Tecnologias da Informação em Educação

The promotion of digital inclusion through MOOC design and use: a literature review

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Abstract

The use of Massive Open Online Courses (MOOCs) is being increasingly equated as a viable option by several educational shareholders in the scope of many scientific areas; nevertheless, research as to its potentialities in terms of digital (and consequently social) inclusion is still sparse and somehow atomised. Thus, this paper aims at putting forward the results of a thorough literature review focussed on the studies that bring together the concepts of MOOC and digital inclusion, published between January 2014 and January 2015. Thus, the main goal was to find out if there is evidence that MOOCS can be an important means for embracing digital inclusion, in particular, by promoting the development of soft skills (e.g., digital skills, communication skills, interaction skills). First and because the concept is becoming more and more polysemic (due to its manifold uses, theoretical frameworks, and application contexts), the MOOC's main facets are depicted, considering its derivatives (e.g., cMOOC and xMOOC). Moreover, some critical aspects that stand out from the content analysis of the results of the literature review are also highlighted, namely as to: accessibility, employability and lifelong learning promoted through MOOC use. In general, results suggest that there is still a long way to go for MOOCs to fully address the digital inclusion challenge.

Keywords: MOOC, soft skills, digital inclusion, social inclusion, accessibility, employability, lifelong learning

Resumo

O uso de Massive Open Online Courses (MOOCs) tem vindo a ser equacionado com opção viável por vários atores na Educação no âmbito de várias áreas científicas; não obstante isto, os estudos que se debrucem sobre as suas potencialidades em termos de inclusão digital (e, consequentemente, social) ainda são escassos e algo dispersos. Assim, com este trabalho pretende-se apresentar os resultados de uma revisão da literatura aprofundada, focada nos estudos em que convergem os conceitos de MOOC e de inclusão digital, publicados entre janeiro 2014 e janeiro 2015. Desta forma, o principal objetivo é encontrar indícios de que os MOOC se podem constituir como meio importante com vista à inclusão digital, em particular através da promoção do desenvolvimento de competências transversais (por ex. competências digitais, de comunicação, de interação). Inicialmente, e porque este se está a tornar cada vez mais polissémico (devido aos seus diversos usos, enquadramentos teóricos e contextos de aplicação), apresenta-se o conceito de MOOC tendo em

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conta as suas variantes (por ex. cMOOC e xMOOC). De seguida, também são analisados aspetos que sobressaem na análise de conteúdo dos resultados obtidos através da revisão da literatura, nomeadamente no que se refere a questões de acessibilidade, empregabilidade e aprendizagem ao longo da vida fomentada pela utilização de MOOCs. Grosso modo, os resultados sugerem que ainda há um longo caminho a percorrer para que os MOOCs respondam inteiramente o desafio da inclusão digital.

Palavras-chave: MOOC, competências transversais, inclusão digital, inclusão social, acessibilidade, empregabilidade, aprendizagem ao longo da vida

Resumen

El uso de Cursos Online Masivos Abiertos (MOOCs) se ha considerado como opción viable para muchos actores de la Educación en diversos campos de la ciencia; a pesar de esto, los estudios para mirar su potencial de inclusión digital (y por tanto social) son todavía escasos y algo dispersos. Así que este trabajo tiene como objetivo presentar los resultados de una revisión profunda de la literatura centrada en estudios en los que convergen los conceptos de MOOC e inclusión digital, publicados entre enero de 2014 y enero de 2015. Así, el objetivo principal es encontrar evidencia de que los MOOCs pueden ser un medio importante para la inclusión digital, en particular mediante la promoción del desarrollo de competencias blandas (por ejemplo, competencias digitales, de comunicación, de interacción). Inicialmente, y ahora que esto se está haciendo cada vez más polisémico (debido a sus diversos usos, marcos teóricos y contextos de aplicación), se presenta el concepto de MOOC teniendo en cuenta sus variantes (por ejemplo, cMOOC y xMOOC). A continuación, también se analizan los aspectos que se destacan en el análisis de contenido de los resultados obtenidos a través de la revisión de la literatura, en particular con respecto a los problemas de accesibilidad, empleabilidad y aprendizaje permanente, fomentado por el uso de MOOCs. En términos generales, los resultados sugieren que todavía hay un largo camino por recorrer antes de que los MOOCs cumplan plenamente el desafío de la inclusión digital.

Palabras clave: MOOC, competencias blandas, inclusión digital, inclusión social, accesibilidad, empleabilidad, aprendizaje permanente

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Introduction

Education is incorporating different innovation fluxes, trying to respond to the social demands and needs, in terms of learning and training offer, lifelong learning (LLL), Information and Communication Technologies (ICT) development, and employability. The information society we live in tends to be based on communication dynamics, in which a person's knowledge (individual and/or plural) is used for the development of (formal, non-formal and informal) learning communities. Besides, the convergence between geographically defined and world-wide online learning environments becomes increasingly evident. This stems from the fact that the contexts we operate in are more and more technological, i.e. most of our action fields (personal and vocational) assume the use of ICT as mandatory. Despite this, as Balula (2014) states, the web-based learning practices imply going beyond the traditional constraints such as time and space, as well as the representation unidimensionality, especially when designing the classroom through i) the virtual dimension of collaborative learning models, ii) the multiple communications and the multiple meanings of those communications, iii) the distributed representation of knowledge and iv) the learning contextualization within the network.

In this context, the MOOC movement is having a strong impact at several levels (Baggaley, 2014): i) it is bringing teaching and learning to the forefront of the Higher Education discussion, which contributes to the quality improvement of both online and traditional courses, ii) it is increasing interest in education for non-traditional learners, i.e. adults, iii) it is providing alternative educational options for low-cost upskilling and training, iv) it is prompting interest in alternative credentials, such as digital badges, and v) it is taking the stigma out of online education, i.e. MOOCs offered by MIT, Harvard University, and Stanford University are legitimising online learning (Blake, 2014).

According to de Waard et al. (2014), about 24% (120 million) of the entire EU population is at risk of poverty or social exclusion. The European Commission (2014d) also revealed that 47% of the EU population has insufficient digital skills and 23% has none at all; moreover, 64% of disabled Europeans have an insufficient level of digital skills and 38% have no digital skills at all. In order to thwart these numbers, these potential learners "need to be considered in their physical, as well as in their virtual (digital) reality" (de Waard et al., 2014, p. 34). Thus, as Alario-Hoyos, Pérez-Sanagustín, Cormier and Delgado-Kloos (2014) point out, MOOCs are a disruptive trend in education and their use can provide us with crucial research analytics, once it poses as a "unique opportunity to discover more about how, where, when, what and with whom people can learn" (Dias & Diniz, 2013, p. 2738) and can also be a means to provide scalability for the upskilling of more vulnerable groups of learners, e.g. learners with physical disabilities.

As Chiappe-Laverde, Hine and Martínez-Silva (2015, p. 10) mention:

> *the growth of academic research on MOOCs in recent years is a clear indication of the interest in the phenomenon and perhaps a sense that there is a need to map what is known about existing distance education practices, looking for incomplete knowledge in this area and to deepen the theoretical and practical implications of adopting the new practices.*

This was, actually, the motto for this paper, and, consequently, the main goal of this literature review is to try to find understand if MOOCs can be a means of improving digital inclusion through upskilling. So, in terms of structure, after presenting the research method used, a holistic and updated perspective over the main trends regarding MOOC design and its derivatives, as well as a view over how MOOCs

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can contribute to promote digital inclusion, are put forward. In the end, some final considerations as to future work are presented.

Method

In this study the option was to develop an in-depth literature review, once the main goal was to highlight research evidence regarding MOOC design and use as a means of improving digital inclusion. According to Levy and Ellis (2006, p.182), the literature review process consists of "sequential steps to collect, know, comprehend analyse, synthetize and evaluate quality literature to provide a firm foundation to a topic and research method"; and, thereof, it should follow an "input-processing-output" approach. Taking this into account, the steps followed in this study were: step 1 – to define the review purpose; step 2 – to define search and inclusion/exclusion criteria; step 3 – to search for and collect the most relevant works according to the predefined selection criteria; step 4 – to select the final corpus according to the inclusion/exclusion criteria (which include the evaluation of the quality of the studies); and step 5 – to summarise and interpret the findings based on the information/evidence found.

Subsequently, an integrative review method was also applied (Whittemore & Knalf, 2005). Initially, the use of this method implied the creation of a documentary corpus based on the following criteria (step 2):

- the selected databases were to include international, open source, scholarly peer-reviewed journals, as well as relevant international reports, in the areas of education and technology. Therefore, the databases selected were B-On, Directory of Open Access Journals, Eric, Google Scholar, Scopus, and Web of Science.
- the search terms to be used – MOOC, adult education, digital inclusion – were combined using the Boolean operators OR and AND.
- the search was restricted to the timeframe: January 2014 – January 2015.

The timeframe was defined taking into account an exploratory search for MOOC-related works, in which the results did not unveil a direct approach of the studies to digital inclusion issues, namely i) the study developed by Liyanagunawardena, Adams and Williams (2013), entitled *MOOCs: A Systematic Study of the Published Literature 2008-2012*, and ii) the study undertaken by Ebben and Murphy (2014) entitled *Unpacking MOOC scholarly discourse: a review of nascent MOOC scholarship*, the latter framed between 2009 and 2013. Moreover, and given the time scope already studied, the timeframe of the study was also established taking into account the great international visibility that MOOCs have been given in 2014 and beyond.

The search was undertaken between 1.02.2015 and 10.02.2015 (step 3). This process yielded 82 articles from a variety of sources: B-On – 23; Directory of Open Access Journals – 1; Eric – 0; Google Scholar – 52; Scopus – 6; Web of Science – 0. The documents retrieved were then reviewed to eliminate:

- duplication, grounded on the documents' title and abstract;
- documents that did not focus on the articulation of MOOC design and digital inclusion – based on the analysis of the abstracts;

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- papers that did not match the inclusion criteria defined above.

A thorough analysis of these documents unveiled that the documents that followed the study selection criteria were mainly reports of the European Union (7) and only a few were research papers (2). Consequently, in a second phase the search was widened, i.e. the works from the references/ bibliography sections of the documents initially selected were carefully analysed and included when matching the criteria defined above. This process (step 4) resulted in the cross-analysis of 33 documents (29 published in 2014 and 4 in January 2015). Furthermore, it was found relevant to conduct a backward references search, which "refers to reviewing the references of the articles yielded from keyword search" (Levy & Ellis, 2006, p. 191) to clarify some assumptions or concepts; consequently, when considered necessary some works outside the established timeframe were included in this study.

The documents retrieved were analysed resorting to a direct content analysis technique, as presented by Hsieh and Shannon (2005). Once the option was to assume an exploratory attitude throughout the coding process, the documents were analysed and those that focused on topics not included in the predetermined categories ('MOOC design', 'Accessibility' and 'Employability') were open-coded. After that, the whole category structure was analysed to determine if the new categories represented a new category or subcategory and, consequently, reorganised. In the end, an independent expert in the area was asked to validate the categories assigned to 5 of the considered studies (randomly selected).

At the completion of the filtering process, three main final categories and some subcategories were defined, namely: i) MOOC design (with the subcategories: 'definition' and 'derivatives'), ii) Accessibility (with the subcategories 'participant characteristics', 'financial issues', 'technical issues', 'collaboration/ interaction skills', 'digital skills' and 'language/cultural translation') and iii) Employability (with the subcategories 'learning recognition/certification' 'digital fluency', 'adult education/requalification', and 'LLL'). This way, the coded documents were grouped according to each (sub)categories in order to summarise and interpret/critically analyse its content (step 5).

As to the main limitations of this study, it should be noted that: i) the search only included works written in English, mostly because it tends to be considered by researchers as language of communication, i.e. *lingua franca*, and it was expected to included works from all over the world; ii) it includes the works published in a limited time span, because the main idea was to set ground to further in-depth research as to the role of MOOCs in the promotion of digital inclusion; and ii) although it was intended to include as many relevant studies as possible, the corpus selected for this review may not be an exhaustive list.
The results of the analysis of the selected works are synthesised in the next sections, i.e.: first, an overview over the main trends as to MOOC design is presented, and then key-ideas that stand out from the literature as to the role of MOOCs in prompting digital inclusion/divide.

MOOCs: wild present, undiscovered future

The term MOOC was first applied to the Connectivism and Connective Knowledge course (CCK08) facilitated by Steven Downes and George Siemens in 2008 and it was coined by David Cormier (Cormier & Siemens, 2010 as cited by Hollands & Tirthali, 2014).

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Regarding the words that compose the term itself, many discussions have been held as to what they imply. Starting with 'Massive', although there is some difficulty in establishing its boundaries, it should, in principle, allow for mass scale participation (Mystakidis & Berki, 2014) and infinite scalability (Bates, 2014). As to 'Open', authors such as Pata and Bardone (2014) argue that it should foster accessible and free of charge enrolment for everyone and Bates (2015) also adds that there should be no pre-requisites for participants. Fischer (2014) argues that, in many cases, even if MOOCs are presented as free in terms of registration, they are not totally free, once learners pay to have their examinations proctored, companies pay to access to the participants' performance records, etc. Lastly, the use (or not) of open content is also an important discussion issue, because some MOOC platforms (e.g. Coursera) own the rights to the course materials and frequently remove it when the course ends, not allowing them to be reused, remixed and/or repurposed (Bates, 2015). Thereof, as Chiappe-Laverde et al. (2015, p. 9) refer, it seems like "the true essence encapsulated in the concept described as Openness has been largely lost in practice".

Regarding the word 'Online' it stands for the context in which it occurs, i.e. a course delivered through the Internet. Even though, in some cases, MOOCs are used as a supplement of face-to-face classes, Bates (2015) asserts that they should be understood as a whole and, therefore, be wholly online – empowering learners as to ICT use for specific purposes and helping them to develop digital competences[1]. Finally, concerning 'Courses', Pata and Bardone (2014), as well as Bates (2015), defend that the key element that distinguishes MOOCs from Open Educational Resources (OER) is the existence of learning goals and outcomes, which should be fully or partially defined by the learner. It is so, especially because, in MOOCs, there should not be a fixed curriculum and, consequently, learners are supposed to set their own learning paths and share responsibility in the learning process.

In the last years, many MOOCs have been created, tackling very different subjects/areas (European Commission, 2014a and 2014b). These MOOCs, though, do not tend to have similar designs, i.e. the term 'MOOC' is becoming polysemic (sometimes even ill-defined) due to its manifold uses and to the underlying theoretical framework, contexts, pedagogical goals, etc. Nonetheless, the term is used in two main different senses: 'cMOOC' and 'xMOOC'. The former applies to a "specific conceptual framework of networked learning in which a connectivist approach is embedded" (Boyatt, Joy, Rocks & Sinclair, 2014, p. 135). Thus, the 'c' in cMOOC places the focus on community, connectivity and connectivism, incorporating connectedness between learners and peer interactivity, as well as "significant learner autonomy that is geared towards adult lifelong learners interested in personal or professional development" (Kennedy, 2014, p. 1). The latter ('xMOOC') refers to an "expert-led course being made available on the web for open, large-scale participation" (Boyatt et al., 2014, p. 135), focused on scalability, delivered in a conventional directed instruction mode, i.e. xMOOC, in which the 'x' refers to exponential (massive enrolments) or extension (Hollands & Tirthali, 2014; Margaryan, Bianco & Littlejohn, 2015). Thus, these two models tend to have different audiences, learning approaches and pedagogical strategies as evidenced in the work developed by authors such as Bartolomé and Steffens (2015), Bates (2015), Margaryan et al. (2015), Ebben and Murphy (2014), Kennedy (2014), and Shrivastava and Guiney (2014), summarised in Table 1.

[1] As defined in the glossary of EU Skills Panorama, 'digital competences' can be defined as "the ability to access digital media and ICT, to understand and critically evaluate different aspects of digital media and media contents and to communicate effectively in a variety of ICT influenced contexts" (retrieved from http://euskillspanorama.cedefop.europa.eu/Glossary/, accessed 06.06.2015).

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Table 1 – cMOOCs and xMOOCs

	cMOOCs	xMOOCs
teaching/learning theory	• connectivist model of learning (Bates, 2014)	• cognitive-behaviourist model of learning (Ebben & Murphy, 2014) • instructionist model of learning (Bates, 2014)
curriculum teaching/learning activities	• creation/exploration of topic area in "atelier" environment (Hollands & Tirthali, 2014) • non-linear structure, participants set their own learning goals and learning paths (Hollands & Tirthali, 2014) • decentralised (Margaryan et al., 2015) • network-based (Bartolomé & Steffens, 2015)	• pre-determined and sequenced weekly activities (Shrivastava & Guiney, 2014) • hyper-centralised(Margaryan et al., 2015) • content-based (Margaryan et al., 2015) • instructor-led, linear structure (Shrivastava & Guiney, 2014; Kennedy, 2014) • video lectures (Bates, 2015)
interaction	• participants share responsibility in defining the MOOC's development, in generating knowledge and supporting the community's learning (Hollands & Tirthali, 2014) • facilitator aggregates, reviews, summarizes and reflects on activity in daily/weekly newsletter (Hollands & Tirthali, 2014) • distributed communication (Bates, 2015)	• discussion forum participation optional (Hollands & Tirthali, 2014; Bartolomé & Steffens, 2015) • knowledge dissemination is one-to-one or one-way interaction (Shrivastava & Guiney, 2014)
participation	• open to learners worldwide (Hollands & Tirthali, 2014) • target an adult lifelong learning audience (Kennedy, 2014)	• large scale participations (Boyatt et al., 2014) • access to everyone (Eben & Murphy, 2015), but not genuinely open to learners worldwide(Hollands & Tirthali, 2014) • target: postsecondary online education (Kennedy, 2014)
contents	• learning/teaching materials and products are co-created by experts and learners (blog posts, images, diagrams, videos) (Hollands & Tirthali, 2014) • participant-driven content (Bates, 2015)	• instructor-provided contents (Shrivastava & Guiney, 2014) • short, content-based videos, readings (Shrivastava & Guiney, 2014)

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technology	• 'boot-strapped' platform and collaboration tools (Hollands & Tirthali, 2014) • use of social media (Bates, 2015) • discussion forums, Diigo groups, Twitter and other social networking are key (Hollands & Tirthali, 2014)	• delivered via third party (proprietary) learning management platform provider (Hollands & Tirthali, 2014; Shrivastava & Guiney, 2014)
assessment	• peer assessment or automated assessment (Shrivastava & Guiney, 2014) • no formal assessment (Bates, 2015)	• automated, auto-graded quizzes, multiple-choice testing, peer-graded assessment (Bates, 2015)

In fact, for authors as Ebben and Murphy (2014), the adoption of the aforementioned models (cMOOC or xMOOC) tends to influence the type and role of participants in the digital learning process, i.e. on the one hand, as observers, drop in, passive or active (Kim, 2014), on the other hand, as consumers, users, produsers or co-produsers (Pata & Bardone, 2014). Other studies, though, do not to establish a direct relationship between the different learners' profiles and the MOOC model, they tend to put the emphasis on MOOC pedagogy, on the need for an in-depth analysis of the learning motivations and constraints of different groups of learners, i.e. of the gap between learners' objectives and achievements (Cisel, 2014).

Somehow grounded on these models, a great amount of MOOC derivatives have emerged since 2012, which have been described in-depth by several authors, as summarised in Table 2.

Table 2 – MOOC derivatives

derivative	authors	focus/characteristics
BOOC (Big Open Online Courses)	• Cuzack (2014)	- similar to traditional MOOC, but limited to smaller number of students (around 50)
DOCC (Distributed Open Collaborative Course)	• Cuzack (2014)	- bring together participants from several institutions, engaging network learning through a collaborative open course - same course materials are distributed to students at different institutions
ECO sMOOC (Social Massive Open Online Course)	• Morgado et al. (2014)	- focusses on equity; social inclusion; quality; diversity; autonomy; openness
gMOOC (Game-based Massive Open Online Course)	• Jones and Singer (2014)	- combines knowledge-making with recent developments in Game studies to produce interactive and collaborative learning platforms
iMOOC	• Teixeira and Mota (2014)	- focusses on innovation; interaction; inclusion; individual responsibility; interpersonal relationships

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meta-MOOC	• Davidson (2014)	- addresses the possibilities and pitfalls of MOOCs in Higher Education
MOOC-Ed	• Hollands and Tirthali (2014)	- targeted at teachers and for professional development
qMOOC	• Mystakidis and Berki (2014)	- focusses on qualification and quality
SMOC (Synchronous Massive Online Course)	• Bates (2015)	- on-campus, live (real time) lectures broadcasted on the internet
SPOCs (Small Private Online Courses)	• Shrivastava and Guiney (2014) • Hollands and Tirthali (2014)	- number of learners is limited - closed, on-campus course - entry requirements - customised approach to learning - tends to be in blearning (conventional delivery mode – face-to-face + online learning) - solution found to simplify the possibility of formal assessment and accreditation
VOOC (Vocational Open Online Courses)	• Aberdour (2014)	- Based on practical authentic tasks and expert advice and lectures - the aim is to develop skills
"White label" MOOC	• Hollands and Tirthali (2014)	- only available to employees of a company or members of an organization (e.g. edX)
"Wrapped" MOOC	• Fisher and Fox (2014)	- similar to SPOC - re-designed courses around MOOCs offered by other institutions - enables learners to participate in the global and the local cohort of the MOOC

Even though, in Table 2, more than a dozen MOOC derivatives are put forward, the truth is that there are still many other constantly emerging. In fact, the name given to a MOOC (usually by their creators) tends to be grounded on its main focus; moreover, some authors, such as Clark (2013), are also setting forth other taxonomies seeking to aggregate them in terms, for instance, of pedagogy. More important than the taxonomy used, though, is the reasoning as to the MOOCs' potentialities to foster digital inclusion, as presented in the next section.

MOOCs: digital inclusion or digital divide?

Nowadays, it is widely assumed that MOOCs can be an important means for embracing social inclusion, through the development of soft skills – e.g., ICT skills, communication skills (Shrivastava & Guiney, 2014). Moreover, MOOCs seem to meet the European recommendation to address unemployment, adult learning, LLL and info-inclusion through open education (European Commission, 2013a, 2013b and 2014c). This is evidenced in initiatives of the European Commission, such as: the Opening up Education initiative, in which it is underlined the need to open education to meet the Europe 2020 goals, i.e. to foster "EU competitiveness and growth through better skilled workforce and more employment" (European Commission, 2013b, p. 2); the first pan-European MOOC platform

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(http://www.openuped.eu/); and the Include-ED (http://www.includ-ed.eu/), among other.
The triangulation of the results regarding 'MOOC use', 'adult education' and 'digital inclusion' also highlights two main concerns that MOOCs should address: accessibility and employability, as presented below.

Accessibility

It is widely accepted that ICT already play an important role within societal organics, since they allow for bringing real-world (vocational) contexts into the teaching and learning context. In other words, ICT use enhances learning, especially when used to promote strategies that allow students to: solve problems; manipulate, interpret, formulate hypotheses; experiment and make decisions. In this scenario it is crucial to think of accessibility issues, seeking to minimise the constraints that ICT may pose to potential learners.

When looking at accessibility in MOOC design/use, it stands out from the literature that it can translate into manifold aspects, in particular as to i) the participants characteristics and sensory-motor needs, ii) their financial resources to access education, iii) the relevance of technical/helpdesk support, iv) their communicational/interaction skills, and v) their digital fluency, as depicted below (see Table 3).

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Table 3 – Results of the content analysis for the category 'Accessibility'

categories	subcategories	authors
accessibility	participant characteristics	• Shrivastava and Guiney, 2014 • Moser-Mercer, 2014 • de Waard et al., 2014 • Margaryan, Bianco and Littlejohn, 2015 • Kim, 2014
	financial issues	• Shrivastava and Guiney, 2014 • de Waard et al., 2014 • Hollands and Tirthali, 2014
	technical issues	• Moser-Mercer, 2014 • de Waard et al., 2014
	collaboration/ interaction skills	• Moser-Mercer, 2014 • Shrivastava and Guiney, 2014 • Margaryan, Bianco and Littlejohn, 2015 • Bates, 2014
	digital skills	• European Commission, 2014a, 2014b, 2014c and 2014d • Moser-Mercer, 2014 • de Waard et al., 2014
	Language/cultural translation	• Moser-Mercer, 2014 • Nkuyubwatsi, 2014 • Sanchez-Gordon and Luján-Mora, 2014 • Moser-Mercer, 2014 • de Waard et al., 2014 • Wahyudi and Malik, 2014 • Gaebel, Kupriyanova, Morais and Colluci, 2014

Based on the results of the literature review, if MOOCs aspire to engage all types of learners (and be 'massive'), designers have to take into account that some may not have the financial and/or technological (e.g. bandwidth) means to enrol these courses, i.e., as Moser-Mercer (2014, p. 121) underlines:

> [MOOC providers] *need to consider offering suitable engagement tools such as lower resolution versions of videos and/or podcasts of short duration, facilitating the use of offline burst connectivity tools that download the minimum text-only information during connection, allow offline reading and composition of replies, and then manage upload interaction in a second burst.*

Besides, learners also tend to have difficulties as to ICT use, not only in technical terms, but also in terms of information search, selection and validation in online context (Balula & Moreira, 2014). The lack of these skills can compromise the learners' success, and, therefore, their development should always

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be integrated in the MOOCs' design. Consequently, and in order to enable learners to deepen their digital and technological fluency, MOOCs should not just converge upon content availability, but rather upon the digital interaction (with the contents, the learning community, etc.), holding learners accountable for their individual and collective learning and fostering digital inclusion (Margaryan, Bianco & Littlejohn, 2015).

Furthermore, taking into account the aforementioned diversity of MOOC derivatives, it is increasingly important to think of their general target audience, once "without clear indications as to which groups are being targeted with these initiatives, or a defined program that targets vulnerable learning groups, it is possible that people who could benefit from MOOCs will not participate in these initiatives" (de Waard et al., 2014, p. 34).

In fact, accessibility is easy to overlook but may represent one of the most empowering aspects for people with special needs and it is crucial to promote equity among people with physical disabilities. The MOOCs' design itself can (even though maybe unwillingly) also exclude participants if not prepared to include, for instance, people with vision, hearing or other physical impairment. In fact, some studies point out that the majority of courses have the same set activities for all participants; nevertheless, different learners should be "provided with different avenues of learning, according to their need" (Margaryan, Bianco & Littlejohn, 2015, p. 79).

To sum up, emphasis should be given to opening up MOOCs to global audiences and potential learners through the development of inclusion/inclusive skills, not only regarding their technical/technological component but moving beyond. In other words, by providing different options for learning activities, for learning resources, and for media/technologies to be used, MOOCs can help to minimise digital divide and, therefore, empower people with special needs (Margaryan, Bianco & Littlejohn, 2015).

As it is well-known, the majority of MOOCs are only offered in English (Moser-Mercer, 2014), and this can also pose as an important barrier to participation (Sanchez-Gordon and Luján-Mora, 2014; Gaebel et al., 2014). The learners' low proficiency in English (in particular, in the case of non-native speakers) may lead to information overload, as well as to learning difficulties, once they tend to understand, interconnect and correlate, as well as produce, information/knowledge more slowly. Consequently, plurilingual participation is an important tenet for MOOCs to incorporate. In other words, it may open up the range of participants, just by giving them the possibility to interact in a language of their choice or even in their own native language. Moreover, according to Nkuyubwatsi (2014, p. 128) findings:

> *best practices indicate that MOOCs can be tailored to each individual learner regardless of her/his cultural setting, and require course designers to keep diversity in mind. (…) The lack of cultural translation was found to be an issue of course design rather than being a typical feature of MOOCs.*

Thus, in the design process of MOOCs, it should deliberately be bared in mind the relevance of cultural translation to meet the expectations of all learners, especially in the case of MOOCs addressing learners from different cultural backgrounds; otherwise, the tendency is for learners not to fully engage with the course, once it can be seen as not relevant to their own setting (Nkuyubwatsi, 2014).

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MOOCs can also be looked at as a means to offer (what could be called) 'glocalised learning'. In general terms, 'glocalisation' is an amalgamation of the words 'globalisation' and 'localisation' and it implies the adaption of something global to suit local needs, bringing together standardisation and differentiation. Taking this into account, some authors (de Waard et al., 2014; Moser-Mercer, 2014) affirm that it could be advantageous to have a glocalised learning through MOOCs in order to preserve, as well as disseminate, the participants background culture and language. Besides, MOOCs, if seen as learning structures that may be reused, remixed and/or repurposed, may also be adapted to local needs – opening up to a wider audience through customisation of learning activities, learning resources, and even media/technologies to meet the needs of learners' with specific characteristics. As Wahyudi and Malik (2014, p. 253) highlight:

> *MOOCs can be more socially, culturally, historically and institutionally grounded in local societies around the world. Doing so can allow participants to de-centre the topics presented in MOOCs and get the opportunity to interrogate, negotiate, and appropriate knowledge to their local context and, in the end, gain the space to perform their own views about topics in MOOCs from a variety of disciplines and angles.*

So, regarding accessibility and besides technical issues (e.g. lack of connectivity), the concerns that emerge from the literature review are: on the one hand, the need for MOOC design to embrace the development of digital skills, not only regarding technology use, but also promoting the development of other soft skills, e.g., communication, networking and collaboration skills; and, on the other hand, the possibility it should offer in terms of glocalised learning, enhancing the participants' culture and language and helping to endorse equity for learners in general and, in particular, for people with special needs

Employability

As Chiappe-Laverde et al. (2015, p. 13) mention, MOOCs are seen by many authors "as a disruptive concept from a pedagogical perspective". In general, MOOC design (regardless of the derivative) aims at promoting ubiquitous learning supported by ICT, as well as to embrace individual and networked learning. These two aspects per se may enable learners to harness new challenges and opportunities in terms of employment, especially in the interaction with contents and other learners, but also through certification.

Considering the role that MOOCs may have regarding employability, the results of the literature review highlight the relevance of four different aspects, namely: i) digital fluency, ii) adult education and requalification, iii) lifelong learning, iv) certification (see Table 4).

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Table 4 – Results of the content analysis for the category 'Employability'

categories	subcategories	authors
employability	learning recognition/ certification	• Chiappe-Laverde et al., 2015 • Canals and Mor, 2014 • Haug, Wodzicki, Cress and Moskaliuk, 2014
	digital fluency	• Shrivastava and Guiney, 2014 • European Commission, 2014a, 2014b, 2014c and 2014d • Chiappe-Laverde et al., 2015 • Gutiérrez-Rojas, Alario-Hoyos, Pérez-Sanagustín, Leony and Delgado-Kloos, 2014 • Bartolomé and Steffens, 2015
	adult education/ requalification	• Shrivastava and Guiney, 2014 • European Commission, 2014c • Fischer, 2014 • Alraimi, Zo and Ciganek, 2015 • Haug et al., 2014 • de Waard et al., 2014
	LLL	• Shrivastava and Guiney, 2014 • Fischer, 2014 • Alraimi et al., 2015 • Morgado et al., 2014 • Bartolomé and Steffens, 2015 • Kennedy, 2014

As to the learning recognition and/or certification (see Table 4), for authors as Canals and Mor (2014) or Haug et al. (2014), MOOCs allow for uncoupling knowledge from degrees and creating a new combination of subjects in order to fulfil the learners' needs, using badges as a mechanism for motivating participation and recognising achievement. Fischer (2014, p. 151) also reinforces this idea, underlining that the success of MOOCs can greatly depend on whether learners "can learn what they want and when they want it, freed from the restrictions of curriculum consisting of desirable and undesirable content that has been segmented into majors and degree programs". Consequently, in terms of soft skills, instead of having overqualified and/or underqualified staff in specific areas, these people's educational and training background can be combined with short online learning courses, meeting the employee's and the employer's short-term necessities (Shrivastava & Guiney, 2014).

Furthermore, Fischer (2014) also emphasises that MOOCs can pose as important means to drive learners to reposition as to their learning process, i.e. there should be a shift from have-to-learn to want-to-learn. In fact, as to this, two types of motivation may be considered – intrinsic motivation (doing something because we want) and extrinsic motivation (doing something because we are commanded to). In teacher-centred environments, the tendency is for an overlap of extrinsic over intrinsic motivation, but MOOCs are ideal sets to foster learner-centred learning; therefore, promoting intrinsic motivation and engagement in the learning process (Haug et al., 2014).

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In this sense, the ICT-based structure of MOOCs may play a crucial role, once they allow for: i) bringing real-world (professional) contexts into learning, ii) learners to learn at their own pace (without time and space constraints), iii) learners to deepen digital and technological fluency, and iv) learners to develop soft skills (communication, collaboration, leadership, among other). Consequently, MOOCs can be looked at as employability enhancers if, concomitantly, they meet the learners (as well as the employer's) expectations and if their utility is recognized (by both), i.e. as Alraimi et al. (2015, p. 29) mention, "Satisfaction (intrinsic motivation) and perceived usefulness (extrinsic motivation) significantly influence IS (information systems) continuance intention". This can actually be one of the key-aspects to take into account to fight the enormous MOOC dropout rates evidenced by several authors (e.g., Bartolomé & Steffens, 2015; de Waard et al., 2014; Gaebel et al., 2014; Shrivastava & Guiney, 2014).

As mentioned before, equity of access is very important to promote the learners' satisfaction, which also implies that "contents and activities should guarantee that learners can access and build knowledge by different means, in various formats and with different learning strategies. This is especially relevant when approaching people with different professional training backgrounds" (Morgado et al., 2014, p. 16). Nevertheless, it is also crucial to guarantee equity as to chances to success for all learners (de Waard et al., 2014). In practical terms, this could translate into preparing MOOCs to enable participation and co-construction of knowledge in several languages, as well as not to exclude physically impaired people. This can be reached, for instance, by having multi-format digital artefacts, but always including text-based format – increasing the threshold for learners that are not fluent in the language used and enabling the use of computer screen readers –, or by having video subtitles in different languages. Moreover, affordable/free training for the unemployed and 'on-the-job training' should also be embraced through MOOCs, and, in both cases, it is vital to guarantee quality standards of MOOCs that can (and should) be defined beforehand by (European or national) vocational certification agencies.

Moreover, and as de Waard et al. (2014, p. 35) puts forward:

> *One of the EU Adult education central priorities is how to attract and support more adults back into lifelong learning; this is contrasted against the background of decreasing participation in adult learning. Participation in adult lifelong learning currently sits at 8.9% with the EU benchmark set at 15% by 2020.*

In fact and given the constant ICT development, the job market requires employees to regularly update their digital skills (among other) and MOOCs can also pose as a viable solution for this problem. Nonetheless, we can look at the lack of ICT skills, as well as the "lack of study skills and work habits as a significant factor, hindering the successful completion of MOOCs by less experienced learners" (Gutiérrez-Rojas et al., 2014, p. 47). Thus, MOOCs should provide potential learners with means to develop these literacies beforehand, ensuring learners more equity and enabling them to choose what they want to learn, taking into account their professional or requalification needs. This is really another central aspect that can help learners to self-regulate their learning, one of the key skills for LLL, according to the European Council (Bartolomé & Steffens, 2015).

To sum up, in terms of employability and LLL, MOOCs can be maximised to stimulate specialised vocational training of (future) employees, equipping and updating the workforce with technical and systemic skills that meet the industry's and businesses' needs.

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Final remarks

In a global glimpse over the results of the content analysis there seems to be a clear trend for MOOCs to be designed for student (tertiary education) use, not reaching a mass scale and it is emphasised there should be a shift to position participants as learners (which includes Higher Education students but not exclusively). Furthermore, MOOCs have potential to provide support to learning virtual mobility, much more easily than through conventional/traditional education delivery modes.

Even though, MOOCs tend to be theoretically assumed as ecosystems that can be used to promote employability and LLL in general, the results of case studies tend not to establish a direct relationship between the different learners' profiles (e.g., observer, active) and the MOOC design (Pata & Bardone, 2014). Moreover, most of the current studies on MOOCs highlight that their design and development are only a pale reflection of the theoretical framework that gave them rise, namely as to scalability, openness, reusability, and most of all not really addressing barriers to access (Bates, 2014 and 2015).

There is, also, a growing deviation from the initial conceptualisations of MOOC and the emerging MOOC offerings, and more significantly practices tend not to be founded on solid pedagogical frameworks, which may be resulting in poor experiences and high drop-out rates (Bartolomé & Steffens, 2015; de Waard et al., 2014; Gaebel et al., 2014; Shrivastava & Guiney, 2014). In fact, as Fischer (2014, p. 149) states, "Massive open online courses (MOOCs) have generated enthusiasm, excitement, and hype worldwide and recently increasing scepticism". Consequently, it is crucial to review practices before MOOCs are discredited, as e-larning and b-learning practices, somehow, were in the past (present?).

As the European Commission (2014) concludes in its *Report on Web Skills Survey,* "MOOCs offer a viable solution for the training of aspiring entrepreneurs in Europe… [once] Both MOOCs participants and potential recruiters claimed that the current MOOC offering covers the skills demands they are interested in developing for themselves or their workforce." In fact, this statement is corroborate by other authors, such as de Waard et al. (2014), once they consider that MOOCs are definitely an important means to offer more education possibilities to a wide range of learners; nonetheless, it seems tends to substantiate as an opportunity to develop employability skills for those who have already benefitted from higher education and for those who are already employed, i.e. LLL. To sum up, work has still to be done for MOOCs to set ground for digital inclusion, becoming dynamic systems, in which those that cannot access education, because of socio-economic constraints or special needs, feel comfortable and valued.

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