

# Teachers' roles in light of massive open online courses (MOOCs): Evolution and challenges in higher distance education

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**Abstract** This article analyses the challenges teachers face when entering a digital and open online environment in higher education. Massive open online courses (MOOCs) have become a popular phenomenon, making online learning more visible in the educational agenda; therefore, it is appropriate to analyse their expansion and diversification to help inform the next generation of courses. In this article, MOOCs are contextualised in a historical and wider approach to online education, building upon lessons learned from open and distance education, and exploring the introduction of technologies in providing higher education to massive populations over the past 45 years. In particular, the research study presented in this article used the *open scholarship* approach to analyse many of the changes that can occur in teaching when an open context applies, as in the case of MOOCs. Taking into account that a collaborative online learning experience is influenced by the simultaneous presence and overlap of cognitive, social and teaching elements, the study also used the *community of inquiry* model as a theoretical framework. In the study, 24 teachers (from the Universidad Nacional de Educación a Distancia [UNED] in Madrid, Spain) were surveyed about their experiences of MOOCs in terms of their current tasks, and the main changes they have observed compared to teaching in a more traditional electronic learning (e-learning) environment (at both graduate and postgraduate levels). These changes in roles, as well as teachers' views about the impact of “massiveness” and “openness” on their understanding and teaching practice, are presented and analysed. Finally, the article also discusses how the

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evolution towards adapted learning, collaborative learning and assessment supported by technical tools, for example, was already in progress at UNED before MOOCs were initiated.

**Keywords** massive open online courses (MOOCs) · teachers' roles · higher education · e-learning · online education

**Résumé** Rôles des enseignants dans les formations en ligne ouvertes à tous (FLOT) : évolution et défis dans l'enseignement supérieur à distance – Cet article analyse les défis que rencontrent les enseignants quand ils agissent dans un environnement numérique en ligne de l'enseignement supérieur. Les FLOT sont devenues un phénomène populaire et donnent une visibilité à l'apprentissage en ligne dans le projet éducatif ; il est donc opportun d'analyser leur expansion et leur diversification afin d'alimenter la prochaine génération de cours. Les FLOT sont contextualisées ici selon une approche historique et élargie de l'enseignement en ligne, qui tient compte des leçons tirées de l'enseignement ouvert et à distance et explore l'introduction des technologies en vue de dispenser l'enseignement supérieur à de grands nombres au cours des 45 dernières années. L'étude de recherche présentée applique notamment l'approche du *savoir ouvert* pour analyser les nombreux changements pouvant s'opérer dans l'enseignement dans un contexte ouvert comme celui des FLOT. Tenant compte du fait que l'expérience collective d'apprentissage en ligne est influencée par la présence et la superposition simultanées d'éléments cognitifs, sociaux et enseignants, l'étude utilise également le modèle de la *communauté d'enquête* comme cadre théorique. Vingt-quatre enseignants (de l'université nationale de formation à distance UNED à Madrid, Espagne) y ont fait l'objet d'une enquête sur leurs expériences avec les FLOT par rapport à leurs tâches courantes et aux principaux changements qu'ils ont observés, en comparaison avec l'enseignement électronique dans un environnement plus traditionnel (apprentissage en ligne), et ce au niveau des second et troisième cycles. L'article présente et analyse cette évolution dans les rôles et les opinions des enseignants quant à l'impact de la « massivité » et de l'« ouverture » sur leur conceptualisation et leur pratique de l'enseignement. Enfin, l'article examine dans quelle mesure l'évolution vers l'apprentissage adapté, l'apprentissage collectif et l'évaluation facilitée par des outils techniques par exemple était déjà en cours à l'UNED avant l'apparition des FLOT.

**Resumen** Los roles de los docentes a la luz de los cursos online masivos abiertos (MOOCs): Evolución y desafíos en educación superior a distancia – Este artículo analiza los desafíos a los que se enfrentan los docentes al desarrollar su trabajo en un entorno digital y abierto en educación superior. Los cursos online masivos abiertos (MOOC, por sus siglas en inglés) se han convertido en un fenómeno popular, y han hecho que el aprendizaje en línea sea más visible en la agenda educativa; por tanto, resulta apropiado analizar su expansión y diversificación para ayudar a informar la próxima generación de cursos. En este artículo, los MOOC se contextualizan en un enfoque histórico y más amplio de la educación en línea, aprovechando las lecciones aprendidas de la educación abierta y a distancia, y explorando la introducción de tecnologías para proporcionar educación superior a

poblaciones masivas durante los últimos 45 años. En particular, esta investigación utiliza el enfoque del conocimiento abierto (*open scholarship*) para analizar algunos de los cambios que pueden ocurrir en la enseñanza cuando se realiza en un contexto abierto, como en el caso de los MOOC. Teniendo en cuenta que una experiencia colaborativa de aprendizaje en línea está influenciada por la presencia simultánea y la superposición de elementos cognitivos, sociales y de enseñanza, este estudio utiliza también el modelo de comunidad de indagación (*community of inquiry*) como marco teórico. En el estudio, se realizó una encuesta a 24 docentes (de la Universidad Nacional de Educación a Distancia [UNED] en Madrid, España) acerca de sus experiencias y tareas docentes en MOOCs y sobre los principales cambios que han observado en comparación con la enseñanza en un entorno de aprendizaje electrónico tradicional (e-learning) (sus cursos virtuales en los niveles de grado y posgrado). En el artículo se presentan y analizan estos cambios en los roles, así como las opiniones de los docentes sobre el impacto de la “masividad” y la “apertura” en su conceptualización y práctica docente. Finalmente, el artículo discute cómo la evolución hacia el aprendizaje adaptado, el aprendizaje colaborativo o la evaluación facilitada por herramientas tecnológicas, entre otros, ya estaba en marcha en la UNED antes de que se iniciaran los MOOC.

## Introduction

Teaching methodologies related to electronic learning (e-learning) gained popularity in the late 1990s as personal computing and technological connectivity increasingly reached more people. Since then, the evolution of e-learning and open learning<sup>1</sup> on the Internet has reached a series of significant milestones. In particular, the Wikipedia project and the Massachusetts Institute of Technology's OpenCourseWare (OCW) initiative were launched in 2001;<sup>2</sup> while massive open online courses (MOOCs) became popular after George Siemens and Stephen Downes' *Connectivism and Connective Knowledge*, an open and experimental online course, was introduced in 2008 (Cormier and Siemens 2010), and the *Artificial Intelligence* course offered by Sebastian Thrun and Peter Norvig was launched in 2011, with 120,000 registered learners. In 2012, major “platforms” for MOOCs (such as edX and Coursera) were released,<sup>3</sup> offering courses from universities around the world. Today, most universities offer open and online courses in one form or another,

<sup>1</sup> Open learning refers to a process of active and self-regulated learning, non-formal or informal, which takes place through the use of technological tools available on the Internet.

<sup>2</sup> The Wikipedia project is a “multilingual, web-based, free-content encyclopedia project supported by the Wikimedia Foundation and based on a model of openly editable content” (<https://en.wikipedia.org/wiki/Wikipedia:About> [accessed 4 March 2018]). The OpenCourseWare (OCW) initiative is “a web-based publication of virtually all MIT [Massachusetts Institute of Technology] course content. OCW is open and available to the world and is a permanent MIT activity” (<https://ocw.mit.edu/about/> [accessed 4 March 2018]).

<sup>3</sup> The edX MOOC platform was founded by Harvard University and the Massachusetts Institute of Technology (MIT) in 2012 (<https://www.edx.org/about-us> [accessed 4 March 2018]) and Coursera was founded in 2012 by two Stanford Computer Science professors (<https://about.coursera.org/> [accessed 4 March 2018]).

including entirely open environments such as the *open educational resources* (OER) movement, institutional environments such as learning management systems (LMS), and mixed environments such as open courses that lead to certification.

These examples have a number of common features which have remained unchanged since the advent of online learning in higher education,<sup>4</sup> such as *digital mediation*,<sup>5</sup> physical separation between students and teachers,<sup>6</sup> adaptation to new kinds of learning resources, and the assessment of knowledge in distance settings. It is generally accepted that the methods used to deliver e-learning and open online education either directly or indirectly affect the traditional role of teachers (Bates 2015). However, the variety of approaches used in digitally mediated education makes it difficult to characterise teacher roles as uniform, as there is neither a common core across the underpinning educational theories nor are there organisational modes of teaching which apply equally to different initiatives, as is the case in both MOOCs and institutional online learning (Veletsianos et al. 2015).

This article aims to provide evidence to help overcome this gap in knowledge in open online teaching modalities. To address the gap, we conducted a research study to analyse teachers' experiences of MOOCs in terms of their current tasks, and the main changes they have observed compared to teaching in a more traditional e-learning environment. Our study aimed to contribute to a better understanding of how teachers teach in a MOOC, to identify their main concerns, and to examine how to appropriately focus their teaching, given the specific nature of this type of open and distance learning. Our overarching research question was: *How do MOOC teachers perceive the evolution of teachers' roles in MOOCs?*

## Theoretical framework: teaching in open and digitally mediated spaces

Our research study used the *open scholarship* approach to analyse many of the changes that can occur in teaching when an open context applies, as in the case of MOOCs. Open scholarship includes all the practices that scholars undertake – not only teaching, but also research and dissemination – under openness and accessibility criteria. It is characterised by the intersection of three attributes: digital, networked and open (Veletsianos and Kimmons 2012; Weller 2014); these same structural elements are also characteristics of the pedagogical model used in MOOCs.

We also used the *community of inquiry* model (Garrison et al. 2000) as a theoretical framework in our study, which helps explain the role of teachers in a

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<sup>4</sup> Typically, higher education refers to study undertaken after completion of high school or secondary education. It is also referred to as tertiary education.

<sup>5</sup> Digital mediation in this context means that education and learning occur in virtual environments and are mediated through digital technologies and media.

<sup>6</sup> Our use of the collective term refers to all professionals involved in the teaching of e-learning courses and MOOCs. In this article, “teachers” thus includes professors, associate professors, lecturers and any other professionals with a teaching role.

digitally mediated distance education context.<sup>7</sup> Under these circumstances, because teachers do not have direct contact with students, learning resources and spaces where learning is generated, it is necessary to redefine the traditional processes of teaching in classroom spaces.

## MOOCs and the open scholarship approach

MOOCs are learning spaces which are open to participation by anyone interested in the course topic. They are also open in the sense of allowing participants to leave during the course, not just at the end as with conventional courses. Finally, they are open in terms of participants being able to choose whether or not they receive a certificate. *Instructional design* (such as course design, implementation and assessment of the knowledge acquired by participants) needs to incorporate some features that differentiate these open courses from other conventional online courses. In this section we deal specifically with issues affecting teachers of MOOCs; in particular, how their work is also influenced by the features that characterise open courses. In order to properly substantiate our analysis, we refer to the literature on open scholarship that attempts to explain the practices of teachers in open courses such as MOOCs, and in other areas of training and knowledge management on the Internet.

George Veletsianos and Royce Kimmons (2012) state that open scholarship takes three forms: (1) open access and open publishing, (2) open education, including open educational resources and open teaching, and (3) networked participation. Consequently, open scholarship can be defined as

a set of phenomena and practices surrounding scholars' uses of digital and networked technologies underpinned by certain grounding assumptions regarding openness and democratization of knowledge creation and dissemination (Veletsianos and Kimmons 2012, p. 168).

This approach allows us to identify teaching practices in a MOOC because it focuses on explaining and analysing the actions of teachers beyond the formal spaces where they habitually carry out their work.

In addition, the open scholarship approach asserts that the characteristics of open educational environments directly influence teachers' roles and activities. These environments offer opportunities for teachers to develop open pedagogy, but they can also cause problems that teachers need to consider in the design and delivery of learning experiences.

One of the most commonly cited problems in the case of MOOCs is a low completion rate (Ho et al. 2014; Jordan 2014, 2015; Perna et al. 2014; Reich 2014; Rashid et al. 2015; Garrido et al. 2016). This appears to relate to learner profiles, which differ from conventional courses. There is consensus across analytical studies in differentiating the various learner types who participate in MOOCs, including "completing", "auditing", "disengaging" and "sampling" (Kizilcec et al. 2013); or "completionist", "optimizer", "listener" and "registered" (Reich et al. 2014). Despite these categories not corresponding to learner types in conventional courses

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<sup>7</sup> The model is explained in more detail later in this article.

(where we might assume that, in the case of formal courses, access requirements reduce the probability of any learner profiles other than “completing”), the majority of learners enrolled in MOOCs are not the “completing” kind.

A second differential element in open compared to conventional courses is the problem of determining and measuring quality (Hayes 2015; Kocdar and Aydin 2015; Lowenthal and Hodges 2015; Margaryan et al. 2015). In conventional courses, quality can be controlled through measures/indicators and procedures, such as student completion rates, student satisfaction scores, external assessment of course content and checks against external benchmarks. However, in open courses, many of these elements are altered. If the main traditional quality indicator – the completion rate – is not considered to be valid in this context, Justin Reich (2014) suggests other dimensions that teachers in open courses could consider.

Course teams can use certification rates conditioned on intention as one indicator among many – ranging from course satisfaction to performance on learning assessments to persistence through course material to engagement on forums and in social media – to help characterize a course’s success (Reich 2014, n. p.).

The role of designing and developing courses in a MOOC context, traditionally assigned to teachers in online courses, can also be different (Guàrdia et al. 2013; You et al. 2014; Drake et al. 2015; Janssen et al.). Indeed, an open course offers diverse opportunities for pedagogy development, which varies according to teachers’ or institutional objectives. For instance, Martin Weller (2014) identifies two alternatives in course design according to its objective: (1) *design for retention*, which is the case in MOOCs that promote course completion because they are proposed as a bridge to formal education or offered as part of an employment recruitment process; and (2) *design for selection*, where learners select what they want from the course and the completion rate is not a relevant metric.

A final dimension to consider is the institutional context into which MOOCs are integrated (Domínguez 2014; Gil-Jaurena 2014, 2015; Schuwer et al. 2015). Both traditional face-to-face institutions and those already offering online courses have seen the need to open new pathways of open access to higher education. For these institutions generally, a main concern is how to integrate MOOCs – which are usually new courses, offered openly and at no cost to students – into the context of their conventional or formal courses. Different strategies will have far-reaching implications for institutions, since they directly impact key areas, such as funding models, recruitment policies, strategic alliances and course production systems. In the case of teachers’ roles and tasks, many alternatives have also been explored by institutions, such as, for example, outsourcing teachers, developing courses using current teachers, setting up alliances between institutions and existing platforms, and involving teachers in creating their own MOOC platforms (Brown et al. 2015; Jansen et al. 2015).

## Approaches to teaching in MOOCs

In terms of teaching methodologies and the use of educational resources, MOOCs initially emphasised the relevance of networks, whereas more recent initiatives have focused on video-based instruction and automated assessment. To distinguish between them, George Siemens (2012a) suggests classifying courses into two groups: (1) *cMOOCs*, courses based on a *connectivist* approach to learning (Downes 2005; Siemens 2005), which take place in non-formal spaces and with open technologies that emphasise the engagement between participants' activities in the network and joint knowledge generation; and (2) *xMOOCs*, courses developed in institutional contexts that use total or partially proprietary (owned) software and that are based on an *instructivist* and teacher-directed pedagogy.<sup>8</sup>

Lectures, as oral expositions to an audience, are a traditional mode of content delivery that persist in face-to-face and online environments. Teaching in xMOOC-type courses is mainly based on knowledge transmission through video lessons, which are equivalent to lectures or introductory instructions. As Tony Bates (2015) reminds us, "in order for a lecture to be effective, it must include activities that compel the student to mentally manipulate the information", a central idea in *constructivism*. This approach implies an active role of the learner in the learning process and the role of teachers as creators of rich learning experiences, including collaboration and interaction with the environment (IGI Global 2017). MOOCs usually include these elements, however

even if the new technology, such as lecture capture and computer-based multiple-choice questions organised in a MOOC, result[s] in helping more students memorise better or learn more content, for example, this may not be sufficient to meet the higher level skills needed in a digital age (Bates 2015, n.p.).

In this sense, xMOOCs that rely primarily on information transmission, computer-marked assignments and peer assessment (Rodriguez 2013) may only lead to *surface learning*, for example, "activities like rote memorization and superficial knowledge acquisition" (Shearer et al. 2015, p. 126). This more commonly occurs when there is a focus on information transmission, a lack of interaction and discussion, and testing that mainly relies on memory (Bates 2015). By contrast, *deep learning* refers to the most complete forms of learning, which imply the acquisition of complex abilities and allow the development of high-level skills. Rick Shearer et al. (2015) explain that "deep learning involves more substantial engagement with a non-obvious meaning and underlying structure" (ibid., p. 126). It is more likely to occur when there is a focus on analytical or critical thinking, problem solving, in-class discussion, and assessment based on analysis, synthesis, comparison and evaluation. Even if MOOCs remain at a basic xMOOC level, to encourage deeper learning MOOCs can potentially experiment with networked

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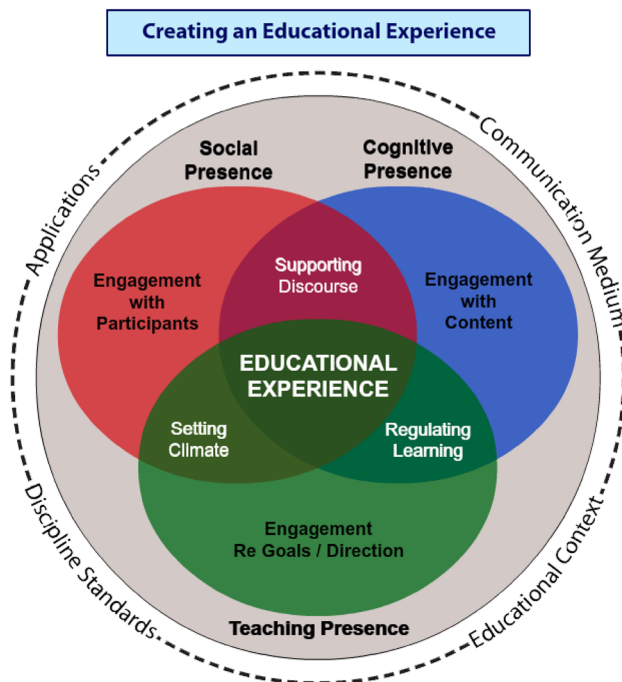
<sup>8</sup> In cMOOCs the "c" stands for connectivist, while in xMOOCs the "x" stands for "MOOC as eXtension of something else" (Downes 2013, n. p.), such as in "TEDx", "MITx" or "edX".

learning, social discussion and knowledge building. (In this article, we consider the entire spectrum of options to develop our analysis.)

As a result, Bates (2015) states that building academic knowledge requires a strong teacher presence within a *dialectical* environment (reasoning through dialogue), in which critical discussion is encouraged and developed by the teacher. When framed within the Community of Inquiry (CoI) model (see Figure 1), the massive character of MOOCs allows value to be placed on the social presence and engagement with participants that *peer learning* provides.

The CoI model (Figure 1) is one approach that can inform the potential of teaching in a digitally mediated space such as MOOCs. In terms of teacher presence, the *constructivist* orientation of the CoI model maintains that teachers' work is related to a re-definition of student roles and student-content interactions (Rourke et al. 2001). This is consistent with the two learning theories most commonly applied to MOOCs – constructivism and connectivism – with both valuing social interaction to encourage deeper learning (Anderson 2016).

These community- and interactivity-based approaches to learning are more commonly present in cMOOC-type courses, which focus more on the communicative interaction between learners, resources and teachers than do xMOOCs. These differences also apply to the specific requirements of all types of MOOCs which teachers must address, mostly related to course design and preparation (which varies according to the type of course). In the case of xMOOCs, Walter Sinnott-Armstrong



**Fig. 1** Community of Inquiry (CoI) model. *Source:* Garrison et al. (2014)



(2012) outlines a 10-step process for course development, which includes teachers' preparing a syllabus, explicitly identifying the topics to be dealt with, and planning the time required to cover them. Inputs to the process include detailed scripting; setting up audio-visual equipment and hardware; and recording, editing and enhancing video content. Organising permissions, quizzes, uploads, monitoring and in-course modification also add to teachers' workloads (BIS 2013).

Meanwhile, George Siemens (2012b) describes the workload linked to planning and executing a cMOOC that operates autonomously (independently) from an institution as a nine-step process: (1) developing a topic for a certain audience; (2) finding other facilitators with whom to teach the course, preferably from other backgrounds; (3) determining course content (e.g. blogs, online articles, lecture videos) as a starting point for the course; (4) planning spaces for interaction (e.g. forums, blogs, e-mails, use of tags<sup>9</sup> in distributed spaces); (5) planning interactions (synchronous versus asynchronous);<sup>10</sup> (6) planning the continued and active presence and participation of facilitators; (7) organising learning creation through course activities and peer feedback; (8) promoting and sharing the course website; and (9) iterating and improving on previous course work.

In terms of the practices teachers undertake during course implementation, digital technologies allow for new pedagogies to be employed, which can be organised around a wide range of "emerging practices" (Veletsianos 2016). The exact nature of these practices depends, ultimately, on the technologies and workflows set within the MOOC platform, and on the protocols established by the administering institution. A review of approaches to the MOOC phenomenon in recent years indicates a wide range of available teaching practices. However, in contrasting empirical studies which analyse concrete activities teachers undertake in relation to MOOCs, it is apparent that these practices have not evolved to their maximum potential. In fact, Weller (2014) refers to teachers' adaptation to the new requirements of MOOCs as being based more on "resilience" than on innovation. As explained by Martin Weller and Terry Anderson (2013), "resilience requires adaptation and evolution to new environmental conditions, but retains core identity" (ibid., p. 55).

In open education, resilience relates to the use of open practices (if convenient), while maintaining the underlying function and identity that represent existing practices (if still deemed necessary). According to Weller and Anderson (2013),

the practices themselves are not core to scholarship; rather, they are the methods through which core functions are realised, and these methods can and should change (ibid., p. 55).

In the case of MOOCs, online education practices can remain constant and unaltered, since they constitute the main functions associated with teacher roles; yet

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<sup>9</sup> A tag is a kind of categorisation label which helps to organise large amounts of information, thus enabling easier access to specific topics. One example is the use of hashtags [#] in Twitter, a distributed space for interaction; another example is the use of tags in blogs.

<sup>10</sup> *Synchronous* refers to interaction happening at the same time (for example, through a chat or a live webinar), while *asynchronous* means communication with a time lag (for example, in online forums or via e-mail).

what may change are the methods through which those basic functions are developed. For instance, current teacher tasks include preparing a course syllabus, which involves a series of practices such as gathering, analysing, organising and sequencing information according to a predetermined logic. In a conventional online course these practices are opaque to learners; in open education, syllabus preparation can be developed through open collaborative methodologies, transparently and involving learners in the process.

Consequently, performing the new tasks related to developing a MOOC can result in a new type of teacher. In the following section, we expand upon these practices.

## Empirical data and analysis

The empirical research study described in this section is contextualised within the overall research on the roles of teachers in MOOCs, focusing on how these roles evolve when courses become massive, open and online. In particular, our study's methodology was based on a literature review (presented earlier in this article) to identify teachers' new requirements and roles in a MOOC environment, and on a survey of MOOC teachers' perceptions using a sample involved in institutionally driven MOOCs delivered by a distance education university: Universidad Nacional de Educación a Distancia (UNED).

UNED was the first provider of MOOCs in Spain, in 2013. We considered it a relevant context to explore the perceptions and practices of MOOC teachers who had up to four years' experience in this environment. As UNED already provided an e-learning environment, it also allowed us to receive input from teachers experienced in online education, and to compare their views on MOOCs and on the conventional (regular) online courses they taught at graduate and postgraduate levels.

### Context: UNED MOOCs

The institutional perspective is important in this study, since it informs the action framework available for teachers, and the resources and services they can use to deliver their MOOCs. In 2013, UNED began offering MOOCs using its own platform, and it has been doing so ever since.<sup>11</sup> Proposals for each course come directly from a teacher or group of teachers, who voluntarily present their MOOC proposal to UNED Abierta.<sup>12</sup> The University Council approves those MOOCs that meet the requirements of internal regulation (approved in 2014), taking into account the following criteria that measure the level of course quality and appropriateness (UNED 2014):

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<sup>11</sup> Currently all UNED MOOCs and other open learning resources are available at <https://iedra.uned.es/>.

<sup>12</sup> UNED Abierta is the open educational resources (OER) programme office at UNED.

- Quality and scientific/academic relevance of the proposal and the teachers involved.
- Current topic and social interest.
- Courses linked to UNED educational programmes: graduate, postgraduate, continuing education and language learning.
- Courses 101,<sup>13</sup> introductory courses or courses that deal with generic or cross-curricular skills.
- Courses linked to competitive research projects and/or groups, in order to disseminate research findings to wider audiences.
- Courses linked to institutions that collaborate with UNED (e.g. Foundations).<sup>14</sup>
- Courses with a special innovative approach, for example, in methodology, pedagogical design or social learning.

In terms of course structure, UNED MOOCs can be considered to be xMOOCs (defined earlier in this article), despite sometimes including collaboration and discussion. Instructional design is based on providing content (mainly videos) and proposing activities (mainly setting computer-based, multiple-choice questions, and other activities such as peer-assessed essays and open questions). According to the guidelines presented by Bates (2015), UNED MOOCs have the following design features: specially designed platform software (OpenMooc and Open-edX), video lectures, computer-marked assignments, peer assessment, supporting materials, shared comment/discussion space, badges/certificates upon completion, and learning analytics. Regarding “no, or very light, discussion moderation” – another feature identified by Bates (2015, p. 154) – UNED MOOCs use different approaches to this aspect. For example, in terms of tutoring and teacher presence, some teachers have been actively involved in course implementation by encouraging forum debates and addressing learners' doubts about content, while others have prepared material for self-learning and have not been so present during the course implementation phase (Gil-Jaurena 2015). In the context of Weller's classifications (2014), UNED MOOCs are designed to complement formal education, rather than replace it.

## Research question and methodology

To obtain the views of UNED's MOOC teachers on our study's main research question – *How do MOOC teachers perceive the evolution of teachers' roles in MOOCs?* – we developed and administered a survey in 2016. The survey was designed specifically for this study, and it was organised as follows:

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<sup>13</sup> “101” refers to basic or introductory-level courses.

<sup>14</sup> Foundations that collaborate with UNED include MAPFRE Foundation (<https://www.fundacionmapfre.org/fundacion/en/>) and ONCE Foundation (<http://www.once.es/new/otras-webs/english>).

- a series of profile questions for information about the sample composition;
- three “closed-ended” questions about teachers’ reasons for running a MOOC, and on their roles developed in both MOOCs and regular courses conducted through UNED; and
- six “open-ended” questions about the differences between teacher roles in MOOCs and regular courses; changes to their teaching in regular courses after their MOOC experience; the major influence of MOOCs on their teaching; the influence of MOOCs being open on their teaching; the type of support needed to be more effective teachers in massive open online environments; and a final open question for any other comments.

When developing the survey,<sup>15</sup> we considered existing literature about teaching practice in open environments (Weller 2011; Wiley and Green 2012; Veletsianos and Shepherdson 2016). For the closed-ended questions, we also drew on a previous survey administered in 2014 which asked UNED’s MOOC teachers about their reasons for running a MOOC<sup>16</sup> (this question is the same in both surveys), and their list of usual tasks while teaching regular online courses; as well as the steps identified by Siemens (2012b) and Sinnott-Armstrong (2012) (presented earlier – in the section on *Approaches to teaching in MOOCs*). One teacher who had experience both in distance education and in MOOCs validated the survey, and his suggestions were also considered when we finalised the design of the survey.

At the time the survey was administered in 2016, 45 full-time university teachers employed at UNED had taught at least one MOOC. All were invited by e-mail to complete the online survey (we used Google forms), and 24 (53.33%) voluntarily responded. Most of these teachers worked in the areas of Social Sciences and Law (66.7%, which includes MOOCs in Economics, Educational Sciences, Sociology, and Law), followed by Arts and Humanities (20.8%, including MOOCs in Language Studies, the Arts, and History) and Engineering and Architecture (12.5%, comprising MOOCs in Computer Science and Electronics). All respondents were experienced at teaching in an e-learning environment, with at least five years of experience (83.3% had more than 10 years’ teaching experience in distance mode). In relation to teaching in MOOCs specifically, experience ranged from one to four years (39.1% had three years’ experience as MOOC teachers); while 52.2% had been or were teachers in one MOOC, and others had taught in two, three or more than five MOOCs.

### Data analysis and interpretation

MOOC teachers’ motivations, roles and perceptions are summarised and analysed in this section, and then discussed and compared with the theoretical framework in the following *Discussion* section.

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<sup>15</sup> The survey was carried out in Spanish. For the purposes of this article, we have translated responses into English.

<sup>16</sup> UNED Abierta, the office that provides support to UNED MOOCs, planned the first survey, administered in 2014. The first author of this paper was the Director of UNED Abierta at that time.

**Table 1** Teachers' reasons for running a MOOC

Reasons	2014		2016	
	<i>n</i>	%	<i>n</i>	%
Pedagogical experimentation and innovation	22	88	21	91.3
Reaching a different audience	16	64	14	60.9
Making my area of knowledge visible	13	52	10	43.5
Research	8	32	8	34.8
Publicising other courses I teach	5	20	6	26.1
Other			1*	4.3

\*Reaching as many people as possible with the topic of the course (social entrepreneurship)

### *MOOC teachers' motivations*

Table 1 shows the reasons given by teachers for developing a MOOC. It incorporates replies both from the 2014 survey of UNED's MOOC teachers and from the 2016 survey administered as part of this study. In 2014, 25 replies were collected from teachers of 14 of the 18 MOOCs already finalised at UNED at that time, in order to evaluate their experience; in 2016, we collected 24 responses. Answers were predefined and respondents could choose among them, as well as adding open responses.

In Table 1, the reasons for running a MOOC are ordered by importance. Replies from 2014 and 2016 show similarities, with "pedagogical experimentation and innovation" the most relevant reason among the surveyed teachers. This pedagogical innovation included elements such as peer assessment, video lecturing (short videos), gamification (using game-designed elements to increase motivation and engagement), peer support and social interaction in academic forums.

### *Teachers' roles in regular e-learning courses compared to MOOCs*

In the 2016 survey, we asked UNED's MOOC teachers about the teaching roles they had developed, both in regular e-learning courses (graduate and postgraduate) and in MOOCs. The comparison is presented in Figure 2.

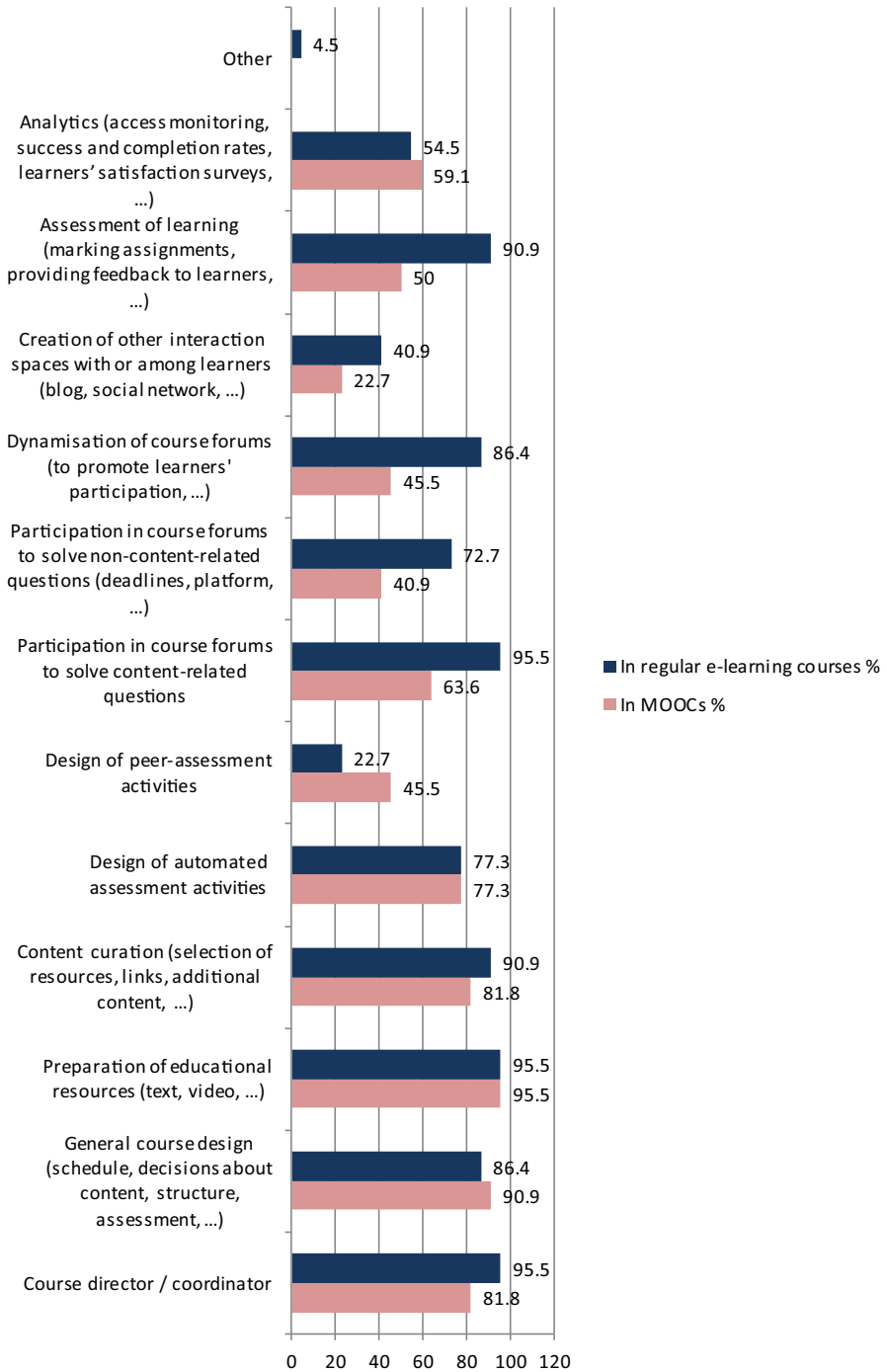
As a complement to Figure 2, when we asked (in an open-ended question) about the differences in teaching roles between MOOCs and regular e-learning courses, the most common response we got was related to reduced teacher presence and reduced interaction with learners during the implementation of MOOCs. For example,

"in the MOOCs there is no personalised attention to the learner"

"[in the MOOC] I try to design content, but I do not interact much";

and

"in the MOOCs I don't participate much in dynamising and boosting the forums".



**Fig. 2** Teachers' roles in regular e-learning courses and in MOOCs

The second most common difference stated by respondents referred to assessment, which they indicated was less demanding in MOOCs and required less involvement from teachers. Respondents said that

“in regular courses there is a strong incentive to carry out assessment, which doesn't occur in MOOCs as they are ‘voluntary’”,  
“in regular [online] courses, I actively participate in the assessment of learning”,  
and  
“there are differences in the way I provide feedback”.

The third most common difference related to more involvement in MOOC course design than in implementation, which some teachers attributed to different time frames (MOOCs are shorter than regular e-learning courses). One respondent claimed that

“MOOCs require a bigger effort beforehand (design, virtualisation ...) than during the implementation of the course”;  
another stated that  
“student learning through MOOCs is more self-sufficient; I rely more on the other MOOCs' participants”.

When asked about changes to their teaching in regular e-learning courses (graduate and postgraduate) after having experienced MOOC teaching, teachers' responses were divided: six respondents had not changed anything (because “regular courses and MOOCs are different” and “the [teaching] methodology is different”); four mentioned that they valued the role of peers more (in collaborative learning or assessment), although some had not yet introduced peer support into their regular courses; and five stated that they valued and used more audio-visual content in e-learning courses. One teacher had even incorporated their MOOC as part of a regular graduate course.

Other respondents stated that after their MOOC experience they made the following changes to their teaching of regular e-learning courses:

“I have introduced the idea of modules, the order of the activities, the planning times”;  
“I use a wider variety of resources. I use mini-videos”;  
“I have planned to use more short videos explaining the course content, as well as automated and peer assessment like in MOOCs, and I know more about learning analytics to make better decisions”;  
“I give more value to technological innovations as a resource to facilitate content and try to focus the topics on matters of interest for the students”;  
and  
“it has led me to consider other assessment systems, such as peer assessment and gamification in virtual learning communities”.

One teacher stated: “both scenarios are complementary to each other”.

### *Teachers' perceptions about MOOCs*

The fact that MOOCs are, potentially, *massive* did not imply much change in more than half of the respondents' understanding and practice of teaching. As some explained, regular e-learning courses at UNED (especially in the graduate programmes) were already massive, thus their previous UNED teaching experience had been valuable for dealing with MOOCs.

Those teachers who perceived a change in the way they addressed their role due to a large number of learners in regular e-learning courses mentioned that their MOOC experience made them more aware of the role that peers may play in learning in massive environments, which therefore encourages collaborative learning. They were also more aware of the diverse profiles and previous knowledge that learners bring to a course, which requires teachers to orientate or adapt content to address these differing interests and demands. In addition, "massiveness" made them more aware of the need for support for teachers to implement MOOCs. One teacher mentioned technological tools for automated assessment, and for support in solving non-content-related questions in the forums, thus addressing reduced teacher presence during course implementation and responding to these types of learner doubts. Another teacher explained how, in the MOOC environment,

"teaching is more a product closer to 'consumption' by learners than to 'interaction' with learners, and this conditions both objectives and content".

Finally, one respondent highlighted that teaching big groups is difficult without sufficient teacher presence to dynamise participation:

"the impact is smaller if there is no such presence".

On the other hand, the fact that MOOCs are *open* (e.g. with no access barrier and no cost to students) did not change most teachers' perceptions or teaching practice. More than half of our respondents stated that their idea of teaching had not changed. Others, despite sharing this view, attributed this to their opinion that

"regular courses at UNED also give access to a great variety of students [despite the fact the courses are not free]".

In this context, teachers of regular e-learning courses were more concerned with completion rates. One teacher firmly believed that

"open content and activities can be offered, even as motivators for regular courses",

and another explained how their view of teaching had not changed due to openness, but rather

"the volatility of the demand is clearer, and in many cases it depends on social circumstances and interests and how new the course topic is. Because they are open courses about specific topics without a need for completion, there can be peaks with a high number of learners and moments of inactivity".



From those teachers who considered that openness in MOOCs had changed their way of understanding and/or practising teaching, one indicated that it

“reinforced the idea of ‘education for all’, but has not modified teaching strategies”.

Another respondent (a language teacher) valued openness because it

“has converted the teaching experience into an authentic language-learning laboratory”.

From an institutional perspective, it made some respondents reconsider their role as teachers and

“reflect on the need to redefine the institutional mission of public universities”.

One respondent indicated that MOOCs had led him/her to think that “maybe some universities may disappear”.

Finally, when asked about the type of support needed to more effectively teach in massive open online environments, respondents suggested a variety of resources and personal support. The most common recommendations (ordered by the number of teachers rather than mentions of them) referred to:

- Technical tools, such as “a virtual environment that can be enriched” and improvements in the virtual platform (Open edX, in this case), tools that facilitate grouping students for collaborative learning, tools for learning analytics and tools for automated and peer assessment.
- Tutoring and management of interaction in forums, including tutorial support for dynamising forums, content curation and solving non-academic questions (e.g. how to apply for a certificate or how to use the quizzes).
- Technical support for course design, and preparation of audio-visual and interactive content.
- More recognition of MOOCs, both for learners (e.g. they can be useful for getting credits in regular courses) and for teachers (e.g. including MOOCs as a recognised task in workloads rather than as an extra, supplying resources for research, time for preparing content).
- Pedagogical issues: clarification of the didactic (instructional) model in MOOCs, teacher training.

In answering the final open-ended question, one teacher added: “Developing a MOOC is an extraordinarily rewarding experience for a teacher, but does not have academic value for him/her, nor recognition for the learner”. This is a clear example of resilience, as described by Weller and Anderson (2013): the core academic activity and identity (what teachers and learners are expected to do and get recognition for) does not change, but at the same time there is a change in practices, and an adaptation to, and evolution of, the new MOOC environment.

## Discussion

The study's findings show that, for those teachers surveyed, the changes caused by MOOCs to their understanding of their role, teaching practice, and concerns and reflections about teaching, have not, in fact, evolved dramatically. Mostly, teachers develop similar tasks (see Figure 2) in both their MOOCs and regular e-learning courses, albeit with more interaction with learners and assessment of learning in regular e-learning courses (due to concern about completion rates), and with greater peer assessment in MOOCs (due to the technical facilities the Open edX platform provides and the increased interest in pedagogical innovation associated with running a MOOC). The use of peer assessment and demand for learning analytics from various teachers are good examples of "emerging practices" facilitated by digital technologies (Veletsianos 2016) – in this case, the MOOC platform.

But our overall impression is that the teachers' tasks, and the changes teachers introduced to their regular e-learning courses after their MOOC experience, are not, in fact, all that different. This finding, while perhaps initially surprising, can be better understood if we acknowledge that the surveyed teachers, experienced in e-learning, had to some extent already addressed the changes in their roles in a digital setting. Considering that participation in MOOCs is voluntary for UNED teachers and that their main reason for getting involved is pedagogical experimentation, our respondents' profile could already be that of an "innovative teacher". Their existing experience with massive and online (albeit not open, in the sense of "free of charge" to students) courses in their regular e-learning teaching had already challenged them to incorporate new tasks and evolve into more effective teachers capable of providing education for all in online environments. In this regard, the gap we referred to in the introduction to this article did not turn out to be as wide as expected.

Most UNED MOOCs fall under the xMOOC category – including, overall, the type of MOOCs taught by teachers who were involved in this study – thus promoting surface learning through a transmissive, and to some extent constructivist, approach to learning. Therefore, the teacher skills needed to properly deliver this type of MOOC are essentially based on producing good quality content, such as video lectures, multiple-choice questions, and in some cases, peer-assessed activities, with necessary support. But the more we move towards a constructivist and connected approach in search of deeper learning (thus incorporating social interaction in MOOCs), the more teachers will need different skills and will perform different roles (Mackness and Bell 2015). From a CoI model perspective (Garrison et al. 2014), our results show that the creation of educational experiences in the MOOCs involved in this study entails engagement with content (in different formats, including videos) which appeals not only to cognitive presence, but also to teacher presence in setting the direction and general design of each MOOC, and an attempt (sometimes achieved) at renewed engagement with participants, combined with an emphasis on social presence provided by peers.

The analysis of our results using an open scholarship perspective reveals that among the three attributes that characterise it (i.e. digital, networked and open)

(Veletsianos and Kimmons 2012), it is the networked element that remains least developed in the current teaching practices of UNED's MOOC teachers. Since the type of MOOC offered by UNED is generally more content- than process-based, and more teacher than learner-centred, this finding is not surprising, given that networking and personal interaction are not particularly promoted. Despite these circumstances, our surveyed teachers showed an interest in incorporating more interaction, collaborative and peer learning, and forum dynamisation, as they valued the enriching learning environment that networking can provide.

Furthermore, the declaration by some respondents about recognising learners' diversity and demands, and adapting teaching to them, shows a move towards more student- or learner-centred models. In this sense, the use of analytics to gain a better understanding of learner profiles, performance and satisfaction (which were slightly higher in MOOCs than in regular e-learning courses in the study sample), and the demand from some teachers for better learning analytic tools, align with progress towards focusing on the learning process.

In accordance with the open scholarship approach, which states that open educational environments offer both opportunities and challenges, the data collected in this study show that teachers are aware of both. Some of the opportunities have already been discussed above, but in terms of challenges, UNED teachers are aware of the types of support needed to fully achieve their mission. Their responses indicate the need for creating collaborative teams which include academic, technical and tutoring staff, who together can generate richer learning experiences in MOOCs. These support structures are also relevant for institutions to consider, since they can provide teachers with greater support, both in terms of staffing (e.g. technicians, content designers and developers, tutors to dynamise forums) and in terms of resources – immaterial (recognition of workload, time, training) as well as material (mainly related to the MOOC platform and technical tools). The suggestion from some teachers about the need to consider the role of universities at this stage is aligned with this importance for the whole institution.

## Conclusion

The study presented in this article aimed to contribute to a better understanding of how teachers teach in a MOOC environment, and, in particular, their concerns about how to focus their teaching in an appropriate manner. While performing some of the “new” tasks related to developing a MOOC *can* result in a new type of teacher, those teachers already experienced in other e-learning modalities have found the actual degree of “novelty” to be minimal.

Our findings from this study highlight two sides of the same argument: on the one hand, emerging practices were not markedly disruptive or innovative compared to those the MOOC teachers were already undertaking in their regular e-learning courses. From a resilience perspective, for example, there had been an evolution facilitated by more flexible digital technologies (in addition to the virtual platforms already used in the regular e-learning courses), but teachers' roles remained the same. In this sense, much of the disruption had already occurred when UNED's

regular graduate and master's courses first introduced the inclusion of a distance online mode, and these same teachers had had to progressively incorporate digital means. On the other hand, this "soft" transition into the digital realm does seem to have produced different levels of awareness in MOOC teachers with existing experience in delivering courses that were already massive and online; at least some of them were fully aware of a new scenario where *open* and *network* are aspects that need further development, and a review of institutional support structures and models is necessary.

Coming out of the inertia of teaching regular e-learning courses, the teachers in this study seem to have understood MOOCs as being experimental settings, which are more or less distanced from their experience of regular e-learning courses. A key challenge in providing more effective learning experiences for students in massive open online environments will be the creation of collaborative teams which, together with teachers, will support the design and implementation of courses, along with the production of the kind of content and technical support which best serves education and learning objectives.

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