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CREATING AND DISSEMINATING OPEN EDUCATIONAL RESOURCES (OER): RESEARCH TRENDS AND THE BASICS FOR NEWCOMERS

Gregorio González-Alcaide¹, Francisco Javier Hernández San Miguel²

¹*Departamento de Historia de la Ciencia y Documentación, Universitat de València (SPAIN)*

²*Servicio de Bibliotecas, Universidad Politécnica de Valencia (SPAIN)*

Abstract

Distance-based courses offered through e-learning platforms are gaining in popularity and supporters, particularly those resources offered through the Internet due to their ability to transcend the limitations of time and space. In this context, it is essential that teachers and educational researchers become familiar with the main e-learning initiatives and the most outstanding content development software, particularly open source tools that facilitate free access to knowledge. The aim of this paper is to present a conceptual outline describing the most common topics addressed by e-learning researchers. Furthermore, we present some key points to consider in choosing the most appropriate design tools for digital learning objects, managing e-learning courses and preserving the copyright and integrity of developed contents. Finally, we offer a directory of some of the major open source initiatives that facilitate the access, use and exchange of Open Educational Resources (consortia, digital libraries and repositories).

Keywords: Open Educational Resource (OER) - Research trends - Learning Management System (LMS) - Learning Content Management System (LCMS) - OpenCourseware (OCW), Creative Commons (CC) licenses - Digital libraries - Repositories.

1 INTRODUCTION

Distance-based courses offered through e-learning platforms are gaining in popularity and supporters, particularly those resources offered through the Internet due to their ability to transcend the limitations of time and space. This paper will present the research areas related to e-learning in the main journals of the educational field and a directory some of the principal resources for the creation, consultation and use of online educational resources. We will pay particular attention to projects initiated through the Open Source movement, which defends free access to knowledge. [1], [2].

2 TOPIC AREAS IN E-LEARNING RESEARCH

In order to characterize the topic areas addressed by educational researchers with regard to e-learning, we searched the ERIC database for documents published from 2010 to 2014. ERIC database is the main source of international bibliographical references in the area of education, and it also has a thesaurus that ensures control over the key words that characterize the content of the documents contained in the database.

The term “Electronic learning” (e-learning) is utilized in ERIC to refer to “using electronic devices, applications, or processes to acquire or transfer knowledge, attitudes or skills through study, instruction or experience. Content delivery modes include, but are not limited to, Internet, local and wide networks, CD-ROM, audiotape and videotape, satellite broadcasts, stand-alone computers, and interactive TV.” Searches for “electronic learning” capture all documents that use that subject heading as well as other related key words, such as e-Learning, m-Learning, Mobile learning and Online learning.

Our search identified 3124 documents published in peer-reviewed scientific journals. We quantified the frequency of concurrences of subject headings assigned to the identified documents, using the VOSViewer tool to graphically present the main research focal points (the keywords most often assigned to the documents) in the context of the literature in the area. The visual representation also sheds light on the thematic relationships and associations established between the subject headings, based on the frequency of concurrences in the documents, where the distance separating them in the graph represents the degree of the interrelationships between research fields.

Our analysis reveals several outstanding thematic clusters and axes within the educational research literature on distance learning (fig. 1). Teaching methods for web-based instruction, online interactive processes (computer-mediated and asynchronous communication) and the instructional effectiveness of web-based materials are topics included in the most prominent research cluster, as seen in the center of the constructed network. The role of technology in education with regard to learning processes, educational practices developed for distance education, student attitude and the development of online courses all constitute other prominent focal points of research attention.

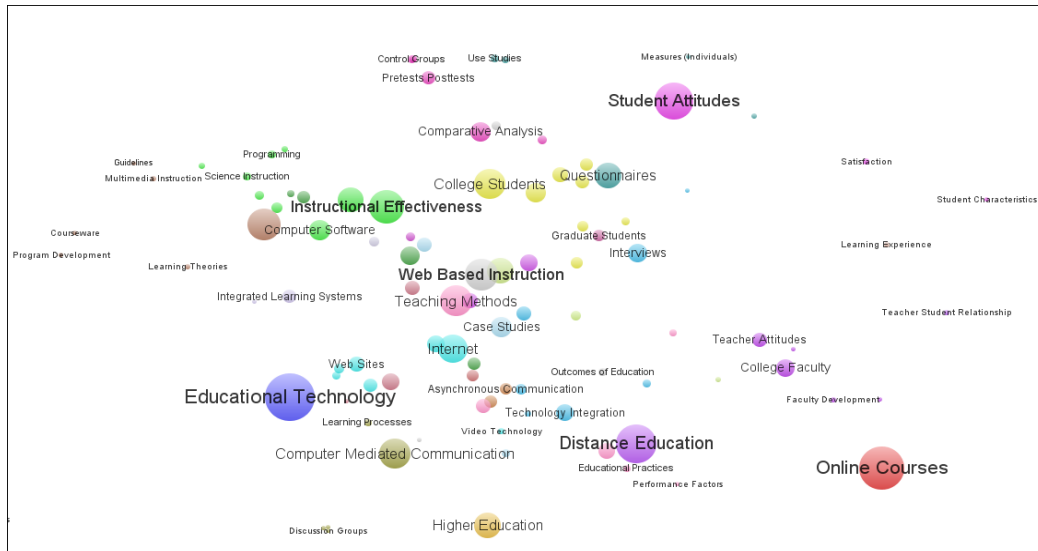


Fig. 1. Main thematic research clusters around e-learning in the publications indexed in the ERIC database

3 E-LEARNING AND OPEN ACCESS

In order to characterize the development of e-learning and its relationship with Open Educational Resources, this time beyond the field of education, we also ran a search in the multidisciplinary database Scopus (e-learning AND Open Educational Resources) for the 2010–2014 period. We present our results in fig. 2.

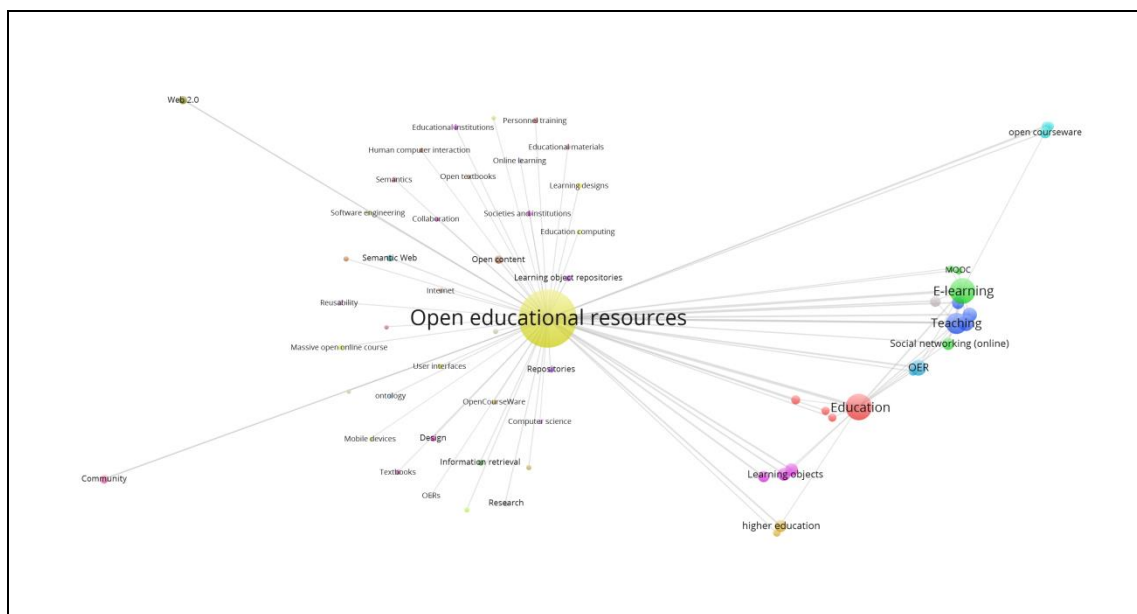


Fig. 2. Main thematic research clusters around e-Learning and Open Educational Resources in the publications indexed in Scopus

It is important to point out the broad and multidisciplinary scope of research related to Open Educational Resources, a concept that is related to numerous topics, including the design of materials

(in general or for specific devices such as mobile phones or e-books), the development of initiatives such as open access repositories, the representation and recovery of information or the interactive processes of users. The presence of a cluster of independent topics that are related to Open Educational Resources is also apparent, for example e-learning, education and teaching.

Some institutions have bet heavily on the promotion of e-learning through Open Educational Resources. For example, the Polytechnic University of Valencia launched a Teaching Network (Docencia en Red), which aims to incentivize the development of digital learning objects and modules among its staff, especially the creation of multimedia content [3], [4].

4 CONTENT CREATION AND MANAGEMENT FOR E-LEARNING

Any computer application (e.g., word processor, programs to create presentations and slides, videocameras or recorders) that allows users to generate content for different digital formats and mediums can be used to create teaching materials for distance education, although the administration and utilization of learning objects also requires software to run the e-learning program, known as learning management systems (LMS). These programs include functions such as student registration and administration (controlling user access and monitoring progress), resource management (facilitating access to materials and learning activities), assessment of results, and virtual interaction (chats, discussion forums, videoconferencing), as well as reporting and other services. In addition, LMSs increasingly include modules for content creation or they allow the integration or interface of content developed through other specific programs, known as Learning Content Management Systems (LCMS) [5].

A crucially important aspect in the development of digital learning objects is the choice of a tool or program that will be used to create, design and implement content. The characteristics of the chosen software will determine the program's functionality as well as which features can be developed for the digital learning objects, what content can be included and how students can interact with each other, among other aspects.

Assuming the principles of the Open Access movement for the development of education resources, it is essential that the program selected fulfil the following criteria: release of stable versions of the program, existence of an active development community and the support of a prestigious educational institution. The program should also meet the Experience API standards (also known as Tin Can API), a software specification that permits learning content and systems to interface in a way that records and tracks learning experiences. Some of the most common programs with these characteristics, which in addition comply with the principles of the Open Access movement, include Moodle (www.moodle.org), Sakai (www.sakaiproject.org) and Exelearning (www.exelearning.net). Other initiatives that stand out for their content management capabilities include Claroline (www.claroline.net), Ilias (www.ilias.de), Dokeos (www.dokeos.com) and Atutor (www.atutor.ca). In addition to the criteria mentioned, the consultation of academic research that describes, compares and evaluates the available e-learning platforms and programs can be very helpful in understanding their respective strengths and weaknesses and in choosing one or another [6], [7], [8], [9].

5 COPYRIGHT PROTECTION: OPEN LICENSING

Once the materials have been designed, it is necessary to protect intellectual property rights in order to prevent third parties from commercially exploiting the project, claiming authorship or plagiarizing the materials. Assigning a license to the new material constitutes the legal mechanism and the best way to ensure the integrity of the materials and the recognition of their authorship. Creative Commons (CC) licenses are the simplest, most widely used, and most recommended way to protect open access educational resources; the process is handled online (www.creativecommons.org), and an automatic generator leads users through the process of choosing the most appropriate license according to how they wish their work to be used.

6 DISSEMINATION: CONSORTIA AND REPOSITORIES OF OPEN EDUCATIONAL RESOURCES

After ensuring the adequate copyright protection for the newly created work, creators must not only make it available (a defining feature of this kind of material) but also make it as widely accessible as possible. Fortunately, a wide variety of initiatives exist with the purpose of disseminating open access

learning objects, including different consortia that aim to promote this type of project as well as repositories and specific search engines for these resources. Many of these initiatives also contemplate the possibility of reusing or developing different resources.

Two consortia stand out in this regard: the Multimedia Educational Resource for Learning and Teaching Online (MERLOT), which compiles thousands of open access materials for teachers and students; and the Open Education Consortium (OEC), which sponsors the OpenCourseWare (OCW) initiative, in which more than 200 institutions of higher education participate worldwide, with hundreds of courses available for anyone with Internet access. In the development of the OCW project, and more generally with regard to the promotion of open access educational resources, the role of the Massachusetts Institute of Technology (MIT) has been prominent. In 2002, MIT launched its OpenCourseWare (MIT OCW), which has served as a model for hundreds of universities worldwide that made different courses available to interested users through open access platforms.

Beyond university-led initiatives, there are also other independent or consortia-sponsored projects open to all kinds of users, some virtual communities and different repositories. One example of a significant open source initiative is OpenStax, a repository of educational content, which anyone can share, reuse, or contribute to with new material, using a variety of different formats.

Other initiatives may be more firmly rooted in a specific location, bring together different institutions in a single country, present a specialized thematic orientation or focus on the use of specific materials. There are also projects focused on specific educational levels, such as Curriki, an open access educational resource, structured as a non-profit organization, which facilitates access to primary and secondary level education materials for teachers, students or any other interested person. The project ensures a review process to monitor quality and enforce the organization's standards. Two notable projects that have developed within virtual communities around specific resources include WikiEducator and the OpenCast Community, which specializes in developing and promoting audiovisual materials.

An example of digital library is the National Science Digital Library (NSDL), which brings together teaching materials in the areas of science, technology, engineering and mathematics, all compiled from resources that have been developed independently by institutions and private parties. Finally, it is worth mentioning a few examples of repositories or search engines that allow users to find and use materials from different online locations through a single interface, such as OpenStax CNX, OER Commons or Open Tapestry. As in the case of the web applications for course and content management, the localization of resource directories allows users to explore and build on the available materials, which have been only briefly outlined here [10].

7 CONCLUSIONS

The upsurge in Internet activity and the development (and accessibility) of numerous learning objects online has profoundly changed the educational process and even the conception of educational practice. This paper describes the broad panorama of research development in this area, focusing on a broad group studies that analyze topics related to distance learning and the development of web-based materials: teaching methods and instructional efficiency in this medium, teacher-student interactions, and student and teacher attitudes related to e-learning, among others. We have also described some of the main tools and specialized resources that aim to promote e-learning using Open Educational Resources, a concept that is gaining ground not only in e-learning circles, but also in multidisciplinary contexts and at the level of individual researchers.

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