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HOW ELDERLY PEOPLE EXPERIENCE VIDEOS IN MOOCS

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ABSTRACT
Massive Open Online Courses (MOOCs) are becoming increasingly popular. They give people an opportunity to take courses for free and learn at their own pace, thus making education more accessible for all, despite economic conditions, location and age. According to literature, online education, and MOOCs in particular, can be very beneficial for elderly people and provides them opportunities for better integration with the rest of the society. Unfortunately, seniors often face a variety of barriers while using digital applications and devices. The lack of accessibility and usability considerations in the design is the main cause of the barriers. Recently, MOOC course has been investigated from different perspectives. However, there are still several issues that require further research to better understand the challenges and give recommendations for developing of MOOCs. In a previous project, the researchers studied the accessibility of some MOOC platforms. The research presented in this paper focuses on the user experience with different type of MOOC video. The aim is to understand the experience of older users with videos in MOOCs, since videos play an essential role for the learning experience in most of the MOOC courses. In order to achieve these goals, pretesting survey, user testing and post-testing interviews with elderly participants have been conducted. The results of this research provide insight into elderly user experience with MOOC videos.

Keywords: MOOC, user experience, universal design, elderly, online education, video, presentation format.

1 INTRODUCTION

Every day, the Internet continuously improves the quality of our life and brings new opportunities such as new sources of entertainment and education. For instance, one type of a currently popular free source of online education is Massive Open Online Courses (MOOCs). These are educational courses available through online platforms, offering the opportunity for anyone to join for free through the Web across the globe [13]. According to the literature, MOOCs can help to make higher education more accessible for people with functional disabilities, but in order to make it possible universal design principles should be applied during MOOCs development process [16].
The literature has shown that e-learning, and MOOCs in particular, can be very beneficial for seniors [15]. Especially considering that nowadays, elderly want to spend their free time more actively. They believe that the continuation of education and learning is an important component of their retirement [8]. Unfortunately, due to a variety of accessibility and usability issues, they cannot take full advantage of MOOCs [15]. Several of these issues are related to age, but also to a lack of confidence due to insufficient experience [10], unfamiliarity with Web jargon and terminology [17], and foreign language issues [14]. In 2016, Liyanagunawardena and Williams conducted a review [11] on elderly learners' engagement with MOOCs. The results of this review showed that a considerable number of senior users are already participating in MOOCs. They also emphasize a lack of research in this area. The current research is focusing on the experience of older users with different types of MOOC videos. It seeks to identify and gain understanding of the experience and possible challenges, which older users could have with videos in MOOCs. MOOC courses use different advantages of both traditional and online education. The concept of MOOC courses takes advantage of new technologies that allow having far more interactiveness and better content delivery than traditional education methods [1]. According to Guo, P. J. et al (2014) [7] among other types of content, videos play a very important role for the learning experience in most of the MOOC courses provided by platforms, such

as Coursera, edX, and Udacity. During the MOOC education process, students spend a lot of their time watching videos. There are different types of video materials used in MOOC courses, including classroom lecture, "talking head" shot of an instructor at a desk, digital tablet drawing format, and PowerPoint slide presentations [7]. "*These online courses are mostly organized as sequences of instructor-produced videos interspersed with other resources such as assessment problems and interactive demos.*" [7]. This means that special attention should be paid to accessibility, usability and comprehensibility of the video materials in MOOC courses.

2 RELATED WORK

Although varied, the main bulk of recent investigations have focused on the issue of MOOC course accessibility from different perspectives, for example, pedagogy, accessibility, data analysis, and student activities [16]. For instance, MOOC platforms, such as Udacity, Coursera, edX, OpenCourseWorld, and Iversity, have been evaluated based on observations of blind users [4]. Results have shown that none of the platforms are fully accessible and understandable for users. In addition, Coursera courses were evaluated from the angle of users with screen readers and experts, and Geo-MOOC courses were tested with three automated tools [2]. All these studies and tests showed there are some accessibility issues with each of the MOOC platforms mentioned above [16].

In 2013, Sanchez-Gordon and Luján-Mora conducted research [15] related to MOOC accessibility for elderly users. Their study focused mainly on the framework of MOOC platforms, and the researchers manually evaluated it against WCAG 2.0 principles[1] and WAI-AGE Project[2] recommendations without participation of real users. The results of their study showed that the Coursera platform and its MOOCs contain accessibility barriers for seniors. It also stated the importance of further research in the field of MOOC accessibility for seniors.

In 2016 Way Kiat Bong and Weiqin Chen conducted a research [5], also focused on MOOC accessibility for elderly. They evaluated an introductory course on the edX platform "edX: DemoX.1 Demo Course", by performing automated testing using WCAG 2.0 principles and conducting user testing with six senior participants in total. The results of the study shows that the demo course has a number of issues and that none of the elderly participants fully succeeded in completing it.

Both studies showed barriers for elderly users and claimed the importance of further investigations of the topic, particularly involving real users or including a larger number of elderly participants and testing more courses and platforms.

There are several different angles from which MOOCs could be investigated in the future, especially as MOOCs currently are widely and continuously used [12]. After careful investigation of the literature related to MOOCs, and despite the existence of the varied research conducted related to different aspects of the MOOC courses, it seems fair to conclude that issues related to MOOC video materials regarding accessibility, usability and perception, have not been sufficiently investigated. In addition, these issues have not been addressed in the context of elderly users, who comprise a significant segment of the target group for MOOCs.

3 METHODS

In order to understand the experience of older users with videos in MOOCs, user testing of three MOOC courses with four elderly participants (P1 to P4) were conducted. Before proceeding with user testing, pretesting interviews with participants were conducted to collect general information about the users, including their age, background, experience with computers, Internet, and attitude toward e-learning and MOOCs. The participants' age ranges from 61 to 69 years old, which corresponds to older category of Web users segmentation [3]. Two of the participants are men and two are women. All of them have some years (6-8 years) of experience with computer technologies and Internet, but at the same time have significant difference in computer usage frequency, from once a week to every day. None of them are familiar with MOOCs and they haven't used Internet for educational purposes before. In addition, they all have average level of English language proficiency.

Based on video type, course prerequisites, and the courses' platforms, three courses, representing different types of video, were selected. The "Dog Emotion and Cognition" course[3] from the Coursera

[1] https://www.w3.org/TR/WCAG20/ [Accessed on 2017, 20 Feb]

[2] https://www.w3.org/WAI/WAI-AGE/ [Accessed on 2017, 20 Feb]

[3] https://www.coursera.org/learn/dog-emotion-and-cognition [Accessed on 2017, 26 Feb]

platform[4], designed by the Duke University, represents a “talking head” shot of an instructor at a desk combined with a Power Point slides presentation. The “Intro to Descriptive Statistics" course[5] from the Udacity platform[6], designed by the Facebook and MongoDB, consists of videos in digital tablet drawing format. The "Shakespeare: On the Page and in Performance"[7] course from the edX platform[8], designed by the Wellesley College, represents the videos of a real classroom lecture with teacher-student communication: questions, answers, and discussion. All selected courses are at introductory level, which means no prerequisite knowledge is needed for starting the course (no prerequisites mentioned in the courses' description).

Table 1. The participants' choice of courses

Participants who tested the course		**P1**	**P2**	**P3**	**P4**
Coursera	Dog Emotion and Cognition		+	+	+
Udacity	Intro to Descriptive Statistics	+	+		
edX	Shakespeare: On the Page and in Performance	+		+	+

The participants were asked to choose two courses (Table 1), go through a given amount of course steps and operate the video player (turn off/on subtitles and change the speed of the video). Their interaction with the courses was observed and notes were taken on all the issues experienced by participants during the process. After testing, post-testing interviews were conducted in order to understand identified issues and the participants' overall experience with the tested courses. The combination of interview with observation helps to understand the relation between participants' actions and words, and to avoid missing any important data [9].

4 RESULTS AND DISCUSSION

All the participants expressed positive attitude toward MOOC. They managed to watch the videos from start to end and stated that it is a great way to learn things. The participants also expressed they were thinking of possibly using MOOCs in the future. However, all of the elderly participants faced a variety of barriers during their use of the tested MOOC courses. The post-testing interview helped to clarify these barriers and to understand the experience of users and their opinions and preferences. The results of the study can be organized into two main categories that sum up the identified challenges and preferences of the elderly participants.

4.1 Challenges

4.1.1 Video player interface

During the user testing of the “Dog Emotion and Cognition" course from Coursera, the participants were given the task to make the video slower/faster. All of the participants had difficulties with finding the way to do it. Two of them stated that they did not understand the meaning of "Playback rate" (the option of changing the speed of the video), which in its turn caused the difficulties (Figure 1).

[4] https://www.coursera.org/ [Accessed on 2017, 26 Feb]
[5] https://www.udacity.com/course/intro-to-descriptive-statistics--ud827 [Accessed on 2017, 26 Feb]
[6] https://www.udacity.com/ [Accessed on 2017, 26 Feb]
[7] https://www.edx.org/course/shakespeare-page-performance-wellesleyx-eng112x [Accessed on 2017, 26 Feb]
[8] https://www.edx.org/ [Accessed on 2017, 26 Feb] [Accessed on 2017, 26 Feb]

Figure 1. The option of changing the speed of the video in Coursera course

In the same course, two of the participants had difficulties with working out how to play the next video, after they finished the previous step. Both of them emphasized that the buttons (Figure 2) were not really noticeable for them and the colour contrast was not sufficient. According to colour contrast checker tools, the contrast ratio in this situation is 4.61:1, which does not meet 1.4.6 success criteria of WCAG 2.0 – at least 7:1 (level AAA).

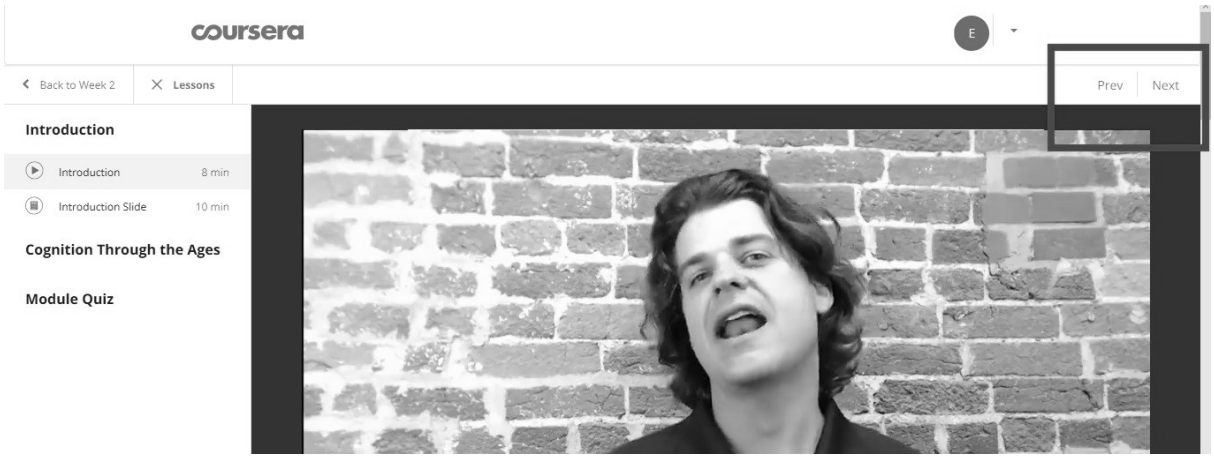

Figure 2. The buttons "Prev" and "Next" in the course of Coursera platform

Although the Coursera and edX courses contain the clickable transcripts of the videos, the possibility to click on transcript lines in order to play a certain part of the video was not obvious for the elderly participants, which makes this usually helpful option useless for them.

4.1.2 Presentation format

The course “Dog Emotion and Cognition" from Coursera contain additional material in the form of slides described in the videos. Although the participants claimed that having the slides is a good option, two of them said that the slides did not contain enough information, which makes the slides less useful.

The course “Intro to Descriptive Statistics" from the Udacity platform is an interactive course, which contains interactive forms for answering questions in the video. The results of the research show that this way of presentation may be more suitable for more experienced users, as the participant with low computer skills had difficulties adjusting himself to the course because the interactive check marks were confusing to him. This course also contained an open question, which users cannot skip. However, it is possible to submit any combination of symbols or letters when answering, which does not make any sense. In addition, the user does not receive any feedback for his/her submitted answer, which, as the results showed, could be frustrating for inexperienced users.

4.1.3 Length of video

The participants commented that the videos in “Dog Emotion and Cognition" and "Shakespeare: On the Page and in Performance" courses were too long for them, which made it very hard to concentrate on the video the whole time. The average length of the video in these courses is 8 minutes, although one of the previous research stated that *“shortest videos (0–3 minutes) had the highest engagement and much less variance than all other groups*” [7].

4.2 Preferences

During the post-testing interviews, most of the elderly participants mentioned that they were not aware of some of the helpful features, which MOOC platforms provide for the users. For instance, a clickable transcript of the video or additional materials under the video, and a book page with a poem in the "Shakespeare: On the Page and in Performance" course. The participants pointed out that more detailed and informative instructions would help them to operate the course more easily and confidently.

The real classroom lecture video format was considered as the most preferable by all the participants who tested it. The participants explained their preference by saying that it was interesting to follow the teacher-student discussion, so it became a source of entertainment for them. Two of them also mentioned that another reason for their choice is the familiarity with the format, since all of them received the traditional education in a higher education institution.

The results of the research showed that the less experienced participant had difficulties with the interactive format of one of the tested courses, while the more experienced user highly appreciated the interaction part.

It is important to take into consideration that the quality of the MOOC content, in particular the level of the material (introductory or advanced) and language of the content (plain language or overuse of complicated words and jargon), influences user experience, especially in the case of inexperienced Internet users.

5 CONCLUSION AND FUTURE WORK

In this paper, the results of interviews and user testing with older users were presented, and challenges and preferences, related to MOOC videos, were identified. Based on the research findings, the following recommendations for improving the experience of older users with MOOC videos:

- Classroom lecture format. The elderly participant showed a positive attitude toward real classroom lecture format of the educational MOOC videos. One of the participants said that this format of the video made him feel “as a part of the classroom”, and that makes the course more interesting to follow. So, it is recommended to use this format for topics that could be interesting for elderly users.
- Instructions. Since elderly users often are inexperienced, they do not intuitively know all about additional options, such as clickable transcript or additional materials. So, it is recommended to include more detailed instructions in order to make them familiar with all the features that can be helpful for them. It should be easily available in the beginning and throughout of the course.
- Length of the videos. The results also showed that it might be hard to concentrate fully for 8 minutes videos. It is better to keep the length of the videos shorter (0–3 minutes), as recommended in previous research.
- Feedback. The users should always be able to get feedback to their answers, since leaving it without feedback is frustrating for the users.

The presented study had a small number of participants (only four elderly) and a limited number of tested courses. However, the findings may still present a valuable step in the investigation of MOOC content accessibility and contribute to the field of design and engineering education. The provided set of recommendations can have implications on the design of videos in MOOC courses. It can help MOOC designers to make MOOCs and online education more accessible for elderly users, including those who wish to take design and engineering education through MOOCs. In the future, we plan to recruit more participant, as well as testing more courses representing not only different types of video format, but also text, images and audio.

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