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## The current state of accessibility of MOOCs: What are the next steps?

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### Abstract

Accessibility focuses on supporting people with disabilities – such as those related to auditory, cognitive, neurological, physical, speech, and vision requirements. Massive Open Online Courses (MOOCs) are no longer a novelty and the technologies associated with them should cater to all users irrespective of their accessibility requirements. In this paper, we will discuss the current state of research related to accessibility of MOOCs. We will then outline a research plan towards developing recommendations for the effective design of accessible MOOCs. The plan includes stages such as developing an evaluation instrument, evaluation of existing MOOCs and conducting empirical research with design teams of MOOCs and learners (MOOC-users).

### Keywords

MOOC, accessibility, accessibility evaluation, evaluation instrument

### Introduction

To date, research focused on the accessibility of MOOCs has been limited. However, the need to incorporate greater access for those who declare disabilities is now being highlighted (US Department of Justice, 2015). Information and Communications Technology (ICT) offers opportunities to people with disabilities and people of any age including people aged over 55 years (referred to as ‘older people’) to improve their wellbeing through socialisation, learning, and for re-skilling and employability (Bühler & Fisseler, 2007; Vila, Pallisera & Fullan, 2007). MOOCs can be beneficial when compared to other online learning opportunities, through holding characteristics of openness within a structured learning framework, low cost of learning, scope for individual planning in terms of the learner’s time and at their preferred pace and place, opportunities for social learning, and the chance to gain new skills and knowledge. Providing accessible MOOCs could offer flexibility of learning and benefits to all, irrespective of any disability.

Indeed, the Porto Declaration on European MOOCs (Porto Declaration on European MOOCs, 2014) highlights: “*Importantly, we stress that MOOCs must not be seen as the outcome or exemplar of online education. Rather they need to be understood in a wider context as there is a long history of research on open and online education and a variety of approaches and tools to provide quality learning opportunities to all.*” It is this aspect of providing ‘opportunities to all’ that can only be achieved if MOOCs are accessible to all.

In the following sections we will describe our research, covering: the context of accessibility and

lifelong learning of MOOCs, MOOCs and accessibility research, our research plan towards developing recommendations to support the design of accessible MOOCs, and concluding remarks that outline the next steps to be taken.

### **Accessibility and lifelong learning**

To begin to understand issues in MOOC accessibility, we can draw on research on accessibility and Open Educational Resources (OERs). This reflects a general consensus that there is a need to address accessibility features of platforms where OERs are deposited, and that educational repositories should be designed with accessibility in mind (Law & Perryman, 2013). A study supported by the SCORE project (Gruszczynska, 2012) identified that accessibility of OERs can be enhanced by relatively simple strategies, such as use of accessibility features embedded within software packages, for example increasing the font size or reading out the text, or the provision of transcripts for audio and video resources. EU4ALL was a major collaborative project supported under the EU Framework Programme (McAndrew, Farrow & Cooper, 2012). It highlighted the importance of adapting online learning resources for all and stressed the need to make accessible content available. Recommendations included validation against standards, providing alternatives as necessary for the educational resources for users with disability-related requirements, ensuring both providers and end-users have adequate training and IT skills, and the need for a culture change to promote proactive consideration of accessibility. A study related to imparting digital skills to people aged 55 years and over (Minocha, McNulty & Evans, 2015) stresses that this user group is normally not recognised as being significant for the workforce and the economy. It recommends the use of open educational resources in the form of MOOCs as a suitable approach for training and opportunities for re-skilling which can keep them employed.

The Open University (OU) has more disabled students than any other university in UK and Europe (The Open University Annual Report, 2015). OU's Equality and Diversity Annual Report (2014) states: *"More than 21,000 disabled students are now registered, representing just over 12% of the OU student body. This is double the proportion of three years ago and far in excess of the performance indicator in the University's equality objectives"*. These insights on the preference for distance education and online learning by disabled students reinforce the need to design accessible MOOCs.

### **MOOCs and accessibility research**

In our initial literature review, we have observed there has been limited research focused on accessibility within MOOCs. We have found three groups of papers. The first group pertains to accessibility assessment with users. Sanchez-Gordon & Luján-Mora (2013) reviewed five Coursera courses for evaluating the accessibility of the Coursera platform and the contents of these courses, with a particular focus on learners in their old age (generally over 55 years). Al-mouh, Al-khalifa & Al-khalifa (2014) evaluated ten Coursera courses of different disciplines such as technology, design, humanities and physics for their suitability for blind or partially sighted learners; none of the courses reached the minimum level of accessibility. Finally Bohnsack & Puh (2014) conducted accessibility evaluation of five MOOC platforms for blind users: Udacity, Coursera, edX, which are popular in the US, and OpenCourseWorld and Iversity in Germany. Except for edX, all the other platforms had severe accessibility problems.

The second group breaks down data taken from student-surveys. Liyanagunawardena & Williams (2016) analysed data via a pre-course survey for 10 courses on the FutureLearn platform to show evidence that learners in their old age are already participating in MOOCs.

The last group of papers relate to integrating accessibility aspects within the technological infrastructure of MOOCs. Sanchez-Gordon & Luján-Mora (2015) have proposed a three-layer architecture to extend the Open edX platform to enhance the accessibility of the course content for users with disabilities by adapting course content, and which is personalised to student needs, preferences, skills and situations. Rodríguez-Ascaso & Boticario (2015) have proposed a MOOC framework consisting of services, standards and quality procedures related to accessibility. This is based on the EU4ALL project, which originally focused on accessibility in Learning Management Systems (LMS). The authors discuss the applicability of the above services architecture in a set of scenarios illustrating various learning situations in MOOCs.

### **A research plan to support design of accessible MOOCs**

In our previous research (Iniesto, Rodrigo & Moreira Teixeira, 2014; Iniesto & Rodrigo, 2014), the focus has been on evaluating different European MOOC platforms in the Hispanic - Portuguese context by using expert accessibility evaluation methodologies – for example, the Website Accessibility Conformance Evaluation Methodology (WCAG-EM 1.0, 2014). The following platforms were considered: COLMENIA, UNED COMA ([coma.uned.es](http://coma.uned.es)), Miriada X ([miriadax.net](http://miriadax.net)) and UAb iMOOC ([eco.imoooc.uab.pt](http://eco.imoooc.uab.pt)). All the platforms scored 5 or 6 out of 10, indicating that there is scope for improvement in their accessibility. The threshold for reasonable accessibility was not achieved for any of the platforms. We noted that the educational content was not following any standards - either pertaining to platforms or accessible educational content.

In our research project, we are now working towards developing an evaluation instrument which will combine the use of both automatic tools and manual evaluation procedures. The evaluation criteria include usability and user experience characteristics alongside accessibility of the user interface design, and accessibility characteristics of the pedagogical design such as clarification or reinforcement of concepts for students with cognitive impairments. The evaluation instrument currently includes (Figure 1):

- Evaluation through accessibility tools:
  - WCAG accessibility validation, like eXaminator ([examinator.ws](http://examinator.ws)) and TAW ([tawdis.net](http://tawdis.net)).
  - Disability simulators, for example aDesigner ([eclipse.org/actf/downloads/tools/aDesigner/](http://eclipse.org/actf/downloads/tools/aDesigner/)).
  - Text based documents and video lessons accessibility validation.
- Evaluation of Usability and User Experience (UX):
  - Usability Testing tools, such as Sortsite ([powermapper.com/products/sortsite](http://powermapper.com/products/sortsite))
  - Manual techniques of user experience testing with learners
- Educational content (pedagogical design) evaluation.
  - Review of intended learning outcomes.

- Activity run-throughs or developmental testing with users.

We will apply our evaluation instrument to conduct evaluations of platforms such as FutureLearn ([futurelearn.com](http://futurelearn.com)), Coursera ([coursera.org](http://coursera.org)), edX ([edx.org](http://edx.org)) and Udacity ([udacity.com](http://udacity.com)), by considering courses from different institutions on each of the platforms. It is also important to assess the accessibility of MOOCs on alternative technologies such as mobile devices. This process of evaluation and development of the evaluation instrument will be iterative in nature by refining the evaluation methodology and the instrument based on literature review and outcomes from evaluations.

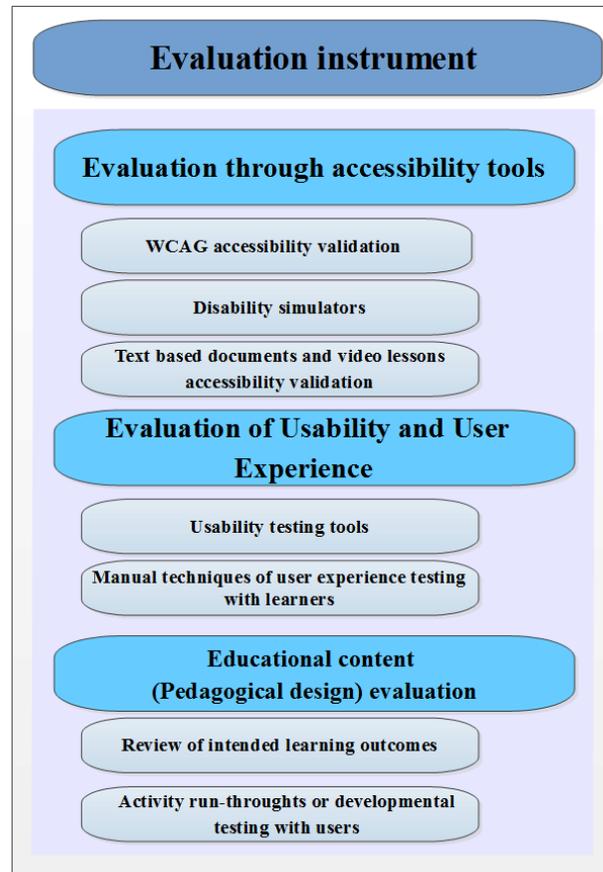


Figure 1. Initial Evaluation instrument

As Seale (2014) argues, we need to understand the multiple viewpoints of stakeholders in accessibility practice, such as those of educators who create materials and facilitate learning, and of technologists who develop and maintain platforms. It is therefore essential to identify how these stakeholders can be involved in achieving accessibility in MOOCs. As such, we will carry out empirical investigations with design teams of MOOCs suggested to capture their practices and constraints of integrating accessibility. We will also investigate the experiences, constraints and requirements of the end-users (learners) who have accessibility requirements, those who are already realising the benefits of MOOCs, and the ones that are aspiring to access MOOCs.

## Conclusions

Based on our accessibility assessments and empirical investigations with stakeholder-groups, we aim to derive recommendations for accessible MOOCs, and develop guidance on how MOOCs can be accessed through the assistive technologies that learners/users may already have. This work can then provide the foundation for supporting those with disabilities to follow a route to open learning that meets their particular needs.

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