

A collaborative digital pedagogy experience in the tMOOC “Step by Step”

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This research analysed social MOOCs (sMOOCs), which are characterised by the involvement and the interaction of participants in a model based on intercreativity, with the final objective of transferring knowledge by an agile replicating process. The fieldwork focused on the analysis of the sMOOC “Step by Step” of the European Commission-funded Elearning, Communication and Open-data (ECO) Project, which aims to build and apply an innovative pedagogical model for the the training of e-teachers. This sMOOC reaches out to a specific academic community, providing learners with digital competences in order to transform them in e-teachers. The quantitative analysis was done via an online questionnaire. One of the most significant conclusions, which answers the research questions regarding why and how to make a successful sMOOC, is that the design of collaborative activities increases the involvement of learners with the course and the interaction between participants, independent of age but dependent on area of work. This formative process in turn generates transfer of learning together with the embedded pedagogical transformation in e-teachers. This validates the addition of the transferMOOC (tMOOC) model to the existing typologies of MOOCs.

Introduction

Social massive open online courses (sMOOCs) are characterised by the creation of learning shared among the members of the community, with tools and hypermedia environments connected to social media (Cruz-Benito, Borrás-Gené, García-Peñalvo, Fidalgo-Blanco, & Therón-Sánchez, 2015; Veletsianos, Collier, & Schneider, 2015). The learners construct learning in connection with other participants. sMOOCs promote the collective construction of knowledge, which corresponds to a model based on the *culture of participation* (Aparici & Osuna-Acedo, 2013; Jenkins, 2006).

Based on the sMOOC model, the Elearning, Communication and Open-data (ECO) Project is a unique example of a European macro-project, supported by the Competitiveness and Innovation Framework Programme (CIP-ICT-PSP.2013) (Ecolearning, 2015). The project aggregates a large consortium of 20 institutions in 7 European countries (France, Germany, Italy, Netherlands, Spain, Portugal, United Kingdom), where the institutions produced 17 sMOOCs for teacher training. Its main objective is to help teachers acquire digital competences so that they feel empowered to use them in their own courses, be it at initial training level or continuous training level.

The main contribution of the ECO sMOOCs takes root in *intercreativity* (Osuna-Acedo & Camarero-Cano, 2016; Osuna-Acedo et al., 2017), a term coined in 1996 by Tim Berners-Lee, which combines interactivity and creativity. Intercreativity refers to the capacity of individuals to create original and productive elements inside a virtual environment, thanks to collaboration and participation. Intercreativity considers the process of creation from the birth of an idea to its development and conclusion, within a social environment of creative exchanges, where knowledge is constructed collectively.

The ECO Project also adds the transfer of knowledge to the joint construction of learning, as it purports to encourage participants to become e-teachers in their own right, thanks to replicating tools, consisting of open educational resources and a supportive environment. To facilitate such transfer, the MOOC “Step by Step” was taught globally, using the best practices carried out in the 17 pilot MOOCs developed though the first year of the project. The sMOOC “Step by Step” was the over-arching course of all the MOOCs

produced by the initial team. It was delivered simultaneously in six languages to learners connected from all around the world. The participants were motivated to learn to become critical and creative e-teachers, capable of producing their own sMOOC. The sMOOC “Step by Step” was built collaboratively on a cross-country basis, with coordination by Université Sorbonne Nouvelle (France) and Universidad Nacional de Educación a Distancia (UNED, Spain). Upon completing the sMOOC “Step by Step”, learners were enabled to produce and launch their own sMOOCs on the platform. This final stage was implemented during the third and last year of ECO project. By doing so, ECO engineered the transition to what would become a new generation of MOOCs: the tMOOC (*transfer*MOOC).

The tMOOC model was in previous research carried out by several authors (Cabero, Llorente-Cejudo, & Vázquez-Martínez, 2014; Vázquez, López, & Sarasola, 2013), who related it mostly to the design of pedagogical materials. However, ECO tMOOCs aim to reach further beyond and therefore they rely on a more complete taxonomy of the “10 Ts” (authentic tasks; transfer of learning towards professionalism; pedagogical transformation; technologies of relation, information and communication (TRICs); transmediality; open temporality; transnationalism; intercreative talent; collaborative teamwork; and tolerance) (Osuna-Acedo, Marta-Lazo, & Frau-Meigs, 2018). The parameters needed to be reformulated, not only from the perspective of activities but also from the holistic approach to transformative learning in an intercultural context. “Moreover, tMOOCs go a step further by promoting active and collaborative learning, not just from a pedagogical perspective, but also as a bid for civic commitment” (Osuna-Acedo et al., 2018, p. 112).

A collaborative digital pedagogy

A review of literature shows that some authors are critical of MOOCs, due to their high rate of attrition and to their still largely transmissive methodologies (Capuano & Caballé, 2015; Daradoumis, Bassi, Xhafa, & Caballé, 2013). However, there is a continuous flow of new models that point to participatory strategies for learning that drive learner motivation. This constant evolution enriches the contexts, the pedagogical models and the objectives of each generation of MOOCs, fostering new versions that are increasingly creative and innovative.

Digital affordances and e-strategies are at play in the development of MOOCs in general and ECO sMOOCs in particular. MOOCs started using the affordances of social media in 2008 with Siemens and Downes’s cMOOC (Osuna-Acedo et al., 2018; Siemens, Downes, & Cormier, 2012). They benefited from the social turn of 2006 made possible by the joint commercial emergence of Facebook (2006), Twitter (2006) and YouTube (2005/bought by Google in 2006) (Van Dijck, 2013). The social turn augmented the digital affordances by fostering socially engaged productions that are collaborative, often participatory, and involve people as part of their material.

MOOCs also came of age at the same time as a whole generation of people born after the eighties, often considered as “digital natives” by contrast with the preceding generation, supposedly composed of “digital immigrants” (Prensky, 2001). Such a demographic cohort is reaching the time when digital affordances and the repertoire of e-strategies are becoming part of their workplace, not just their leisure space. And MOOCs are being incorporated among their initial training options, while being offered to their elders as part of their continuous training.

Generational as it is, this dichotomy, however, was revised by Prensky himself. He blurred the lines of age and the attendant expectation that the younger, the more computer-savvy, by advancing the notion of “digital wisdom” (Prensky, 2009, 2012). Digital wisdom takes into account the extension of the mind as it interacts with the new digital environments, which leads to the enhancement of the whole potential of a person, independent of age (Prensky, 2009, 2012). Prensky (2012) takes the examples of political leaders who are digital-wise persons as they use technologies to connect with their electors and to ask for their vote or of journalists who take advantage of participatory technologies to extend their perspectives and those of their audience. This implies that digital immigrants can, thanks to their experience, turn into digital-wise persons, with *epistemic maturity*, that is, their capacity to reason about their learning process (Frau-Meigs & Bossu, 2018b; Siemens & Weller, 2011).

Age and experience can account for one of the sore issues raised by MOOCs (as also by distance learning in general), which is high drop-out rates. The level of involvement and motivation of the learners may

depend on these two variables, which have not been often tested in large samples and remain under-researched, especially in conjunction (Marta-Lazo, Frau-Meigs, & Osuna-Acedo, 2018). There is a need to test the age variable to see if the older the participants are, the more engaged they are likely to be, whatever their level of technological savvy. And experience also needs to be tested to see whether the more familiar with the educational profession the participants are, the more likely they are to engage in the course and interact with others. These elements may yield information as to how MOOCs can enhance participation, user satisfaction and capacity to transfer learning to their participants.

The ECO sMOOCs, through their evolution to tMOOCs, aim at transferring learning in two directions: towards autonomous empowerment and towards pedagogical transformation. They purport to do so with the integration of digital competences in the learning process as digital affordances and repertoires of e-strategies that foster socially engaged productions and interactions that are collaborative and participatory by nature. This double dimension is a new modality that some researchers (e.g., Cabero, et al., 2014), up to now, had connected only with the resolution of tasks and activities on the part of the learners. To support such intercreativity, the ECO sMOOCs rely on the concept of TRICs (technologies of relation, information and communication), whose key notion is the relational factor, thus stressing digital humanism over mere technological determinism (Marta-Lazo & Gabelas, 2016). A learning process based on TRICs aims at a more inclusive and participatory approach to pedagogical transformation, by embracing the critical, creative and reflexive dimensions of digital participation. Hence, the importance of promoting the relational factor “in horizontal, collaborative and ethical learning” (Marta-Lazo, Marfil-Carmona, & Hergueta-Covacho, 2016, p. 316).

The relational factor in active online participation

Models based on the relational factor (Marta-Lazo & Gabelas, 2016), such as the ECO sMOOCs, promote active learning and encourage participants to get involved using the interactions enabled by virtual environments. Active learning relies on a wide base of teaching tools that invite learners to apply what they are learning including problem-solving exercises, cooperative projects, informal group work, simulations, case studies, and role playing (Meyers & Jones, 1993). They are focused on the promotion of the relational component that is elicited by digital affordances so that the immersion of learners in the networks turns into the cornerstone of knowledge acquisition and transfer, thanks to active participation, peer interaction and conversation (Hergueta-Covacho, Marta-Lazo, & Gabelas-Barroso, 2016).

Furthermore, the relationships generated within these processes between the interconnection of individuals, the social environment and the repertoire of e-strategies at their disposal enable learners to acquire fundamental competences for media and digital literacy (Marta-Lazo & Gabelas, 2016; Osuna-Acedo & Camarero-Cano, 2016).

In the case of ECO, the empowerment of learners in MOOCs is ensured by social media designed into the internal workings of the project (microblogging, forums, chats ...). These can be used in addition to and complementarily with commercial social networks. The group of e-teachers can develop knowledge, ideas, conversations, and aptitudes to learn and share, via social software, thus fostering a social learning process (Gil-Quintana, 2015). Additionally, to ensure epistemic maturity, social networks are not used alone; instead, they are mediated via facilitators and tutors (not just one guide as in early sMOOCs) (Marta-Lazo et al., 2018) who do not aim at changing the nature of knowledge but the relationship to knowledge, by re-opening communication and conversation about it. Such human intermediaries can modify the relationship to learning as they offer different modalities for training (resources, interactions, media ...). ECO creates the conditions for this maturity by re-joining the often-disjointed spaces of pedagogical strategies, digital affordances and social learning, in order to create a continuum for participatory practices to take place in training.

Existing models for participation

Several authors have established typologies to understand how to engage participation in MOOCs. The interaction in the learning process can come from various actors, with several distinctions:

- The interaction that is established among learners. Several researchers have analysed the various profiles of participants in MOOCs. Hill (2013) proposes five categories of MOOC students: no-

shows, observers, drop-ins, passive participants and active participants. Alario-Hoyos, Pérez-Sanagustin, Delgado-Kloos, and Muñoz-Organero (2014) add two more: latecomers and drop-in latecomers. They point to the fact that the most active participants are those who engage fully in the interaction with peers. They suggest that such types should receive rewards to encourage them to act as counsellors and motivators for the least active profiles (Gallagher & Savage, 2016). Moreover, interactions among peers, rather than interactions with instructors, are linked to higher satisfaction, more high-level knowledge discussions and a potentially stronger sense of community (Ke & Xie, 2009).

- The interaction that is established among learners and teachers. The motivation of teachers to offer MOOCs depends on how gratifying and personally significant the activities that they propose are. By means of a suitable use of technology, such as forums, to support learning, it is possible to reduce the effort needed for ensuring learners' commitment and knowledge acquisition (Fischer, 2014). Some authors, such as Garrison, Anderson and Archer (2010), propose a model of online learning that promotes interaction among teachers and learners, so as to facilitate the comprehension of the contents and activities, to develop competences aiming at continuity in the training process, promoting at the same time cognitive independence and social interdependence.
- The interaction supported by opinion leaders (Li, Ma, Zhang, & Huang, 2013). The most engaged participants are expected to act as mentors in communities of online learning (Leon Urrutia et al., 2015), assisting their peers and enriching the MOOC with additional contents and discussion (Mackness, Mak, & Williams, 2010). The opinion leaders who emerge in the MOOC are an important piece to connect the teachers and learners and to produce a snowball effect in the motivation to continue the course, thus diminishing attrition (Cabero Almenara, 2015). In their design, some MOOCs already rely on mechanisms to take advantage of opinion leaders as facilitators of learning, of understanding and of sociability via constant interaction (Pei & Shen, 2016).

In order to move on from facilitators to transformers and in order to test the capacity to combine participation and transfer, ECO has created a "metaMOOC", the sMOOC "Step by Step" (Frau-Meigs & Bossu, 2017a). This MOOC on designing MOOCs aims at facilitating the creation of sMOOCs by the participants, thus moving participation one step beyond, towards a prototype of tMOOC. To do so, it adopted a multi-actor, non-linear approach, based on the relational factor.

It recombined the different models of participation, mixing interactions between teachers, learners and opinion leaders, and enriched them. Several elements coexist in the MOOC "Step by Step": the *designers* (engineers and project managers who oversaw the global pedagogical design), the *pilots* (trainers and intermediary co-creators of the 17 pilot sMOOCs and "Step by Step"), and the participants, who are split in two categories – the *learners at large* and the future *e-teachers* (the co-creators of their own sMOOCs) (Frau-Meigs & Bossu, 2018a).

The latter can potentially become connectors or intermediary leaders who act as mentors and can transform into entrepreneurs of their own sMOOCs. Intellectual stimulation, social relationships and the achievement of goals, from a professional perspective, can provide these intermediary leaders with enough epistemic maturity to turn them into transformational leaders, because they can go beyond simple tasks and be more effective in solving problems (Contreras Torres & Barbosa Ramírez, 2013). Such leaders, unlike others, have a major replicating effect in fostering transformation (Jung, 2003). They can become change agents and promote the diffusion of pedagogical innovation (Roberts, 1985). In this sense, they can take full advantage of the tMOOC pedagogical design.

Methodology

The main methodology used was quantitative, using questionnaires to collect data. As corroborated by a recent research based on the analysis of journals published in the last five years (2011–2017), indexed in Journal Citation Reports, ScImago Journal-Scopus and the Spanish Foundation for Science and Technology, the questionnaire is the tool most used to conduct research on MOOCs in the area of social sciences (Cabero-Almenara, Marín-Díaz, & Sampedro-Requena, 2017). This is supported by other recognised authors in the field (Cho & Summers, 2012; Jansen, Van Leeuwen, Janssen, Kester, & Kalz, 2017). However, in order to complement the quantitative results, a qualitative content analysis was also

used to see how the epistemic maturity was evinced on the tMOOCs, those realized by the e-teachers as an outcome of the sMOOC “Step by Step”.

This analysis is based on the results obtained in the sMOOC “Step by Step” (http://portal.uned.es/portal/page?_pageid=93,48125241&_dad=portal&_schema=PORTAL). At the end of the sMOOC, the learners must be able to answer the following questions:

- Why do an sMOOC?
- How is an sMOOC built?
- How is an sMOOC designed?
- What is an sMOOC based on?
- How do we make an sMOOC accessible and successful?
- How is an sMOOC assessed and its data used?

With this tMOOC, the learner is trained in a pedagogical model coherent with the requirements of connectivism (Barnett, McPherson, & Sandieson, 2013), which involves a great co-responsibility of the participants in their own learning, building their epistemic maturity. And the evidence of actual transfer is expected to be demonstrated by the subsequent proposals of sMOOCs by the e-teachers themselves, thus confirming that the tMOOC is actually a new generation of MOOC. They are expected to be able to transfer competences acquired in leisure time to working time and to become “change agents” (Rogers, 1983, p. 28) even more than opinion leaders.

The objective of this research consisted of assessing the degree to which an innovative pedagogical design for empowerment and transformation functions via collaborative digital participation that fosters interaction between designers, pilots, participants at large and future e-teachers. The purpose was to ascertain the perception the participants have of their involvement and interaction in the sMOOC “Step by Step”, in relation to the collaborative design of tasks and resources.

With these objectives in mind, the following twofold research question was formulated, to guide the analysis, with its attendant hypotheses: What perception do the learners have of their involvement in the course and of their participation with others in the sMOOC “Step by Step”?

The general hypothesis to be tested was that a collaborative learning model in the sMOOC promotes participation and pedagogical transformation among learners, as future e-teachers. This was accompanied by two sub-hypotheses:

- (1) The involvement that the learners have in the sMOOC changes according to their age.
- (2) The interaction that the learners have among themselves in the sMOOC is different depending on their area of employment.

Therefore, age and of area of employment were used as independent variables to cross-check with involvement and interaction using bivariate correlations.

Data analysis

To answer the research question, a mixed methodology was designed. The collection of information was done with a quantitative analysis, by means of a questionnaire to the participants. For the quantitative analysis, the information was gathered by means of an individual semi-structured questionnaire completed online by the participants of the sMOOC “Step by Step” in two instances of the course (2015 and 2016). The questionnaire was completed anonymously and voluntarily at the end of the course. The questionnaire was available on the ECO platform and sent using LimeSurvey software. Later, the collected information was analysed using Statistical Package for the Social Sciences.

This process made it possible to compile the necessary information with significant savings in costs and materials. It could not have been conducted otherwise since the respondents were in several different countries of residence. An important advantage of this type of questionnaire is that the respondents can choose the best time and place to answer the questions. Finally, considering that the sMOOC is carried out on the Internet, the online questionnaire seemed the natural procedure. The total sample of this study

consisted of 292 responses (representing 8.5% of the total of 3416 participants in both instances of the course), with ages ranging from 19 to 73 years old.

The questionnaire consisted of a total of 30 questions, the majority of which provided choices and included a Likert scale, in order to ascertain the degree of satisfaction, the level of learning, the interaction and the usefulness related to the different dimensions learned in the course. The questionnaire was validated by experts before administering. It consisted of three blocks of questions. The first block gathered the demographic information of the respondents and technical information about the way in which they were informed about the course, the amount of time devoted and their opinion about the course contents. The second block included questions relative to the methods of learning, the aims of the course, and their opinion and personal evaluation of the sMOOC. This section dealt with issues related to the hypotheses: the involvement in the course, the interaction with other students and the level of fulfilled expectations. Finally, the third block gathered information on the use of technological infrastructure, technical problems, fulfilled expectations, degree of completion and intention of taking more sMOOCs.

Description of the participants in the sample

The sample was comprised of 52.1% women and 47.9% men, which can be considered a balanced distribution. As for the age variable (X1) (Table 1), according to the differentiation that Prensky (2001) makes from the year of birth in 1980, the break-up shows that 34.6% of the sample correspond to the so-called digital natives and 57.2% to the digital immigrants.

Table 1
Age distribution in the sMOOC

X1_Age_	Frequency	Percentage
Below 36	101	34.6
Above 36	167	57.2
No answer	24	8.2
Total	292	100

In relation to professional experience (X6), Table 2 presents the most representative areas of employment. Only two major groups of occupations appear: 54.1% of the learners devote themselves to teaching and education compared to 45.9% who work in other areas, out of which 8.6% are involved in computer science, mathematics, or information technology. Hence, half the sample is not part of the pedagogical field per se.

Table 2
Area of employment distribution in the sMOOC

X6_Area_of_employment	Frequency	Percentage
Teaching and education	158	54.1
Computer science, mathematics, or information technology	25	8.6
Community or social service	8	2.7
Office or administrative support	8	2.7
Arts, entertainment, sports, or media	6	2.1
Engineering	6	2.1
Business, management, or financial operations	5	1.7
Sales or sales-related	4	1.4
Law	4	1.4
Healthcare	4	1.4
Public administration officer	3	1
Grant holder	3	1
Architecture or design	3	1
Industrial	2	0.7
Construction, maintenance, or cleaning	2	0.7
Transportation	2	0.7
Biology	2	0.7
Farming, fishing, or forestry	2	0.7
Food preparation or service	1	0.3
Professor (doctorate in education)	1	0.3
Dining hall monitor	1	0.3
Natural environment	1	0.3
Emergency	1	0.3
Archaeology	1	0.3
Other	1	0.3
I'm not currently employed	38	13
Total	292	100

When variables X1 (age) and X6 (area of employment) are crossed, they provide an interesting distribution, as shown in Table 3.

Table 3
Variables X1 (age) by X6 (area of employment)

	X1_Age_1		X6_Area_of_employment_		Total
			Educational area	Non-educational area	
19–25	No.	7	10	17	
	% of total	2.4	3.4	5.8	
26–35	No.	38	33	71	
	% of total	13	11.3	24.3	
36–50	No.	68	55	123	
	% of total	23.3	18.8	42.1	
51–65	No.	33	20	53	
	% of total	11.3	6.8	18.2	
Above 65	No.	13	15	28	
	% of total	4.5	5.1	9.6	
Total	No.	159	133	292	
	% of total	54.5	45.5	100	

When considering age by area of employment, the digital natives (19–35) (Prensky, 2001) represent 15.4% in the educational area, whereas the digital immigrants (36 and higher) (Prensky, 2001) represent 39.1% of the sample. Of note is that 15.8% of the digital immigrants are above 50 and may be in need of retraining

or self-actualisation. The two biggest groups are in education: they represent the digital natives in their first job (26–35) and the digital immigrants (36–50) in a full career track.

Results

Enhancement of active and collaborative learning among the future e-teachers

The field work and the ensuing analysis made it possible to answer the research question on the perception of the participants as to their involvement and participation in the sMOOC “Step by Step”. The results corroborate the general hypothesis according to which a collaborative model of learning promotes participation and the pedagogical transformation of the learners as future e-teachers, via active learning strategies.

To do so, it was firstly necessary to examine the socio-educational and demographic profile of the learners in the sMOOC “Step by Step” to determine if there were characteristics that could be related to a greater or lesser degree with participation and involvement in the course. Table 4 presents the p values of the Chi-square test for the independence between these socio-educational and demographic characteristics, such as age (X1), employment (X6), the satisfaction with the involvement in the course (X30) and participation of the learners in the course (X31) together with the pedagogical design of collaborative tasks (X18).

Table 4
P values of the Chi-square test for the independence of nominal variables

	X30 To what extent does sMOOC promote learner involvement?	X31 To what extent does sMOOC promote interaction between learners?
X1: Age ($n = 268$)	0.881	0.795
X6: Area_of_employment ($n = 292$)	0.000*	0.446
X18: Design_collaborative_tasks ($n = 292$)	0.000*	0.000*

* The relationship is significant (0.01).

Though age does not have an influence in X30 and X31, the data were crossed between the variables X1 (age), X30 (involvement of the students in the course) and X31 (interaction among students). Tables 5 and 6 show that digital immigrants have higher values in the involvement in the course and in the interaction with other learners. This suggests that the digital immigrants do not have problems with the use of technologies and that motivation comes from interest in the educational profession.

However, the first sub-hypothesis, according to which involvement changes according to age, was not validated. The results show that the age variable does not influence the involvement of the learners in the learning process. This invalidates Prensky’s (2009) generational divide and validates his digital wisdom revision. The results point to the need of training across all age groups as the people born in the Internet era have used it in the context of leisure and they have not transferred their uses to the professional sphere. In fact, the data in the crossed Tables 5 and 6 demonstrate that the level of involvement and of interaction among peers seems higher among the population born before the Internet, the so-called digital immigrants.

Table 5
Level of involvement in the course by age (broken down by before or after 1980)

		X30 To what extent does the sMOOC promote learner involvement?				Total
		Completely	To a large extent	To some extent	Inadequately	
Born before 1980	No.	33	47	18	3	101
	% of total	12.3	17.1	6.7	1.1	37.7
Born after 1980	No.	55	71	36	5	167
	% of total	20.5	26.5	13.4	1.9	62.3
Total	No.	88	118	54	8	268
	% of total	32.8	44	20.1	3.0	100

Table 6
Level of interaction of learners by age (broken down before/after 1980)

		X31 To what extent does sMOOC promote interaction between learners?				Total
		Completely	To a large extent	To some extent	Inadequately	
Born before 1980	No.	26	44	24	7	101
	% of total	9.7	16.4	9.0	2.6	37.7
Born after 1980	No.	38	73	45	11	167
	% of total	14.2	27.2	16.8	4.1	62.3
Total	No.	64	117	69	18	268
	% of total	23.9	43.7	25.7	6.7	100

Finally, calculating the Kendall and Spearman correlation coefficients between ordinal variables X18, X30 and X31 (Table 7), a positive correlation is observed also between these variables: the design of collaborative tasks for the course influences positively the involvement in the sMOOC and the interaction between learners. This confirms that the collaborative dynamics carried out in the course involve and engage learners in a transformative pedagogy. It suggests that they may carry it out if they decide to be involved in the production of their own sMOOC, which relates to the general hypothesis.

Table 7
Kendall and Spearman correlation coefficients between variables X18, X30 and X31

			X18 Design collaborative tasks	X30 To what extent does sMOOC promote learner involvement?	X31 To what extent does sMOOC promote interaction between learners?
Kendall's Tau	X18_Design_collaborative tasks	Correlation coefficient	1.000	.498*	.576*
		Sig. (bilateral)	.	.000	.000
		N	292	292	292
	X30 To what extent does sMOOC promote learner involvement?	Correlation coefficient	.498*	1.000	.667*
		Sig. (bilateral)	.000	.	.000
		N	292	292	292
	X31 To what extent does sMOOC promote interaction between learners?	Correlation coefficient	.576*	.667*	1.000
		Sig. (bilateral)	.000	.000	.
		N	292	292	292
Spearman's Rho	X18_Design_collaborative tasks	Correlation coefficient	1.000	.565*	.645*
		Sig. (bilateral)	.	.000	.000
		N	292	292	292
	X30 To what extent does sMOOC promote learner involvement?	Correlation coefficient	.565*	1.000	.20*
		Sig. (bilateral)	.000	.	.000
		N	292	292	292
	X31 To what extent does sMOOC promote interaction between learners?	Correlation coefficient	.645*	.720*	1.000
		Sig. (bilateral)	.000	.000	.
		N	292	292	292

* The correlation is significant at level 0.01 (bilateral).

With a view to ascertaining the statistical reliability of items X18, X30 and X31, Cronbach's alpha was applied (Table 8), using Statistical Package for the Social Sciences. The result obtained was .813, well above the acceptable threshold of .7, which points to a high reliability level (Cronbach & Shavelson, 2004). This high level confirms the internal consistency of the results, that is to say, the strong correlation between the three items:

- Design collaborative tasks (X18)
- To what extent does sMOOC promote learner involvement? (X30)
- To what extent does sMOOC promote interaction between learners? (X31).

Table 8
Cronbach's alpha for X18, X30 and X31

Reliability statistics	
Cronbach's alpha	N of items
.813	3

Consequently, the joint instruments of Kendall and Spearman and Cronbach's alpha coefficient validate the results of the research as well as its methodological choices.

The correlations carried out in the quantitative analysis of the data validate the learning process characterised by the relational factor, that is to say, by the connection between the participants in a dynamic, fluid and progressive form by means of different modes of interaction.

The analysis of these aspects has implied more horizontal and participatory dynamics based on multidirectional communication between various actors. Such dynamics have a significant impact on empowering learners in their own process of education and learning, fostering their epistemic maturity, besides contributing to the formation of social and collaborative groups of learning, and inciting learners to create their own sMOOCs as e-teachers. These e-teacher sMOOCs in turn show that the innovative pedagogical design has been adopted by the learners.

The e-teachers replicator sMOOCs

If the first sub-analysis was not validated, the second one, the level of involvement in relation to the area of employment was confirmed. Although area of employment does not influence interaction with other learners, it still does express involvement in the course. The level of involvement and interest in a profession appears to be the real motivation for e-teachers, as attested to by the creation of more than 50 new sMOOCs in the third year (2016) of the ECO project.

The new sMOOCs confirm the possibility of transfer by replication, that is, the duplication of formats, methodologies, competences and evaluations as fostered by the "Step by Step" set of resources and processes. They were proposed by teams that involved nearly 700 e-teachers as replicators who have learned to negotiate their competences between the spheres of leisure and of work. Some of the choices of themes reflect an aligned form of replication, with themes very much aligned with those of the "Step by Step" sMOOC and its focus on digital competences and innovative pedagogies:

- Mediation of conflicts in classroom
- Teacher training in first aid
- Cyberbullying 3.0: Discursive communities around cyberbullying
- Infographics: Educational and pedagogical use
- PhD and continuing career
- First step with an ERP
- Evaluation beyond grades: Practical experiences
- Digital culture: Digital humanities and ICT, the future of the humanities
- Awakening the gaze: Introduction to the critical reading of the image
- Open educational resources (OER), research articles and development of academic communications
- How to make a flipped classroom project.

The titles of the e-teachers sMOOCs show a real interest in reflecting over the digital affordances, especially in their relation to education.

Other choices of themes reflect a non-aligned form of replication, where the format and pedagogy are kept alike but the themes are not related to academic disciplines and canon:

- Cave painting
- Crowdfunding
- Healthy running 2.0

- Volunteering and you: Development aid
- Organisation and communication in youth associations
- Healthy food for sport
- Music therapy as a resource against bullying
- Micromachism
- Forest fires: A multidisciplinary approach.

The open process of intercreativity has empowered some learners and transformational leaders to push forward the process and show even more epistemic maturity than their colleagues.

These sMOOCs show a variety of interests that circumvent any required or prescribed academic degree, but may reflect legitimate needs or desires that are facilitated by the platform. In both forms of replication, there is a visible transfer with a snowball effect as a majority of the topics is related to digital competences (privacy in social media) and innovative pedagogies (flipped classroom). Some titles suggest personal interest and autonomy as well (healthy eating for sports). There is also a mirror effect as the e-teachers and transformational leaders carry on the participatory design model set in place by the designers and pilots (contrary to other education models where the teachers are trained in content delivery mostly). The topics they choose and the titles they give them suggest an interest for project-based pedagogies, multi-disciplinary approaches and self-actualisation.

Discussion

As evidenced by the results, e-teachers are aware of the need to be technically and pedagogically savvy in their profession and use the sMOOC as an opportunity for self-updating and lifelong projection (Castaño-Muñoz, Kreijns, Kalz, & Punie, 2017), thus confirming the fifth pillar of education, learning to evolve (Camarero Cano & Cantillo-Valero, 2016).

The “Step by Step” population of learners evinces four different profiles: the designer, the pilot, the learner at large and the transformational leader. The research demonstrates the emergence of a group of transformational leaders (Jung, 2003) who act as connectors and motivators. They do not correspond to opinion leaders (Mackness et al., 2010), because they emerge from a participatory approach that is not vertical or linear. They point to a new typology to be added to participation, as they reflect the more horizontal approach specific of the social change: the interaction supported by influencers or transformational leaders.

The transformational leaders in ECO relate more to the influencers of the digital world, able to create nodes in non-linear exchanges rather than be leaders of a linear audience (Frau-Meigs & Bossu, 2017). Their influence depends on their capacity to transfer experience and information, based on the “relational factor for inclusiveness and participation” (Marta-Lazo, Osuna-Acedo, & Frau-Meigs, 2018, p. 11). They are not in a rival situation, as they are more interested in creating a community online, as evidenced by the fact that 70 sMOOCs implicated 700 team members. They believe in recommendation (many e-teachers attended other ECO sMOOCs and replied positively in the questionnaire concerning their intention to attend other sMOOCs). They can act as mentors and counsellors, and they can also evolve towards being creators of new sMOOC, as in the case of the e-teachers, which confirms the potential for intercreativity (Osuna-Acedo & Camarero-Cano, 2016).

This emergence of transformational leaders or influencers can be understood as a distributed model, related to the model of transition by change agents (Roberts, 1985) and by interpersonal interaction with the network of learners around them. This two-level distribution shows that effective change occurs, one step at a time, without pushing for big pedagogical transformations but nudging instead for small-scale transformations, which contain huge replicating potential. The snowball effect results from the fact that transformational leaders act like influencers who support other pedagogical methods that are more interactive and participatory in nature. This allows them to become e-teachers who take the lead in new teams of MOOC creators, becoming models of pedagogical transformation. This is confirmed by the mirror effect, as the pedagogical transfer focuses on the form and format of the course rather than on the contents per se. The connectivist model of Siemens et al. (2012) is carried further with a socio-cognitive model mediated by transformational leaders who embark the learners in the process with them.

Several explanations can explain this emergence. The socio-economic perspective shows that these leaders already are in the system and see the sMOOC as a new professional strategy to enter the labour market or to retrain, to be competitive inside the market, as professional reorientation and to self-tune using digital affordances as purported in learning to evolve. They want to make their competences more visible and to reveal their potential.

The sociocultural perspective shows that the competences in activities of leisure do not penetrate professional activities. The step to a public service level is not obvious. The integration of transformational leaders is a way of contributing to a change in mindset, as their epistemic maturity evinces. They themselves have dealt with other cultures, with two levels of interculturality: between the European countries of the “Step by Step” and between the professions in the same country (Osuna-Acedo & Camarero-Cano, 2016).

The potential of MOOCs for social change is called into question by some authors, such as Stohl (2014), who raise numerous questions about their communicative dynamics and their revolutionary capacity to bring in a new era of educational democracy or, on the contrary, about their transitory short-lived spurt in distance learning. But there is no need to applaud the potential of MOOCs or to criticise their weaknesses. The possibility of a pedagogic transformation can be on a small scale, by means of the empowerment of transformational leaders who pass the torch to others, by replication, generating networks of short or medium range and scope, which multiply little by little. This stepped and distributed manner revises the mass interests and the macro-scale of connectivism with the relational factor and posits that transformational leaders are influencers who can act as change agents.

Recommendations or implications from the research

Further research on this new relational factor concept is highly recommended, as a truly innovative and scarcely studied element in previous scientific literature. Therefore, one of the main contributions of this research is the inclusion of this concept in training practices for future e-teachers, under a new communicational paradigm based on professional transfer.

Limitations and future research opportunities

The main limitations this research has faced lay on the difficulty of having speakers of six different languages interacting and using social media as learning environments. A different follow-up has been required on the fly depending on the students’ context and geographical location.

Further exploration of the educational model in our study provides new opportunities for future research. The analysis should go beyond pedagogical transformation into its potential social transformation, towards ethical commitment and citizen awareness. Such an approach implies increasing self-awareness and engaging with continuous personal development and subsequent lifelong learning.

Some conceptual and practical aspects of tMOOCs are yet to be developed, such as intercreative talent, students’ empowerment and the proactive, respectful and healthy use of social media as scenarios for educational interaction. Finally, the study of the tMOOC model as a method for citizenship training on ethics is suggested as a possible research line in future work, with the aim of preventing unwanted social behaviours such as gender-based violence, ideological radicalisation, and intolerance towards the different.

Conclusions

This paper presents a model of learning transfer towards autonomous empowerment and pedagogical transformation. The design of collaborative tasks in the sMOOC influences involvement and interaction with peers. This may give more importance to those methodologies carried out with an eminently participative conception. Learners seem to take co-responsibility for their own learning and therefore their involvement proves more effective in the course while it enhances their interaction with others. They seem to have incorporated this design in their own sMOOCs. The learners who are empowered are for the most part those in the field of education and those who later transfer their learning gains to the creation of other sMOOCs. Though they could be considered as a captive audience and self-selected group, they maintained their motivation in spite of the heavy attrition rates in MOOCs. From the emergence of the intermediary leaders and their networks comes the need to consider that ECO sMOOC creates a new type of MOOC, the

tMOOC where the “t” stands for transfer, as a learning proposal based on collaboration and empowerment for pedagogical transformation – another dimension of the “t”.

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