Reflections on Instructional Design Guidelines from the MOOCification of Distance Education

A Case Study of a Course on Design for All

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ABSTRACT

There are some similarities in developing distance education online courses and Massive Open Online Courses (MOOCs), using the basis of eLearning instructional design. However, the task of converting an online course into a MOOC is not as simple as direct migration of eLearning materials and assessment resources into a MOOC platform. In online learning learners should be continually influenced by information, social interaction and learning experiences, providing them with the knowledge to come up with new ideas to develop within an engaging course. In this chapter, the process of MOOCification a distance education online course on "Design for All for an Inclusive and Accessible Society" is explained and contextualized. The re-factorization process has been based upon the quality model used for MOOCs at UNED Abierta and the instructional design based on Gagné's events of instruction. The eLearning activities were completely refactored, along with the content itself, the interaction events and the online assessment following the Gardner's Multiple Intelligences product grid.

Keywords: MOOC, Instructional Design, eLearning, Accessibility, Design for All, Quality Model, Multiple Intelligences, MOOCification

INTRODUCTION

Massive Open Online Courses (MOOCs) have been a turning point in online learning delivery, in some cases being positioned as an alternative to traditional higher education (HE) courses (Yuan & Powell, 2013). It offers teachers, researchers and practitioners the opportunity to experiment with different pedagogies, trying different possibilities using their materials in either face to face or online campus settings, such as in flipped classroom or blended learning approaches (Hoyos et al., 2019; Hill, 2012). The pedagogical and visual design of MOOCs, their information architecture, usability and interaction design, is having a variable impact on learner engagement, retention and completion rates, as previously analyzed in adult learning (Montgomery & Mallette, 2018; Jordan, 2015; Liyanagunawardena et al., 2014; Yang et al., 2013). For instance, Jordan (2015) confirms that completion rates vary significantly, from 0.7% to 52.1%, with an average value of 12.6%, according to course length (longer courses having lower completion rates), start

date (recent courses having higher percentage completion) and assessment type (courses using auto-grading having higher completion rates).

Recent innovations in MOOCs include the creation of new educational approaches (both from the pedagogical and technological point of view) that can be used to rethink education, also renewing calls for inclusive education to reach all citizens. Social inclusion can only be obtained by embedding inclusive strategies, leading to targeting and including vulnerable groups, such as people with disabilities, being emphasized (de Waard et al., 2014), although there has been limited progress to date in either producing accessible MOOCs, or tailoring MOOCs to meet individual learners' needs (Iniesto et al., 2016).

MOOCs are usually developed and delivered as independent online courses, but some pedagogical experiments have been reported by teachers and researchers on how to integrate MOOC into HE (Sandeen, 2013). From being video courseware repositories to dynamically adaptive eLearning models, the MOOC ecosystem has matured significantly leading to a wider taxonomy of MOOCs (as explained originally in the taxonomy of 8 types of MOOC developed by Clark (2013)). Transfer MOOCs are created with recordings of existing classroom video lectures and engage learners by different motivating factors (Sooryanarayan & Gupta, 2015). Other researchers wrap formal university courses around existing MOOCs (Holotescu et al. 2014; Caufield et al., 2013; Bruff et al., 2013; Bruff, 2012; Koller, 2012), while some have attempted a different approach, where the participation of learners in different MOOCs was integrated into a blended course run on a social mobile Learning Management System (LMS) (Conole, 2008). More recently, Defaweux et al. (2019) combined a MOOC with a face-to-face course using blended pedagogical patterns.

Integration of MOOCs into HE appears to be converging on content licensing to support hybrid or flipped classes, an incremental change from current practice rather than a fundamental transformation (Sandeen, 2013; Rodrigo et al., 2016). As revealed by Gasevic et al. (2014), the design of MOOCs and their integration into formal curricula was one of the main research themes within the framework of future MOOC research. Gasevic also stated the need to increase efforts towards enhancing multi-disciplinarily. According to Desarathy et al. (2014), MOOCs could enhance crowd-sourcing multi-institutional degrees and competence-based education by improving the quality and personalization of the learner experience.

MOOC design can be addressed from the perspective of eLearning design (Conole, 2014), a research field that provides tools and methods for both articulating and representing the design process of learning experiences, making them more explicit and shareable while assisting educators in planning and organizing pedagogically educational actions (Conole, 2010). The focus is placed on the educational aspects of new technologies and, particularly, what might be the most appropriate "schema" for describing the ways in which technologies are used. Learning design methods and tools have been shown to be especially beneficial when employed to design complex learning contexts, as is the case of MOOCs, in which a significant number of resources and stakeholders are involved.

Our main contribution in the chapter is to contextualize and explain both methodologically and in a practical way, how to re-factorize a distance education online course into a MOOC. This MOOC needs to be designed as an engaging online course, following the quality model used for MOOCs at UNED Abierta and the instructional design based on Gagné's events of instruction. The transformation process is named MOOCification. This chapter is structured as follows. First, quality issues regarding MOOC pedagogical design and content production are analyzed, followed by a description of the hybrid approach to MOOC quality established at the university. Then, the MOOC design process on Design for All is presented, along with the mapping of new re-factored learning activities using Gardner's Multiple Intelligences Product Grid. Finally, future work and the main conclusions of the research are outlined.

BACKGROUND

There are some successful experiences of converting courses into MOOCs: Ostashewski et al. (2017) explored enhancing university course activities using MOOCs, Combéfis et al. (2014) remodeled a course into a Small Private Online Course (SPOC), Nuñez et al. (2016) transformed a small private traditional online course into a massive one. Nonetheless, distance learners are different from on-campus students. Early MOOC research tells us that the majority of MOOC learners are adult learners (Zweifler, 2013; Emanuel, 2013), such as those that enroll in distance HE (Richardson, 2017). When (Universidad Nacional de Educación a Distancia – The National Distance Education University (UNED)) took the decision in 2011 to start producing MOOCs, launching its own MOOC platform (UNED Abierta), it was evident that there were several online university courses that could be prepared and started rapidly as Transfer MOOCs, based on materials produced for the undergraduate courses. These online courses were used by many participants, ranging from 500 to 10,000 learners in the first run, depending on the subject. It soon became clear that it was not rational to apply the same specifications used for standard online undergraduate courses to the MOOCs development at the university. At the same time, every teaching team wanted to design them differently (e.g. engaging activities, peer-to-peer interaction and assessment methods). Therefore, a strategic decision was taken to follow a standard approach to structure the MOOCs, using design templates to provide a similar *"look and feel"*, but allowing pedagogical differences between them, as if each course was one specific type of MOOC (Clark, 2013). Given the heterogeneous nature of the subjects being covered in the courses and the way in which each teaching team wanted to deliver a course, simple systematic quality control was undertaken, based upon previous experience in online learning (Read & Rodrigo, 2014).

MOOCs Quality issues

While there is an abundance of quality models for online course, they do not cater specifically to MOOCs. While research on MOOC quality has appeared in the literature, there is currently no consensus on how the quality assessment of these courses should be undertaken (Haggard, 2013) or even if it makes any sense to try to measure it (Weller, 2013). MOOCs have gained a lot of attention in the last decade as a new Technology Enhanced Learning (TEL) approach in HE, but further research is needed to identify the elements that drive a successful MOOC. Yousef et al. (2014) developed an empirical examination of criteria to assure design quality, identifying 74 criteria distributed into 6 categories - from both technological and pedagogical perspectives - that need to be considered when designing and implementing MOOCs. Curiously, although there is almost universal agreement that usability, content, collaboration, and instructional design play a major role in achieving effective MOOCs, these categories were identified in this study as less important compared to the learning analytics and assessment categories. In fact, the latter two categories are highly challenging tasks in MOOCs and are still less explored than the former ones. The MOOC Quality Project (Creelman et al., 2014), undertaken by the European Foundation for Quality, found that it was difficult to define what quality means for MOOCs since their very nature is constantly changing, with new types and variants of courses appearing all the time. Creelman et al. highlighted some factors that are related to the perception of MOOC quality, such as the notion of choice, what pre-course information is provided, the pedagogical approaches supported in a course, the level of learner commitment required, whether a course is scheduled or not, its technical requirements, the role of the teaching team, its availability, and level of interaction, whether certification is available or not, etc.

Downes (2015), as part of his contribution to The MOOC Quality Project, differentiates between the quality of a MOOC in terms of its platform and the related tools (functionality, stability, etc.). He also pointed out the difficulty in assessing the success of a specific MOOC in a given context with a given learner body, noting that *"measuring drop-out rates, counting test scores, and adding up learner satisfaction scores will not tell us whether a MOOC was successful, only whether this particular application of this particular*

MOOC was successful in this particular instance" (pp.72). Daniel (2012) even suggested that one approach could be for the courses to be evaluated by learners and educators, leading to league tables that rank the courses by the quality of the offering. In this case, the most relevant form of quality assurance and enhancement comes from the reflections and informal evaluations of the enthusiasts who put on the courses, and comments from participants using social media. Mudler (2013) proposed the 5 Components for Open Education (COE) quality model, focused on the application of Open Education components at MOOCs. It establishes that the use of Open Education components is not Open Education by itself, it needs three supply-side components: Open Educational Resources (OERs), Open Learning Services (OLS) and Open Teaching Efforts (OTE), and two demand-side components: Open to Learner's Needs (OLN) and Open to Employability & Capabilities development (OEC). The measurement of these five items reflects the course quality *"fingerprint"* in the model.

Another quality initiative suggested in the literature is considering MOOCs through the lens of the Quality Code at the QAA (Quality Assurance Agency for Higher Education at the UK) (Rosewell & Barefoot, 2013), which has influenced the OpenupEd label (Rosewell, 2013), based around the EADTU E-xcellence framework approach of using benchmarks for quality assessment that has been already tested at UNED Abierta MOOCs (Rodrigo et al., 2014). OpenupEd is the first MOOC Europe-wide initiative with the support of the European Commission. Its name refers indirectly to the European program Opening up Education. OpenupEd was initiated and is currently coordinated by the European Association of Distance Teaching Universities (EADTU), a group comprised mostly of open universities, but focused on reaching new partners that perform MOOCs and are keen on opening up education for all. It aims to be a quality brand embracing the diversity in (institutional) approaches to open up education by the use of MOOCs. Although there is a diversity of institutional approaches, the partnership has agreed on a framework of 8 common features; the 32 benchmarks represent the first step toward MOOC quality control (Kear et al., 2016).

MOOCs Instructional Design

MOOCification refers to a pedagogical approach used when a closed or small-format traditional online course is re-factored into a MOOC. There are several possibilities to do so successfully. Some authors explore the possibility of finding new formulas for connecting formal and informal learning (Dabbagh & Kitsantas, 2012). For instance, massive courses can be blended with existing units offered in universities allowing for links and connections between study programs and the outside world (Howell & Ostashewski, 2015). Ostashewski et al. (2017) presented evidence in their study that blending MOOCs with classroom-based or online learning provides HE learners with personalized learning opportunities.

Some of the reasons to re-factorize HE courses into a single MOOC or even a collection of NOOCs (Nano-MOOCs or pill-based courses) might be:

- to reach a wider audience with the subject,
- to deepen the learning of the learners through engagement in an informal learning context,
- to encourage significant peer interaction beyond forum posts and functionalities of regular and eLearning platforms,
- to learn small pieces of information in a short time by presenting pieces of information in an attractive and engaging way,

- and to make learners draw upon the open-content already present in the field and get both a realistic experience of the field and make first real connections with it.

In relation to learner's engagement, knowledge absorption and retention, Robert Gagné (1992) stated that different types of learning exist, and that different instructional conditions are most likely to bring about these different types of learning:

1. **Intellectual skills.** Create individual competence and ability to respond to stimuli.
2. **Cognitive strategies.** Capability to learn, think, and remember.
3. **Verbal information.** Rote memorization of names, faces, dates, phone numbers, etc.
4. **Motor skills.** Capability to learn to drive, ride a bike, draw a straight line, etc.
5. **Attitudes.** Approach to ideas, people, or situations that affects how one acts towards these things.

Gagné suggested that certain mental conditions must be present for knowledge absorption and retention to occur. He proposed a series of events which follow a systematic instructional design process that shares the behaviorist approach to learning, with a focus on the outcomes or behaviors of instruction or training (see Table 1).

Table 1. Gagné's nine events of instruction

	Event
G.1	Gain the attention of the learners by using a compelling introduction. Even online learners who are distracted or possibly unmotivated to participate create an emotional connection about the topic.
G.2	Inform learners about the objectives and the outcomes of the course. When possible, they can be tied into real-world applications and benefits, as pursued in adult's learning, where learners know they are going to take something valuable away from the course are more likely to engage in the online learning process.
G.3	Stimulate recall of prior knowledge or learning, helping learners make sense of new information by relating it to something they already know or something they have already experienced. This gives learners the chance to commit it to long-term memory, rather than forgetting it right after reading it.
G.4	Create goal-centered online content, presenting it in a meaningful way: every activity, exercise, and piece of online content will be tied in directly to the goals and objectives. Information can be better grouped together along with concepts based on the specific goal.
G.5	Online learners need support and specific coaching to develop favorable online learning behaviors, or else they might be committing incorrect information to their long-term memory.
G.6	Activate learner processing to help them internalize new skills and knowledge and to confirm correct understanding of these concepts.
G.7	Give learners timely and constructive feedback they have the power to improve learning behaviors and identify their weaknesses and strengths.
G.8	Performance should be based on previously stated objectives and assessed early and often.
G.9	Enhance retention and transfer of knowledge by tying it into real-world situations and applications.

In relation to the process of making the learning to be a realistic experience and make real connections with the context, Gardner's Multiple Intelligences theory (1983) differentiates human intelligence into specific 'modalities', rather than seeing intelligence as dominated by a single general ability. Gardner argued that the broad spectrum of learners would be better served if disciplines could be presented in a different number of ways and learning could be assessed through a variety of means. The learning styles are as follows (Gardner & Hatch, 1989):

1. **Visual-Spatial.** Think in terms of physical space, as do architects and sailors. Very aware of their environments. They like to draw, do jigsaw puzzles, read maps, and daydream.

2. **Bodily-Kinesthetic.** Use the body effectively, like a dancer or a surgeon. Keen sense of body awareness. They like movement, making things, touching.

3. **Musical**. Show sensitivity to rhythm and sound. They love music, but they are also sensitive to sounds in their environments. They may study better with music in the background.

4. **Interpersonal**. Understanding, interacting with others. These learners learn through interaction. They have many friends, empathy for others, street smarts. They can be taught through group activities, seminars, and dialogues.

5. **Intrapersonal**. Understanding one's own interests, goals. These learners tend to shy away from others. They're in tune with their inner feelings; they have wisdom, intuition, and motivation, as well as a strong will, confidence, and opinions. They can be taught through independent study and introspection.

6. **Linguistic**. Using words effectively. These learners have highly developed auditory skills and often think in words. They like reading, playing word games, making up poetry or stories. They can be taught by encouraging them to say and see words, read books together.

7. **Logical-Mathematical**. Reasoning, calculating. Think conceptually, abstractly and are able to see and explore patterns and relationships. They like to experiment, solve puzzles, and ask cosmic questions. They can be taught through logic games, investigations, and inquiries.

It seems impossible to teach using all learning styles, however, but it becomes apparent that a mix of multimedia resources is more effective; it satisfies the many types of learning preferences that one learner may embody as refuted by Lane (2008). Specifically, Guàrdia et al. (2013) present a set of principles drawn from the learner’s perspective for the case of MOOCs. Authors focus on empowering learners in networked environments for fostering critical thinking and collaboration, developing competency-based outcomes, encouraging peer assistance and assessment through social appraisal, providing strategies and tools for self-regulation, and finally using a variety of media to create and publish learning resources and outputs.

MAIN FOCUS OF THE CHAPTER

Issues, Controversies, Problems

The main focus of this chapter is to contextualize and explain both methodologically and in a practical way, the process of MOOCification used to re-factorize a traditional online course into a MOOC as a case study of UNED considering its learning design and quality issues. The MOOC has been designed with the idea of connecting formal and informal learning, and it will be blended with the existing units offered by the traditional online course at the university, “Accessibility and Usability”, and offered in the 3rd level of

Computer Science bachelor degree. The first two sections of the course content deal with Design For All principles and the barriers of people with disabilities when working with technology. This content will be delivered through an open and massive environment, as it can be used as an introductory course by itself, empowering the university open curricula and advance in inclusion awareness.

UNED Abierta quality issues

In June 2012, when UNED started its MOOC program at UNED Abierta, relatively few guidelines on MOOC quality existed. Specific guidelines were then created in the university to provide quality control during the creation of MOOCs, protecting the university's brand and ensuring a level of performance. The initial quality model was based upon the one used for the online undergraduate programs, which had been developed and refined over more than 15 years. Designing a MOOC is expected to be simpler for distance university staff than for their face-to-face counterpart since the former had been using eLearning platforms for years as part of their daily activities and they are familiar using the developing tools. The OpenupEd label and E-xcellence approach of using benchmarks for quality self-assessment process was applied to UNED Abierta quality model (Rodrigo et al., 2014). The process facilitated large-scale implementation (Gil-Jaurena, 2015), including several specific guidelines such as:

- course syllabus divided into N modules (overall workload of 1-5 ECTS),
- a short introductory video per module,
- a self –paced methodology,
- interactive user forums to help to build a community for the learners, teachers, and facilitators,
- peer-review and group collaboration,
- and automated feedback through online assessments (e.g. quizzes and tests).

Based upon the quality process used at the university for online courses, a model was defined in terms of two types of control:

- **Coherence**. The structural and functional coherence of a given course, based upon the objectives defined by the teaching team which would be matched to a set of characteristics that could be used to evaluate the initial design of the course (Creelman et al., 2013, Morrison, 2013).
- **Flexibility.** The establishment of a flexible certification model (freemium model), that would demonstrate through a standard test-like evaluation, that the course had achieved its objectives and the learners had achieved the learning goals intended by the teaching staff.

Regarding the former, the establishment of a variable metric for each MOOC made it possible to control how each course was structured, what kind of resources were included and how activities, interaction and assessment was included. Specifically, the metric contemplates seven specific characteristics (Read & Rodrigo 2014):

1. **Topic.** Each course should be as specific as possible.
2. **Contents.** Educational resources could be reused from HE courses, although they had to be adapted to the MOOC format (e.g. videos with a maximum duration of 5 minutes, guidelines that would be understandable without the support of teaching staff, activities that either finished with self-evaluation or involved some kind of forum-based collaboration or interaction, etc.).

3. **Duration**. Between 25 and 125 hours of workload (equivalent to 1 ECTS to 5 ECTS).

4. **Structure.** UNED MOOCs are typically divided into 4 to 8 modules, depending upon duration and objectives. Each module would typically have between 4 to 8 videos with associated activities and evaluations. The latter is used to consolidate acquired knowledge and foster interaction between the learners.

5. **Specific instructional design guidelines.** As stated in the next section. Self-assessment methodology required learners to reflect on their own work and judge how well they have performed.

6. **Social channels.** Forums are the main interaction tool provided, although other associated web tools could also be included depending on the methodology. The forum tool present in the MOOC platform enables stakeholders to vote on any post, therefore posts with higher ranks will appear higher up in the relevant thread in the forum.

7. **Teaching roles**. In UNED Abierta, teaching roles are restricted to facilitators and content curators. These last being a "*critical knowledge broker*", someone who seeks the forums continuously trying to maintain the relevance of the information that flows freely by learners for creating information environments.

Design for All learning objectives

As for the content of the MOOC, Spanish Legislative Decree 1/2013 establishes that the Government encourages universities to include new curricula regarding Access for All matters. This provision has been developed in universities across the Organic Law 4/2007, which has the aim of developing official curricula and programs according to the general lines emanating from the European Higher Education Area (EHEA) directives. It has been a breakthrough as it requires the inclusion of courses related to Human Rights and the principles of Design for All in the curricula. The main objectives of the initiative are as follows:

1. **Inclusion.** Advancing in inclusion awareness and dissemination of the Design for All criteria to learners in undergraduate levels.

2. **Empowerment.** Empower university curricula bearing in mind that any professional activity must be performed from the respect and promotion of human rights and equal opportunities for all.

3. **Good practices.** Meet examples of good practices and successful experiences of the inclusion of Design for All in the curricula of university degrees.

4. **Relevance.** Analyze the importance of studying this subject as a way for specialization and doing research activities at the university.

5. **Awareness.** Raise awareness of the importance of Design for All as a necessary precondition for improving the life quality of people with disabilities.

The MOOC content was selected to achieve the Inclusion and Awareness objectives.

SOLUTIONS AND RECOMMENDATIONS

The course was defined to be an extended MOOC (xMOOC, similar to standard online courses but with larger learner numbers) that could focus on knowledge creation by collaborative work trying to engage learners in online activities as explored by Ostashewski et al. (2016). The interaction through the forum and its ordered message system is run by content curators. Curators give valuable feedback to learners undertaking the courses, not only on specific course-related content but also on general platform-related and associated topics (Rodrigo et al., 2016).

Authors share the vision for a new approach to curricula design that responds to the challenges of education and personalization aspects for learners with disabilities. Design for All provides an excellent approach for the development of products and services by considering the needs of all potential users, including those with disabilities. Raising stakeholders' awareness of Design for All concepts and their application is necessary in order to apply these principles in the design of products and services (Persson et al., 2015). Therefore, the design of the course had the objective of familiarizing the learner with an accessible use of the Internet as a way to reduce barriers for people with disabilities. Assistive technology is any tool that helps a user to perform tasks that he or she may not otherwise be able to do. Therefore, the course also includes the process used in selecting, obtaining, and using these tools.

As an overall, the MOOC provides learners with an introduction to:

- the barriers users with disabilities may face in accessing Internet services,
- sample strategies for improving accessibility,
- the principles of Universal Design, Access For All and User-Centered Design,
- a framework for web accessibility to remove barriers,
- and assistive technologies used for accessing Internet services.

MOOC learning design process

Little guidance is available for educators to address the design of MOOCs from scratch (Papathoma, 2019), therefore, the teaching staff tried to keep a balance between the following aspects:

- a general description of the course (name, duration and field/area),
- the target learners,
- the pedagogical approaches that will be followed,
- the specific objectives and competencies pursued within the course,
- the learning contents that will be delivered,
- the assessment activities employed,
- and the complementary technologies that will support the MOOC.

As previously discussed, online learners include a significant percentage of adult learners with a degree of autonomy, self-direct learning, potential linguistic or spatial capabilities and inter-intrapersonal skills (Littlejohn et al., 2016). For the content, most of the learning activities belonging to the traditional online course were actualized and adapted to the new open environment. For this process, we have used Gardner's learning styles (Gardner & Hatch, 1989) in conjunction with Gagné's nine events (1992) to design an engaging and meaningful MOOC type of instruction. From the nine intelligences, the following five have been selected for the Design for All MOOC taking into account the variety of potential learners:

1. **Linguistic Intelligence.** New activities on reading texts and explaining their thoughts about through forum posts have been encouraged.

2. **Logical.** New activities that foster investigation and inquiries on assistive technologies have been developed.

3. **Spatial Intelligence.** New resources have been included implementing graphics, charts, maps and links to video.

4. **Interpersonal Intelligence.** Tools have been included for video-conferencing and writing activities have been reinforced.

5. **Intrapersonal Intelligence.** Distance learners are used to be taught through independent study and introspection. New textual materials have been included.

As for the relationship with Gagné's interaction events (1992), some new activities and related learning resources have been implemented or re-factored as explained below:

- new online lessons (modules) that focus on one core objective, which allows the learner to master that topic before moving onto the next,
- more explanations after demonstrations,
- online learning guidance,
- concept mapping as a method to provide learning guidance,
- provision of case studies for real-world application,
- visual images to make visual associations,
- self-practice for accessible web development,
- timely feedback: confirmatory, informative, analytical and remedial,
- and real-world scenarios.

As examples, an interactive video (HTML5 Package, H5P) has been re-factored for presenting types of disabilities (Activity A.5), an old presentation video was converted into a modular mini-video (Letón & Molanes-Lopez, 2014) for implementing spatial learning style in activity A.5 and an inquiry-based design activity, searching for assistive technologies, has been developed for logical learning in Activity A.9. Table

2 shows the complete correlation between the 14 re-factored or new-designed learning activities, the pre-selected Gardner's Learning Styles and the Gagné's events.

Table 2. Gardner's Multiple Intelligences Product Grid mapping with re-factored learning activities for MOOC adjusted to Gagné's nine events of instruction

	RE-FACTORED LEARNING ACTIVITY			
	GARDNER'S LEARNING STYLE	**TEACHING ACTIVITIES**	**TEACHING MATERIALS**	**INSTRUCTIONAL STRATEGIES** (A – N, Activity) (T – N, Assessment test) (G – N, Gagné's event)
Study Guide				(G.2) Inform learners of the objectives of the course, the outcomes and the assessment methods
MODULE 1. BASIC CONCEPTS ON USABILITY AND WEB ACCESSIBILITY				
1.1. Understanding Design for All, facing barriers and challenges ahead	Spatial	Visual presentations	Video presentation	(A.1) Video (G.4) Present the course
	Linguistic	Read about it, write about it	Source documents on the web	(A.2) Forum participation (first interaction) (G.5) Provide learning guidance
1.2. Usability and accessibility: somewhat distinct design concepts	Intrapersonal	Independent study	Self-checking material	(A.3) Personal activities (G.7) Provide feedback
	Intrapersonal	Independent study	Self-checking material	(T.1) Self-assessment test (G.3) Stimulate recall of prior learning
1.3. Types of disabilities	Interpersonal	Roleplay, social gatherings	Accessibility software	(A.4) Social empathy, case studies (G.1) Gain the attention of the learners
	Spatial	Visual presentations with interaction and assessments	Interactive H5P-based video	(A.5) Video (G.4) Present the content
MODULE 2. WORKING ALONG WITH UNIVERSAL DESIGN, DESIGN FOR ALL AND USER-CENTERED DESIGN				
2.1. Universal Design and Access For All	Spatial	Visual presentations	Graphs, maps, slides	(A.6) Conceptual maps, organizational charts (G.4) Present the content
	Spatial	Visual presentations with interaction	Modular Mini-video	(A.7) Video (G.4) Present the content
2.2. User-Centered Design	Linguistic	Lectures, discussions, read about it, write about it	Source documents on the web	(A.8) Debate, forum participation (G.5) Provide learning guidance
	Intrapersonal	Individualized instruction	Project materials, web accessibility checker	(A.9) Practice (G.6) Elicit performance
	Intrapersonal	Independent study	Self-checking material	(T.2) Self-assessment test (G.8) Assess performance
2.3. Assistive technologies and reasonable accommodations	Interpersonal	Cooperative Learning, a feedback technique	Fill-in tables	(A.10) Brainstorming, team learning (G.7) Provide feedback

	Logical	Independent study	Web navigation	(A.11) Object searching (inquiry) (G.6) Elicit performance
	Intrapersonal	Independent study	Audio-description development	(A.12) Self-designed project (G.8) Assess performance
	Intrapersonal	Independent study	Self-checking material	(T.3) Self-assessment test (G.8) Assess performance
MODULE 3. INTERFACE AND CONTENT ACCESSIBLE DESIGN				
3.1 Web access for people with disabilities	Linguistic	Read about it, write about it	Source documents on the web	(A.13) Debate, forum participation (G.5) Provide learning guidance
	Intrapersonal	Independent study	Self-checking material	(T.4) Self-assessment test (G.8) Assess performance
3.2 Adapted and personalized design	Intrapersonal	Independent study	Self-checking material	(A.14) Personal activities (G.9) Enhance retention and transfer to the job

FUTURE RESEARCH DIRECTIONS

Future work will focus on the practical use of the developed course in differentiated educational environments, as it will be delivered in the next academic year in UNED Abierta. Regarding the MOOCification process, authors will gather and analyze quantitative data to differentiate between the course being taught as a blended MOOC and the traditional online course to identify where learners achieve better results, taking the research done by Parry & Baird (2013) as a reference.

A second objective is to evaluate this MOOC learning design within the framework developed in the YourMOOC4all project (Iniesto & Rodrigo, 2018). This project provides a framework for registered learners evaluating MOOCs based on Universal Design for Learning (UDL). Learners will provide direct feedback on the course's UDL characteristics, autonomously, through a web form specifically designed to assess Design for All quality of the course, along with information about their accessibility needs. In that sense, the course content links relevant concepts such as User eXperience Design (UXD) and User-Centered Design (UCD) and the importance they have in inclusive design and accessibility (Persson, et al., 2015). It is relevant to consider the evolution of design approaches with a more user-centered focus such as the UCD, or a Universal Design (UD) perspective like Design for All. Inclusive Design (ID) is suitable in a massive online environment such as MOOCs where an individualized learning experience can be achieved through the personalization of the learning environment (García-Peñalvo et al., 2018).

CONCLUSION

The task of converting introductory sections of a HE traditional online course into a MOOC has been shown to be not as simple as just transferring the online learning materials to a different platform. Teaching staff can take advantage of the similarities from HE online delivery while developing MOOCs, mainly due to the use of eLearning instructional design, but differences arise because, in MOOCs, learners should be continually influenced by information, social interaction and learning experiences keeping it as an engaging course.

In this chapter, an example of MOOCification of an online course based on Design for All has been detailed and explained. The standard quality model for online courses was complemented with the OpenupEd label features. The specific MOOC instructional design was based on a variable metric that facilitates the control on the way each course is structured, the kind of resources that are included and the way the activities, the interaction points with the learners and the assessment process are integrated.

Specifically, metrics measured seven aspects: topic, contents, duration, structure, specific instructional design guidelines, social channels, and teaching roles. The learning activities were completely refactored, adapted to MOOC learners, along with the content itself and the online assessments. The subject of the course is based on Design for All and reinforces current legislation regarding the need to include educational curricula focused on inclusion awareness.

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KEY TERMS AND DEFINITIONS

MOOC: MOOCs are courses designed for large numbers of participants, which can be accessed by anyone anywhere as long as they have an internet connection, are open to everyone without entry qualifications, and offer a complete course experience online for free.

Instructional Design: The instructional design process consists of determining the needs of learners, defining the end goals and objectives of instruction, designing and planning assessment tasks, and designing teaching and learning activities to ensure the quality of instruction.

eLearning: a learning system that we can obtain through the internet using an electronic device. I can also be called online learning or online education.

Accessibility: All learners can use courses in a range of contexts of use, including mainstream and assistive technologies; to achieve this, courses need to be designed and developed, considering technical and learning design aspects, to support usability across these contexts.

Design for All: design of products, services and systems by as many people as possible without the need for adaptation.

Quality Model: is the framework of a product quality evaluation system, it determines which quality characteristics will be taken into account when evaluating the properties of an educational product.

Multiple Intelligences: The theory of multiple intelligences differentiates human intelligence into specific 'modalities', rather than seeing intelligence as dominated by a single

MOOCification: the process of converting a distance education online course into a MOOC.