances quality. Hence better quality OER integrated materials can be developed with lesser time and this clearly shows that development of OER integrated course materials are more cost/time efficient than developing entirely new content or using copyrighted content with royalty paid.

Conclusions

This paper reports the findings of the first three objectives of the sub-project of ROER4D Meta Project. Being an exploratory study and taking only one content area, the findings related to the three variables viz. findability, reusability and cost-time efficiency of adoption and integration of OER materials for course development can be considered as generalizable to other contexts. However, these findings do provide directions for formulating a number of hypotheses that could be further tested using more intensive and replication studies in different contexts. It is however evident through this study that adoption and use of OER in development of new course materials is not a straight forward and simple process. Its complexity has not been fully understood and acknowledged by researchers and practitioners. The operational processes involved are complex influenced by variations in available OERs on a number of attributes involving quality, formats, extent of copyright relaxation, media types, size, etc. When a number of such resources have to be identified and reused for a new learning environment with different learning and learner needs of that context, the process is found to be too complex to be explained with terms such as mix and remix, repurpose, etc. The process is much more granular and a term such as integration may be better suited to explain fully its sub-operational processes. OER integration is an accepted term in class room teaching while it is still not fully accepted in course material development where the students are expected to go through all the learning experiences required for the course. Distance educators consider a good self-instructional material to be like an effective teacher in the classroom and hence the term OER integration is equally applicable to the self-instructional context. And this term subsumes the five sub-operations viz. adoption, (re) mixing, adaptation, re-creation and new creation. These sub-operational processes are the different ways of reuse leading to integration. This study has not looked into how various types (both media types and text types) of OER materials fit into the needs of achieving different learning outcomes. This research area is very new and virgin providing lot of possibilities for further studies.

Acknowledgement

The authors would like to acknowledge the research grant and professional support provided by Research on Open Educational Resources for Development (ROER4D) Project and IDRC (Canada) this study. The authors also acknowledges the entire research team of the Subproject-7.

References

- Atkins, D. E., Brown, J. S. & Hammond, A. L. (2007). *A review of the open educational resources (OER) movement: Achievements, challenges, and new opportunities*.
- Chiappe, A., & Arias, V. (2015). Understanding reusability as a key factor for open education: A review. *The International Review of Research in Open and Distributed Learning*, 16 (1). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/2042/3208>
- Coughlan, T., Pitt, R., & McAndrew, P. (2013). Building open bridges: collaborative remixing and reuse of open educational resources across organisations. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 991-1000). Paris, ACM.
- Menon, M. B. (2014). Wawasan Open University: Developing a fully OER based course. S. Naidu, & S. Mishra (Eds.), *Case Studies on OER based e-Learning*, CEMCA, New Delhi.
- Morville P. (2005). *Ambient findability: What we find changes who we become*. CA: O'Reilly Media.
- Okada, A. (2010). Reusing educational e-content. Retrieved from <http://labspace.open.ac.uk/course/view.php?id=5571>, retrieved 29 July 2016.
- Okada, A., Mikroyannidis, A., Meister, I., & Little, S. (2012). "Co-learning"- collaborative networks for creating, sharing and reusing OER through social media. In *Cambridge 2012: Innovation and impact – Openly collaborating to enhance education*, 16-18 April 2012, Cambridge, UK.
- Petrides, L., Jimes, C., Middleton-Detzner, C., & Howell, H. (2010). OER as a model for enhanced teaching and learning. Retrieved from <http://openedconference.org/2010>
- Thakrar, J., Wolfenden, F., & Zinn, D. (2009). Harnessing open educational resources to the challenges of teacher education in Sub-Saharan Africa. *The International Review of Research in Open and Distributed Learning*, 10 (4). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/705> 1-15.
- Wiley, D. (2009). Impediments to learning object reuse and openness as a potential solution. *Revista Brasileira de InformaticanaEducação*, 17 (3), 8-10.
- Wiley, D. (2009). Open education license draft. Retrieved from <http://opencontent.org/blog/archives/355>
- Wiley, D. A. (2000). Connecting learning objects to instructional design theory: A definition, a metaphor, and a taxonomy. In D. A. Wiley (ed.), *The instructional use of learning objects: Online version*. Retrieved from <http://reusability.org/read/chapters/wiley.doc>
- Wiley, D., Green, C., & Soares, L. (2012). Dramatically bringing down the cost of education with OER: How open education resources unlock the door to free learning. *Center for American Progress*. Retrieved

from <http://www.americanprogress.org/issues/labor/news/2012/02/07/11167/dramatically-bringing-down-the-cost-of-education-with-oer/>

Wiley, D. (2013). On quality and OER. Retrieved from <http://opencontent.org/blog/archives/2947>