

Towards Multicultural Open Educational Resources: a comparative analysis of design processes

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ABSTRACT: The propose of this paper is an investigation that uses a Systematic Review (SR) process in order to retrieve the state of the art in relation to design processes of open educational resources (OER) that represent cultural issues in their stages. The SR made it possible to identify the main features of design process of OER. After identifying these features an comparative analysis was developed to reflect on each features and its implications in the design process of Multicultural OER..

Keywords: Open educational resources, instructional design, multicultural, design process, open access

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I. INTRODUCTION

Open Educational Resources (OER) have been getting a lot of attention and the it's on the spotlight by creating new possibilities for the production and dissemination of knowledge. The idea of an OER goes beyond the free access without barriers for open sharing, use and reuse. It means any person has legal permission to download and modify the OER's contents and also share and distribute it freely (ONU, 2017).

Although this context offers new and countless opportunities that contribute to make the access to this knowledge easier, the execution of such scenario also depends on adaptations according to the local context of the student utilizing the OER, for cultural elements are always present in an OER (AMIEL and SOARES, 2016). Therefore, translating the text from an OER to a different language, pointing examples closest to the students' realities or modifying the educational content according to beliefs or traditions in order to attend to the specific necessities of its students, can be necessary and so much as indispensable practices to a certain educational context, taking into account that the lack of these adaptations can even become barriers for the students (AMIEL and SOARES, 2016).

Thus, while the research in the area of OERs has evolved significantly and the design of OERs that comply to certain cultural issues is possible, there is a need to understand better the existing design processes and its characteristics that help support cultural issues during the design process.

Given those facts, the object of this paper is the study of OER's design processes that possess characteristics to support cultural issues in OERs . Therefore, this study intends to compare five OER design processes in order to present their characteristics, applications, advantages and limitations, highlighting differences, similarities and each method approaches. To obtain a better understanding about each method's perspectives, a Systematic Review of Literature (SR) was made, including the realization of planning activities, execution and summarization of results for a state of the art gathering.

This paper is organized in the following way: Section 2 presents a OERs concepts review. Section 3 presents a Design Processes' concepts review, in Section 4 the comparative analysis of the found works and, finally, in Section 5 the conclusions are shown.

II. OPEN EDUCATIONAL RESOURCES

The term Open Education Resource was created in UNESCO's Open Educational Software Forum, in 2002 (UNESCO, 2002) and was defined OERs as "teaching, learning and investigating materials in any media, digital or others, that are situated in public domain or that have been made available under open licenses, allowing free access, use, adaptation and redistribution by third parties, under none or few restrictions". According to such definition, OER can range from educational books and academic papers to classes' grades and courses, in addition to software, videos, and other artifacts that may collaborate in learning and access to knowledge.

Banzato (2012) argues that OERs are based on three fundamental principles: the materials must have educational value; a resource is only considered an OER if it is totally open, without any costs or restrictions,

being available for reuse, review, recontextualization and redistribution; and the technologies must be capable of giving support to the development and pedagogic issues of OERs.

According to Hylan (2006), OERs include:

- Learning content: Complete courses, didactic material, content modules, learning objects, collections and magazines.
- Tools: Supporting software development, use, reuse and delivery of learning content, including search and organization of content, learning management systems and content, content development tools and online learning communities.
- Resources: Intellectual property licenses to promote the open publishing of materials, better practices design principles and content localization.

Wiley (2006) even relates that, with the quick evolution and dissemination of the idea of open educational contents, some members of Harvard's Law School created the Creative Commons, in 2011, and with it a versatile set of licenses. During the same period, the Massachusetts Institute of Technology (MIT) decided to offer part of their courses to the public for academic means in open format – that was MIT's Project OpenCourseWare.

In the context of Open Education, Open Content, Open Licenses and Free Software, the OERs are the main initiative that gathers all of these concepts and applications.

III. DESIGN PROCESSES

1.1. Design

The term “design” has a very ample meaning and can comprise many areas. According to Flusser (2007), design as a substantive can mean purpose, plan, intention, goal, malign scheme, conspiracy, shape, basic structure, cunning and fraud. As a verb, it can mean to plot something, simulate, project, schematize, configure, and proceed in a strategic way.

Margolin (1989, p.3) argues, “Design is everything around us. It always insinuates the object in the material world and gives shape to the non-material process, both in the industrial production as in services”. In the same path as the aforementioned works, Torrezan and Behar (2009) defines design as projecting, visually composing or putting to practice an intentional plan.

According to Mozota (2003), the advantage of these definitions is that they avoid the mistake of seeing design only with the perspective of result (aesthetic and appearance), but emphasizes notions of creativity, consistency, industrial quality, shape and planning.

Therefore, it is observed that design doesn't just approach drawing, aesthetics or appearance, as how the term is commonly used, but approaches many needed factors to the conception of solutions that use mankind's knowledge to create objects, systems, environments(real or virtual), among others.

1.2. Design Process

According to Best (2006, p. 112), “design is rigorously a cyclic process of questioning and creativity”. The design process consists of a series of methods put together and suited to the nature of each project or design issues. This is not linear, since it possesses many feedback cycles that are defined to allow the interactive nature of design and to accommodate the insights that occur in each process' stage.

Demarchi (2015) affirms “the methods are experiments that try to make public the designer's thought”, meaning it tries to externalize thoughts, which normally the designer keeps to himself. One meaningful advantage in this externalization is the possibility of other people, for example, the users, follow the same train of thought and contribute to it with informations and intuitions about the problem, out of the knowledge and experience of the designer.

The design process, according to Mozota (2003), possesses four essential characteristics, the “Four C's of design”. These are:

- Creativity - design requires the creation of something nonexistent;
- Complexity – design envelops decisions with a great number of parameters and variables;
- Commitment – design requires equilibrating multiple and sometimes conflicting requirements;
- Choice – design requires making choices between many possible solutions to problems.

Demarchi, 2015 divides the design process in 3 essential steps: divergence, transformation and convergence. Divergence as the act of expanding the limits of the design situation and obtaining an investigation space sufficiently wide and rich for the design situation that aims to expand the designer knowledge about the problem in question. Transformation is the step for the model elaboration, it is blander, of high level of creativity, full of insights, etc., in other words, everything that contributes for the design conversion into a pleasant task. This step is divided in two: the divergent transformation, which uses methods of researching ideas

(creativity), and the pure transformation which helps in the elaboration of concepts and uses methods of exploring problem structure. And finally, convergence where the objective of the designer is to find a single alternative among the many possible ones, through a progressive reduction of secondary uncertainties until it reaches a final solution.

An OER Design Process is, therefore, a set of activities, methods and practices used for a designer or a team of multidisciplinary designers to plan, project, develop, evaluate and distribute an OER for a certain educational demand.

IV. RESULTS AND DISCUSSIONS

As a strategy for searching and identifying studies, its contributions, as well as the state of art design process of the OER, it was used an Systematic Review (SR) technique to conduct and consolidate this project. This is a search technique based in evidences of scientific literature, conducted through the definition of a well-defined search process and protocol. The phases of this process are: Planning, Execution and summarization of results.

In order to conduct this process, the StArt¹ tool was adopted to assist the phases' management and also the entire conducting process of the SR.

The first phase of SR is Planning which consists in the definition of the protocol that will be followed during the SR. In this phase are defined the search's questions, its' strings, its' source, among others. The search for papers was realized by submission of the search string in bases of the ACM digital library, IEEE digital library, Science Direct, Springer and Google Academic. This search process was accomplished for papers about Multicultural OERs published until december of 2018. In this step search terms formulated in english were consolidated from the sentence "cultural issues" or "culture" and "instructional design" and "open educational resource".

In the Execution phase the searches were made in the previous sources and the results were exported in Bibtex format and imported to StArt tool.

In the summarization, after the evaluation of the 125 papers, 5 were chosen to be studied and analyzed. As the result of the papers analysis presented in the systematic revision, a comparison was made between the papers presented in the systematic revision. The comparison was made considering as basis the features found in the papers studied, as presents table 1.

Table: Papers and Features

	(Rocha et al., 2017)	(Rodés et al., 2014)	(Fatayer, 2016)	(Qi and Boyle, 2010)	(Chung and Khor, 2015)
Needs Analysis	Yes	Yes	Yes	Yes	No
Planning	Yes	No	No	Yes	No
Collaboration	No	Yes	Yes	No	Yes
All parties involved and participating	No	Yes	Yes	No	Yes
Repositories/web searching	No	No	No	No	Yes
Reutilization	No	Yes	No	No	Yes
Licensing	Yes	Yes	Yes	No	No
Project iterativity	Yes	Yes	Yes	No	No
Distribution and metadata	No	No	Yes	No	No
Testing and evaluation	Yes	No	Yes	No	Yes

There was no unanimous characteristic, meaning, in other words, that no characteristic was present in all studies, but all of them are present in at least one study. The most common one was "Need Analysis", shown in 4 of 5 studies.

¹ StArt - http://lapes.dc.ufscar.br/tools/start_tool

The Planning characteristic is very important for the process control, however, it is verified that, only two papers consider this characteristic in its phases. In Qi and Boyle (2010) considers this characteristic in the step denominated Instructional Design, and Rocha et al. (2017) has a phase of pre-production where the process planning is made. All characteristics are considered fundamental in the production of the OER and, for that, it is important that these are taken in consideration in the development process of the OERs.

The Collaboration characteristic parts of the OER project were considered for the majority of the papers, but its implementation stood out in the approach presented in paper (Fatayer, 2016).

In this project, the students are the responsible for the content creation and the teachers act as co-creators and evaluators for the quality of the material produced.

A similar situation occurs with the Collaboration characteristic, that is, it's considered in the majority of the papers, but it stands out in paper (Rodés et al., 2014), which is based in the formation of collaboration groups for the production of OERs.

The participation of the involved parts such as students, teachers, designers, among others, it's an important characteristic when trying to represent cultural issues in the design process and it's present in papers (Rocha et al., 2017), (Rodés et al., 2014) and (Fatayer, 2016).

Chung and Khor (2015) is the only one that has a Search characteristic in repositories/web, because the basis for the beginning of the OER design process are the Wikibooks, so, the initial effort in (Rodés et al., 2014) is to search for the appropriate Wikibooks, understand its' license terms, search for integration strategies and content customization.

The reuse is present only in papers (Rodés et al., 2014) and (Chung and Khor, 2015). It's interesting to notice that both work with open books. In (Rodés et al., 2014) whose context is the Latin project, the final objective is the confection of collaborative open books with open licenses for Massive and Online Open Courses (MOOC). In paper (Chung and Khor, 2015) the basis are open books too, the Wikibooks. The process begins with the reuse of those books for the confection of new books.

The Licensing characteristic is fundamental for a OER and it's present in papers (Rocha et al., 2017), (Rodés et al., 2014) and (Fatayer, 2016). It's a featured topic in OER research, however the lack of documentation about the license terms interferes in the reuse and the search of these resources repositories, as it points Amiel (2012). Therefore, it is necessary in this phase to communicate and document clearly to the final user the licensing information, even if it's an open licensing.

The concern in disseminating an OER is a topic that must be taken in consideration in the design process of an OER. Therefore the Metadata and Distribution phase is important and this precaution only was demonstrated by the author in paper (Fatayer, 2016). Adding information in the metadata of an OER and publishing it in public repositories is a work that must be done for the knowledge dissemination.

The Testing and Evaluation characteristic are present in the papers (Rocha et al., 2017), (Fatayer, 2016) and (Chung and Khor, 2015). Chung and Khor (2015) makes two evaluations in the OER production: one internal, and the other with an external evaluator. Rocha et al. (2017) and Fatayer (2016) made this step once on the final step of production.

Finally, in an overview around the characteristics of the processes studied, (Rocha et al., 2017), (Rodés et al., 2014) and (Fatayer, 2016) shown iterative processes, that is, progress is made through successive attempts of refinement until a final version is reached. Unlike what is seen in (Qi and Boyle, 2010) and (Chung and Khor, 2015) where the process is still based in a traditional cascade model.

V. CONCLUSION

This study made a qualitative comparative analysis of five design processes and development of an OER with the intent of identifying and introducing the main characteristics of an OER design process that supports at any point the representation of cultural issues.

From the analysis, the characteristics pointed out in this paper were: Needs Analysis, Planning, Collaboration, All parts involved and participating, repositories/web searching, Re utilization, Licensing, Project Iterativity, Distribution and Metadata and Testing and evaluation.

It was also noticed that there are few proposals for design process and it's majority is not comprehensive enough to contemplate the design and developing of a multicultural OER.

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