Analysis of the pedagogical perspective of the MOOCs available in Portuguese

Análisis de la perspectiva pedagógica de los MOOC ofertados en lengua portuguesa

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Abstract:

After an initial stage of exponential growth in MOOCs, a need has arisen of to address several different aspects of these innovations in order to understand and develop them from different perspectives, such as this one, with the analysis of pedagogical dimensions aimed at improving course design. This paper presents an updated review of the literature and proposes five research lines for an in-depth approach. This study is part of a broader research project[1] and here analyses 356 MOOCs delivered in Portuguese by 16 different platforms. The research design is quantitative, non-experimental and transversal. An adaptation of the MOOC Educational and Interactive Indicators Instrument —INdiMOOC-EdI— was used in the data collection process. The reliability and internal consistency analysis of that adaptation for the whole sample resulted in a Cronbach alpha score of 0.731. The data obtained enable us to classify the existing MOOCs in Portuguese according to descriptive, formative, and interactive components. These different types correlate with the quality indices, being negative in the first dimension (descriptive) and positive in the second and third ones (formative and interactive).

Keywords: Massive Open Online Courses, platforms, pedagogical design, instructional design, content analysis.

Resumen:

Después de una primera etapa de desarrollo exponencial de los MOOC surge la necesidad de abordar estas innovaciones desde diversos aspectos que permitan comprender y evolucionar desde diferentes perspectivas, como el caso que nos ocupa aquí, con el análisis de las dimensiones pedagógicas en los cursos con vista a mejorar su diseño. El artículo realiza una revisión actualizada de la

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literatura y propone cinco líneas de investigación para estudios en profundidad. El trabajo es parte de otra investigación más amplia[1], aquí se analizan 356 MOOC en lengua portuguesa y 16 plataformas. El diseño de la investigación fue de tipo cuantitativo, no experimental y transversal. Para la recolección de datos se utilizó el Instrumento de Indicadores Educativos e Interactivos en los MOOC —INdiMOOC-EdI—. El análisis de fiabilidad y consistencia interna de su adaptación para el total de la muestra obtuvo un coeficiente de Cronbach de 0.731. Los datos obtenidos permiten clasificar los MOOC existentes en lengua portuguesa según componentes pedagógicos de tipo descriptivo, formativo e interactivo. Estos diferentes tipos correlacionan con los índices de calidad, siendo negativas con la primera dimensión (descriptivo) y positiva con la segunda y tercera (formativo e interactivo).

Descriptores: Cursos Online Masivos Abiertos, plataformas, diseño pedagógico, diseño instructivo, análisis de contenido.

1. Introduction

Few technological developments have inspired as many divided opinions and attracted as much attention and expectation in such a short period of time as have MOOCs, or Massive Open Online Courses (Chiappe-Laverde, Hine, & Martínez-Silva, 2015; López, Vázquez, & Román, 2015; Sangrà, González, & Anderson, 2015). The MOOC movement was started by Stephen Downes and George Siemens in 2008 whose work was followed by experiments performed at Stanford University in late 2011. The movement started to take off in 2012 with the creation of new platforms such as Udacity and Coursera and the EdX open platform created by the Massachusetts Institute of Technology and Harvard University, to mention just a few. Many other initiatives have subsequently arisen such as the pan-European initiative on MOOCs led by the European Association of Distance Teaching Universities, followed by FutureLearn, and, in early 2013, MiríadaX, the first platform in Spanish, promoted by Banco Santander and Universia.

Producing open access content that offers certification obviously poses many questions that are yet to be answered: the homogenisation and globalisation of culture, free availability and new business focuses, new strategic approaches and positioning of companies, pedagogical design, new formats and content, and in particular the role of universities in the knowledge society. This is not a phenomenon to which we should be indifferent, nor should we approach it from a naïve position and implement MOOC services in every university without considering what Open Educational Resources —OER— in general and MOOCs in particular represent for the strategic lines of each institution.

Despite little time having passed in which lines of research can be shaped, there is a nascent state of the

art (Liyanagunawardena, Adams, & Williams, 2013; Yousef, et al, 2014; Sangrà, González-Sanmamed, & Anderson, 2015; Aguaded, Vázquez-Cano, & López-Meneses, 2016) based on questions that have arisen in light of other earlier technologies such as, firstly: the design of digital videos and their impact on learning (Guo, Kim, & Rubin, 2014); the meaning and interpretation of multimedia codes; learning performance; the different implicit models; users' interest profiles; orientation and motivation guidelines; usability and satisfaction; learning and self-regulation styles (Bartolome-Pina & Steffens, 2011). These are well-known commonplaces that in this case are becoming true. Secondly, and simultaneously, new research scenarios and requirements are appearing with the aid of emerging technologies (data mining and big data, ontologies, multimedia annotations, etc.). It is still too early to say whether MOOCs will drive new research methods but they undoubtedly favour the creation of lines of research such as the following ones:

a. *Self-regulation of learning and socialisation of learning*. The globalization and internationalization of content, approaches to open resources without entry requirements, understanding content with a high scientific-technical level require research and development from an inclusive education perspective but also examination of the active role of users in their learning process.

b. *New analysis methods and techniques for new processes*. The importance of social learning and knowledge management in the mass communication settings involved in MOOCs require new analytical instruments and methodologies. It is worth asking whether it is also possible to move away from the methods typical of social research that are already known from mass communication, towards other new methodological formulas that make it possible to represent these processes so that they can subsequently be analysed and understood.

c. *New educational policies and legislation*. The appearance of MOOCs, based on the philosophy of open resources, inspired utopian ideas with regards to solving the problems of education in the world (Ehlers, 2011), an idea that was strengthened when prestigious universities offered their content. This belief still persists and might develop further in future; at least, this is something that education needs to happen. Criticisms started to appear when the transition from informal education to formal education occurred; a process that will require political, legislative, and regulatory decisions using best practices in the short term.

d. *New technologies and virtual environments for supporting learning*. Further research will be required about the functions of the platforms and personal learning environments, given that MOOC platforms are as different from each other as the learning possibilities they offer, in order to determine what new learning options and innovations they offer

(Bartolomé-Pina & Steffens, 2015). Areas that should be researched in greater depth include eAssessment, the application of techniques and tools such as eRubrics, self-evaluation guides and self-directed learning (Lip, Zimmaro, Strader, Bier, & Thille, 2014; Gallego Arrufat, Gámiz Sánchez, & Gutiérrez Santiuste, 2015), crowdsourcing, improving the conditions that create and maintain motivation through studies on satisfaction and usability that already exist for other online services (Serrano & Cebrián Robles, 2014), redesigning tasks, and user interaction with the materials through multimedia annotations (Monedero-Moya, Cebrián-Robles, & Desenne, 2014; Muellner, 2014), among others.

e. Finally, research and projects should place greater emphasis on *measures to further facilitate inclusiveness and access to training for all people*. The focus of MOOCs requires accessibility measures for the end user that set the personalisation of teaching —as one of its intrinsic values— against the homogenisation of content and standardisation of teaching processes. ICT accessibility is regarded as a right for people in the information and knowledge society, as well as being a quality of life indicator, regardless of the level of functional diversity of each individual (Rodríguez Ascaso & Martínez Normad, 2011).

There are currently over three and a half million people in Spain with some kind of disability according to CENTAC (the Spanish national centre for accessibility technologies)[2], and there is also a significant number of people with disabilities in Brazil. According to the 2010 census by the Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics) over 47 million people (23.92% of Brazil's population) have some sort of disability, a number that is constantly increasing as it is estimated that over 10 thousand people contract some type of disability each month. This number will rise much more in future and so the United Nations recommends statistical studies to analyse the achievements made and present the prospects of achieving the Millennium Development Goals for all[3]. In its mission the European Union sets out the priorities and challenges faced in similar terms in its mission, including the search for strategies to *make education more accessible and encourage more inclusive education through access to information on the internet for everyone*[4] and encouraging web skills and competencies through massive open courses[5] and the *Open Education Europa* portal[6].

On-line courses in general undoubtedly raise great interest among researchers, especially with regards to their technological support, supply setting, and the many tools provided by computer-based educational technologies. It is true that the objective of these technologies is to make learning experiences more effective and efficient, attractive and accessible for students (Koper, 2001). However, without prior planning and educational design they lose their value and focus. As Nativ-

idad and others (2015) state, technology in itself is neither good nor bad; the great educational challenge is to make it effective, efficient, and sustainable.

Until now, the methodological approaches and academic outputs of MOOCs have been very heterogeneous; however, all of them raise problems with students regarding the need to provide them with guidance and greater attention to pedagogical design (Roig, Mengual, & Suárez, 2014; Conole, 2015; Raposo-Rivas, Martínez-Figueira, & Sarmiento-Campos, 2015). Similarly, there is very high level of diversity among users, content, and contexts, but the average rates of certification are similar. Furthermore, most of them seem to share a general taboo about answering the question of what sort of learning these courses favour. Faced with these contradictions, the number available is, like their range, increasing at a dizzying rhythm and pace. This circumstance necessarily requires research to go beyond evaluation of a statistical record of the tasks —typical of the initial cMOOC focusses— and move forwards into this second current phase of xMOOCs (Ebben & Murphy, 2014), which are more interested in users' interaction and satisfaction with the materials (Monedero-Moya, Cebrián-Robles, & Desenne, 2015), as well as directing studies towards the impact and evaluation of the educational, ethical and cultural aspects of globalisation, and above all, a fundamental pedagogic approach in the course design from an inclusive education perspective.

The small number of users who complete MOOC courses and obtain accreditation —certification that must be reconsidered for this type of courses (Ho and others, 2014)— has not prevented increased enthusiasm and multigenerational participation or scepticism at a similarly high level. Following the excessive expectations of the initial period of MOOCs, explanations are still being sought for the expectations that have been met and the paradoxes found in practice (Bartolomé-Pina, 2013; Daniel, 2012; Jona & Naidu, 2014). At the same time, new and interesting perspectives are being raised for research (Jona & Naidu, 2014), teaching (Bates, 2014), and the design of pedagogical content (Roig, Mengual, & Suárez, 2014; Raposo-Rivas, Martínez-Figueira, & Sarmiento-Campos, 2015). Faced with this realisation, studies focussing on research into the pedagogical aspects involved in on-line courses are notably less frequent, something that represents a reversal of values from an educational perspective.

Even with the exponential growth in the supply of MOOCs and the interest in evaluating and optimising the quality of these educational activities, the research base on this recent format in the history of on-line learning is still tentative and little-developed, despite the growing interest in them (Saadatmand & Kumpulainen, 2014). MOOCs must be examined more closely, analysing their educational components in search of a more in-depth and general view of the offer.

In just a few years, MOOCs have ceased to be an experiment and have become a reality with exciting possibilities for *lifelong learning*. These courses

offer a combination of technological and pedagogical innovations that are still to be explored in all of their dimensions owing to the growth in these courses (Raposo-Rivas, Martínez-Figueira, & Sarmiento-Campos, 2015). Faced with the exponential growth in MOOCs and the concern with verifying these formative activities and optimising their quality, the need to analyse their pedagogical dimension with greater care and attention has arisen. Similar studies with this educational focus have provided interesting recommendations for analysing them and taking decisions (Roig, Mengual, & Suárez, 2014; Raposo-Rivas, Martínez-Figueira, & Sarmiento-Campos, 2015).

2. Design and methodology

This study enables us to analyse and develop one of the objectives of the R&D&i project for producing massive courses [1]. It focuses on establishing what pedagogical designs the range of MOOCs on offer in Portuguese offers in order to be able to reveal the elements that depend on the platforms that support them. Portuguese is the language of three of the fourteen institutions taking part in the project. To do so a quantitative, non-experimental, cross-sectional research model (Hernández, Fernández, & Baptista, 2010) with a descriptive aim has been designed and developed.

To select the sample, criterion sampling was used (McMillan & Schumacher, 2005) with the MOOCs selected based on the following criteria: (i) they were in Portuguese; (ii) the course information was available without having to register on the platform; (iii) the information was available during the months of February to April 2016. The inclusion criteria used are justified by the descriptive nature of this work. With these criteria, all of the population at this moment is covered. Consequently, we have obtained information for 356 MOOCs from 16 platforms.

For subsequent research on the same theme with aims going beyond the merely descriptive, a process of triangulating experts, focusses, and content to select which criteria to use would be advisable.

2.1. Objectives of the study

— Discover and analyse from a pedagogic perspective the offer and design of the MOOCs available in Portuguese in a specific time span;

— Describe the offer of MOOCs in Portuguese according to a particular level of pedagogical quality.

Taking into account the stated objectives, the following questions are answered:

— What is the pedagogical profile of the MOOCs offered in Portuguese?

— What pedagogical components categorise the MOOCs available in Portuguese?

— Is there a correspondence between the empirical aspects and the level of quality displayed in the pedagogical design of MOOCs in Portuguese?

2.2. Instrument

For data collection an adaptation of the Educational and Interactive Indicators in MOOCs Instrument (Instrumento de Indicadores Educativos e Interactivos en los MOOCs - INdiMOOC-EdI: Raposo-Rivas, Martínez-Figueira, & Sarmiento-Campos, 2015) was used. This was organised into four main sections (identifying data, descriptive aspects, formative aspects, and interactive aspects) with a total of 27 variables measured on various scales. The reliability and internal consistency analysis for this adaptation calculated using Cronbach's alpha was 0.731 for the whole sample. This can be considered to be satisfactory as «values from 0.60 to 0.70 are considered to be the lower limit of acceptability» (Hair, Anderson, Tatham, & Black; 2001).

With the data obtained, a descriptive analysis and a multiple correspondence analysis were performed using the IBM SPSS 23.0 program and selecting three dimensions. This number of dimensions was chosen as it was found, using the correspondence analysis and k-means clustering algorithm technique, that with this choice certain important characteristics were revealed that remained hidden if only two dimensions were used, or were diluted if four were chosen.

As the variables are measured on different scales, we opted for the simplest (the one that can include all of them), accepting a loss of information from some of them. Consequently we decided to turn them into nominal or categorical variables. With this classification of data we believe that the most appropriate statistical technique is *multiple correspondence analysis* as this tool enables us to show which courses have similar profiles in relation to the attributes that describe them (Pérez, 2005).

The variables considered for the multiple correspondence analysis (MCA) were: organising institution, platform, category, subcategory, field, importance for the public, end users, prerequisites, duration of the course, daily/weekly commitment, duration in weeks, weekly hours of work, number of people in the teaching team, number of people in the technical team, enrolment, introduction to the course, whether the course objectives are presented, work programme, number of blocks/modules, number of lessons, which working method is proposed, which ICT tools are used, which activities must be performed, how the process and results are evaluated, certification, accreditation, level of interactiveness, and related courses.

3. Results

3.1. What is the pedagogical profile of the MOOCs available in Portuguese?

Given the greater frequency displayed in the variables considered for the 356 MOOCs, we can sketch the following profile for massive open on-line courses in Portuguese:

— *Organising institution*: private institution (84, 23.6%), private university (68, 19.1%), private public-interest

institution (57, 16%), private business (40, 11.2%), individual initiative (39, 11%), public university (35, 9.8%), and public institution (33, 9.3%).

— *Platform*: Fundação Bradesco (84, 23.6%), Udemy (71, 19.9%), FGV Online (47, 13.2%), EaD SEBRAE (31, 8.7%), Coursera (29, 8.1%), Saberes ILB (24, 6.7%), SENAI (14, 3.9%), Veduca (13, 3.7%), SESI (12, 3.4%), MiriadaX (9, 2.5%), ESPM (7, 2%), ANP Cidadã (6, 1.7%), Open Education (5, 1.4%), EdX (2, 0.6%), OpenupEd and UAP (1, 0.3% each).

— *Thematic category* of the platform: business and economy (94), computing (42), applications development (34), courses without a tutor (24), computer science (18), professional initiation (20), personal development (12), law (11), advanced training (10), education (8), social sciences (8), languages (4), technological sciences (3), test preparation (3), earth and space sciences (2), design (1). This information is not specified in 39 cases (11%). The corresponding *subcategory* is not stated in 79.8% of the cases (284 courses).

— Grouping these categories by *field,* over 60% of the MOOCs studied are multidisciplinary (122, 34.3%) or technological (112, 31.5%) in character. Following on from this, almost 25% are from the fields of «arts and humanities» (54, 15.2%), and «science» (41, 11.5%). The least frequent are «legal-social» (23, 6.5%) and health sciences (3, 0.8%).

— The *importance* that the MOOCs have for the public is indicated on 230 courses (64.6%), and the *end users* are identified as the general public (people interested in the subject matter) in 220 cases (61.8%), or someone with a particular profile (79, 22.2%). In 77% of cases the course's entry *prerequisites* are not indicated. These are stated on 82 occasions (23%).

— The *duration of the course* is generally undefined (142, 39.9%) or limited (122, 34.4%), although in over 25% of cases it is not stated (92, 25.8%). *Daily / weekly commitment* is often undefined (200, 56.2%) or not specified (123, 34.6%); the number of cases in which it is limited is under 10% (33, 9.3%). However, in a high percentage of courses, the *weekly hours of work* are not stated (325, 91.3%). The *duration in weeks* varies greatly as there are the courses range from 1 week (1, 0.3%) to 16 (6, 1.7%), although the most common are those lasting 8 weeks (25, 7%) or 4 weeks (54, 15.2%), with a mean score of 5.84. This information is not stated in 238 MOOCs (66.9%).

— With regards to the personnel connected to MOOCs we find that *the teaching team* has a highly variable number of people, from 1 (97, 27.2%) or 2 (38, 10.7%), up to 30 (1, 0.3%), although in over half of the cases this information is not stated (196, 55.1%). The *technical team* is not specified in 84% of cases (299 courses) and is the same as the teaching team on 57 occasions (16%).

— As for *enrolment* on the MOOCs, it is common for this to be permanently open (310, 87.1%), only 43 (12.1%) have it open for a specific period, and

in 3 cases (0.8%) it was closed when the data were collected.

— The *introduction to the course* normally refers to the content of the course (246, 69.1%), the topics (21, 5.9%), or both things (6, 1.7%), normally through an introductory video (81, 22.8%). Over 60% present the *course objectives* (219, 61.5%). The *work programme* is organised into modules or lessons (243, 68.3%) or by weeks (22, 6.2%); in almost 25% of cases it is not stated (88, 24.7%). The teaching sequences are presented in modules (170, 47.5%) varying from one single one to 10; lessons or topics (113, 31.7%), or others such as teaching units (5, 1.4%), weekly sessions or chapters (3, 0.8%). This is not stated on 62 occasions (17.4%).

— In the MOOCs analysed the *working method* is not usually specified (223, 62.6%). The cases where it is stated refer to «independent study» with the support of audiovisual resources (50, 14%), with the support of audiovisual resources and performing automated tests (39, 11%), with the support and guidance of a tutor (31, 8.7%), with the support of audiovisual resources and interacting with other participants (8, 2.2%), and through «individual work» (5, 1.4%). The *ICT tools* used are also not generally listed (249, 69.9%), on occasions «audiovisual material» are stated (49, 13.8%) or «a variety of audiovisual material and automated tests» (46, 12.9%), forums are added to these on 7 occasions (2%). The *activities* that have to be performed are not stated in 259 cases (72.8%), and in the cases where they are stated they are summarised as «viewing the material, studying it, carrying out the exercises and tests» (44, 12.4%), «viewing the material» (32, 9%), or variants such as «viewing the material and studying it» (18, 5.1%) accompanied by «carrying out the exercises and tests and collaborative participation» (3, 0.8%).

— With regards to *evaluation*, this is shown as final (summative) on 108 courses (30.3%), it is carried out by «access to educational resources and the score obtained in the tests» (55, 15.4%), or simply through «access to educational resources» (50, 14%). It is not specified in 143 courses (40.2%). The *certification* is mainly free (244, 68.5%), under 10% require payment (31, 8.7%), or both forms are provided —payment and free (17, 4.8%). This is not stated on 62 occasions (17.4%). *Accreditation* is by certificates (292, 82%) or in the form of «official proof of participation issued by the platform» (7, 2%). It is not stated for 55 courses (15.4%).

— The *level of interactivity* of participants on the MOOCs is not stated in over 80% of cases (316, 88.8%). On the few occasions that it is stated, it is as «Interaction with the tutor and with other participants in the formative process, during all of the period of the course» (31, 8.7%), «collaborative work» (5, 1.4%), and others such as «direct contact or contact by mail with the teacher», «peer corrected activities», or «section for discussion in the course space» (4, 1.2%).

— It is common for *related courses* not to be publicised on any particular MOOC (209, 58.7%), although there are also cases in which several appear: an undefined number (76, 21.3%) or three (24, 6.7%).

3.2. What pedagogical components categorise the MOOCs existing in Portuguese?

As all of our data are categorical in nature since we are working at an entirely nominal scale level, we initially seek some kind of underlying pattern or grouping in the information obtained. To do so we use cluster or grouping techniques opting for the use of the k-means clustering algorithm. So:

— If we wish to distribute the information into two groups, the outcome that the algorithm provides is that Group 1 has 73 elements (21%) and Group 2 = 283 (79%).

— If we opt for three groups instead of two, we obtain a Group 1 with 73 elements (21%), Group 2 = 212 (60%), and Group 3 = 71 (20%).

— With a distribution into four groups we obtain a Group 1 = 69 (19%), Group 2 = 183 (51%), Group 3 = 33 (9%), and Group 4 = 71 (20%).

To ensure a minimum representation of 10% of the MOOCs, the decision was made to work with three dimensions. Therefore, starting from the model obtained using the multiple correspondence analysis with these three dimensions, in Table 1 we can see that the variance explained by each of the factors is high; the importance rank of the dimensions coincides with their number.

TABLE 1. Variance explained in the multiple correspondence analysis with three aspects.

Summary of the model				
Dimension	Cronbach's alpha	Variance explained		
		Total (eigenvalues)	Inertia	% of the variance
1	.957	12.692	.470	47.008
2	.914	8.363	.310	30.976
3	.902	7.633	.283	28.271
Total		28.689	1.063	
Mean	.930a	9.563	.354	35.418

a. The mean Cronbach's alpha is based on the mean eigenvalues.
Source: prepared by the authors.

Ordering the variables in each of the dimensions by importance, depending on the variance percentage of the respective dimension (Table 2), it can be seen that *platform* and *organising institution* appear in all three dimensions while other variables appear in two, and some are specific to one dimension. Subcategory, activities to be performed, and introduction to the course appear in dimension 1; accreditation, end users, and number of teaching team are from dimension 2, and duration in weeks, commitment, and ICT tools are in dimension 3.

TABLE 2. Distribution of the variables in three analysis dimensions.

Dimension 1	**Dimension 2**	**Dimension 3**
Platform	Platform	Platform
Organising institution	Organising institution	Duration in weeks
Subcategory	No. of blocks/modules, no. of lessons	Certification
Related courses	Certification	Work programme
What working method is proposed?	Accreditation	How are progress and results evaluated?
What activities have to be performed?	End users	Organising institution
How are the process and results evaluated?	No. of people in the teaching team	Daily/weekly commitment
No. of blocks/modules, no. of lessons	Related courses	What working method is proposed?
Introduction to the course	Work programme	What ICT tools are used?

Source: prepared by the authors.

If we try to extrapolate the results obtained in the dimensions to the components that define the structure of the measurement instrument, it is apparent that dimension 1 to a greater extent contains subcomponents (variables) related to the *identifying and descriptive* elements; while dimension 2 focusses on the *formative aspects* and to a lesser extent on descriptive ones. Finally, dimension 3 focusses on *formative and interactive aspects*. In a biplot diagram, the representation would be as shown below.

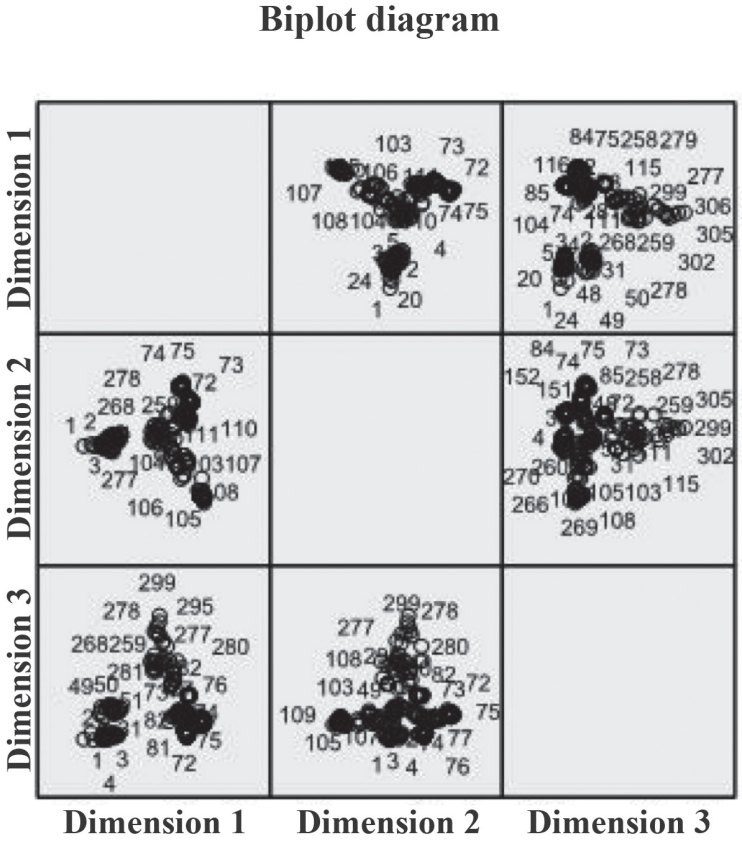

FIGURE 1. Biplot diagram.

The choice of three dimensions is also justified in light of Figure 1, as it shows how dimension 1 creates groupings that are loose and distinct from each other compared with the other two dimensions. Nonetheless, dimensions 2 and 3, even differentiating groups, create a more uniform distribution of courses.

The distribution of the courses in the three dimensions obtained by organising institution is shown in Figure 2. The ellipses show the courses organised by each body; ellipsis 1 refers to those organised by private institutions, number 2 to private companies, 3 to public university, 4 to private universities, 5 to private public-interest companies, 6 to state schools, and 7 to private institutions.

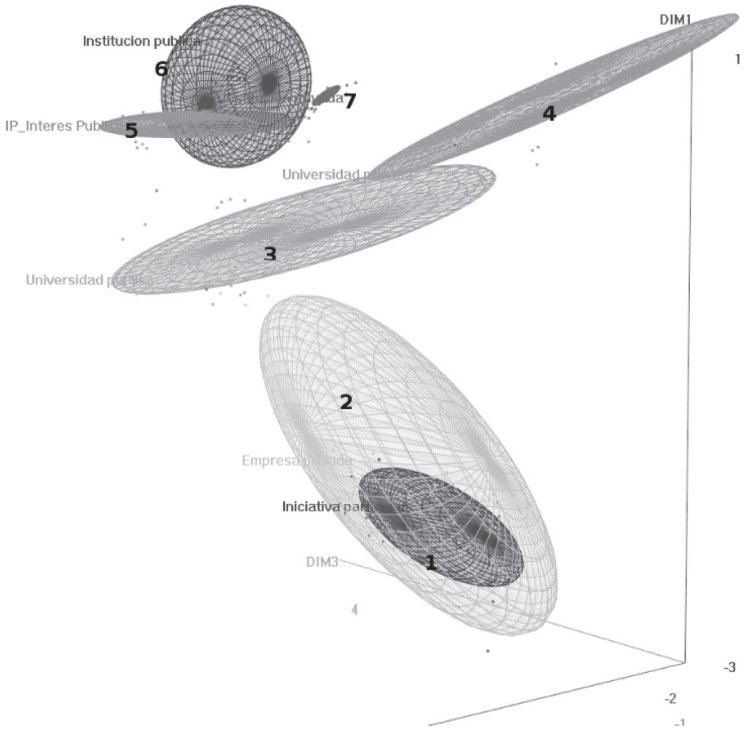

FIGURE 2. Distribution of the dimensions of MOOCs by organising institution.

3.3. Is there a correspondence between the empirical dimensions and the level of quality shown in the pedagogical design of the MOOCs?

To answer this question an overall score for each of the MOOCs was calculated according to the pedagogical elements they display (coinciding with the instrument variables) and each of them was weighted. To calculate this overall score, the following process was followed:

1) Taking into consideration all of the subcomponents whose achievement would result in a qualitative improvement, the maximum value for each of them was set as one with the value set as zero when the subcomponent was not achieved at all. Intermediate values were proportionally and linearly weighted. For example, the «category» variable could take two values: «specified» (value 1) or «not specified» (value 0). The «end users» variable can take three values: «not stated» (value 0), «general public - interested in the subject matter» (value 0.5) or «with profile» (value 1).

2) Once weighted, all of the subcomponents were added together. From the sum of them, quartiles were established and each course was assigned to its corresponding quartile, taking into account that for the 356

MOOCs as a group, the descriptive statistics are: minimum score = 1.89, maximum = 14.88, average = 8.79, and standard deviation = 2.624.

3) Considering that the previous step provides a quality value for each course that situates it in one of the quartiles and that we also have the three dimensions obtained through the multiple correspondence analysis, the question arises of the extent to which the relative quality (obtained through the instrument) related to the dimensions underlying the empirical data.

Consequently, if we correlate the values that each of the three dimensions takes for each analysed MOOC and the variable that indicates the quality value for each course as well, we obtain clear results that, again, in this case justify the choice of three dimensions. It can be seen that the first dimension (identifying and descriptive elements) discriminates between those courses with low quality values (negative correlation), while dimensions 2 (formative aspects), and 3 (formative and interactive aspects) are directly related to the highest quality courses (positive correlation).

TABLE 3. Correlation between the dimensions of analysis.

Correlations					
		Dimension I	Dimension II	Dimension III	Total_MOOC
Dimension I	Pearson Correlation	1	.000	.000	-.682**
	Sig. (bilateral)		1.000	1.000	.000
	N	356	356	356	356
Dimension II	Pearson Correlation	.000	1	.000	.394**
	Sig. (two tail)	1.000		1.000	.000
	N	356	356	356	356
Dimension III	Pearson Correlation	.000	.000	1	.292**
	Sig. (two tail)	1.000	1.000		.000
	N	356	356	356	356
Total_MOOC	Pearson Correlation	-.682**	.394**	.292**	1
	Sig. (two tail)	.000	.000	.000	
	N	356	356	356	356

**. The correlation is significant at the 0.01 level (two tail).
Source: prepared by the authors.

By relating the «formative aspects» and «interactive aspects» dimensions that indicate «higher quality» in the courses, with the quartiles of the quality index and the platforms analysed, we find that SEBRAE, Coursera, and Udemy show the greatest percentage of courses in the highest quartile (in red). Nonetheless, it is Coursera that has the highest values in dimension 3 (interactive aspects), and SEBRAE in dimension 2 (formative aspects).

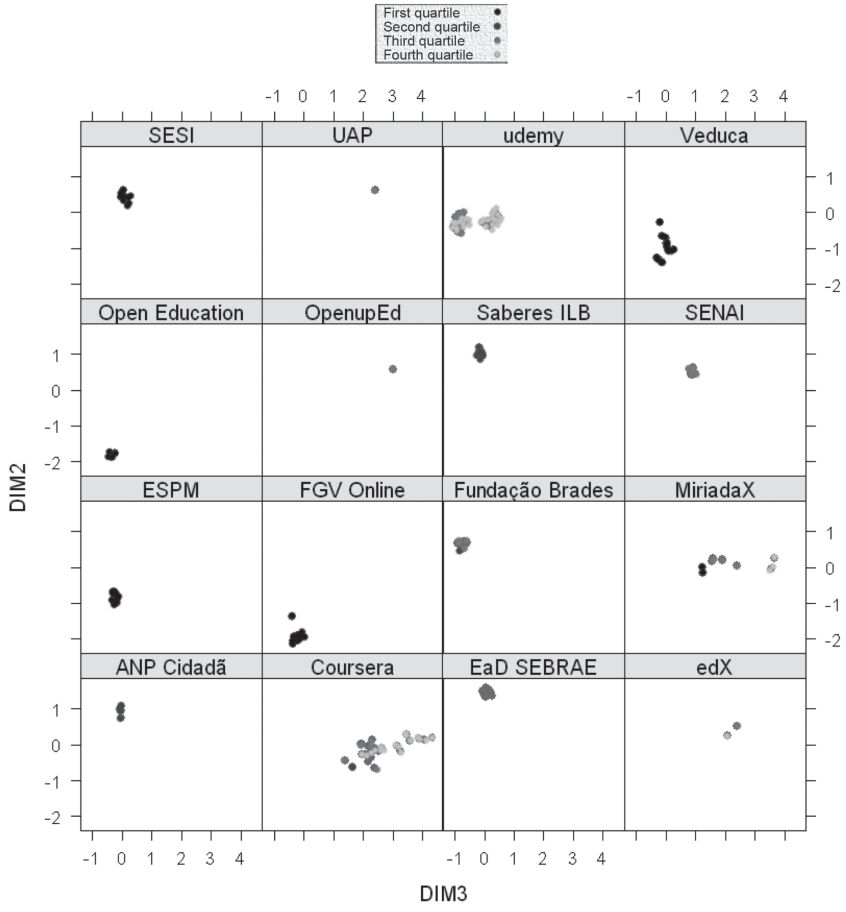

FIGURE 3. Dispersion by quartiles of the aspects of the MOOCs by quality index and platform.

4. Conclusions

The results of this study giving an overview of the pedagogical design of MOOCs available in Portuguese certainly provide the worlds of academia and formative content production with useful elements for examining the pedagogical approaches most frequently observed in these specific cultural and linguistic contexts. Furthermore, it gives the pro-

vider institutions and professionals involved in offering this type of courses an opportunity for critical reflection about the educational formats, resources, and activities available for end users. It concludes with a series of pointers related to the findings by Raposo-Rivas and others (2015) that might guide future designs for massive open online courses in Portuguese. This work's main contributions are in the field of educational design. The linguistic adaptation of the instrument —INdiMOOC-EdI— has made it possible to perform potentially valuable analysis and reflections for proposing and classifying MOOCs by their components.

With the first question about the profile of users in Portuguese we find that, on the whole, a generic profile for the end user (61.8%) is found, with particular profiles and without entry requirements, something that helps to disseminate the input knowledge but that might limit it to professionals with specific interests. For the second question —the pedagogical components— the design of the courses shows a highly varied and undefined duration and a commitment of weeks ranging from one to four, the most common figure. It is normal for them to be permanently open (310, 87.1%), something that allows greater flexibility. The introduction to the course usually refers to the content (246, 69.1%), normally through an introductory video. Over 60% of the courses are defined by objectives (219, 61.5%) rather than competencies. Specifying the working method is uncommon (223, 62.6%) and in cases in which it is specified it refers to «independent study» with the help of audiovisual resources (50, 14%), automated tests (39, 11%), and the support and guidance of a tutor (31, 8.7%). Nonetheless, these differences contradict the similarity of the underlying methodological design in most of the MOOCs studied as a group, given that the portals use similar «templates» for content providers, leading to the courses resembling each other and the platform that hosts them, as was already concluded in the studies by Chiappe-Laverde, Hine, & Martínez-Silva (2015) and Raposo-Rivas, Martínez-Figueira, & Sarmiento-Campos (2015). This debate and discussion will be maintained in future if the design does not avoid repeating the «unidirectional» structure that proposes the didactics of videos, exercises, and the «banking» pedagogy, as we are reminded by Ebben & Murphy (2014) for whom the pedagogical models will not change despite the incorporation of the new proposals for «Learning analytics», «e-assessment», etc.

Once the MOOC platforms had been analysed we found differences and distribution according to the three dimensions, especially in the first one (identifying and descriptive elements), the second and third dimensions being more uniform (formative aspects and formative and interactive aspects), even though they do differentiate between groups, and these last two dimensions were directly related with the highest quality courses. Therefore, in response to the third question, we can conclude, unlike in the work of Roig Vila and others (2014), that there is a correlation between pedagogical quality and the media and platforms that host the courses, as can be seen in figures 2 and 3. Likewise, it has been possible to identify three platforms (SEBRAE, Coursera, and Udemy)

that offer a greater percentage of courses in the highest quartile, with SEBRAE standing out in the formative aspects and Coursera for the more interactive values.

Ultimately, the results show that MOOCs in Portuguese use a classic design that presents users with the materials and activities, distancing itself from more connectivist models and collaborative ideas (just 3.08%). We find these courses in an early design stage, planned more as xMOOCs, that does not consider students as knowledge creators, receiving the content with which they must interact (Dron & Ostashewski, 2015). Based on our analysis they should explore other designs that are closer to the cMOOC design, beyond the inclusion of connectivism that Siemens (2005) initially proposed as a theory and that represents a «pedagogic perspective» more than a theory that is a basis from which to propose models, methods, etc. (Zapata-Ros, 2012; Downes, 2012). Therefore, it remains to redesign the courses from a more pedagogical viewpoint, seeking standards that guide and improve this dimension, until we can construct a pedagogical theory. Without any doubt, we have only taken a step identifying benchmarks and pedagogical designs in the platforms, there is still much work remaining to propose a model that creates learning for all users.

Notes

[1] Funded by the call for R&D&i projects named: «Estudio del impacto de las erubricas federada en evaluación de las competencias en el practicum» (Study on the impact of federated eRubrics in the evaluation of the competences in the practicum). Plan Nacional de I+D+i de Excelencia (National R&D&i Excellence Plan) (2014-16) no. EDU2013-41974-P.

[2] Centro Nacional de Tecnologías de la Accesibilidad (the Spanish National Centre for Accessibility Technologies-CENTAC), a centre dedicated to provide for the development of accessibility technologies for companies, industries, and service sectors, as well as facilitating access to them and improving the quality of life of the elderly and people with disabilities, as well as their families: *http://www.centac.es/es*

[3] Millennium Development Goals. United Nations, Report 2010. The Millennium Development Goals, also known as Millennium Goals (MDGs), are eight human development goals set in 2000 that the 189 member states of the United Nations agreed to achieve by 2015. *http://www.un.org/millenniumgoals/pdf/MDG%20Report%202010%20En%20r15%20-low%20res%2020100615%20-.pdf*

[4] The European Commission Directorate- General for Research and Innovation established in 2014 the research and innovation programme (2014-2020). It is this Directorate-General's responsibility to define and implement the European Research and Innovation (R & I) policy with a view to attaining the objectives of the Europe 2020 strategy and its main initiative, the Innovation Union.

[5] The Digital Agenda for Europe, created in May 2010 and updated in November 2014, has the objective of boosting Europe's economy by taking advantage of the economic and social advantages promoted by digital technologies.

[6] The Open Education Europa portal, launched in September 2013, aims to provide students, teachers, and researchers with access to open educational resources in Europe in a single space.

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