



Open Research Online

The Open University's repository of research publications and other research outputs

Auditing the accessibility of Massive Open Online Courses (MOOCs)

Conference or Workshop Item

How to cite:

Iniesto, Francisco; McAndrew, Patrick; Minocha, Shailey and Coughlan, Tim (2017). Auditing the accessibility of Massive Open Online Courses (MOOCs). In: 14th AAATE Congress 2017, 13-14 Sep 2017, Sheffield.

For guidance on citations see [FAQs](#).

© 2017 The Authors

Version: Accepted Manuscript

Link(s) to article on publisher's website:
<http://www.aaate2017.eu/>

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

Auditing the accessibility of Massive Open Online Courses (MOOCs)

Francisco Iniesto¹, Patrick McAndrew, Shailey Minocha and Tim Coughlan
The Open University
{francisco.iniesto, patrick.mcandrew, shailey.minocha, tim.coughlan}@open.ac.uk

Abstract. The outcome from the research being reported in this paper is the design of an accessibility audit to evaluate Massive Open Online Courses (MOOCs) for accessibility and to arrive at solutions and adaptations that can meet user needs. This accessibility audit includes expert-based heuristic evaluations and user-based evaluations of the MOOC platforms and individual courses.

Keywords. Accessibility, MOOC, Audit

1. Introduction

To date, research on the accessibility of Massive Open Online Courses (MOOCs) has been limited; the recent issues related to accessibility for edX [1] and Berkeley [2] have indicated that to a large extent the legal challenges could have been averted by integrating accessibility in the development of platforms and MOOCs.

There is evidence in the literature related to accessibility assessments of MOOCs such as those with learners [3, 4] that show users had accessibility problems with key tasks such as browsing the contents or accessing video-lessons. All these studies revealed poor accessibility results, however they were only focused on visually impaired learners. Other authors have performed accessibility evaluation through automated tools and expert-evaluations [5, 6] uncovering critical accessibility issues in the courses being evaluated. These evaluation studies involved heuristic evaluations against the technical aspects from the standards, especially WCAG 2.0¹, however did not include complementary user-based approaches for evaluations. Studies that employ an empirical user-based approach tend to have small samples of participants and cover just one type of disability, typically vision impairment. For a more holistic understanding of MOOCs accessibility, the methodology should include the widest possible set of disabilities and a combination of evaluation methods.

The authors' research programme on MOOC accessibility has taken a mixed methods-research approach to understand the complexity of the issues related to disability and MOOCs. One of the studies has involved interviews with MOOC platform providers, software developers/designers and researchers in the MOOC community [7]. The interviews showed that accessibility is not always embedded in the

¹ WCAG 2.0 (2008). <https://www.w3.org/TR/WCAG20/>

routine design and development activities within the educational context of organisations. Despite this, the massiveness of MOOCs requires being proactive in producing accessible materials:

Content Manager 1: *“The only big barrier to actually seeing from our point of view accessible courses is just the time and effort it takes to make something accessible”* while CM2 indicates a common situation: *“the only data we have are the support requests that come in where learners will self-identify as having a disability”*.

A technical issue was highlighted by a Software Developer: *“A lot of the time even when the course is live, we are still fixing things the first weeks even the first runs”*.

The research team is also involved in quantitative analysis of survey data from different MOOCs of UK’s Open University in FutureLearn [8]. In the next stage of the research programme, we will be undertaking an interview study with MOOC learners to capture the disabled learners’ experiences with MOOCs. This study will be useful to understand first-hand the accessibility issues learners may be facing in their interactions with MOOCs. Building on the evidence-base from interviews with the MOOC providers, planned interviews with disabled learners, analysis of the survey data and literature review, we are now developing a MOOC accessibility audit instrument. The audit will support addressing issues of accessibility while a MOOC is being designed and developed rather than after the MOOC goes live when the changes are more difficult and costly.

In this paper, we describe the methodology to develop a MOOC accessibility audit, the results expected from this audit, and we discuss its significance.

2. Methods

In order to assess the likely accessibility issues in MOOCs, our proposal is to develop an audit instrument that will combine expert-based heuristic evaluations with user-based evaluations [9]. To evaluate accessibility of websites several methods can be employed such as conformance reviews, user testing, subjective assessments and screening techniques [10]. Assuming that different accessibility evaluation methods (AEM) lead to different types of results, that reveal different levels of quality, it is suitable to use complementary methods as described in the framework of the Website Accessibility Conformance Evaluation Methodology (WCAG-EM 1.0)². This methodology combines the methods of conformance reviews, screening techniques and user evaluations [11] (Figure 1):

- **Evaluation through accessibility tools.** The audit includes automated checking of conformance to guidelines or standards (tools for automated accessibility checking) [9]. It is important to take into account the weaknesses automated accessibility tools have [12]; therefore, a combination of several ones is significant to enhance their strengths.
- **Evaluation of usability and user experience.** The evaluation criteria will include usability and user experience characteristics alongside accessibility of the user interface design and evaluations conducted by experts (heuristic evaluation) [9, 13].

² WCAG-EM 1.0 (2014), <https://www.w3.org/TR/WCAG-EM/>

- **Educational content (pedagogical design) evaluation.** It is important to consider the accessibility of conceptual content of the educational resources within a MOOC based on users profiles and disabilities, while taking into account the pedagogical objectives of the resources and accessibility characteristics of the pedagogical design (for example, clarification or reinforcement of concepts for learners with cognitive impairments) [14].

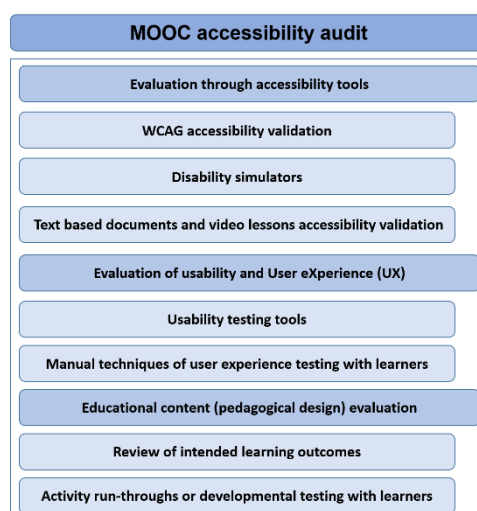


Figure 1. Evaluation methods included in the MOOC accessibility audit

3. Results and discussion

The MOOC accessibility audit instrument shown in Figure 1 will be iteratively refined based on our previous research on MOOC accessibility [15-16] and while applying it in this current research programme. As shown in Figure 1, a wide-range of methods have been included in the audit. During the next stage of empirical work in this project, the suitability and effectiveness of the methods will be assessed and some of the methods may be removed from the final accessibility audit instrument. The outcome of the MOOC accessibility audit will be a vector of characteristics representing an evaluation of the MOOC course and will guide the adaptations in the design to cater for accessibility requirements.

A recent study [17] assessing overall accessibility of content in online course identified how slow progress has been. The study showed the value of an automated process to help quantify the issues that need to be addressed, at the same time the approach taken limits outcomes to content related issues, rather than those of design. The accessibility audit instrument, discussed in this paper, is a part of a larger research programme related to the accessibility of MOOCs that aims to achieve a deeper and multi-faceted insight into MOOC learner's accessibility needs when participating in MOOCs. The MOOC accessibility audit will help to assess the accessibility of MOOCs early on in the design and development process and before the MOOCs are launched by the providers.

Acknowledgements

This work is supported by a Leverhulme Trust Doctoral Scholarship in Open World Learning based in the Centre for Research in Education and Educational Technology at The Open University. Francisco would like to thank the Global OER Graduate Network, supported by the William and Flora Hewlett Foundation.

References

1. US Department of Justice. (2015). Justice Department Reaches Settlement with edX Inc. Retrieved February, 2017, from <http://www.justice.gov/usao-ma/pr/united-states-reaches-settlement-provider-massive-open-online-courses-make-its-content>
2. Inside Higher Ed. (2016). University May Remove Online Content to Avoid Disability Law. U.S. Retrieved February, 2017, from <https://www.insidehighered.com/news/2016/09/20/berkeley-may-remove-free-online-content-rather-complying-disability-law>
3. Al-Mouh, N. A., Al-Khalifa, A. S., & Al-Khalifa, H. S. (2014). A first look into MOOCs accessibility. In *International Conference on Computers for Handicapped Persons* (pp. 145-152). Springer International Publishing.
4. Bohnsack, M., & Puhl, S. (2014). Accessibility of MOOCs. In *International Conference on Computers for Handicapped Persons* (pp. 141-144). Springer International Publishing.
5. Calle-Jimenez, T., Sanchez-Gordon, S., & Luján-Mora, S. (2014). Web accessibility evaluation of massive open online courses on geographical information systems. In *Global Engineering Education Conference (EDUCON), 2014 IEEE* (pp. 680-686). IEEE.
6. Martín J. L., Amado Salvatierra H. R., & Hilera J. R. (2016) MOOCs for all: Evaluating the accessibility of top MOOC platforms, *IJEE*, vol. 32, no. 5(B), pp. 2374–2383.
7. Iniesto, F., McAndrew, P., Minocha, S., & Coughlan, T. (2016). Accessibility of MOOCs: Understanding the Provider Perspective. *Journal of Interactive Media in Education*, 2016(1).
8. Iniesto, F., McAndrew, P., Minocha, S., & Coughlan, T. (2017). What are the expectations of disabled learners when participating in a MOOC? *L@S '17: Proc. of the Forth ACM Conference on Learning @ Scale*, ACM
9. Petrie, H., & Bevan, N. (2009). The evaluation of accessibility, usability, and user experience. In *The universal access handbook* (pp. 1-16). CRC Press.
10. Brajnik, G. (2009). Validity and reliability of web accessibility guidelines. In *Proc. of the 11th international ACM SIGACCESS conference on Computers and accessibility* (pp. 131-138). ACM.
11. Brajnik, G. (2008). A comparative test of web accessibility evaluation methods. In *Proc. of the 10th international ACM SIGACCESS conference on Computers and accessibility* (pp. 113-120). ACM.
12. Vigo, M., Brown, J., & Conway, V. (2013). Benchmarking web accessibility evaluation tools: measuring the harm of sole reliance on automated tests. In *Proc. of the 10th International Cross-Disciplinary Conference on Web Accessibility* (p. 1). ACM.
13. Xiao, J., Jiang, B., Xu, Z., & Wang, M. (2014). The usability research of learning resource design for MOOCs *Proc. of IEEE International Conference on Teaching, Assessment and Learning for Engineering: Learning for the Future Now, TALE 2014*, (December), pp.277–282.
14. Rose, D. H. R., & Gordon, D. (2014). *Universal design for learning: Theory and practice*. CAST Professional Publishing.
15. Iniesto, F., Rodrigo, C. & Moreira Teixeira, A. (2014). Accessibility analysis in MOOC platforms. A case study : UNED COMA and UAb iMOOC. In *V Congreso Internacional sobre Calidad y Accesibilidad de la Formación Virtual (CAFVIR 2014)*. pp. 545–550.
16. Iniesto, F., & Rodrigo, C. (2014). Accessibility assessment of MOOC platforms in Spanish: UNED COMA, COLMENIA and Miriada X. In *Computers in Education (SIIE), 2014 International Symposium on* (pp. 169-172). IEEE.
17. Inside Higher Ed. (2017). ‘Glacial Progress’ on Digital Accessibility. Retrieved May, 2017, from <https://www.insidehighered.com/news/2017/05/18/data-show-small-improvements-accessibility-course-materials>