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Review of the Current OER Search Dilemma



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Open Educational Resources (OER) are fast gaining traction amongst the academic community as a viable means of increasing access and equity in education. The concept of OER is of especial significance to the marginalised communities in the Global South where distance education is prominent due to the inability of conventional brick and mortar institutions to cope with the growing demand. However, the wider adoption of OER by academics in the Global South has been inhibited due to various socio, economic and technological reasons. One of the major technological inhibitors is the current inability to search for OER which are academically useful and are of an acceptable academic standard. Many technological initiatives have been proposed over the recent past to provide potential solutions to this issue. Among these are OER curation standards such as GLOBE, federated search, social semantic search and search engines such as DiscoverEd, OCW Finder, Pearson's Project Blue Sky. The research discussed in this paper is carried out in the form of literature review and informal interviews with experts. The objective of the study is to document the extent of the OER search issues contributing to the slow uptake of the concept of OER. This review paper discusses the current OER search dilemma and the impact of some of the key initiatives which propose potential solutions.

Keywords: Open Educational Resources, OER, OER Search, OER Search Technologies

1. Introduction

With the new drive towards accessible and open information, Open Educational Resources (OER) have taken centre stage after being first adopted in a UNESCO forum in 2002. OER can be defined as “*web-based materials, offered freely and openly for use and re-use in teaching, learning and research*” (Joyce, 2007). Although many countries have, in theory, embraced the concept of OER, it is still to become mainstream academic practice due to various inhibitors. One such inhibitor is the inability to effectively search for OER which are academically useful and are of an acceptable academic standard.

With the dramatic changes taking place in Higher Education (HE) within the past 10 years, academics have had to adopt new cost effective approaches in order to provide individualised learning to a more diverse student base (Littlejohn, Falconer & McGill, 2008). In this context, OER has the potential to become a major source of freely reusable teaching and learning resources, especially in higher education, due to active advocacy by organisations such as UNESCO, the Commonwealth of Learning (COL), Organisation for Economic Co-operation and Development (OECD); and the International Council of Distance Education (ICDE).

Despite the fact that OER were initially limited to text based material and are still predominantly in text based formats, they are not restricted by the media types or the file types used. Many modern OER are released as images, movie clips, animations, datasets, audio clips, podcasts, among others, providing rich multimedia based material for use and reuse. These multimedia resources are made available through large repositories such as YouTube¹ (video), Flickr² (images) and iTunesU³ (podcasts) under the *Creative Commons* (CC) licensing scheme.

According to McGreal (2010), modern OER repositories can be classified into three categories:

- *Content repositories* – hosts content internally within the repository.
- *Portal repositories* – provides searchable catalogues of content hosted in external repositories.
- *Content and portal repositories* – hosts content internally in addition to providing catalogues of content hosted externally.

Within these three types of repositories, Wiki, “*...a software tool that promotes and mediates discussion and joint working between different users...*” (Leuf & Cunningham, 2001), plays a central role in the present day OER arena. Projects such as WikiEducator, Wikibooks, Wikimedia Commons and Wikiversity are among the popular Wiki based OER repositories. Another widely used repository is *Rhaptos* developed by Rice University. This repository hosts the popular Connexions OER repository which allows the easy creation, use and re-use of text based learning objects (LO). The *Rhaptos* platform is currently also being used by other repositories such as Vietnam Open Educational Resources (VOER) under FOSS licenses. When considering institutional OER repositories, the popular DSPACE⁴ repository systems is the most

¹ <http://www.youtube.com/>

² <http://www.flickr.com/>

³ <http://www.apple.com/education/itunes-u/>

⁴ <http://www.dspace.org/>

commonly used due to its compatibility with existing library systems and protocols. However, DSPACE only acts as a repository of content and does not provide features which facilitates reuse and remix of resources.

The attribute common to all of these repositories is the use of metadata for resource curation. These metadata are defined according to established standards such as Dublin Core Metadata Initiative (DCMI) and IEEE Learning Object Metadata (IEEE LOM). However, one of the key concerns regarding OER curation is the standardisation of metadata across repositories and ensuring the integrity of the metadata defined by content creators. The manual cataloguing of OER has also become an issue due to the human resources required to keep up with the constant expansion in OER volume. However, new technology platforms and initiatives are currently being developed which will eventually lead to viable solutions to these issues. This paper briefly introduces some promising innovations which claim to provide long term solutions to the current OER search dilemma. The rest of the paper discusses the current OER search dilemma and looks at some promising innovations currently in development.

2. The Current Dilemma

Over the recent past, many global OER initiatives have been established by organisations such as UNESCO, COL and the United Nations (UN) to name a few. Among these initiatives are the ‘Education for All’ initiative by the UN and World bank (Geith & Vignare, 2008), the Open e-Learning Content Observatory Services (OLCOS) (Geser, 2007), OER Africa (OER Africa, 2009), the African Virtual University (AVU) (Bateman, 2006), China’s Open Resources for Education (CORE) (Downes, 2006), Japan’s Open Courseware Consortium (JCW) (Fukuhara, 2008), Teacher Education for Sub-Saharan Africa (TESSA) (Moon & Wolfenden, 2007), the European educational digital library project ‘Ariadne’ (Duval et al., 2001), eVrest which links Francophone minority schools across Canada (Richards, 2007) and the Blended Learning Open Source Science or Math Studies Initiative (BLOSSOMS) (Larson & Murray, 2008). A great majority of these OER initiatives are based on established web based technology platforms and have accumulated large volumes of quality resources which are shared openly. However, one limitation inhibiting the wider adoption of OER is the current inability to effectively search for academically useful OER from a diversity of sources (Yergler, 2010). This limitation of locating *fit-for-purpose* (Calverley & Shephard, 2003) resources is further heightened by the disconnectedness of the vast array of OER repositories currently available online. As a result, West & Victor (2011) argue that there is no single search engine which is able to locate resources from all the OER repositories. Furthermore, according to Dichev & Dicheva (2012), one of the major barriers to the use and re-use of OER is the difficulty in finding quality OER matching a specific context as it takes an amount of time comparable with creating one’s own materials. Unwin (2005) argues that the problem with open content is not the lack of available resources on the Internet but the inability to effectively locate suitable resources for academic use. The Paris OER Declaration (2012) states the need for more research in this area as

“encourage the development of user-friendly tools to locate and retrieve OER that are specific and relevant to particular needs”. Thus, the necessity of a system which could effectively search the numerous OER repositories with the aim of locating usable materials has taken centre stage.

The most common method of OER search is generic search engines such as Google, Yahoo! or Bing (Abeywardena, Dhanarajan & Chan, 2012). Even though this method is the most commonly used, it is not the most effective as discussed by Pirkkalainen & Pawlowski (2010) who argue that “...*searching this way might be a long and painful process as most of the results are not usable for educational purposes*”. As possible alternatives, many methods such as Social-Semantic Search (Piedra et al., 2011), DiscoverEd (Yergler, 2010) and OCW Finder (Shelton et al., 2010) have been introduced. Furthermore, semantic web based alternatives such as Agrotags (Balaji et al., 2010) have also been proposed which build ontologies of domain specific keywords to be used for classification of OER belonging to a particular body of knowledge. However, the creation of such ontologies for all the domains discussed within the diverse collection of OER would be next to impossible. Furthermore, Abeywardena, Raviraja & Tham (2012) state that despite all these initiatives there is still no generic methodology available at present to enable search mechanisms to autonomously gauge the usefulness of an OER taking into consideration (i) the level of openness; (ii) the level of access; and (iii) the relevance; of an OER for ones needs. As such, new innovations need to take place to address the present technological issues hampering the growth of the OER movement.

3. Some Promising Innovations

As discussed earlier, there are many research initiatives exploring various technological angles trying to provide long term solutions to the current OER search dilemma. Among these research projects, there are a few experimental or prototype initiatives which provide great promise on a global scale.

Pearson’s Project Blue Sky

One of the more exciting technologies unveiled recently is the *Blue sky* project (Kolowich, 2012) by the global publishing giant Pearson. This custom search engine specifically concentrates on searching for OER with an academic focus. The platform allows instructors to search for e-book chapters, videos and online exercise software from approximately 25 OER repositories distributed worldwide. However, it gives precedence to e-book material published under Pearson. Irrespective of this possible bias towards its own products, Associate Professor David Wiley states that “*the more paths to OER there are in the world, the better*” (Kolowich, 2012).

GLOBE

Another promising initiative is the Global Learning Object Brokered Exchange (GLOBE) initiative which uses a federated search approach to solving the OER search dilemma. The GLOBE consortium, which was founded in 2004, has now grown to 14 members representing America, Asia, Australia, Europe and Africa. GLOBE acts as a central repository of IEEE LOM educational metadata harvested from various member institutional repositories. Users are provided with a single sign-on query interface where they can search for resources across repositories, platforms, institutions, languages and regions. As of February 2012 the total number of metadata harvested available through globe is 817,436 (Yamada, 2013). The consortium is currently expanding its reach to more institutions worldwide. One limitation however is the standardisation, harvesting and tagging of the constantly expanding volume of resources.

LRMI

Among the highly anticipated initiatives is the Learning Resource Metadata Initiative (LRMI) launched by the Association of Educational Publishers and *Creative Commons*. This project aims to build a common metadata vocabulary for educational resources. This *common metadata framework* is used for uniform tagging of web based learning resources. According to the official website of the project, it believes that “*Once a critical mass of educational content has been tagged to a universal framework, it becomes much easier to parse and filter that content, opening up tremendous possibilities for search and delivery*” (<http://www.lrmi.net/about> retrieved May 13, 2013). The inclusion of LRMI into schema.org, a joint project by Bing, Google and Yahoo! looking at standardising metadata, is an early indication of the potential global impact.

Desirability Framework

The *desirability* of OER, proposed by Abeywardena, Raviraja & Tham (2012), is a parametric measure of the usefulness of an OER for a particular academic need. This framework provides a breakthrough in the parametric measure of the usefulness of OER by search engines taking into consideration (i) *level of openness*: the permission to use and reuse the resource; (ii) *level of access*: the technical keys required to unlock the resource; and (iii) *relevance*: the level of match between the resource and the needs of the user. By calculating the *D-index*, the measure of *desirability*, for a particular set of OER search results, search engines can better present OER which are more suitable for use and reuse in a given academic scenario. The relative simplicity of the *desirability* framework allows it to be easily incorporated into any existing OER search mechanism.

OERScout

In contrast to the large scale projects such as Blue Sky, GLOBE and LRMI, *OERScout* (Abeywardena et al., 2012) is a relatively small research project which looks at providing a solution to the OER search dilemma by autonomously generating metadata for a particular resources. The novelty and innovation of this project can be largely attributed to the clustering and text mining approaches used in the design to “read” text based OER, “understand” them and tag them using autonomously mined domain specific metadata. This approach eliminates the need for manually tagging resources with human defined metadata. Thus, *OERScout* provides a viable solution to tackle the need for increased human resources due to the exponential expansion in OER volume. *OERScout* also incorporates the *desirability* framework and a faceted search approach which allows users to quickly zero-in on the most suitable resources. Many experts believe that the technological concepts behind *OERScout* would be a game changer challenging the traditional norms of OER search.

4. Conclusion

Open Educational Resources (OER) are fast gaining traction in the academic community as a viable solution to educating the masses. However, despite the fact that many governmental, non-governmental and philanthropic organisations have heavily promoted the OER movement, it is

still to become mainstream practice in many countries and regions. One limitation hindering the spread of OER is the current dilemma with respect to OER search. Based on the literature, no search engine exists at present which has a keen focus on locating OER distributed worldwide. Providing some hope are initiatives such as Pearson's Project Blue Sky, GLOBE and LRMI which looks at solutions to this issue on a global scale. In addition, there are other ambitious research projects such as the *desirability* framework and *OERScout* which look at breaking the norms in conventional OER search to provide game changing solutions. With more and more research interests growing in this area, the future of OER seem to be positive.

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