Holistic vision for creating accessible services based on MOOCs

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Abstract

MOOCs are examples of the evolution of eLearning environments towards more a revolutionary computer and mobile-based scenario along with social technologies that will lead to the emergence of new kinds of learning applications that enhance communication and collaboration processes. The flexibility of the learning service students to learn at their own time, place and pace, enhancing continuous communication and interaction between all participants in knowledge and community building, especially benefits people with disabilities and therefore can improve their level of employability and social inclusion.

However, the access to MOOC platforms still present barriers, there is also a lack of accessibility on the learning resources, the communicating tools and even personalized user interfaces. All these issues present definitive barriers that add extra difficulties such as the need to develop specific digital or even social skills for students with functional diversity. Therefore, an holistic vision of different strategies regarding the achievement of accessibility (from content to user preferences) is presented in this paper, strategies than should be addressed in order to achieve the better accessibility level while designing new learning services for people with functional diversity based upon MOOC.

Keywords
MOOC, usability, accessibility, employability, standards, social inclusion

Introduction

The pedagogical and visual design of the MOOCs, their information architecture, usability and visual and interaction design could be having a negative impact on student engagement, retention and completion rates as has been analysed previously in adult learning (Tyler-Smith, 2006). Whilst designing a service based on MOOCs to be used by people with functional diversity, it is important to take into account the accessibility level of each of the parts of the system and also the role of the meta-information related to functional diversity, for instance to define specific user profiles. Thus, an analysis of the critical factors necessary for building a specification of requirements for an accessible MOOC system is provided here, presenting an outline of all the accessibility issues that must be addressed, as regards user abilities and needs, user profiling, service domain and associated technological infrastructures, the requirements for academic eLearning delivery, adaptable and multimodal interfaces, along with a review of well-known applicable standards.

Inaccessibility of MOOCs delivery

A driving force has been precisely the beneficial application of this type of content in the area of education to favour active learning or the tendency towards the Web 2.0, in which the majority of places are based on collections of shared visual and audio-visual resources (such as Flicker or Youtube), just as in MOOCs. But MOOCs are full of video-

presentations, animations, automatic self-assessment (some of them multimedia based) integrated into them. This introduction of audiovisual content into e-learning platforms adds a new difficulty to the accessibility requirements, since they include new elements which widen the digital divide, and not only for people with disabilities.

Demands of usability and accessibility in MOOCs services

In practice, the e-learning services are rendered mainly by means of web technologies. For this reason, e-learning represents a domain in which the paradigm for web accessibility is of immense application. In this sense, the Web Accessibility Initiative (WAI) from W3C promotes accessibility by means of guidelines related to the content (WCAG), the authoring tools (ATAG), and the user agents (UAAG). The multimedia formats that are very popular in MOOC platforms are based on creative audiovisual content with a high technical quality of sound and image as well as the interactive services that make the participation and communication of their students possible by facilitating accessibility for people with reduced physical disabilities and convert them to active users of the learning. Students using assistive technologies may have problems while navigating in the MOOC environment, accessing the platform (registration process) and even using the learning content contained in the platform.

A MOOC interface design is often determined by the platform since some of the features – learning and testing tools – cannot be edited or customized by the academic assistants. Its materials and its mode of delivery might adhere to a set of accessibility standards. Also MOOCs environments typically contain a variety of components which do not always share a consistency of interface logic or interactive elements, ranging from posts in a forum, make up elements in tests or timed quizzes through to playing embedded videos or downloading a variety of document formats. Videolectures are key elements in the MOOC model, and the hurdles of interacting with the platform or contents should be minimized. But alternative accessible formats, subtitles, and/or sign language interpreters for audiovisual materials, audio-description recordings are not easily available even thpugh there exist great guidlances, such as (Sánchez, 2013).

As for documents, the versatility of the PDF format has given rise to its rapid extension on the Web and it is the most used format to present documents on Web pages. Adobe allows accessible PDF documents to be produced, they can be navigated by means of a keyboard and PDF forms can be filled in and sent online easily. A significant characteristic was the support it offered to screen readers that allowed the content of the documents to be labelled in a similar way to HTML. Acrobat 6 also allows voice to text content in PDF documents to be converted by means of synthesisers contained in the operating systems. The advances allowed authors to create complex accessible documents, however to do so the author has to create the documents with care and take into account the improvement in accessibility.

Lastly, The Flash format is frequently used to create multimedia elements. Its content is independent of the navigator and to be able to see it, the corresponding plug-in must be installed. With the launch the Flash Player 6, Macromedia provided a media player compatible with MSAA which served as a link between deliberately created multimedia material and the support technologies that the users use. Thus applications such as Window-Eyes and JAWS can have access to the aforementioned material. However, Flash is not independent of the device as is demanded by the WCAG guidelines. The

alternative to this problem of accessing information is to provide a standard version of the content of the course, for example, in HTML format. There is also the standard SVG technology as an alternative in the field of vectorised graphics, also recommended for W3C, in spite of the need for a plug-in in order to use it and that multimedia elements cannot be included directly (unlike the Flash format).

Strategies for improving usability and accessibility in MOOC services

With all of the above considerations, some strategies can be applied to improve the usability and accessibility level of MOOC systems: platforms and services as a whole.

Learning Resources Metadata to Improve Accessibility

In order to improve the accessibility of e-learning content, the AccessForAll Meta-Data (ACCMD) specification was developed by IMS in 2004. It describes learning content by identifying which types of resource are available in a Learning Object that can be used to present the same content to a given learner, but by means of different media.

The IMS Access for All (AfA) Digital Resource Description (DRD) 3.0 - draft released in 2012 - aims to solve these problems by radically changing the point of view: now it is possible to declare one or more access modes for each resource, define existing accessible adaptations and whether they come from the specific original resource.

Assessment Accessibility

Another interesting and recent IMS specification is the Accessible Portable Item Protocol (APIP), which is related to the accessibility of e-learning assessment. It provides assessment programs and developers with a data model for standardizing the interchange file format for digital test items.

Enabling User Adaptable Interfaces

An effective e-learning environment should take into account each learner's abilities, together with learning goals, where learning takes place, and which specific devices the learner uses. In this context, it is strategic to describe learner's preferences and needs by means of a profile. How this profile interacts with the eLearning platform interface and the objects it contains can impact upon the learning experience of users with different capabilities.

Multimodal Adaptive Interfaces

One solution to the challenge of computer systems becoming more and more complex and with more interaction consists of making computer systems easier to use and learn. One way of doing this is through research into and the development of more intelligent interfaces that are adapted to the user in a natural and progressive way, trying to detect their characteristics so that the system can adapt to their level and preferences. The premise must be that the interfaces adapt to the person, not vice versa.

Accessibility Standards for Learner Profiling

Some standards have been defined to profile learner preferences and needs that will help the user to personalise devices and services for students with disabilities. Groups that have been really active in this work are:

1. IMS Global Learning Consortium developing the IMS Learner Information Profile (IMS LIP) and IMS Learner Information Package Accessibility for LIP (ACCLIP). This profile provides a means of describing how learners interact with an e-learning environment, by focusing on accessibility requirements.
2. ISO developing the ISO/IEC 24751:2008 accessibility standards. While the IMS standard is focused in defining content characteristics, ISO specifies the senses through which content is accessed.

With all these standards, learners can specify which kind of adapted and/or alternative resource they prefer or need. For instance, text may be preferred over visual resources or audio might be preferred over text or images, etc.

User Experience and User Centered Design Model

Regardless of possible platform User eXperience improvements, universities, professors and instructional designers will always have the last word on shaping the user experience of their courses. How they organize the content, how they label the menu sections or how they structure the different pages is absolutely crucial. And for these decisions, one should consider human-computer interaction guidelines, usability best practices or recommendations for writing usable online texts.

The User Centered Design Model (UCDM) (Kinzie, 2002) means not only planning learning goals and actions, but also specifying different contexts of use and the requirements of different ‘actors’, which might include teachers, students, etc. In MOOC contexts, user centered design and user-centered evaluation have been driven by the concept of 'task'. The student needs to be able to perform tasks such as studying course materials, taking notes, watching videos, writing assignments, accessing forum or chats, communicating with a curator, etc.

Conclusion

In MOOCs learning activities are used that had been originally designed neither for specific MOOC platforms nor for a specific learning scenario. Therefore, educational resources that are being delivered present some problems for certain target groups, such as people with complex communication needs or disabled users. As a result, the level of usability and/or accessibility of these resources is often lower than desired.

Some proposed accessible features for MOOC platforms are listed below:

- Different themes should be available so as to invite users to choose the interface layouts which best meets their needs.
- The MOOC platform should be compliant with accessibility standards, not only related to the Web interface (i.e. the IMS/ISO AccessForAll).
- The MOOC platform should also address the accessibility from an instructor’s point of view, not only from student’s.

Although the usual accessibility barriers may exist in MOOC platforms, perhaps the model of large scale participation and social accessibility (Takagi et al., 2008) could be used to support special needs users by providing peer assistance in terms of study skills, content adaption and remote assistance.

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