Supporting the planning of hybrid-MOOCs learning designs

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Abstract. This paper presents a work-in-progress solution for planning hybrid Massive Open Online Courses (MOOC). The use of MOOCs in brick and mortar courses presents several design challenges. One of them is to find the most suitable online course regarding the alignment with the face-to-face course structure, timeline and syllabus. Despite there are different lesson planning and design tools which support educators in the design of their courses, there is a lack of solutions allowing to incorporate the use of MOOC or MOOC resources in the planning process of blended courses. In this paper, we present a MOOC design module for being used in design authoring tools which aim to support the planning of blended courses that incorporate MOOCs (or MOOCs resources). We discuss two different solutions for gathering information regarding existing MOOCs in the market: the creation of our own MOOC database versus the parsing of MOOC information from existing search engines on demand. Our exploration leads us to discard the first solution as maintaining the database is highly demanding. Thus, the final system uses existing MOOC search engines to extract the online courses design information to later be used in the overall hybrid-course planning. As it is a work-in-progress article, we present and discuss our future steps for supporting educators in the of design hybrid MOOCs scenarios.

Keywords: Hybrid-MOOCs, Blended Learning, Learning Design, Authoring Tools.

1 Introduction

The use of Massive Open Online Courses (MOOC) or MOOC resources in blended contexts offers the potentiality of influencing higher education in several ways [1]: influencing and shaping students' approaches to learning; assisting in the development and use of online resources by the educators as well as changing their traditional teaching practices; and providing large amount of data to be analysed and used by institutions and researchers to advance in the understanding of learning processes and behaviours. Despite their potentialities [2], the use of MOOCs in face-to-face (f2f) university courses presents several challenges [3]. One of them is to find

the most suitable online course regarding the alignment with the f2f course structure and syllabus (including time constraints). Despite there are different lesson planning and design tools which support educators in the design of their courses, there is a lack of solutions allowing the incorporation of MOOC or MOOC resources in the planning process [4]. In this paper, we present a MOOC design module for being used in learning design authoring tools which aim to support the planning of blended courses that incorporate MOOCs (or MOOCs resources). The final system uses existing MOOC search engines to extract the online courses design information to be later used in a design authoring tool for the hybrid-course planning.

2 Planning hybrid MOOCs

The use of MOOCs in regular university courses has led to different types of hybrid combinations [5], with different goals [6]. In some cases, the main aim is increasing variety of the f2f curriculum and provide students more opportunities to learn beyond the university course [7]. In others, the goal is to leverage the work done in developing their own MOOC by providing it to the campus students in an Small Private Open Curse (SPOC) format [8][9]. But, in all cases, the context and learning objectives require to identify the best hybrid model that can take advantage of MOOCs in effective, efficient, and engaging ways [3].

The planning of blended learning can be challenging in general, but the planning process of hybrid MOOCs can be even more, especially when using external MOOC/s or MOOC/s resources (i.e. using MOOCs that are not from our university and have been designed by other instructors). In this context, we have developed a learning design tool [10] which is based on a visual representation of hybrid MOOC designs [4] which aims to support teachers in designing blended learning. Specifically, in the case of blended MOOC cases, the tool aims to facilitate the integration of MOOCs in the design process to be able to better plan the integration of both worlds regarding the curriculum alignment (topic, language, educational level…) and time suitability (dates of both courses, availability constraints…). Our work in progress presented in this paper arises from this need and studies a solution for extracting MOOC design data to be used in the learning design authoring tool. Next section presents the exploration of two possible ways of doing this data extraction in our research context.

3 Exploring solutions for extracting MOOC information from existing platform providers

3.1 First exploration: building our own data base of MOOCs

Our first exploration was centred on building a data base from scratch, which contained the available information about existing MOOCs in the market. The main idea was to extract the MOOCs' information from the existing platforms and update the database periodically (e.g. daily). Our authoring tool would communicate directly with the database when information on MOOCs was required during the blended

courses design process (Fig. 1-A). The main method thought for gathering the data was using the existing APIs from the MOOC providers. However, only few platforms offered an API and sometimes they did not provide all the necessary data or documentation. To face this limitation, we decided to implement a web crawler for the MOOC platforms that were not providing a satisfactory API. The diversity of platforms and the unexpected changes that could occur on the web interfaces by the providers hindered the automatic crawling development based on MOOC platforms. On that point, we looked for existing searchers engines (we selected Class Central https://www.classcentral.com/, and MOOC list https://www.mooc-list.com/) and decided to apply the crawler to both MOOC aggregators (as they had no available APIs). The implemented solution was successful but presented several issues regarding ethical and security restrictions. Despite the exploration was in a research context, the application used for the automatic crawler was at certain time automatically blocked due to prevention of Denial of Service (DoS) attacks ensured by security companies. Although, even if working, the fact of maintaining the database of MOOCs would be highly demanding for research purposes (APIs from some MOOC providers, the crawler, etc.) and would not be justified by the use that we seek to (as an integrated feature in our authoring tool). Moreover, the possibility that new platforms may appear in the market, it would also present a new scalability challenge.

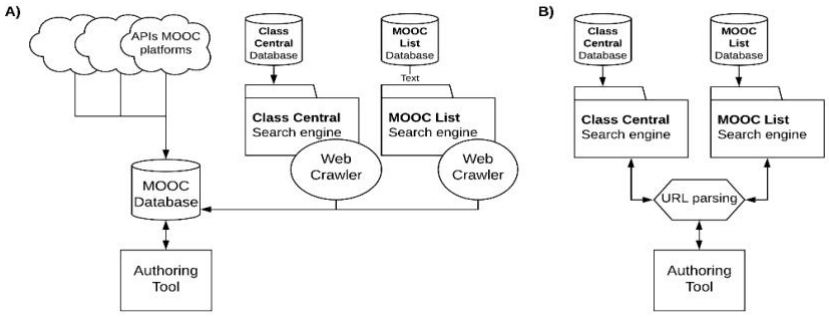

Fig. 1. Diagrams of explored solutions for extracting MOOC information from the existing MOOC providers: A) own Database and B) URL parsing on demand.

3.2 Second exploration: using MOOC data from existing search engines

There are web search engines that allow users find a desired MOOC on the market, allowing them searching courses filtering them by MOOC platform, university, topic, language, etc. Our second exploration had the aim of using the two above mentioned search engines (Class Central and MOOC list) as a source for our design module. But instead of using an automatic crawler of the complete web engines (as we already explored in our first approach) we developed a less intrusive system which use a grammatical parsing of single MOOC pages on demand. The system asks users to add the webpage Uniform Resource Locator (URL) of the online course provided by the selected search engine. Then, it extracts the required information from it to be used in

the design authoring tool (Fig. 1-B). The main inconvenient of this approach is that, as well as in the crawler solution, the interfaces of the search engines may change periodically. Thus, the parsing algorithms need to be updated every time the search engine changes their web design configuration. But this would be less demanding and intrusive than our first solution.

4 Planning hybrid MOOC courses: the MOOC integration in-design module

This section describes the implementation of the second solution: an independent MOOC module which is integrated in our design authoring tool. Users can use the module for extracting data from MOOCs and use it for planning the blended learning unit that they are designing in the tool's editor. The system provides an interface with the links to the two search engines and asks users to add the URL of the online course provided by the selected search engine (see Fig. 2). Then, when the users click on the 'Read Info' button, the system extracts the information from the URL and it shows it in another interface (Fig. 3).

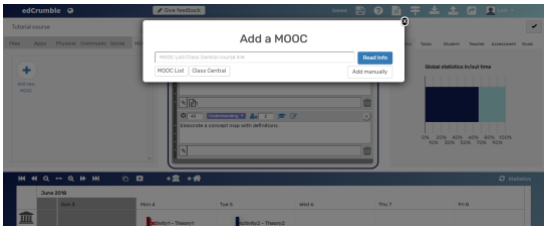

Fig. 2. Screen capture of the interface of the module within the authoring tool edCrumble.

Probably, the best way of implementing this solution would be to directly provide the web of the search engines to the users using an iframe in the authoring tool and extract the information directly (so users would not need to leave the tool's webpage and switch to the search engines sites). But for security reasons, the web browsers do not allow to discover the URL that the user is viewing using code through an embedded iframe. Thus, we decided to use the URL "copy and paste" approach.

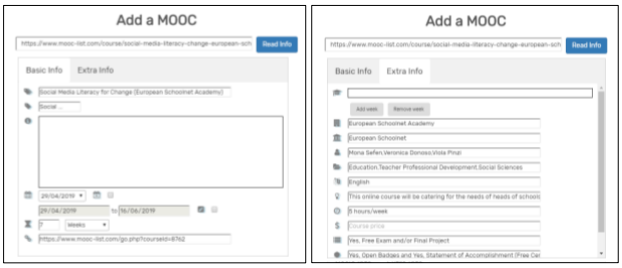

Fig. 3. Screen capture of the interface that shows A) the 'Basic Information' and B) the 'Extra Information' extracted from the MOOC URL from the search engines.

The system also allows users to introduce the information of a MOOC manually. Due to the amount of information extracted is quite large, we needed to prioritize it and we decided to divide it in two groups (showing them in two different tabs): the first tab contains the 'Basic information' (Fig. 3-A) whereas the second tab shows the 'Extra Information' (Fig. 3-B). The system provides all the extracted information in a json file format. Table 1 presents the list of items that the system can extract from the URL provided indicating which ones are in the Basic tab or in the Extra tab. Sometimes, the system cannot extract all the items due to, in some cases, the MOOC URL do not provide them all. To face this issue, the interface allows users to edit all found items as well as introducing new information in the empty ones at any moment.

Table 1. Items extracted from the MOOC URL provided by the search engines.

Item	Description	Tab
Title	Complete name of the MOOC.	Basic Info
Short title	Short version of the name of the MOOC.	Basic Info
Description	Course description.	Basic Info
Start date	Date when the MOOC starts. In case of self-paced courses, there is an option to indicate there is no start/end dates.	Basic Info
Length	Duration of the course in weeks, sessions, days or hours.	Basic Info
Link	Link to the course URL in the origin MOOC platform.	Basic Info
Course syllabus	Syllabus of the course (e.g. content for each week).	Extra Info
Provider	Name of the MOOC platform.	Extra Info
University	Name/s of the university/es providing the MOOC.	Extra Info
Teachers	Name/s of the MOOC instructor/s.	Extra Info
Subject	Subject of the MOOC.	Extra Info
Language	Language/s of the MOOC.	Extra Info
Prerequisites	Recommended prerequisites to take the MOOC.	Extra Info
Effort	Workload of the course (e.g. hours/week).	Extra Info
Course price	Price of the course.	Extra Info
Exam	Indicates if the course requires doing a final exam/project.	Extra Info
Certificate	Indicates if the MOOC provides a certificate.	Extra Info
Certificate price	Price of the certificate (if it applies).	Extra Info

5 Conclusions and Future work

Whereas some of the items extracted from the MOOC design module can serve for reporting general context of the MOOC (title, description, provider, university…), others can have a more relevant role in the design process. In the context of our

authoring tool [4][10], the dates of the course, for instance, can facilitate the visualization of the time compatibility between the f2f course and the online one (allowing teachers accept or discard the selected MOOC for the hybridization). Moreover, the workload of the MOOC as well as the syllabus per week, can support educators during the design process allowing them to decide which modules of the MOOC use in their regular courses or if they are aligned with the f2f curriculum. Despite the ideal solution would be using an API of from the search engines (e.g. reaching an agreement in research contexts), our solution allows us to keep forward and studying how to better support educators in the design of hybrid MOOC courses. Our next steps will include an evaluation of the whole integrated system with the authoring tool to study its potentialities as well as its further improvements.

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