Erasmus+

MOOC Accessibility Partnership

Project deliverable

O1: Analysis of Different MOOC Platforms for Use in the MOOCA Project

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1. Introduction

The purpose of this report is to collect the MOOCA partners' experiences and research on existing MOOC platforms. The first part contains information collected in late 2014; the second part contains information on a bigger set of platforms, but based on a different set of questions.

The goal of the first part of this document is to identify a suitable MOOC platform for MOOCAP's course on digital accessibility. The two most important requirements for this platform are the following:

1. The MOOC platform should be big enough to help attract at least 1000 participants for the introductory course.
2. The MOOC platform should be accessible to people with disabilities and should allow the project to use accessibility features in content, e.g. it must be possible to turn on captions in video.

With this in mind, and several other requirements that stem from all the different partners of different countries in Europe, we set out to explore which of the existing platforms and technologies might fulfil our demands.

In general, and in particular at the time of the project's beginning, the choices available with respect to technologies and existing platforms for creating a MOOC appeared ample. The major platform providers have accumulated several years of experience. However, with the special look at platform accessibility, the choice thins out quickly.

2. Specialist Review

As basic premise for exploring existing solutions for this task, several specialists for online accessibility drawn from the different partnering institutions were asked to contribute their experience and inquiry to this analysis. Major platforms considered were FutureLearn, edX, Coursera, Canvas and (as an option to run the technical infrastructure without external help) Moodle. Other platforms considered are more localised and smaller, and as such did not receive as much consideration.

2.1. First Assessment

The **first assessor** came to the result that none of the reviewed platforms provides an audio description track on videos or live captioning for live video chats if used. The use of videos with animated graphics or electronic ink drawing on screen (e.g. Khan Academy) may have problems with accessibility for visually impaired participants if anything shown on the screen is not also explained in accessible text format or audio by the presenter. One of the platforms reviewed with the least detectable concerns was **FutureLearn**, for which the

assessor had experience of 17 courses and also close contact and discussions with members of the local team who had developed and run 6 MOOCs for this platform. The assessor's accessibility team had also provided them with accessibility advice. Some advantages of FutureLearn are: High profile, as FutureLearn can become as prestigious and as well-known as Coursera and edX; quality control and assurance so participants know they will get a high quality experience, free transcription and captioning of all video and audio materials; responsive and UI design to work for mobile devices and give a good UX, participants can like and follow staff and student comments and have peer assessments and quizzes and tests and certificates and exams; FutureLearn, according to the assessor, would be committed to accessibility. Further platforms reviewed were:

- Coursera: watched videos, presentations and webinars by Coursera founders
- edX: experienced 3 courses
- Khan Academy: looked at various videos
- MIT Media Lab: experienced 1 course: Lifelong Kindergarten
- Mookit: experienced 1 course: Mooc on Mooc
- Google (based on their Course Builder): experienced 1 course: Accessibility
- ALT on Moodle platform: experienced 1 course: Open Course in Technology Enhanced Learning (ocTEL)

Platforms that would be available for anyone to run a MOOC are:

- Canvas Network: experienced 1 course: Blendkit - which was largely based around a flash live virtual classroom with video/slides/chat which was also recorded for later replay but had no captions or transcript: Currently enrolled in Universal Design course that hasn't started yet but looks like it is just based on documents.
- Wiziq: experienced 1 course: Teaching Teachers online - which was largely based around a live flash virtual classroom with video/slides/chat which was also recorded for later replay but had no captions or transcript.

Finally, the first assessor looked at open source platforms available for anyone to host and run a MOOC: there are also open source MOOC or LMS platforms that institutions have to install and run themselves but this will involve a prohibitively large cost e.g. Google course builder or Open edX or Canvas or Moodle.

It would also be possible to run MOOCs from an institution's own Learning Management Systems (e.g. Blackboard) but these were not designed for only online rather than some face to face contact or for students not registered with that institution.

2.2. Second Assessment

The second assessor examined the platforms/infrastructures: Coursera, Khan Academy, FutureLearn, Moodle, Canvas, and evaluated for accessibility purposes ATutor, Coursera, Drupal, Khan Academy and Moodle[1] (http://web2access.org.uk/activities/33). According to the second assessor, they all have problems offering full captioning and/or transcriptions and audio descriptions unless these have been stipulated by content providers at the time the videos are made.

The assessment's main findings are the following:

- Quizzes often have issues around the **size of check boxes** for those who do not use keyboards and find zooming affects layout etc.
- **Access keys** to some **rich text editors** are not necessarily included in help pages and the user needs to know that for instance TinyMCE has been used or that they may need a specific browser such as Firefox using F10 to reach the toolbar edit features. Basic bold, italics and underline etc. are not so difficult.
- **Colour contrast** levels could be an issue with more pale grey and pale blue being used and unless students have the skills to know how to change the CSS or add browser extensions, they may fail to make contrast mode changes to help readability or to use text to speech to aid comprehension. These tools can be added for free in several languages e.g. using the auxiliary add-on solution ATbar.

2.3. Third Assessment

The third assessor took a closer look at the aforementioned FutureLearn platform. The courses in this platform are week based: each week has its own resources and learning materials. The resources are numbered, which makes it easy to navigate. There is also an overview page that allows students to see their overall progress in the course. The learning materials were provided mostly in text or small video streams, where a professor explains details of Hadrian's wall. It is also possible to link to other learning resources or upload files that can be downloaded by the students.

FutureLearn offers different roles for course organizers (Lead Educator, Educator and Mentor). People are able to subscribe for their comments and get in contact with them. At the end of each week a twitter chat is started where students could discuss topics on the course. This chat is archived and can be accessed later by other students. At the end of each week the organizers of the course send an automated E-Mail to all students that sums up the progress of the week, provide links to additional resources and to the content of the next week.

[1] See also the reviews by the Web2Access project: http://web2access.org.uk/activities/33.

To test the knowledge of the students the platform offers quizzes and multiple choice tests. However, the assessor did not see how exercises and assignments are supported by the platform. Especially for practical parts of software and HTML accessibility the possibility of uploading exercises should be provided by the platform.

Regarding the platform's accessibility, the third assessor stated that a first evaluation of the website resulted in quite positive results - most of the content was accessible. However, videos were not accessible for screen readers. (Tested with Cobra[2] as screen reader and Firefox as browser.) The video player, however, supported subtitles for deaf people, and a video transcript file was also available.

Evaluating the markup of a random step or page on FutureLearn resulted in 33 errors and 29 warnings. Nevertheless, most of these errors could easily be fixed. They used the same ID for an HTML input element several times, for example.

The third assessor concluded that the platform could definitely be an option for us. However, it needs some improvements on markup and accessibility. Another problem could be the structure of the course content itself. It is not known whether it is possible to model an overview course that later on leads to optional specialised topics with FutureLearn, as the courses in this platform are week based.

2.4. Fourth Assessment

The fourth assessor had at the time of the report taken the R programming course[3] organised by Johns Hopkins University on Coursera. This course was, according to the assessor, very intensive with quizzes (multiple choice questions) and assignments every week. Videos range from 6-7 minutes to 16-19 minutes in length, including about one minute showing the professor talking and the rest of the videos show the slides while the professor talking through them. Slides in PDF and HTML and text in different languages are published. The variety is good and one can choose what material to use.

All quizzes and assignments have deadlines and these are also sent to the registered emails of the participants. Forums are available for participants to discuss course-related issues and help each other solve problems. The instructions for how to do each of the activities are very detailed. In addition, the first video shows what to expect, how to work, how to ask questions, and other tips.

Since this course is a programming course, all the grading is done automatically with either matching (quizzes) or unit test (programs). One of the assignments is evaluated by peer assessment. Each participant is required to evaluate at least 4 peers' programs and give

[2] BAUM Retec: "COBRA – the screenreader for Windows 7, 8 and 10": http://baum.de/cms/en/cobra/.

[3] R Programming (Johns Hopkins University): https://www.coursera.org/learn/r-programming.

scores (drop-down menu) based on a set of criteria predefined by the course. There is also a comment field for giving feedback in free text.

Positive aspects:

- Clear guidelines, information on deadlines, progress, email reminders, etc.
- Slides in both PDF and HTML formats.
- Text in different languages for videos.
- Automatic grading.

Negative aspects:

- Some videos are long.
- Videos show slides and sound, without showing the professor's face or any types of F2F feeling.
- Very intensive, busy with meeting deadlines for assignments, no time to mature or reading.

Additional notes:

- The assessor did not evaluate the course using accessibility principles and guidelines.
- Some of the reflections are not on accessibility. They are rather on lessons learned and tips when we make our own MOOC courses.
- Automatic grading is suitable for programming courses; it is not clear whether it works for other types of courses.

3. Licensing Issues

In sum, the judgements of the four assessors give insight into the viability of several platforms, but do not touch on one important aspect that became highly relevant during the project's developments. Although the FutureLearn platform comes out strong from a purely technical standpoint, licensing and liability issues proved to become a crucial obstacle within the project.

One would think that the fact that every project partners released their contents for the introductory course under the Creative Commons' CC-BY 4.0 licence[4] would have allowed an easy reuse within a FutureLearn course. However, since FutureLearn (as almost all MOOC platforms) requires that there is only one party responsible for a course and providing the content, this one party is also fully legally liable for the whole course content, even though it would have been built from resources available under CC-BY 4.0. Liability could become an

[4] Creative Commons 4.0 International (CC BY 4.0): https://creativecommons.org/licenses/by/4.0/.

expensive matter if content was uploaded that infringed on intellectual property rights of external parties.

This issue would only be solved if there was a MOOC platform that allowed multiple parties to be responsible for the content of a course, each one for their own content. At the time of the first round of assessments, such a platform was not known to us.

4. Update 2016

The goal of the update in early 2016 was to establish which MOOC hosts allow educational organisations to collaborate on a single course, and under which conditions (licences and contracts) this would be possible. The motivation for this research is the resistance to supplemental agreements between MOOCA partners when one partner puts the MOOC content on the MOOC platform on behalf of the other partners; this kind of set-up requires agreements about liability and indemnification in case of IPR litigation.

MOOC hosts typically include "Terms and Conditions" on their website, but these are often solely addressed to the learners, not to the universities or businesses that would like to create a MOOC. For this reason, it was often necessary to contact the MOOC hosts or platforms directly. This was done in February and early March 2016; by e-mail, when an e-mail address was available, or through a contact form, when no e-mail address was available.

MOOCAP would like to publish its MOOC on a European platform, so this section also mentions where the owner of each platform is based.

Another goal of this update is to find out what types of courses these platforms already host (especially whether they host courses in the areas of ICT or disability) and whether they already host a course that is similar to MOOCAP's general course.

The data below do not consider MOOC management systems that require universities to set up their own server for it, e.g. the Open edX platform[5] and mooKIT[6].

4.1. Blackboard Open Education

Open Education (https://openeducation.blackboard.com/) is a platform hosted by LMS developer Blackboard Inc., which is based in Washington, DC in the USA[7]. Blackboard Open Education offers many free courses on a variety of topics, not just ICT. The course catalogue contains courses in a variety of languages, not just English (e.g. also Spanish, Korean, Dutch, ...). Blackboard Learn already hosts a course related to accessibility: "Perspectives on

[5] Open edX is the software used by edX and is mostly available under the GNU Affero General Public License version 3: https://github.com/edx/edx-platform.

[6] mooKIT, a lightweight MOOC management system: http://mookit.co/.

[7] Blackboard also has offices in several European countries, e.g. in the UK and Germany. See http://www.blackboard.com/sites/international/globalmaster/about/contact-us.html.

Disability" is a ten-week course by Northern Illinois University[8]. The course first ran in 2014; it is not clear whether it has been repeated since then.

There are probably over 1.2 million students on Blackboard Open Education in over 35,000 courses[9].

The terms of use at https://openeducation.blackboard.com/tou only cover terms of use for users, i.e. learners, not for institutions or other course creators.

An e-mail regarding licence terms and the possibility of individual MOOCA contributions to the same course was sent on 26 February 2016 (to openeducation@blackboard.com); there was no response.

4.2. Canvas Network

Canvas Network (https://www.canvas.net/) is a platform hosted by LMS developer Instructure, which has its headquarters in Salt Lake City, Utah, USA. Its catalogue offers many free courses on a variety of topics, not just ICT. The Canvas LMS is available as open-source software under the GNU Affero General Public License, version 3[10].

Canvas Network hosted 198 courses with a total of 292,672 enrolments between January 2013 and July 2014[11]. In 2014, Canvas Network had 214,997 enrolments (for 164 courses)[12].

Canvas Network already hosts two MOOCs on accessibility:

- "Web Accessibility MOOC for Educators"[13] is a 3-week course created by the Colorado Community College System (CCCS). It ran from 22 February to 6 March 2016.
- "Accessibility: Designing and Teaching Courses for All Learners" is a six-week course by the State University of New York (SUNY). It runs from 22 February to 4 April 2016.

Institutions that sign up can get their own instructional designer[14].

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[8] See https://openeducation.blackboard.com/mooc-catalog/courseDetails/view?course_id=_74_1.

[9] John Wittmer: "Research in progress: Learning analytics at scale for Blackboard Learn", Blackboard Blog, 18 March 2016: http://blog.blackboard.com/research-in-progress-learning-analytics-at-scale/.

[10] Canvas by Instructure, on GitHub.com: https://github.com/instructure/canvas-lms/wiki.

[11] Canvas Network Progress Report 2012-2014: http://www.canvaslms.com/downloads/CN_Progress_report_2014.pdf.

[12] Canvas Network Progress Report 2015: http://www.canvaslms.com/downloads/CN_Progress_report_2015.pdf.

[13] See https://www.canvas.net/browse/cccs/courses/web-accessibility-mooc-for-educators-3.

[14] See https://info.canvas.net/offer-a-course.

Canvas claims to offer “hassle-free contracts”:

> Less bureaucracy, more learning
>
> Your institution's own approval process is all you need to get started. Get your dean or director on board and you'll soon be teaching an open, online course. And what dean or director doesn't love the sound of fast, easy, risk-free innovation?

Canvas Network’s YouTube video “Teaching a Canvas Network Course: What You Need to Know” (from InstructureCon 2013)[15] does not discuss licence issues except for a brief mention during the Q&A session that the course creator owns the copyright to the course, while Instructure needs to have the right to reproduce the course on Canvas Network.

An e-mail regarding licence terms and the possibility of individual MOOCA contributions to the same course was sent on 26 February (to courses@canvas.net). A telephone call with Instructure and HdM took place on 30 March 2016, followed by several e-mails:

- The time to prepare a course on Canvas Network is usually 3-6 months, but this can be shortened when the content is already available.
- Instructure will assign an instructional designer. The instructional designer will communicate the available start dates. They also provide feedback on the course and review the course twice.
- An instructor-led course is usually listed for six weeks before its start date, so a course that would start mid June would be listed starting early May. (The alternative to an instructor-led course is a self-paced course.)
- Before a course can be listed, an agreement (Memorandum of Understanding) needs to be signed between Canvas Network and the organisation that will be affiliated with the course. In the case of MOOCAP, the MOOCAP partners need to decide whether the agreement will be signed by the co-ordinator only or by all eight partners.
- If a course has collaborators, Canvas gives access to multiple instructors (in other words, this is not done by a primary instructor or co-ordinator who invites additional instructors). For an example of a course with three instructors from two different organisations, see “So you want to work in the Pharmaceutical Industry”[16].

Regarding indemnification, the Memorandum of Understanding states the following:

[15] Maria H. Anderson: “Teaching a Canvas Network Course: What You Need to Know”, InstructureCon 2013: https://www.youtube.com/watch?v=45-j4yGYptY (34 minutes).
[16] “So you want to work in the Pharmaceutical Industry”: https://www.canvas.net/browse/dublinit/courses/pharmaceutical-industry.

Mutual Indemnification: Both parties will indemnify, defend and hold harmless the other against any and all losses, damages, costs and expenses arising out of or resulting from such party's breach of its representations and warranties hereunder.

In 2010, the National Federation of the Blind (USA) granted Instructure/Canvas the Gold Level Web Certification[17]. There is also a more up-to-date Canvas Voluntary Product Accessibility Template (VPAT)[18] that describes to what extent the Canvas LMS meets the Level A and AA success criteria in the Web Content Accessibility Guidelines (WCAG) 2.0.

Nevertheless, course creators do not always use the available accessibility features. For example, the intro video for the course "E-Learning Environments and E-learning Design"[19] is an embedded YouTube video that can be controlled from the keyboard (start, pause, toggle captions, etc.), but the video that gives an overview of Module 1 is an MP4 file that needs to be downloaded and that has neither captions nor a transcript. (The second video in Module 1 is another keyboard-accessible YouTube video.) Some videos in this course are hosted on zaption.com and do not play in Firefox; this may be due to certain plugins or extensions in the browser.

A recent accessibility evaluation of Canvas concludes that "... Canvas is technically accessible in most areas but lacked consistency in design pattern and coding best practices, and, consequently, certain areas are inaccessible, cumbersome to use, or functionally not accessible."[20]

4.3. Coursera

Coursera (https://www.coursera.org/) is a company and MOOC platform launched in 2012 with headquarters in Mountain View, California[21]. It is currently one of the top MOOC platforms. Coursera offers both free and non-free courses. Coursera also offers "specialisations". A specialisation is a series of three or more related courses that cover a specific topic, and which includes a hands-on project ("Capstone project") where students apply what they have learnt from the courses. Although some of the courses in a

[17] National Federation of the Blind: "Nonvisual Accessibility Web Certification Granted to Instructure Learning Management System", 29.09.2010: https://nfb.org/node/1037.

[18] Canvas Voluntary Product Accessibility Template (VPAT): https://www.canvaslms.com/accessibility.

[19] "E-Learning Environments and E-learning Design" by the Vrije Universiteit Brussel (VUB) in Belgium: https://www.canvas.net/browse/vub/courses/elearning-environments-design.

[20] Canvas Accessibility Testing and Evaluation Report by sixteen representatives from five higher education institutions and one college system in the US: https://dl.dropboxusercontent.com/u/3486333/presentations/2016/csun2016/cate_report_2016.html.

[21] Coursera's address is not mentioned on the site's "About" page but can be found on the "Terms of Use" page: https://www.coursera.org/about/terms.

specialisation may be free, participating in the hands-on project and obtaining a specialisation certificate requires payment[22]. In January 2016, Coursera removed the free track from some of its courses; learners in those courses need to pay to get their assignments corrected[23]. In February 2016, Coursera launched project-based courses[24].

In the summer of 2015, Coursera claimed it had served 15 million students[25]. Coursera's most popular course from 2015 was "Learning How to Learn" received reviews by over 12,800 students (but it is not clear whether these are cumulative numbers from multiple runs of the course)[26] [27]. By August 2014, over 100,000 students had already enrolled for or attended this course[28]. The fourth most popular course, Andrew Ng's Machine Learning course, has reviews from over 14,300 students[29].

Coursera's course catalogue covers a wide range of domains, not only computer science and data science, but also arts & humanities, business, life sciences, mathematics, physics & engineering, social sciences and language learning. Coursera already hosts a MOOC on accessibility: "Information and Communication Technology (ICT) Accessibility"[30] is a 6-week course by the Georgia Institute of Technology (Georgia Tech). It is the same course (with the same instructors) as on edX.

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[22] Coursera: "Specialization Payments": https://learner.coursera.help/hc/en-us/articles/207033333-Specialization-Payments.

[23] "Coursera Removes Free Track From Some MOOCs", InsideHigher Ed, 25 January 2016: https://www.insidehighered.com/quicktakes/2016/01/25/coursera-removes-free-track-some-moocs.

[24] "Project-Based Courses Launch on Coursera: Create a business model, infographic, Android app, or comic book in an applied course experience", Coursera Blog, 11 February 2016: https://blog.coursera.org/post/139098545432.

[25] Tony Wan: "Coursera Charts Course for International Expansion With $49.5M in Series C Funding", EdSurge, 25 August 2015: https://www.edsurge.com/news/2015-08-25-coursera-charts-course-for-international-expansion-with-49-5m-in-series-c-funding.

[26] "Learning How to Learn: Powerful mental tools to help you master tough subjects", by the University of California, San Diego: https://www.coursera.org/learn/learning-how-to-learn/.

[27] Richard Feloni: "The 10 most popular free online courses for professionals", Business Insider, 13.12.2015: http://www.businessinsider.de/most-popular-coursera-courses-of-2015-2015-12.

[28] "Learning How (Not) To Learn", Coursera Blog, 31 July 2014: https://blog.coursera.org/post/93424900982.

[29] "Machine Learning": https://www.coursera.org/learn/machine-learning.

[30] See https://www.coursera.org/course/digitalaccessibility.

Coursera originally only offered courses from elite institutions[31], but later started admitting other universities (e.g. state universities in the USA)[32].

Coursera does not provide an e-mail address for course creators to contact them; instead, they refer institutions to a form on Google Docs that contains the following message[33]:

> Thank you for your interest in partnering with Coursera! Please note that due to the heavy volume of requests, we are not able to respond to all form submissions.

(Coursera appears to pick the institutions it wants to work with.)

4.4. Desire2Learn / D2L

Desire2Learn is owned by Brightspace, with headquarters in Kitchener (Ontario, Canada)[34]. The platform has a small catalogue of open courses on a variety of topics, not just ICT: https://opencourses.desire2learn.com/cat/. All courses are in English. Desire2Learn hosted a course on accessibility in 2014 and has been repeated several times: "Web Accessibility MOOC for Online Educators"[35].

There is no information on the number of learners on Desire2Learn.

An e-mail regarding licence terms and the possibility of individual MOOCA contributions to the same course was sent on 26 February (to sales@Desire2Learn.com); there was no response.

4.5. edX

edX is a MOOC provider that launched in 2012, with headquarters in Cambridge, Massachusetts (USA)[36].

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[31] Ry Rivard: "Coursera's Contractual Elitism", Inside Higher Ed, 22 March 2013: https://www.insidehighered.com/news/2013/03/22/coursera-commits-admitting-only-elite-universities.

[32] Ry Rivard: "State Systems Go MOOC", Inside Higher Ed, 30 May 2013: https://www.insidehighered.com/news/2013/05/30/state-systems-and-universities-nine-states-start-experimenting-coursera.

[33] Coursera Partnership request Form: https://docs.google.com/a/coursera.org/forms/d/1dAHVElrpDYaxSnUpX4JRdNaomqIR8DMxHcoIZop59b8/viewform.

[34] See also https://opencourses.desire2learn.com/about/opencoursesabout_english.asp.

[35] "Web Accessibility MOOC for Online Educators" by Portland Community College (October 2014 - January 2015): https://opencourses.desire2learn.com/cat/course/web-accessibility-7195/.

[36] See the edX contact form with address (no phone number or e-mail) at https://www.edx.org/contact-us.

edX's course catalogue contains courses in a wide range of domains, not only computer science (the biggest category) but also humanities (the second biggest domain), engineering, business & management, social sciences, biology & life sciences, history, economics & finance, and several other domains. Some of these courses were created by the Massachusetts Institute of Technology (MIT), which still maintains its own OpenCourseWare site[37].

In August 2015, edX claimed it had reached 5 million students[38].

edX already hosts a MOOC on accessibility: "Information and Communication Technology (ICT) Accessibility"[39] is a 6-week course by the Georgia Institute of Technology (Georgia Tech). It is the same course (with the same instructors) as on Coursera.

edX has a contact form at https://www.edx.org/contact-us (submitted on 7 March 2016). In response to our request for information, edX wrote:

> Thank you for your interest in edX! I'm happy to forward your contact information along to our business development team. We do partner with select organizations, with international recognition, interested in providing free MOOCs on the edX platform. We entertain applications to become members with fees starting at $250k.
>
> The edX learning platform source code, as well as platform developments from Stanford, edX and other contributors, is available via http://code.edx.org/. You are certainly welcome to set up your own instance of the platform and host your own courses if you would like to. For specific questions regarding edX code and open source, see this Google discussion group. We are also happy to refer you to third party partners that can stand up and run private instances of the open edX platform.

4.6. Eliademy

Eliademy (https://eliademy.com/) is a course platform that launched in 2011. The company behind the platform is CBTec Oy., with headquarters in Helsinki, Finland[40]. The company was launched by former employees of Nokia. Eliademy is described as "a new learning management system or simply Classrooms in the Cloud based on open source technology"[41]. Eliademy appears to reuse open source frameworks and tools such as Bootstrap, Backbone.js, CKEditor, Requirejs, jQuery and Underscore.js. The Eliademy Android client is

[37] MITx: https://www.edx.org/school/mitx.

[38] "Udacity, Coursera and edX Now Claim Over 24 Million Students", EdSurge, 8 September 2015: https://www.edsurge.com/news/2015-09-08-udacity-coursera-and-edx-now-claim-over-24-million-students.

[39] See https://www.edx.org/course/information-communication-technology-ict-ict100x.

[40] CBTec: Contact Us: http://cloudberrytec.com/contact.

[41] Eliademy: Open Source: https://eliademy.com/opensource.

compatible with Moodle[42], CBTec has also contributed to Moodle, and Eliademy can import Moodle courses[43]. Only the Android client is available under an open source licence[44].

The "top" courses typically have a few hundred learners. At the end of March 2016, the top three free courses had 2745, 1821 and 984 learners, respectively[45], while the top three paid courses had between 130 and 370 learners.

Eliademy's course catalogue contains courses in a variety of categories, such as technology, social science, languages, business & law, and arts & design. Eliademy has no courses on ICT accessibility, but it has several courses related to disabilities or auxiliary aids:

- "Auxiliary Aids and Services for Persons with Disabilities" by Chris Holihan (accessible by invitation only)[46].
- "Learning Disability Awareness Training" by Nick Millington[47].
- "SASI's Generalist Autism e-learning course" by Andrew Broom (accessible by invitation only)[48].

The Eliademy platform is based on open-source technologies such as Moodle.

One feature that distinguishes Eliademy from MOOC platforms such as edX and Coursera is that **it allows instructors to register as individuals**, instead of only allowing institutions to create courses. Course creators can choose between standard features, which are free, and premium features. The premium features are mainly intended to allow organisations to train their employees, customers or students[49].

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[42] Steve O'Hear: "Eliademy, The MOOC Founded By Ex-Nokians, Gets Android App To Benefit The Wider Moodle Community", TechCrunch, 03.06.2013: http://techcrunch.com/2013/06/03/mooc/.

[43] "Import a course in Moodle format to Eliademy": http://helpdesk.eliademy.com/knowledgebase/articles/203992-import-a-course-in-moodle-format-to-eliademy.

[44] Eliademy Android client: https://github.com/cbtec/eliademy-android (MIT LIcense).

[45] "Koodiaapinen", "Traveling Through History with Doctor Who" and "Community Mapping & Digital Story Telling", listed at https://eliademy.com/catalog/top-free.html.

[46] "Auxiliary Aids and Services for Persons with Disabilities": https://eliademy.com/catalog/auxiliary-aids-and-services-for-persons-with-disabilities.html.

[47] "Learning Disability Awareness Training": https://eliademy.com/catalog/learning-disability-awareness-training-ld-g.html.

[48] "SASI's Generalist Autism e-learning course": https://eliademy.com/catalog/generalist-autism-training.html.

[49] "Why there is Eliademy Premium?": http://helpdesk.eliademy.com/knowledgebase/articles/488477-why-there-is-eliademy-premium.

A brief accessibility evaluation with NVDA 2016.1 and Firefox 45 gave the following results:

- The language switching widget at the top of the page is not keyboard accessible; a screen reader user who navigates the page using the TAB key will not notice this widget.
- The login dialog is accessible.
- On the user's home page, the down arrow in the "My Courses" menu is not keyboard accessible; it can only be opened by clicking on it. The home page does not contain a single heading element (hx).
- When the learner has registered for one or more courses, these are listed on the user's home page but this list is not keyboard-accessible. (In the source code, there is no list or table structure; instead, there are many nested div elements without role attributes or tabindex.) The images in the list of courses have no alt attributes. The course titles are coded as div elements instead of a more meaningful element. When hovering the mouse pointer over a course title, the course's logo and title become clickable links. In the source code, these links are not coded as "a" elements but as div elements that do not receive keyboard focus. As a result, one can only enter a course by clicking on the course's logo but not by means of a keyboard.
- After opening one of the courses, a pop-up window appears that asks the user to rate the course. NVDA does not announce this pop-up. When tabbing through the course's homepage with the pop-up still open, the UI elements (the rating widget and the buttons "Don't remind", "Maybe later" and "Share on social media") in the pop-up window are not announced by NVDA.
- When opening a chapter (or other basic subdivision) in the course "Intro. to Computing (JAVA Programming Language I)", the cursor is again at the top of the page (the default behaviour on new pages); there is no skip link to immediately jump to the course content itself. Navigating the headings does not work, since the page has only one heading element (a h3 element for the chapter's title). The course "Introduction to computer science and programming" has a higher number of heading elements, but they are all of level h3 and inside the body content. This seems to suggest that only authors can create headings.
- In the course "Introduction to Algorithms" (MIT OpenCourseWare), the videos are embedded as YouTube videos. (Activating the first link in the video opens the video on YouTube.[50]) While the controls to start and pause the video, to toggle captions on or off, and for the other settings are keyboard-accessible, the controls' labels are not announced by NVDA.

[50] See the course's first video at https://www.youtube.com/watch?v=HtSuA80QTyo.

A comment summarising the main accessibility issues was left on Eliademy's forum on 24 March 2016[51].

4.7. Flooved

Flooved (http://www.flooved.com/) was an online education platform that launched in 2011. The company Flooved Ltd. was based in London in the UK[52].

Flooved hosted textbooks on mathematics and physics[53]; there were no courses or textbooks on ICT, let alone accessibility. All course materials were available as Open Access Content. Flooved did not host MOOCs.

There was no information on the number of learners on Flooved.

Uri Grodzinski, head of content and analytics at Flooved, provides some information on Flooved's business model in a post on 2013-09-03 to the Google group sage-devel. The business model was based on the notion of OERs. Licensing was based on individual authors (see license terms). Flooved was more an OER repository than a course platform. Other reports and descriptions of Flooved were mostly posted in 2013. By early 2016, the platform did not seem to be very active anymore. By November 2016, the website had disappeared; the Wikipedia entry on Flooved was removed with the following comment: "Website defunct, and organisation appears to have disappeared, with last references to it anywhere over 3 years ago."[54] The OER's are now available in the Internet Archive[55].

4.8. France université numérique (FUN)

France université numérique (FUN, https://www.fun-mooc.fr/) is a MOOC platform launched in 2013 by the French Ministry for Higher Education and Research and which is currently co-financed by the French ministry and the universities that joined the platform[56]. The MOOC

[51] "Improve keyboard accessibility and screen reader compatibility": http://helpdesk.eliademy.com/forums/193876-ideas-forum/suggestions/13114959-improve-keyboard-accessibility-and-screen-reader-c.

[52] Flooved: Contact: http://www.flooved.com/about-us#contact.

[53] It appears that Flooved is currently looking only for courses on physics or mathematics, as these are the only disciplines on the "Topics Required" page: http://www.flooved.com/professors#topics.

[54] See https://en.wikipedia.org/wiki/Flooved. Accessed 11 November 2016.

[55] Internet Archive: Flooved: https://archive.org/details/flooved.

[56] About FUN: https://www.fun-mooc.fr/about.

platform is powered by Open edX[57]. In early 2016, FUN claimed to have 1 million enrolments in its 150 courses.

FUN hosts courses on a wide range of topics, such as law, economy & finance, education, business, environment, IT, languages and management. Courses in IT cover topics such as Java, HTML5, Semantic Web, cryptography, big data and Internet routing. There are no courses on accessibility, user-centred design or usability. Almost all courses are in French (there are few courses in English[58]) and were created by French universities or research organisations[59].

The website does not describe which types of organisations can create courses on FUN, nor under which conditions[60].

A brief accessibility evaluation with NVDA 2016.1 and Firefox 45 gave the following results:

- The registration process is keyboard accessible and can be performed with Firefox and NVDA.
- On the dashboard, which lists the learner's courses, headings are not used correctly: there is no h1. (All other headings are h2.) When there are no courses on the dashboard, there is a link to the course catalogue.
- On the course catalogue page, there is a h1 element that says "Courses", and h2 elements for "Availability", "Themes", "Universities", "Language", "All themes" and "Universities". These are the headings for the options that help the learner refine his search results for courses.
- The list of courses can be browsed using the keyboard. For each course, NVDA reads the following types of information: "New course" (or session x for a course that is repeated), an image without alt text, the course title, the name of the university that created the course, the course's start date and "Learn more". In other words, the organisation of the information is not ideal but it is possible to find one's way around the course catalogue.
- After following the link to a course, it is possible to register using the "Register" link on the course's home page.

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[57] Julien Dupont-Calbo: "Derrière le MOOC à la française : Google", Le Monde, 16.10.2013: http://www.lemonde.fr/technologies/article/2013/10/16/derriere-le-mooc-a-la-francaise-google_3496887_651865.html.

[58] E.g. "From neuron to behavior" by the Institut Pasteur: https://www.fun-mooc.fr/courses/pasteur/96001/session01/about.

[59] One of the exceptions is "Développer sa pensée critique" by the Université libre de Bruxelles (ULB) in Belgium.

[60] The help page (https://www.fun-mooc.fr/help/) is aimed at learners; the contact page (https://www.fun-mooc.fr/contact) only provides an e-mail address.

- The introductory video to a course is a DailyMotion video. While the video's start button does not appear in the TAB order, the controls to pause the video, to change its volume, its speed and its quality are keyboard accessible and readable with NVDA. One can close the pop-up player window using the Esc key. The intro video for the course "Écrivez votre premier programme avec Java" does not have captions or a transcript.
- After registering for a course and opening its first page, NVDA finds a "skip to main content" link before the search form at the top of the page.

4.9. Iversity

Iversity (https://iversity.org/) is a MOOC host based in Germany[61] that launched in 2013. Iversity hosts MOOCs on a variety of topics; none of the current courses are about computer science or ICT. The currently available MOOCs are in English, German, Italian or Russian.

Iversity claimed that it reached 1 million enrolments (for its 100 courses) in October 2015[62].

Iversity's website contains little information regarding licences, except for the following statement[63]:

> Who holds the rights to the courses?
>
> The instructors as the creators of the content also holds the rights. Iversity is only granted the usage right for a predefined timeframe

A brief accessibility evaluation with NVDA 2016.1 and Firefox 45 gave the following results:

- Switching the language from German to English (on the homepage) works.
- The registration process uses an accessible form (all labels are read correctly by NVDA).
- In the course catalogue, headings are used correctly; each course title is marked up as h2. Screen reader users can move through the courses using the keyboard and activate the "Go to course" link to go to the course's homepage.
- The homepage of a course, e.g. "Workers' Rights in a Global Economy"[64] or "Prototyping Interaction", typically contains a YouTube video at the top; this video can be started and paused using the keyboard. The other YouTube controls, e.g. for

[61] See the legal notice at https://iversity.org/en/imprint.

[62] "One Million Course Enrolments and a Successful Financing Round at iversity", 15.10.2015: https://iversity.org/en/pages/one-million-enrollments.

[63] FAQ at https://iversity.org/en/higher-education#faqmodal.

[64] "Workers' Rights in a Global Economy": https://iversity.org/en/courses/workers-rights-in-a-global-economy-march-2016.

captions and settings, are also keyboard accessible and their labels are announced correctly by NVDA. NVDA can also read the captions in the YouTube video.

- The button to enrol for a course (or to "audit for free") is also keyboard-accessible.
- On the user's "Dashboard", which lists all the courses in which a learner is enrolled, the list of courses is keyboard accessible and correctly announced by NVDA. The heading levels are not entirely consistent (e.g. h2 and h4 without any h3 headings).
- When the learner goes from the dashboard to a course, a dialog may pop-up to ask the learner to upgrade to the Certificate Track. In this pop-up window, the buttons "Upgrade Now" "No, thanks" and "Remind me later" are keyboard accessible. (Strangely, the button "No, thanks" is read last even though it is visually positioned between the two other buttons.)
- The list of chapters in the course "Prototyping Interaction"[65] does not use headings for the individual chapters. When tabbing through the page, the focus moves straight from the end of the horizontal navigation at the top (Chapters, Announcements, Journal, Discussions, Course Info, Certificates, Upgrade) to the end of the chapter list; the focus does not stop on any of the 5 activated chapters that are listed before the Final Project at the bottom of the list. The chapters are not coded as elements that can receive focus and have no tabindex attribute.
- Once a lesson or unit has been opened, the YouTube video can be started from the keyboard (the Play button is read correctly by NVDA). Pausing, changing the volume, etc. can also be done from the keyboard. (For example, the volume can be changed with the left & right arrows.)
- Moving to the next unit using the keyboard also works without problems.
- In the course "Prototyping interaction", most videos do not have captions, but there is (usually?) a transcript below the video. The transcript is not marked as such; it is just provided below a heading that reads "Additional Materials". In Unit 1.5, the video has neither captions nor a transcript; instead there is a section entitled "Exercises" below the video.
- The source code uses WAI-ARIA roles and landmarks.

4.10.Kadenze

Kadenze (https://www.kadenze.com/) is an online learning platform that launched in 2015. Kadenze, Inc.'s headquarters are in the USA.

[65] "Prototyping Interaction": https://iversity.org/en/courses/prototyping-interaction-february-2016.

Kadenze's course catalogue focuses on the arts. Its courses include "Introduction to Programming for the Visual Arts with p5.js" (University of California, Los Angeles), "Machine Learning for Musicians and Artists" (Goldsmiths University of London), "Project Management for Designers" (Emily Carr University of Art and Design) and "The Nature of Code" (Processing Foundation)[66].

For learners, Kadenze offers both free and premium memberships. Premium membership is required for submitting assignments, receiving grades, collaboration with peers and verified certificates.

Course creators are almost exclusively (arts departments of) academic institutions, but there are also a few industrial partners.

4.11.Learning.ly

Learning.ly (http://learning.ly/) is a course platform launched by the British magazine *The Economist* in October 2015[67] [68]. The Economist Group has headquarters in London, but Learning.ly's headquarters are in New York.

Learning.ly hosts "career-focused courses" on subjects such as business, communication, data, design, digital product development, entrepreneurship, finance & economics, marketing, education and office productivity. While some courses are related to ICT, there are no courses that cover mobile applications, web development or software development. Most courses are paid courses but the "preview courses" are free.

Courses are created by "experts" (both Economist staff members and outsiders) rather than universities or other organisations.

As of 30 March 2016, Learning.ly had only 62 courses in their course overview.

4.12.MiríadaX

MiríadaX (https://www.miriadax.net/) is a Spanish MOOC platform launched by Telefonica and Banco Santander. It reached 750,000 registered users in July 2014[69]. By the end of

[66] Processing is a programming language and development environment specially developed for the arts and visual design. See https://www.processing.org/.

[67] "The Economist Launches Online Course Platform Learning.ly", EdSurge, 12.01.2016: https://www.edsurge.com/news/2016-01-12-the-economist-launches-online-course-platform-learning-ly.

[68] Julee Ho: "Become a Learning.ly Expert", The Learning.ly Blog, 29.10.2015: http://learning.ly/blogs/news/52606849-become-a-learning-ly-expert.

[69] Joshua Bolkan: "Telefonica Launches First Spanish-Language MOOC Platform", Campus Technology, 28.07.2014: https://campustechnology.com/articles/2014/07/28/telefonica-launches-first-spanish-language-mooc-platform.aspx.

March 2016, the counter on the platforms home page claimed over 2 million registered users. The platform is only available in Spanish and Portuguese. The platform's institutional members are from Spain, Portugal and Latin America[70].

The courses catalogue contains courses in areas such as life science, health sciences, languages (Spanish, Portuguese and English), technology, physics, medicine, humanities and economics. Courses in the area of technology cover topics such as product engineering, cryptography, Big Data, e-learning, cloud services. In early 2016, there were no courses on accessibility or usability. The course "Introducción al desarrollo web (iDESWEB)" (Introduction to web development) briefly covered accessibility and usability in one of its 12 modules[71]. The first course related to disability was announced in November 2016: "Discapacidad y envejecimiento activo. Soportes tecnológicos" (Disability and active aging: technological aids") is an 11-week course created by the Universidad Complutense Madrid that is scheduled to start in January 2017[72].

4.13.NovoEd

NovoEd (https://www.novoed.com/) is a MOOC provider by the company NovoEd, which was launched in 2013. NovoEd's headquarters are in San Francisco, California.

NovoEd hosts free and paid courses on a variety of subjects, such as leadership, development, design & innovation, entrepreneurship, social impact, humanities, and math & science. Most courses are in English, but there are also a few in Spanish (e.g. "Evaluación de Decisiones Estratégicas" by the Pontificia Universidad Católica de Chile). There are no courses on computer science, programming, web development or accessibility. The closest thing to a course on user interaction or user interfaces is the course "Design Kit: The Course for Human-Centered Design" by IDEO.org[73].

A distinctive feature of courses on NovoEd is that students are encouraged to collaborate and work in teams, and that it "requires students to work on real-life projects"[74]. Thanks to this higher level of collaboration, NovoEd claims that 45% of its learners finish the MOOCs,

[70] "Unirse a Miríada X": https://miriadax.net/web/guest/unirse-a-miriada-x.
[71] "Introducción al desarrollo web (iDESWEB)" by the University of Alicante (Spain): https://miriadax.net/web/introduccion_desarrollo_web.
[72] "Discapacidad y envejecimiento activo. Soportes tecnológicos": https://miriadax.net/web/discapacidad-y-envejecimiento-activos-soportes-tecnologicos.
[73] "Design Kit: The Course for Human-Centered Design", 26 April – 28 June 2016: https://novoed.com/design-kit-2016-2 & http://plusacumen.org/courses/hcd-for-social-innovation/.
[74] Ali Sewalt: "The future of digital learning", NextStepU, 2016: http://www.nextstepu.com/the-future-of-digital-learning-moocs.art.

as opposed to only 8% in other MOOCs[75]. 80,000 learners enrolled for NovoEd's first course[76]; there are no data about the total number of enrolments on NovoEd.

An e-mail regarding licence terms and the possibility of individual MOOCA contributions to the same course was sent on 4 March (to partnerships@novoed.com); there was no response.

4.14.NPTEL

NPTEL (http://nptel.ac.in/), which stands for National Programme on Technology Enhanced Learning, is an online learning platform launched by the seven Indian Institutes of Technology (IIT) and the Indian Institute of Science (IISc). The platform's main focus is on science and engineering, with subjects such as computer science and engineering, mathematics, electrical engineering, metallurgy & material science, chemistry & biochemistry, nanotechnology, and engineering design. Courses in computer science and engineering cover topics such as artificial intelligence, computer graphics, compiler design, data structures & algorithms, security & cryptography and game theory. There are no courses on accessibility, usability or user-centred design. The course on user experience design is categorised under "engineering design", not computer science.

There are just over 900 courses; all courses were created by the Indian institutions that launched the platform[77].

4.15.OpenCourseWorld

OpenCourseWorld (https://www.opencourseworld.de/) is a MOOC platform started in 2012 by imc information multimedia communication AG, a spin-off of the University of Saarland. (IMC describes itself as Europe's leading e-learning provider.[78])

There is no information on the number of learners on OpenCourseWorld.

OpenCourseWorld currently hosts 17 courses on topics related to business, leadership, English, IT security and UX. The courses are free of charge but students need to pay if they want a certificate after completing a course. Some courses were created by universities while others (possibly the majority) were created by companies.

[75] Jessica Gourdon: "NovoEd, des Mooc nouvelle génération", Educpros, 26.11.2015: http://www.letudiant.fr/educpros/actualite/novoed-des-mooc-nouvelle-generation-1.html.
[76] Kasey Quon: "NovoEd: Group project-based online education", Stanford Daily, 10.02.2015: http://www.stanforddaily.com/2015/02/10/novoed-group-project-based-online-education/.
[77] NPTEL statistics: http://nptel.ac.in/nptel_statistics.php.
[78] IMC AG: Die Organisation IMC: https://www.im-c.de/company/imc/about-us/organisation.

4.16.OpenHPI

OpenHPI (https://openhpi.de/) is a German MOOC platform hosted by the Hasso Plattner Institute (HPI) in Potsdam, Germany. It was launched in 2012.

OpenHPI reached its 200.000th enrolment in 2015[79] and 300.000th enrolment in 2016[80]. In October 2016, OpenHPI introduced the Qualified Certificate, which requires, among other things[81]:

> The participant agrees to be proctored via webcam during the graded exercises and exams. With the help of this online proctoring technology, we determine that the registered user is taking the assignments and the final exam in person.

Courses hosted at OpenHPI focus on ICT (security, programming, web technologies) and business-related topics (e.g. creating an IT start-up and "Industrie 4.0"). There are no courses related to accessibility. The courses are in English or German and are free of charge. All courses are either created by HPI or invited by them; there is no information on how universities or other organisations can host a MOOC on OpenHPI.

4.17.Philanthropy University

Philanthropy University (http://philanthropyu.org/) is "an initiative sponsored by Philanthropy U, Inc., a non-profit registered in the U.S., and powered by Berkeley-Haas."[82] Philanthropy U, Inc.'s headquarters are in Berkeley, California. The learning platform was launched in September 2015 and quickly reached 200,000 students[83]. Its goal is to develop and deliver courses for professionals working in NGOs.

The course catalogue contains free courses on topics such as non-profit strategy, fundraising, leadership, social impact, social entrepreneurship and financial modelling for the social sector. It does not have courses on ICT, accessibility or user-centred design.

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[79] "Look back to a fantastic year and anticipation of many new courses", 26.12.2015: https://open.hpi.de/news#post_48d3fb35-395a-485f-aab2-f9bb60a62f54.

[80] "Highlights of 2017", 20.12.2016: https://open.hpi.de/news#post_1e8e66da-4228-459e-8957-dae06764a8e3.

[81] "Records on OpenHPI": https://open.hpi.de/pages/document_types?locale=en#qualified-certificate.

[82] About Philanthropy University: http://philanthropyu.org/about-us/.

[83] "MOOC This: Over 200K Students Registered for Philanthropy University", EdSurge, 19.10.2015: https://www.edsurge.com/news/2015-10-19-mooc-this-over-400k-students-registered-for-philanthropy-university.

4.18.Udacity

Udacity (https://www.udacity.com/) is a company and a MOOC provider that resulted from an experiment by Sebastian Thrun and Peter Norvig that consisted in offering their course "Introduction to Artificial Intelligence" as an open online course, free of charge. Over 160,000 students from more than 190 countries registered for the course[84]. The company is based in Mountain View, California[85].

Udacity offers both free and paid courses. Udacity also offers "nanodegrees", which are packages of courses and which are not free.

In September 2015, Udacity claimed it had served around 4 million learners worldwide and that it had around 60,000 learners working on nanodegrees at any point in time[86].

Most of Udacity's courses are related to ICT: data science, web development, software engineering, Android and iOS. The "Non-Tech" category in the course catalogue contains courses on mathematics, physics and topics that are useful for start-ups. Udacity has no courses on accessibility, usability or disability, though it has a short course called "Intro to the Design of Everyday Things" that is based on the first two chapters of Don Norman's book *The Design of Everyday Things*[87].

Udacity's legal information[88] also specifies the "License to Educational Content":

> Udacity hereby grants you a license in and to the Educational Content under the following terms and subject to the following conditions: of the Creative Commons Attribution-NonCommercial- NoDerivs 3.0 License (http://creativecommons.org/licenses/by-nc-nd/4.0 and successor locations for such license) (the "CC License"), provided that, in each case, the Educational Content is specifically marked as being subject to the CC License. As used herein, "Educational Content" means the educational materials made available to you through the Online Courses, including such on-line lectures, speeches, video lessons, quizzes, presentation materials, homework assignments, programming assignments, code samples, and other educational materials and tools. Such Educational Content will be considered the "Licensed Material" under the terms of the CC License. Without limiting the generality

[84] John Naughton: "Welcome to the desktop degree", The Guardian (online), 05.02.2012: http://www.theguardian.com/technology/2012/feb/05/desktop-degree-stanford-university-naughton.

[85] See Udacity's Terms of Service page: https://www.udacity.com/legal.

[86] "Teaching tomorrow", The Economist, 05.09.2015: http://www.economist.com/news/technology-quarterly/21662654-sebastian-thrun-pioneer-googles-autonomous-cars-wants-teach-people-how.

[87] "Intro to the Design of Everyday Things", a two-week self-paced course: https://www.udacity.com/courses/design101.

[88] See https://www.udacity.com/legal.

of the terms of the CC License, the following are types of uses that Udacity expressly defines as falling outside of the definition of "non-commercial": (...)

Note that this is a licence between the learner and Udacity, not between Udacity and the course creator. However, it implies that the licence for MOOCAP's content, which is CC-BY 4.0, is compatible with Udacity's.

There is no explicit legal information for course creators. Udacity's YouTube video "Course Development: Behind the Scenes" does not discuss licensing, either[89].

An e-mail regarding licence terms and the possibility of individual MOOCA contributions to the same course was sent on 25 February (to teach@udacity.com); there was no response.

(Regarding accessibility: keyboard focus is not visible on the learner's homepage or dashboard. A more detailed accessibility evaluation is still outstanding. One of the things that need checking is the accessibility of the quizzes that appear as overlays over the videos.)

4.19. Udemy

Udemy (http://www.udemy.com/) was launched in 2010 and describes itself as an "online learning marketplace"[90]. Udemy's headquarters are in San Francisco, California; they also have offices in Dublin and Ankara.

Udemy claims to have over 40,000 courses, over 20,000 instructors and over 10,000,000 students. There are courses about a wide range of subjects, in categories such as development (programming languages, web development, mobile apps, software testing, etc.), IT & software (IT certification, network & security, etc.), office productivity, design, and many non-IT related subjects. Some of the courses are free, while others require payment (prices typically range between €23 and €337). Udemy has both free and non-free courses related to accessibility, e.g.

- Accessibility Features on Android (by Sami Rahman),
- Accessibility Features of iOS for the iPad and iPhone (by Sami Rahman),
- Web Accessibility: Learn Best Practices, Tools & Techniques (by U1 Group),
- Designing Web Accessibility for a Beautiful Web (by Peachpit Press)[91],
- Become an Expert at Creating Forms in HTML (by Dave Hollingworth),

[89] Udacity: "Course Development: Behind the Scenes": https://www.youtube.com/watch?v=hk9fNvHdmKc (6 minutes).

[90] Udemy: About Us: https://about.udemy.com/.

[91] The course is taught by Andy Clarke; see the intro video at https://www.udemy.com/designing-web-accessibility-for-a-beautiful-web/.

- Accessibility Codes and Laws: An Overview (by Laura Baldrati; this course is about accessibility-related laws, standards and state codes for the built environment in the USA).

All courses appear to be self paced. Learners are prompted to rate the course and provide feedback, but there appears to be no forum where learners can discuss course content with each other or with instructors.

As can be seen from the above list, both individuals and organisations can register as instructors on Udemy. Guidance is provided on the website: https://teach.udemy.com/course-creation/. On Udemy, a course can have more than one instructor[92]: the primary instructor can simply add co-instructors[93]. However, it is not clear who would be liable for the course content: only the primary instructor, all instructors collectively (i.e. for all content) or each instructor individually (i.e. each instructor only for his/her own content). (A question about this has been submitted to Udemy through its contact form.)

Creating a course does not cost any money. Udemy reviews all courses published on their platform to make sure they meet their standards of quality[94]. In spite of this, the course "NCTC: Total Immersion Chinese Language Teaching"[95] includes songs by the Rolling Stones, Lou Reed and other artists, which probably constitutes a copyright infringement. (Copyright infringements can be reported to copyright@udemy.com.[96])

A brief evaluation in Google Chrome 49 showed that the dashboard is only partially accessible by keyboard. For example, the link "My Courses" at the top of the screen responds to a mouse hover event but has no visible focus indication when one tabs through the links. After entering a course for the first time, the "Go to lecture 1" link has no visible focus indication.

[92] "Co-instructor Relationships: Rules and Guidelines": https://support.udemy.com/customer/portal/articles/2050652?b_id=3056.
[93] "Adding Multiple Instructors": https://support.udemy.com/customer/portal/articles/1508955?b_id=3056.
[94] Udemy Teach: FAQ: https://teach.udemy.com/faq/.
[95] "NCTC: Total Immersion Chinese Language Teaching" by 体强 黄 / NCTC (Neighboring Chinese & Teaching Chinese): https://www.udemy.com/dayseducnctc-online-courses/.
[96] "How do I report a Udemy course infringing my copyright?": https://support.udemy.com//customer/en/portal/articles/1505776-how-do-i-report-a-udemy-course-infringing-my-copyright-?b_id=3056.

The videos in courses such as “NCTC： Total Immersion Chinese Language Teaching” and “The Speed Reading Process: Expand Your Knowledge!”[97] take up the entire browser window and cannot be controlled using the keyboard: the buttons to pause the video, to change its speed, to change the volume and quality, etc. cannot be reached using the keyboard. Ironically, the settings button opens a list with the item “Keyboard shortcuts”, but this button can only be used with a pointing device. In addition, the buttons that opens the sidebar with the links to the additional learning materials is also inaccessible to keyboard users. Once the sidebar is open (e.g. after pressing the keyboard shortcut “c”), it cannot be navigated using the keyboard alone; for example, there is no focus indication. (These issues have been reported to Udemy.)

4.20.Summary

Table 1: Summary of 2016 MOOC platform review

Platform	Headquarters	Content creators	ITC courses	Accessibility	Comments
Blackboard Open Education	USA	Universities	Yes		
Canvas Network	USA	Universities / HE institutions	Yes (& a11y)		
Coursera	USA	Universities	Yes (& a11y)		
Desire2Learn	Canada	Universities / HE institutions	Yes (& a11y)		
edX	USA	Universities	Yes (& a11y)		
Eliademy	Finland	Anyone (inc. individuals)	Yes	Insufficient keyboard accessibility and screen reader compatibility	Bonus: editing features like in Moodle

[97] “The Speed Reading Process: Expand Your Knowledge!” by Dries Couckuyt: https://www.udemy.com/the-speed-reading-process-expand-your-knowledge/.

Platform	Headquarters	Content creators	ITC courses	Accessibility	Comments
Flooved	UK	Professors	No		OER repository, not a course platform. Defunct.
France université numérique (FUN)	France	Universities	Yes		Based on Open edX
Iversity	Germany	Universities, companies	Yes	Good	
Kadenze	USA	Universities, (companies)	Yes, but focused on the arts		
Learning.ly	USA	“Experts”	Yes		Too few courses. Too much focus on career development.
MiríadaX	Spain	Universities	Yes		Spanish and Portuguese only
NovoEd	USA	Universities, companies	No (not yet?)		
NPTEL	India	IIT and IISC only (India)	Yes		Not open to other organisations.
OpenCourseWorld	Germany	Universities, companies	Yes		
OpenHPI	Germany	Only HPI and invited organisations	Yes		

Platform	Headquarters	Content creators	ITC courses	Accessibility	Comments
Philanthropy University	USA	Selected by Philanthropy University?	No		Target group is NGOs.
Udacity	USA	Universities, companies	Yes (main focus)		
Udemy	USA	Anyone (inc. individuals)	Yes (& a11y)		No real discussion forums.

Appendix: Table of Evaluated Platforms and Features (2014)

Features / platform	FutureLearn	edX	Coursera	Canvas	Moodle	Other
Clarity	Good	Depends on content	Good	Depends on content	Course structure can be difficult to grasp due to adaptive sequencing	Depends on content
Multiple format content	HTML only	Good	Good	Depends on content	Depends on content	Generally problematic
Different languages	Only English	English, French, Mandarin	Good (multiple languages)	English	Good	Good
Length of videos	Short	Depends on content	Long	Depends on content	Depends on content	Depends on content
Screen reader compatibility	Good	Good	Good	Good	Good	Generally problematic (e.g. Udacity)
Subtitles	Good	Good	Good	Good	Depends on content	Depends on content