Developing Methods to Automate the Utilization of OER in Higher Education

Lubna Ali [1]

Abstract: Open Educational Resources (OER) are an important element in the process of digitizing higher education teaching and are seen as an essential building block for openness in the education system. OER can potentially play an important role in improving the education around the globe, since it eases the access to high quality digital educational materials. However, there are challenges that are facing the deployment of OER in higher education. One of the most important challenges is the production of new OER materials and the conversion of already existing educational resources to OER. This could be viable by qualifying educators and teachers through training courses and/or supporting them with appropriate tools. There are many tools to create new OER contents. However, there is a huge amount of already produced and well-tested educational materials, which could be utilized and converted to OER instead of producing new content from the scratch. In this project, we will suggest methods to overcome some of the challenges facing the educators when dealing with OER in order to ease the deployment of OER. Additionally, we will develop a tool to support converting the educational materials to OER and we will evaluate its functionality. We will also investigate, to which extent the technical support can improve the utilization of OER in higher education context.

Keywords: OER, Higher Education, Openness, Open Educational Resources, OER Survey, OER Tool

1 Problem definition and motivation

The term Open Educational Resources (OER) was first emerged at UNESCO's 2002 Forum. Ten years later, the 2012 OER Paris Declaration has been adopted at the World Open Educational Resources (OER) Congress held in Paris from 20. to 22. June, 2012. UNESCO defines 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, adaption and redistribution by others with no or limited restrictions." [UN19]**.** OER cover different types of materials such as full courses, textbooks, streaming videos, tests, software and course materials. They include also different tools and techniques used to support access to knowledge [We15].

OER can potentially play an important role in improving the education around the globe, since it eases the access to high quality digital educational materials [Fr09]. Accordingly, there is steady increase among higher education institutions to participate in the "open" movement in general [Ca08] and in utilizing OER specifically. OER offer opportunities for broadening the participation in higher education, reducing course development and

[1]RWTH Aachen University, Learning Technologies Research Group, Ahornstr. 55, 52074 Aachen, ali@cs.rwth-aachen.de

study costs [ST14]. This could reduce the impact of demographic, economic, geographic educational boundaries [YMK08] and offer students especially from the developing countries access to the best courses and degree programs. There are many other benefits for utilizing OER such as promoting user-centred approaches in education and lifelong learning [Eb18]. In this case, users are not only consumers of educational content, but they are part of the OER-cycle, where they create own materials, develop the content and share their results and experiences.

Nevertheless, there are many challenges that are still facing the deployment of OER in the higher education context. One of the most important challenges is how to access the appropriate resource and to choose among that huge number of available resources which are permanently growing. Creative Commons estimated that there were about 1.47 billion open resources available till the end of 2017 [CC19]. Another significant challenge is the production of new OER materials and the conversion of already existing ones which is only viable by qualifying educators and teachers through training courses and/or supporting them with specific tools.

There are many platforms and tools that support producing and sharing OER contents. One of the most famous tools that supports creating and editing interactive learning content for the web is H5P [H5P19]. The web-based editor is able to add and replace multimedia files and textual content in all kinds of H5P content types and applications. Tutory is another free tool [Tu19], which supports teachers with creating worksheets. The materials created with Tutory are available under Creative Commons licence as OER and can be used and adapted by other teachers. Another useful tool for combining different resources with different creative commons licences is the ccMixer [CcM19], which is still a prototype. This tool checks if different licences are compatible with each other and suggests all possible licences for the new work. Moreover, the integrated online image search in Microsoft products enables looking for creative commons images and include them within the work. However, without listing the appropriate licence for the found images. All of the above-mentioned tools are oriented towards creating new OER contents. But what about the huge amount of already produced and well tested educational materials which are not OER compliant? It would make sense to convert these materials to OER instead of the time-consuming production of new materials from scratch.

In this Project, we will analyse the challenges facing the educators when producing OER based on a survey covering different aspects of utilizing OER in higher education. Additionally, we intend to research some methods that could be adopted to enhance the utilization of OER in (higher) education. We will concentrate mainly in introducing a technical solution (Tool) to enhance the deployment of OER and to motivate more educators in producing OER. Accordingly, we will develop a tool to automate/ semi-automate the conversion of exiting educational materials to OER and evaluate its performance.

2 Research Idea

In order to analyze the current situation related to the acceptance of openness in the context of higher education in general and to the term OER specifically, we have conducted a pre-survey covering different aspects of openness. We have asked 40 participants at three OER Workshops conducted at RWTH Aachen and at the International OER conference in Lucerne-Switzerland [OL19] to fill out the survey. The questions covered many aspects regarding the deployment of OER such as: the most used OER types, the challenges facing the utilization of OER and the purposes to use OER in their educational practices. Additionally, we introduced the idea of automating the (re-)production of already exiting educational resources as OER. The idea behind that is to avoid the unneeded effort to create new educational resources from the scratch and to utilize those already produced and well-tested materials. More than 80% of the participants were interested in a tool to (semi) automate the re-/creation of educational resources and convert them to OER as can be shown in Fig. 1.

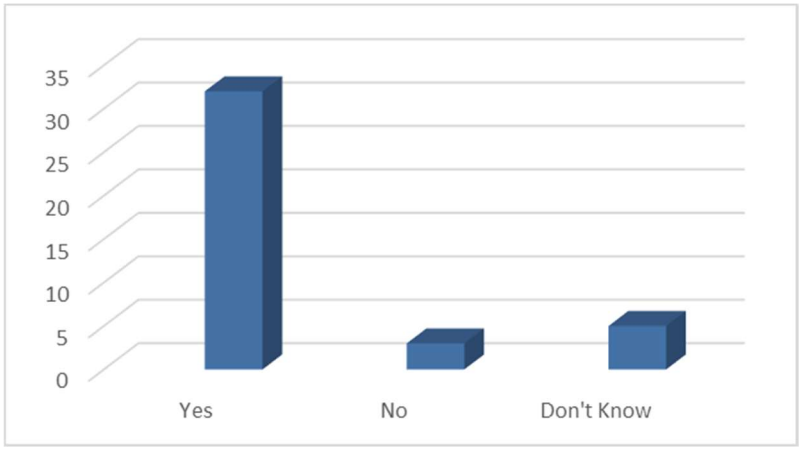

Fig. 1: Responses regarding OER Automation

According to the participants' feedback regarding semi-/automating the production of OER, we have started to develop a tool to asses in converting the already exiting educational materials to OER. We have started with materials containing images, since according to our survey; images are the most common used resources among educators as shown in Fig. 2.

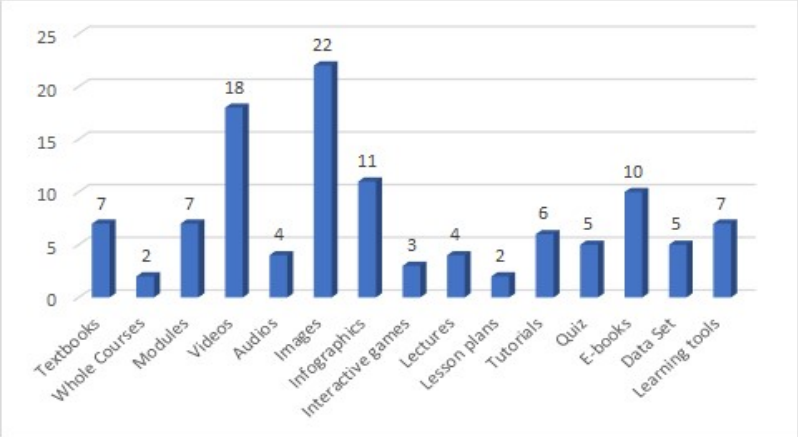

Fig. 2: Most Used OER Types

The tool divides the process into three main parts. The first step is to extract images from the users' file. Then it searches for similar OER-images in the OER portals using text-based search. Upon finding the appropriate similar images, the user will be asked to choose the most suitable OER image, which corresponds to his requirements. The last step is to replace the original images with the found images. The found images will be extracted with their meta data and will be listed with the information necessary for the correct and completed OER-citation like: the source of the image, the name of the author or the artist and the type of creative commons (CC) licence of the image. The new found OER image can then replace the old one. Fig.3 shows a sketch of the first version for the Graphical User Interface (GUI) of the developed tool.

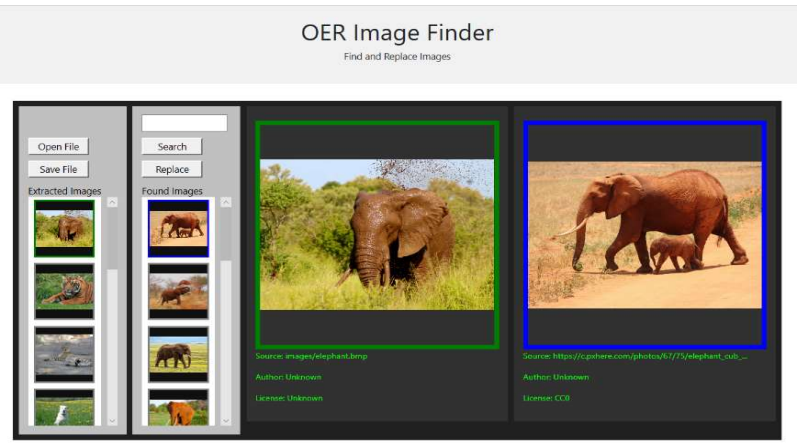

Fig. 3: GUI Sketch of the developed tool

Based on the licences of the new images along with the licences of other resources appeared on the file, the final licence of the overall document can be determined.

3 Summary

The deployment of open educational resources can revolutionize the educational system, since they provide many opportunities in accessing and utilizing the huge amounts of educational materials. However, there are many challenges that are still facing the effective use of these resources in addition to those challenges facing the proper adaption of the valuable already exiting non OER resources and converting them to OER. In this project, we are planning to analyse the challenges facing the educators when utilizing OER and to suggest solutions to overcome these challenges. One of the intended solutions is to develop a tool to support the conversion of already exiting materials to OER and evaluate its functionality. As a future work, we are planning to expand the survey to cover a more representative sample. Therefore, we are planning currently to convert it to an Online-Survey in order to collect data from a broader sample at different universities. Additionally, it is intended to extend the functionality of the tool by adding some properties like Drag & Drop and image-based search. It is also planned to evaluate the performance of (semi)-automatic conversion vs. manual conversion of the educational materials. We look forward to making further updates taking into considerations motivating more people to produce and utilize OER.

Author Information

Lubna Ali completed her studies in Software Systems Engineering (M.Sc.) at RWTH Aachen University. She wrote her thesis in the field of communication systems and wireless mesh networks. She is currently pursuing her PhD in the field of learning technologies and Open Educational Resources (OER) at RWTH Aachen University. She is at the beginning of her dissertation and would like to discuss her research idea with others.

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