Collaborative approach for improving the audiovisual accessibility of Open Education

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Abstract. Over the past few years, Open Education has experienced a tremendous growth, online learning platforms "titans" such as Coursera, Edx, Udacity, are able to attract millions of users on daily basis to study in their virtual environment. On the one hand, Open Education as a revolutionary phenomenon have changed completely the way of learning, while on the other hand, the high dropout rate of online courses is continuously considered as a big problem, around 90% of online learners end up not finishing the course they registered. Current online learning platforms always buy into a one-fit-all approach which neglect the heterogeneity of students and fail to provide a perceivable social environment for self-directed learning. Recently, the number of studies on the accessibility of Open Education is increasing distinctly, however, there is not enough impact in the research community. Previous researches only focused on the architecture or the physical environment of platforms instead of paying attention to the content itself, which in this sense, fundamentally the audiovisual content. Moreover, most of those studies only addressed the technological aspect of accessibility issues, including the use of specification, standards and design principles, etc. The research goal of this paper is to highlight the audiovisual accessibility of Open Education and make it better through collaborative activities supported by the power of online community and social network.

1. Introduction

In the era of network informatization, Open Education helps push forward the education reform in many ways, it gives students great liberty to study "anytime, anywhere", it also contributes to the social justice and fairness by giving students with different profiles (age, education background, location, etc.) the equal opportunity to access to a larger volume of educational contents. Although with a massive success both commercially and socially, some serious doubts about its effectiveness to achieve the expected learning outcome have been raised, one of the most negative aspects of Open Education is the low completion rate; according to various studies, this varies between 5 and 15 % [1]. Among all forms of Open Education, recently, Massive Open Online Course or MOOC as a dominant model becomes a popularized all over the world. Some of its most characteristic features such as massification, heterogeneity and the absence of a tutor, make it different from any other online courses, meanwhile, also causes a lot more difficulties for planning learning design. Another obstacle Open Education is facing, is deficiency of social interaction in a self-directed learning environment online, students are not perceiving other's existence, the feeling of isolation may further conduct to the abandon of the course.

2. The Massive Online Open Course

Today we hear a lot about the explosion of Massive Online Open Course or MOOC, it's an achievement of Open Education Movement, specifically the Open Educational Resources Movement, since late 1990s some universities and organizations started offering open access online for their educational contents. The Open Educational Resources or OER, defined by UNESCO 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, adaptation and redistribution by others with no or limited restrictions.

Later in 2008, the term MOOC is coined for the first time by George Siemens y Stephen Downes in their online course (the first MOOC of the world): "Connectivism and Connective Knowledge Online Course (CCK08)", the course based on the connectivism learning theory (this type of MOOC is referred as cMOOC) was provided for people to gain the ability to connect one and another through social network and collaborative tools. It's a great inspiration for the education innovation, while not reached a wide range of public.

The difference wasn't made until 2011, the course "Introduction to Artificial Intelligence" launched by Stanford University, counted with more than 160 million of students registered, makes MOOC rapidly becomes a revolutionary phenomenon. Scalability is clearly a new feather of this course, while this course followed a traditional learning design framework, the so called instructivism or conductivism, makes it different from the previous one, this type of MOOC is referred as xMOOC, in the next table, we compared some feathers of those two models of MOOC.

Table 1. Comparing cMOOC and xMOOC.

	Cmooc	xMOOC
Learning design	Connectivism	Instructivism
Key feathers	Social Network PLE (Personal Learning Environment)	LMS (Learning Management System)
Curriculum structure	The curriculum is just a start point for extenting in the interaction	A complited curriculum just like in a traditional institution
Type of knowladge	Holistic	Empirical
Content	Distributed and open content with external links	Content only availabe inside the platform
Teacher-student relation	Students are protagonist of the learning	The instructor occupy the most important role
Assessment	Knowladge created in PLE	Quiz, homework, peer assessment

Both models have their advantages and disadvantages, for example, in cMOOC contents are more open and can be linked to other contents outside of the platform, also collaboration and social interaction are favored. While in xMOOC, although the content is only available in the platform and the learning design is organized in a traditional way, somehow, it's more comfortable for learners, and working with universities with good reputation make the educational content more reliable.

3. Accessibility of MOOC: state of art

The International Organization for Standardization (ISO) defines accessibility as: the usability of a product, service, environment or facility by people with the widest range of capabilities (ISO 9241-171 2008b). While the World Wide Web Consortium (W3C) to promote the accessibility of the Web, defines web accessibility to mean that people with disabilities can perceive, understand, navigate, and interact with the Web (WAI 2006). The ISO definition suggests that accessibility is about issues for the largest possible range of users, including older and disabled people, whereas the WAI definition suggest that it is exclusively concerned with issues for older and disabled people. This highlights the current lack of consensus about accessibility. According to the World Health Organization (WHO), more than one billion people live with some form of disability. That is, almost one-fifth of the global population. If we only look at the definition in its narrow sense, we will find out that improve the accessibility is not just a moral necessity, it also implies business success.

Study on the accessibility which drives Open Education to meet the needs of diverse online learners could potentially address the heterogeneity issue mentioned earlier. Nevertheless, it is still a very new phenomenon for the research community, studies on accessibility of Open Education are not developed until recent years. A systematic literature review conducted by Gordon-Sanchez (2017) in

order to identify relevant studies in the field from 2008 to 2016 shows that, although the number is continuously growing, it's still scarce, there is absolutely no research on accessibility of Open Education until 2012 and finally there are only 40 relevant studies founded in total until 2016 [2].
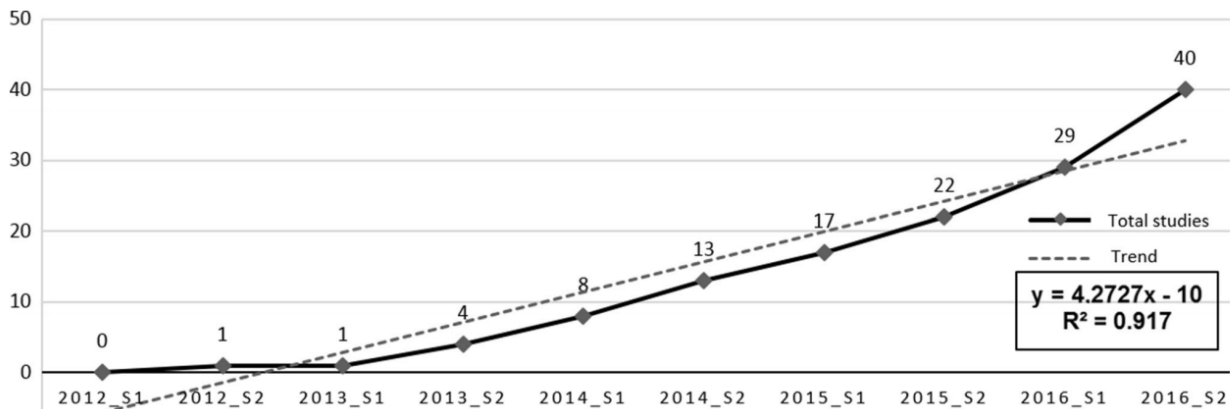

Fig.1. Growth tendency of relevant researches in accessibility of Open Education

Iniesto (2017) conducted another literature review with a different focus on the research methodology [3], both literature reviews characterize those studies in different groups (clusters or research dimensions as they call them), the main research focus of them still was in the use of guidelines, specifications and standards, or in less volume, the architecture of the platform or the design strategy. Some studies started to pay attention to the learners' needs but are still in the early phase of identification of those needs without offering any possible solution.

MOOCs, especially xMOOCs are mostly organized as sequences of instructor-produced videos interspersed with other resources such as assessment problems and interactive demos. Studies found that students spent the majority of their time watching videos and often engage more with video while skipping over assessment quiz, online discussion and other interaction components [4]. It's odd that digital videos as the central of students' learning experience in Open Education, there are very few studies consider its accessibility issue, most studies only focus on the accessibility of the platform or LMS in a general sense. In this paper, we focus exclusively on the audiovisual accessibility of MOOC.

4. The hybrid model of MOOC

The idea of integrating strategies of cMOOC (based on connectivism and incorporating cooperative work) to the existing successful xMOOC to improve the effectiveness of Open Education in dealing with the heterogeneity issue is first developed by Spanish researchers Fidalgo-Blanco et al. (2013) [5], Stephen Downes then mentioned it by calling this model as hMOOC o hybrid MOOC.

One most applied strategy of this approach is to combine the use of social network and the existing xMOOC platform or LMS. In Polytechnic University of Valencia, researchers of QTALNET tested this model by combining the use of the Facebook group and the LMS of the university (PoliformaT), it showed a positive result. Students view PoliformaT as a "official" platform for receive class information, course materials and take exams, while the Facebook Group as a "informal" media to interchange ideas, resolve questions and show their learning progress, the use of social network. The use of social network is to a great extent make up the deficiency of LMS [6].

The same logic can be applied to improve the accessibility of Open Education, current approach for accessible MOOC are locked in improving the technological performance of the system or the physical space, if we step outside of it and take a look at the learning design and strategy planning, we will see the social space construction and collaboration is also play an important role. Accessibility of MOOC is embedded in a complex array of factors, community and institutional structures must be considered as well if meaningful access to educational technologies is to be provided.

5. Social interaction and collaborative learning

The learning process is seen as the result of complex interactions both formal within the course or informal, this can find its origin and epistemological foundation in the theory of social learning of Vygotsky (1978) [7]. With the development of ICT, in a virtual learning environment, the traditional interaction between students and teacher in the classroom is replaced by the interaction not only with more people but also with audiovisual content through internet.

With the blossom of social network, it is recognized worldwide that the web is not only a technological innovation, but also a social movement. Some popular feathers of web 2.0 are also embed into LMS. Nowadays, most online learning platforms allow the creation of community for the online course, no matter it's a forum in the same website or a Facebook Group as we mentioned earlier.

Although many new social feathers have been added to LMS, learners may still perceive them as just tools for interaction with the computer. Only by making online community as a new function available doesn't mean that the expected social space will be created automatically. In a self-directed learning context, the feeling of isolation, caused by not perceiving other's presence or interaction with "real person", lead to the abandon of the course. That's why social interaction is so important, it's a pitfall to take it for granted or restrict it to the cognitive learning process.

In the next place, collaboration is essential for the cognitive development, since the cognition cannot separate from its social context. As we argued before, just placing students in an online community doesn't guarantee collaboration. For the collaborative learning, one key factor is the interdependency among students when they work together for certain tasks. In a collaborative environment, everyone depends on the others inside the community, learners can take advantage of a maximized social support, gain a better self-esteem, and put on more effort to reach their learning goal. Besides, collaborative learning gives students the opportunity to improve their social and communication skills, helps them generate a positive attitude towards other classmates and learning materials.

6. Planning collaborative activities for accessible audiovisual contents

Access to audiovisual contents is fundamental for Open Education, in the past few years, studies on audiovisual accessibility is increasing, a variety of context has been taken into account, such as, different browsers, video players, devices or assistive technologies for disabled people, etc. Make the audiovisual content itself accessible is equally important, as demanded by the Web Content Accessibility Guideline 2.0 of W3C (WCAG 2.0 2008), it's required to add alternative content such as captions, audio descriptions, transcript, subtitle and sign-language interpretation, etc. for the audiovisual contents. Technologies such as speech recognition for automatic generated subtitle is still relatively immature and is often lack of accuracy, also if the course instructors are the only responsible for this job, that will be a cost of time for them. The collaborative approach in this sense is more suitable. Help students engaging in collaborative tasks related to audiovisual accessibility and have their work published in the community is highly motivating for self-directed learning and will improve their learning outcome effectively.

The collaborative approach for improving the audiovisual accessibility comprises 3 components:

1. *Participation in online community*: using both formal and informal online community as social environment or social space, whether its forum in the website or social media like Facebook group, for interchanging ideas and negotiating among learners. Let learners be the protagonist to decide or chose what kind of collaborative activity to develop, the discussion should be active not only in the beginning of the activity, but also during the activity, that means learners should share their progress, and actively comment on others' topic. Online community served as a social space where promote social interaction, the collaborative learning is effective only if the social interaction is active during the whole process of the activity.

2. *Defining accessibility related activities*: firstly, a textual transcription will be created by members of the community based on course videos and additional materials, this transcription can be saved in Microsoft Word or some other online platform for collaborative editing. The final proved version of transcription will then be used for generating subtitles for course videos. Semantic labelling or "social tagging" should be available too for students to add metadata (title, subject code, key words, etc.) associated to the learning resources using video annotation tools.

3. *Assessment and quality control*: assessment in a traditional environment usually evaluate students autonomously, which strips out the social dimension of learning, while for collaborative learning, assessment is also a critical issue, although we put them in a group work situation, it's hard to evaluate their participation individually. Thanks to the power of online community and social network, we can identify each one of them by their ID or social media account and evaluate them by their contribution record in the activity. Finally, peer review, which allows learner to access, questioning and editing other's work, is used for improving students critical thinking and at the same time for the quality control of accessibility related activity.

7. Summary

Improving the audiovisual accessibility for online video courses is one key task for Open Education, surprisingly, there are very few researches on this area. This paper will fill this gap and at the same time promote students' engagement in collaborative learning. For a successful collaborative activity, social interaction is the essential component that needs to be strengthened, this is more important for accessibility related activities, which is usually dominated by a technology-centered approach. The collaborative approach proposed here can make students' participation visible and evaluable and help them build a better self-esteem and social awareness in realistic tasks.

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