Expanding Learning Scenarios
Opening Out the Educational Landscape
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USING MOOCS TO TRAIN THE NEXT GENERATION OF WEB ENTREPRENEURS: CHALLENGES AND OPPORTUNITIES

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Introduction

Over the last few years there has been a growing concern regarding the lack of qualified workers to fill out the increasing number of job vacancies, particularly in the ITC sector worldwide. Against the backdrop of rampant youth unemployment in Europe, the demand for ICT skilled employees is on the raise whilst the number of graduates with computer degrees continues to experience a falling trend. As a response to this situation and the negative impact that it can have on Europe's economic growth in a recovering economy, the European Commission has put forward several initiatives that can help reversing this tendency.

The present project, Fostering Web Talent in Europe by encouraging the use of MOOCs focused on web skills (https://ec.europa.eu/digital-agenda/en/news/foster-web-talent-encouraging-use-massive-open-online-courses-focused-web-skills), is part of Startup Europe (http://ec.europa.eu/digital-agenda/en/about-startup-europe), an umbrella initiative that aims at strengthening the business environment for web and ICT entrepreneurs so that their ideas and businesses can start and scale up in Europe. The project's main objective is to assess the possibilities that Massive Open Online Courses (MOOCs) (https://ec.europa.eu/digital-agenda/news-redirect/14122) focused on web skills offer to train aspiring web entrepreneurs. Throughout the project, several activities were conducted to explore and promote the use of MOOCs as one of the main ways of boosting web skills amongst web entrepreneurs in Europe.

Several activities were carried out over the course of the project that ran from January until November, 2014. The first activity consisted of a scoping study to chart the landscape in terms of demand and supply of MOOCs in the area of web development, which provided a precise mapping of the available MOOCs from European institutions. Germany, Spain, and Switzerland were the three main providers of MOOCs for web talent followed by France, the UK, Finland and the Netherlands. For comparison purposes, an initial count of the MOOCs for web skills available from US MOOC providers was made. It showed that as of March 2014, there was double the amount of MOOCs for web talent available in the US than in Europe.

In addition to the desk research, an online survey was carried out amongst students, entrepreneurs, leaders of innovation support programs, developers, and MOOC providers.

The survey aimed to identify the web skills which are most in demand and evaluate whether or not these are being covered by the current MOOC supply. The goal of this research component was to reveal insights that could help strengthen and enhance the use of MOOCs for web talent across Europe. The first two activities were published in this preliminary report (http://openeducationeuropa.eu/sites/default/files/MOOCs-for-web-skills-survey-report.pdf) where the main findings and recommendations were laid out.

The rest of the activities conducted throughout the project contributed to the creation and development of a network of universities and business schools in Europe interested in developing MOOCs for web talent. The first networking activity was a webinar (http://openeducationeuropa.eu/en/blogs/summary-video-and-presentation-slides-mooc-accreditation-and-recognition-webinar) conducted in July 1st, 2014 that revolved around the topic of certification and recognition of MOOCs to increase the employability of the European workforce. This was a topic that came up as a major concern amongst the survey respondents. The second networking activity took the shape of a workshop (http://openeducationeuropa.eu/en/MOOCsworkshop) that was run on September 17th, during EC-TEL 2014, and that included six paper presentations, a MOOC-platform panel discussion, and a response-speech to the papers presented.

The last activity of the project consisted of a one-day conference (http://openeducationeuropa.eu/en/news/highlights-moocs-web-talent-final-conference) that took place in Helsinki on November 17th featuring introductory presentations of the project, a keynote address by Matt Walton of FutureLearn (www.futurelearn.com), and a panel discussion that gave the other speakers a chance to recount their experiences with MOOCs.

Outcomes from the initial survey and desk study

The study is based on the analysis of over 200 MOOCs and almost 3000 online survey respondents from around the world. The objective of the study was to investigate the supply and demand of MOOCs related to web skills to better understand the potential of MOOCs to develop these skills and it is summarised in this preliminary report. The survey sample includes learners, MOOC providers, entrepreneurs, leaders of innovation support programmes, corporate managers, and IT professionals.

The desk research, conducted in March, 2014, provided a precise mapping of the available MOOCs existing in Europe in the area of web development and laying the groundwork to define the essence of the survey to be carried out. Through the desk research, we were able to identify 56 European and double the amount of US MOOCs (115) related to web skills. The initial offering of European MOOCs related to web talent across European countries was not evenly distributed: Germany, Spain, and Switzerland were the three main providers of this type of MOOCs with 18, 13 and 9 MOOCs respectively. The other major players in the field were France, the UK, Finland and the Netherlands with 6, 5, 4 and 1 MOOC related to web talent. The above-mentioned listing of MOOCs for web talent was provided by 23 European and 41 US higher education institutions.

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According to a more recent count made in November, 2014, existing European MOOCs dealing with web talent have already surpassed one hundred MOOCs. The distribution of MOOCs per country follows the trend observed in the beginning of the project: the leading countries remain Germany, Spain and Switzerland with 34, 23 and 17 MOOCs respectively, whereas France, United Kingdom and Finland follow with 9, 8, and 7 MOOCs respectively. The Netherlands, Belgium, and Sweden are other early adopters who have jumped on the MOOC bandwagon with one MOOC each.

The results of the survey confirm that MOOCs are well-known and valued learning practices. The survey also revealed that there is a strong interest from employers and recruitment entities in exploring and acknowledging the training possibilities of MOOCs and other informal learning practices. Programming and web development skills were not the only skill sets in high demand. Entrepreneurs, leaders of innovation support programs and developers are also concerned about the lack of other skills such as graphic design, animation, eLearning, gamification, and digital art.

Overall, students showed an interest in obtaining more information on where to find MOOCs that are related to the aforementioned web skills. The current provision of MOOCs seems to be sufficient, but the students do not necessarily know where they can easily find the MOOCs they are looking for.

MOOC providers also value highly the benefits of MOOCs for their institutions and for their research, although they struggle with the amount of resources required to develop MOOCs within the current (higher education) educational system. The fact that cost, institutional culture and quality assurance are among the greatest barriers potential providers face in developing and delivering new MOOCs implies, that these concerns need to be addressed if we want to support the growth of European web entrepreneurship through this promising new educational instrument.

The concern of the students and interest of the recruiters about recognition of MOOCs as valuable (albeit informal) learning practices should not be taken lightly, and current policies should seek to implement measures that ensure such recognition in the near future.

Web talent MOOCs supply and demand

The different activities carried out during the project suggest that we have passed the "early adopters" phase according to the Technology Adoption Lifecycle Model, which describes the adoption or acceptance of a new product or innovation based on the demographic and psychological characteristics of defined adopter groups (Beal et al., 1957; also noticed by Daniel, 2014 and Stockport et al., 2012). MOOCs are a well-known phenomenon, both to people who are involved in them (providers and students) and also to people in other sectors, such as leaders of innovation support programs, corporate managers, and human resource personnel.

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However, there is a need to facilitate better mapping of the supply and demand, and to ensure a better fit between them. For one thing, entrepreneurs and potential learners would like to see more hands-on, practice or project based offerings which develop specific skills. These should be suitable for on-the-job professional development.

By and large, there seems to be an abundance of provision of MOOCs, yet learners are struggling to find the MOOCs they need. Therefore, the provision of MOOCs does not seem to be sufficient by itself, and different measures should be implemented to make MOOCs accessible as proper training possibilities to a wider population beyond the one surveyed under this project.

Additionally, better search mechanisms are required, along with course metadata exchange standards to support them (An example for course data exchange standards can be found here: http://www.xcri.co.uk). Different network members have embraced MOOC models that have proven successful, such as University of Reading's MOOC Mobile Game Building MOOC which has now successfully run two iterations.

There are other approaches that address the aforementioned issues. The Webmaker Training uses different modules to teach mentors on how to teach the web or as they put it themselves, "creative ways to teach web literacy, digital skills and open practices". Another interesting example that can serve as an illustration of the synergy between MOOCs and other open educational formats is the Mechanical MOOC which operates without a professor and is built on existing open educational resources and open courseware. Similarly, Code Academy or the initiative code.org, although they cannot be categorised as MOOCs either, have been brought up often during the course of the project by stakeholders, as they offer key training opportunities for web and app developers.

MOOCs and the higher education institutional culture

Most current providers do not see MOOCs as profit bearing activities – the leading motivations for conducting MOOCs are public image, philanthropy, and experimenting with new pedagogies and technologies. Yet at the same time, they cite cost, quality assurance and institutional culture as the main barriers to provision, as also stated by Dillenbourg et al. (2014), Yuan and Powel (2013), de la Garza et al. (2015), and Daniel et al. (2015). While institutional culture is likely to change as MOOCs become the norm, so will their impact on the public image of the university that provides them.

If we want to sustain and make the MOOC phenomenon grow, we need to offer providers mechanisms that will help them reduce the cost and raise the quality of the MOOCs they produce. As an example, the MOOC design project uses a methodology that combines design narratives and design patterns to help MOOC providers share their knowledge of how to design effective MOOCs. The Integrated Learning Design Environment offers a range of open and free tools for designing MOOCs.

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Regarding the issue of the institutional cultures, Professor Pierre Dillenbourg, one of the members of the advisory board of experts that reviewed the initial study for the present project, noted that universities might not be the best agents to produce MOOCs for basic web skills. These skills are orthogonal to the curriculum of computer science departments, which focuses on foundational and theoretical aspects of computing, such as algorithms and data structures, as well as advanced specialist topics such as cryptography and signal processing.

Professor Dillenbourg also suggested a "pyramid" of skills required to stimulate the European market: at the broad base level are elementary skills which could enhance any business, by opening up access to web and mobile channels. At the next level, there are web and mobile design and development skills required for web-centric companies, and at the narrow top end there are advanced skills such as security and data-mining required by specialist companies. The first two can be provided by MOOCs but the latter are only covered by formal academic education.

MOOCs certification and accreditation

Another critical issue that came up several times during the project is the availability of suitable certification schemes. The vocational focus of learners and entrepreneurs suggests that MOOCs are not, and should not, be modelled on the basis of academic programs. Most MOOC participants either already have a degree or are not seeking one. However, they wish to acquire skills that will help them to get a job, or to progress in their current job. Furthermore, they would like to have these skills accredited in a form that would be recognized by their current or future employers.

All the above relates to the design and quality control of MOOCs: providers need to point their MOOCs to vocational objectives, establish mechanisms to ensure their constructive alignment with these objectives, and collaborate with authorities to approve their certification (also addressed by Daniel et al., 2015, and Gaebel, 2014). An open badges system, such as Mozilla's Open Badges, is another possible solution, much more aligned with the open education philosophy than recent developments in the MOOC ecosystem. Some of the most important MOOC providers, such as Udacity and Coursera offer certification possibilities that are available for a fee. Whereas the latter approach mirrors the traditional university system in its methods of assessment (by tests, exams, exercises), the open badges system offers students the possibility of displaying skills they acquired by showing evidence to back them up. For example, FutureLearn's certification scheme implies, in its most complete form, a university-branded certificate that provides proof of learning on the course topic after taking a proctored exam. According to FutureLearn, these certificates are a "good way to show evidence of formal or informal Continuing Professional Development (CPD), commitment to a career path, or your understanding of a particular subject."

The MOOC platform iversity has been long pushing for their MOOC providers and other German universities to award ECTS credits. Iversity insists that beyond the certificate, the

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importance of this step is that it serves as proof that a given MOOC is of sufficient quality and that by the end of the course students will have achieved the defined learning objectives.

As the MOOC phenomenon goes beyond the initial hype, one interesting element is emerging, namely MOOCs are being used by providers as a "techno-pedagogical laboratory", and the lessons learnt inform their main practice in paid courses. This dynamic should be condoned, celebrated and encouraged. It suggests that the impact of MOOCs can potentially go far beyond their immediate domain, as a catalyst for change across educational systems.

The concern of the students and interest on the recruiter's side about recognition of MOOCs as valuable, albeit informal, learning practices should not be taken lightly (Sangrà & Wheeler, 2013). Current policies should seek to implement measures that ensure such recognition in the near future.

Main findings

The main conclusions contained within this report reflect the findings of the initial desk research, the subsequent online survey, as well as insights from the different stakeholders who interacted one way or another with the project during the remaining project activities.

Web and mobile technologies are developing at an accelerating pace and to keep up with these changes, workers and potential workers in the start-up ecosystem need to constantly update their skills. Overall, MOOCs offer several opportunities that will be outlined next, but they also pose some challenges that need to be examined and addressed properly.

MOOCs have proven to be an important means to address the shortage in web talent as part of an ecosystem which includes free and paid courses, self-paced learning resources, learning communities, and traditional educational providers. However, in order to create sustainable and effective MOOCs for web talent, which address the real needs of web and mobile entrepreneurs, it is imperative that industry, educational providers and MOOC platforms collaborate in dynamic and agile partnerships.

Web entrepreneurs and their current and potential employees need hands-on learning experiences, grounded in real-life problems. In order to provide such experiences, providers need to work closely with eLearning pedagogy experts and industry partners. At the same time, employers need mechanisms for validating the quality and efficacy of MOOCs, and verifying the knowledge of participants either through formal credit systems, portfolios, or community credits.

Further actions

It is imperative that industry, educational providers and MOOC platforms collaborate in dynamic and agile partnerships to raise awareness, produce, and enforce the use of MOOCs for web talent in the framework of a MOOCs network which will provide concrete ways to aid building these collaborative partnerships.

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Both companies and academic institutions should commit to work together to create possible schemes to offer credentials using a double-standard format where each would certify the knowledge and skills attained in a given MOOC: the theoretical one by a formal assessment and the practical one by virtual micro-internships. These certificates should be easily shareable on existing e-portfolios or online career-networks, and recruiters should acknowledge their value by giving extra value to candidates who possess them.

MOOC providers should mirror open access communities and should focus on providing the hands-on learning experiences required for teaching web skills that guarantee collaboration between peers, team work, interaction and feedback. Similarly, MOOC providers should tune their offerings to the needs of industry and the preferences of learners and should supplement existing study programs by offering MOOCs on niche or emerging topics which cannot be covered by formal academic programs.

Conclusions

MOOCs have the potential to be one of the educational practices, alongside other educational content delivery systems, that will help redress the skills shortage in an ITC-savvy workforce provided that employers, policy makers and providers work together to make them a viable, valorised, certified training option. MOOCs can be used as initial training for university introductory courses (to provide some hands-on practical knowledge), entry-level jobs, or for up-skilling workers in on-the-job training, but for that to happen they need to be able to satisfy the needs of the students for practical, hands-on, specific learning experiences.

Universities and other MOOC-providers should focus on creating MOOCs on niche or emerging topics which are hardly covered by formal academic programs. They should explore the possibility of establishing partnerships between different institutions to produce MOOCs in collaboration and sponsored by industry or government bodies.

For MOOCs to have a real impact on the learning side, they need to evolve pedagogically and move on from the current content delivery format to allow for a more practical, interactive, collaborative and hands-on type of learning required for teaching web skills. The quality of the learning experience, in terms of clarity, usability, and appropriateness of content and activities should be also taken into account.

The ultimate decision should be whether the purpose of using MOOCs to enhance web skills of young adults in Europe is about preparing a "silicon generation" so that these youngsters can work in web companies across Europe, or whether a more ambitious goal should be achieved, that is, improving the efficiency of IT practices in any company or business so that web components are widespread in all businesses in Europe. In other words, one should have a clear idea about who needs specific training and for what purpose before deciding what the best training option could be. However, and as the outcomes of this project reveals, MOOCs offer a potential solution in both cases. The question of whether MOOCs should mimic university courses or rather offer some practical training directed towards fulfilling specific

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needs remains to be addressed, as well as which institutions are best placed to design, develop and deliver them.

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