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Analysing the Impact of Built-In and External Social Tools in a MOOC on Educational Technologies

Carlos Alario-Hoyos[1], Mar Pérez-Sanagustín[1], Carlos Delgado-Kloos[1], Hugo A. Parada G.[1], Mario Muñoz-Organero[1], and Antonio Rodríguez-de-las-Heras[2]

[1] Department of Telematic Engineering, Universidad Carlos III de Madrid
Av. Universidad, 30, 28911, Leganés (Madrid), Spain
`{calario,mmpsanag,cdk,hparada,munozm}@it.uc3m.es`

[2] Faculty of Humanities, Communication and Documentation
Universidad Carlos III de Madrid. Calle Madrid, 126, 28903, Getafe (Madrid), Spain
`heras@hum.uc3m.es`

Abstract. MOOCs have been a disruptive educational trend in the last months. Some MOOCs just replicate traditional teaching pedagogies, adding multimedia elements like video lectures. Others go beyond, trying to engage the massive number of participants by promoting discussions and relying on their contribu-tions to the course. MOOC platforms usually provide some built-in social tools for this purpose, although instructors or participants may suggest others to fos-ter discussions and crowdsourcing. This paper analyses the impact of two built-in (Q&A and forum) and three external social tools (Facebook, Twitter and MentorMob) in a MOOC on educational technologies. Most of the participants agreed on the importance of social tools to be in touch with their partners and share information related to the course, the forum being the one preferred. Fur-thermore, the lessons learned from the enactment of this MOOC employing so-cial tools are summarized so that others may benefit from them.

Keywords: MOOCs, Social Tools, Educational Technologies, Crowdsourcing.

1   Introduction

MOOCs (Massive Open Online Courses) are considered one of the main educational trends in the last months [1, 2]. Initiatives like Coursera, edX, Udacity or MiríadaX are changing the ways we teach and learn, going beyond traditional online courses, and reaching thousands of learners worldwide [3]. The opportunity for free training through courses taught by experts from major Universities in a ubiquitous context seems very attractive for learners, opening up new opportunities for defining new pedagogies [4] and business models [5].

MOOCs are deployed in platforms that offer services for managing the massive amount of learners. The role of instructors in MOOCs is to design the initial contents, the assignments and the assessment activities that they later upload to these platforms. How-ever, instructors play a secondary role during the enactment of MOOCs, compared

to traditional online courses, since they cannot provide personalized support to the massive number of participants [6, 7]. The community of learners registered in MOOCs is expected to assist their partners, and to enrich the course with discussions and related contents as a way of crowdsourcing [8]; that is called "learner as teacher as learner" model [9]. The instructor becomes a "guide on the side" [10] clarifying only those key questions that drive the debate [11].

One of the main characteristics of current MOOCs is the high attrition rate among registered users [12], which can go up to 90-95% [1]. This is partially due to the free nature of most MOOCs, which attracts many observers that are not really interested in the contents delivered. However, many other users that are interested leave the course earlier than expected. Among their reasons, their difficulties to become self-learners and the lack of personalized support from instructors [8]. One approach to tackle this problem is to offer several social tools during the MOOC enactment in order to create a community of participants that provides support and advice to those with difficulties, connecting learners at an emotional and value level [13].

MOOC platforms normally include some built-in social tools like forums to centralize learners' contributions, discussions and queries; but also, instructors may suggest alternative tools, external to the platform. However, instead of introducing a pool of social tools randomly, it should be detected which ones are adequate to effectively build connections and collaboration among learners [7, 14]. Moreover, a proper selection of social tools can be a good mechanism to engage learners and promote their participation during the course, as outlined in recent guides for MOOCs design [15]. In summary, a proper selection of social tools can facilitate the community with the necessary support to advance in the course and may help reducing drop-outs from those learners that are interested in the course subject.

This paper proposes a deep analysis of how social tools are perceived and utilised by MOOC learners to shed some light on their selection process. Particularly, this analysis involves five social tools used throughout six weeks in a MOOC on educational technologies taught in Spanish and deployed in the platform MiríadaX by Telefónica Learning Services[1]. Two of the tools are built-in (a Q&A service and a forum), while three are external to the platform (Facebook[2], Twitter[3] and MentorMob[4]). The analysis on these tools includes their level of activity in order to detect which social tools are more actively employed, and the kind of information instructors and learners share through them.

The remaining of this paper proceeds as follows: section 2 presents the design of the MOOC on educational technologies and its deployment in the MiríadaX platform, including the built-in and external social tools chosen; section 3 overviews the enactment of the course, collecting information about learners' profiles and performance; section 4 analyses the level of activity in the five social tools and learners' perception on them; section 5 discusses the lessons learnt from the use of these social tools in the MOOC, with conclusions and future work in section 6.

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[1] `http://miriadax.net/web/educacion_digital_futuro`
[2] `https://facebook.com`
[3] `https://twitter.com`
[4] `http://mentormob.com`

2   Design and Deployment of the MOOC

Five Professors and teaching assistants from the Universidad Carlos III de Madrid (Spain) participated in the design and deployment of the MOOC on educational technologies. The six weeks of this MOOC under analysis were structured into two modules covering two fields of knowledge: humanities and engineering. Thus, a wide range of learners could be reached no matter their backgrounds. Particularly, lectures on humanities (module 1) dealt with the concept of interaction and its application to the digital world, while those in engineering (module 2) were about the use of mobile devices in educational settings. Each module was taught during three consecutive weeks. An introductory module presenting the course context, structure, assessment and the social tools was released the day before the first module started.

2.1   Design of the MOOC

The MOOC was designed considering three different aspects in both modules: learning contents, assignments and assessment activities. Learning contents included 8-9 short videos of about ten minutes each week (24-27 videos per module) and supporting materials (i.e. the slides used in some videos); the videos contained weekly interviews with experts on the delivered topics. Assignments included additional reading material and a set of open questions in form of a video showing the opinion of both students and teachers at the campus. Finally, assessment activities covered formative assessment with multiple choice tests after each video lecture to reinforce the explained concepts; and summative assessment with one multiple choice test every week, and a peer review activity at the end of each module, where learners had to submit a work related to the contents explained in that module and later review some peers' works following a given rubric. The contents, assignments and assessment activities were available at the beginning of the week and remained open throughout the course, except for summative assessment activities, which were due at scheduled intervals.

2.2   Deployment of the MOOC

The MOOC was deployed in MiríadaX. This platform allows defining a course structure arranged in different modules, including multimedia resources, multiple choice tests and peer review activities. Videos were uploaded to Youtube and later embedded in MiríadaX as multimedia resources. The course could be followed from laptops, smartphones or tablets facilitating a ubiquitous participation and learning. The platform also provides features to send massive emails to the registered learners, and to publish announcements related to the course in a blog. Also, MiríadaX offers the following built-in social tools that were added to the MOOC:

- **Q&A.** This is a tool for learners to make questions about the enactment of the course, the contents of the modules or the platform. The instructors and other participants may answer the questions or vote them as relevant to gain visibility.

- **Forum.** This is a tool for learners to participate in discussions on selected course topics. The learners must maintain it, but instructors can define a thread structure and make comments on relevant learners' observations about course issues.

Three extra external social tools were selected for this MOOC:

- **Facebook.** Instructors can use this tool to send announcements, foster discussions and share additional multimedia resources with learners, who can contribute to the discussion and share new resources too.
- **Twitter.** Instructors can employ this tool to send short announcements, links to additional resources and quotes extracted from video lectures and learners, who can contribute disseminating the course to their followers.
- **MentorMob.** Instructors and learners can classify and share reading material and websites related to each of the modules through this tool.

Finally, two other external tools were selected in this MOOC: Storify[5] to arrange and share a collection of relevant tweets every week; and Google Drive[6] to deliver questionnaires about learners' profiles and degree of satisfaction with the course. These tools were only used for the instructors to collect and show the learners a summary of the activity in the social tools around the course.

3 Enactment of the MOOC

The two modules of this MOOC under analysis were enacted in February – March 2013. The course was announced three weeks before starting in Spanish and Latin American universities, social networks and press. The first day of the course there were 3105 registered participants. Nevertheless, the registry was never disabled and many learners joined later. All the contents were available since the week they were released to the end of the course, except for summative assessment activities, which were due in scheduled intervals. Even though many latecomers missed some of the first summative assessment activities, the instructors encouraged them not to leave the course since they could pass it by successfully accomplishing the remaining ones. The number of registered users after the six weeks was 5455.

3.1 Learners' Profiles and Motivation

Registered participants had to fill out a questionnaire to help instructors detect profiles and motivation as part of the introductory module. 3,362 learners submitted the answers to the questionnaire (44.6% men and 55.4% women). The range of ages was very varied with most participants between 25-35 years (37.5%) and 35-45 years (24.4%). Learners were located in 40 different countries (mainly Spain and Latin America), which represents a high impact of this MOOC reaching people through multiple frontiers, and at the same time a challenge to teach people with so many different cultural backgrounds. Top countries by number of participants were Spain

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[5] `http://storify.com`
[6] `http://drive.google.com`

(59%), Colombia (10%), Mexico (8%) and Peru (6%). Though most learners had Spanish as their mother tongue (96%), there were important communities of native Portuguese speakers from Portugal and Brazil. It is important to stress that most of the participants combined learning through this MOOC with their regular jobs (57%) and studies (18%), thus demonstrating the potential of MOOCs for workers' training in their leisure time. Also, this MOOC exemplified the cost-effective opportunity for keeping active and updated those unemployed (22% of the registered participants).

The topics of this MOOC awaken interest mainly among qualified people: 40% of the learners took this course as part of their postgraduate studies, and 52% as part of their degree studies. Their backgrounds however were very different: 32% owned some technical background; 46% had some educational background; and 32% claimed some background on humanities. This represented a challenge for instructors, who had to adapt their explanations and vocabulary to a wide audience. Despite the lower number of people with technical background, the second module (i.e. the use of mobile devices in education) was a priori of interest for double those of the first module (i.e. the concept of interaction and its application to the digital world). Finally, it is convenient to note that 61% of the learners had experience teaching and 30% had even recorded educational videos.

3.2   Learners' Performance

From the 5455 registered participants only 81.6% of them started the presentation module, and 64.7% the first week of the first module. This suggests that more than a third of the registered users had no real interest in the actual course material, this being aligned with the percentages highlighted by other researchers [16]. Significantly, there was another sharp drop after the first week, and only 40.7% of the registered learners watched any of the videos scheduled for that week. According to their behaviour, those users that leave the course before the second week (i.e. they enroll in the course but just look at a few contents at the most) are classified in [17] as **lurkers** (either no shows and observers in [18]) and represented 59.3% of the registered users in this MOOC on educational technologies (see Figure 1).
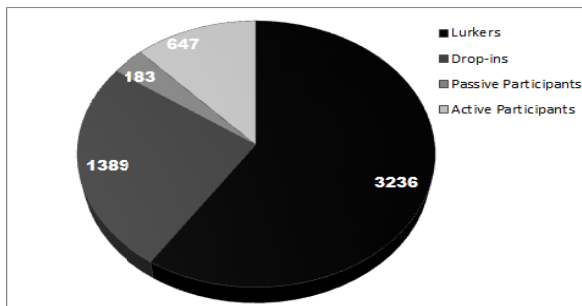

Fig. 1. Classification of the users registered in the MOOC on educational technologies according to their behavior. The description of the type of participants is adopted from [17].

After the second week, the number of participants leaving the course progressively decreased: 31.5% entering the third week; 25.6% the fourth week; 22.2% the fifth week; and 19.7% the sixth week. 830 (15.2%) learners answered the sixth week final test. Users that are initially interested but leave the course as the weeks go by can be classified as **drop-ins** [17, 18], and represented a 25.5% in this MOOC (see Figure 1). Their reasons to stop participating may be interest only in selected topics, disillusionment with the course, lack of support from instructors, lack of time to complete the assignments, or bad experiences with the MOOC platform. Here, learners reported the tight schedule and some problems with MiríadaX as the main shortcomings.

Those users that reach the end of the course can be classified in two groups: **passive participants** and **active participants** [17, 18]. Passive participants are those that consume video lectures and maybe take some tests, but that are reluctant to participate in discussions or complicated activities. On the contrary, active participants not only consume contents, but also contribute to the discussions using social tools, and regularly take part in more elaborated activities such as peer-to-peer (P2P) assessments. In this MOOC we classified as active participants those that claimed to have worked more than two hours per week in the course (the time to see all the video lectures and complete the formative and summative multiple choice tests was estimated in about two hours per week). According to this criterion, 11.9% of the registered users were classified as active participants and 3.4% as passive participants (see Figure 1). These data were collected from a survey delivered after the end of the second module. The coherence of these figures was checked comparing them with the number of learners that completed the P2P assessment in the second module and with the use of social tools (see section 4).

Figure 2 shows the number of learners that carried out the main milestones of the course in chronological order: the surveys about learners' profiles and degree of satisfaction with the course, the weekly multiple choice tests employed for summative assessment and the P2P activities also employed for summative assessment. It is noteworthy that while tests and P2P activities were due in scheduled timings, the surveys were open throughout the course. Differences between active and passive participants are denoted comparing those that carried out the tests and the P2P activities. The P2P activity in the second module received more learners than the same activity in the first module. A possible explanation for this is the initial confusion in the procedure for submitting and reviewing peers' work, as noted from dozens of learners' comments in this line within social tools.

4   Analysis of the Social Tools Employed in the MOOC

As explained in section 2.2, five social tools were employed for different purposes as part of this MOOC on educational technologies: two built-in MiríadaX tools (Q&A and forum) and three external tools (Facebook, Twitter and MentorMob). The analysis of the impact of these social tools was carried out from two different points of view: learners' perspective indicating the utilization of the social tools, and tools perspective, collecting quantitative data from their actual use.
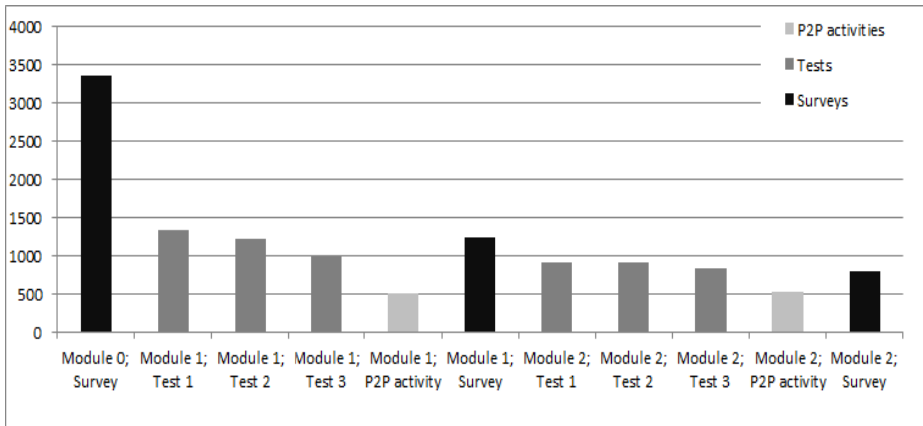
Fig. 2. Number of learners that carried out the main MOOC milestones

4.1 Analysis from Learners' Perspective

Learners were asked whether they intended to participate in the social tools of this MOOC twice during the course: before starting the first module, and before starting the second module. Most learners were willing to participate, and only less than 10% of them had clear from the very beginning that they would not contribute to the discussions.

At the end of both modules, learners' assessed their own participation in each social tool using a six-point Likert scale where one meant, "*I did not use this tool*", and six, "*I used this tool very actively*". Table 1 summarises the results including also the number of answers collected from the surveys. These data indicate that the built-in MiríadaX forum was the social tool that had a higher impact in this MOOC, followed by Q&A, which was very actively used by about 5% of the participants. From the external social tools, Facebook was the one that received a higher interest from learners. It is important to note the growing use of the forum, Facebook and Twitter during the second module. There are two possible explanations for this behaviour: because passive participants are given to leave MOOCs earlier; or because some passive participants may become active after a while benefitting from the cluster of contributions generated by their peers. On the other hand, Q&A kept a similar level of activity while that of the MentorMob slightly decreased in the second module, without catching learners' attention at the level expected by instructors. Learners confirmed the overall increase of participation in the second module: 30.3% of them reported having increased their contributions in the social tools versus 24.8% who decreased them.

To complement this analysis, learners were asked at the end of each module whether they believed social tools were a good mechanism to be in touch with the other participants and share additional information to that provided by the instructors. About 65% of learners reacted positively to this assertion and only 11% of them expressed disagreements, with barely any differences between modules.

Table 1. Learners' perception of their use of the social tools after modules 1 (M1) and 2 (M2)

	Built-in				External					
	Q&A		Forum		Facebook		Twitter		MentorMob	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
1 (I did not use this tool)	47.8%	47.1%	45.1%	39%	59.9%	54%	71.6%	65.4%	63.1%	63.3%
2	21%	21.1%	23.6%	22.3%	17.3%	17.3%	10%	14.1%	15%	18.9%
3	14.6%	14.1%	16.7%	21.3%	11.1%	13.7%	8%	9.1%	10.9%	9.7%
4	6.1%	6.8%	8.3%	9.6%	5.7%	7.6%	4.5%	6.4%	5.2%	4.6%
5	5.5%	5.4%	3.8%	5.5%	3.8%	4.2%	3.2%	2.7%	3.5%	2.5%
6 (I used this tool very actively)	5%	5.5%	2.5%	2.4%	2.1%	3.2%	2.6%	2.3%	2.1%	1%
Number of answers	1190	760	1188	764	1176	761	1173	749	1164	755

4.2 Analysis from Tools Perspective

Q&A had a moderate impact throughout this MOOC. It was frequently consulted by the learners, who mainly inquired about the course assignments, assessment activities and certification, occasionally setting out also questions related to the concepts explained in the theoretical video lectures. Also, it was the entry point for complaints about technical problems in the platform MiríadaX. The instructors regularly replied these questions, but also many learners further contributed with answers or stressing the same questions to gain visibility. At the end of the course there were 270 questions posted, and 464 contributions either questions or answers from 273 different learners. These questions and answers were visualized 6,485 times.

The **forum** was the social tool with a higher impact during the enactment of this MOOC. It was employed for long discussions about the course topics and to exchange common interests within the community of participants. 730 different learners contributed to the forum, posting 2,382 messages in 721 threads. Instructors played a secondary role adding another 138 messages to the most controversial threads. Interestingly, several learners boosted the debates. One of the learners, for instance, posted 155 messages and another participant 82; there were 42 learners with 10 or more contributions and 155 with five or more. The messages posted in the built-in forum were seen 20,901 times.

Facebook produced a moderate impact on the learners of this MOOC on educational technologies. Figure 3 represents on top the number of unique users that talked

about the course website on Facebook per day (i.e. liked the page, posted a comment, liked a comment, or wrote about the site in another page). The bottom of Figure 3 extracts the distribution of new likes per day, which reached a total of 1,297, following a similar distribution worldwide to that of students' profiles in section 3.1 (e.g. 46% from Spain, 12% from Colombia, 11% from Mexico, 8% from Peru). Both graphs reflect an initial excitement and a progressive drop as it also happened with learners' performance in section 3.2. Interestingly, peaks on likes correspond to the start of new weeks, when instructors posted messages on Facebook with instructions about new available materials and deadlines. Other peaks that can be seen, but only in users talking about the course (Figure 3 top), are a consequence of learners' replies to instructors' open questions aimed at fostering the debate. Instructors published 28 messages on Facebook, and received 529 comments from 275 different learners (and 874 likes on these messages and comments). 44,236 users visited this site considering unique users per day according to Facebook analytics.

Twitter had a moderate impact on this MOOC, reaching 815 followers. It was mainly employed to send short announcements by the instructors, who posted 97 tweets (21 retweeted from learners and 19 automatically generated from Facebook entries). The MOOC hashtags facilitated the easy aggregation of Twitter messages produced by participants. Learners shared their opinions in the form of tweets, but also linked videos and other resources related to the course topics. 165 different learners mentioned the course hashtags, although a few of them were particularly active with up to 26 posts. Figure 4 shows a distribution of the times the MOOC hashtags were mentioned per day. It is noteworthy that this distribution follows a similar structure compared to that of Facebook (Figure 3), since announcements and open questions were sent to both social tools at the same time.

MentorMob did not reach the expected impact on this MOOC as a tool to share contents. Instructors created three lists with additional material: one for the presentation module with three personal sites, one for the first module with three readings related to the interaction topic, and one for the second module with 17 additional resources about the use of mobile devices in education. Only 43 new contributions in total were received from 32 different learners. It was noted that students preferred other social tools like the forum or Facebook to share resources. The consumption of extra material was however significant with 20,590 visualizations among all the resources provided by the instructors in MentorMob and those crowdsourced by the learners using this social tool.

Table 2 summarizes the contributions from learners in the form of posts in the different social tools indicating also the number of posts from the most active learners, who turned out to be different in each social tool. The built-in MiríadaX forum was the tool with a higher popularity among the participants on this MOOC on educational technologies, followed by Facebook. These results are consistent with those presented in section 4.1 about learners' perception of their use of social tools, although in that section both production and consumption were implicitly analysed, while here only production is taken into account.
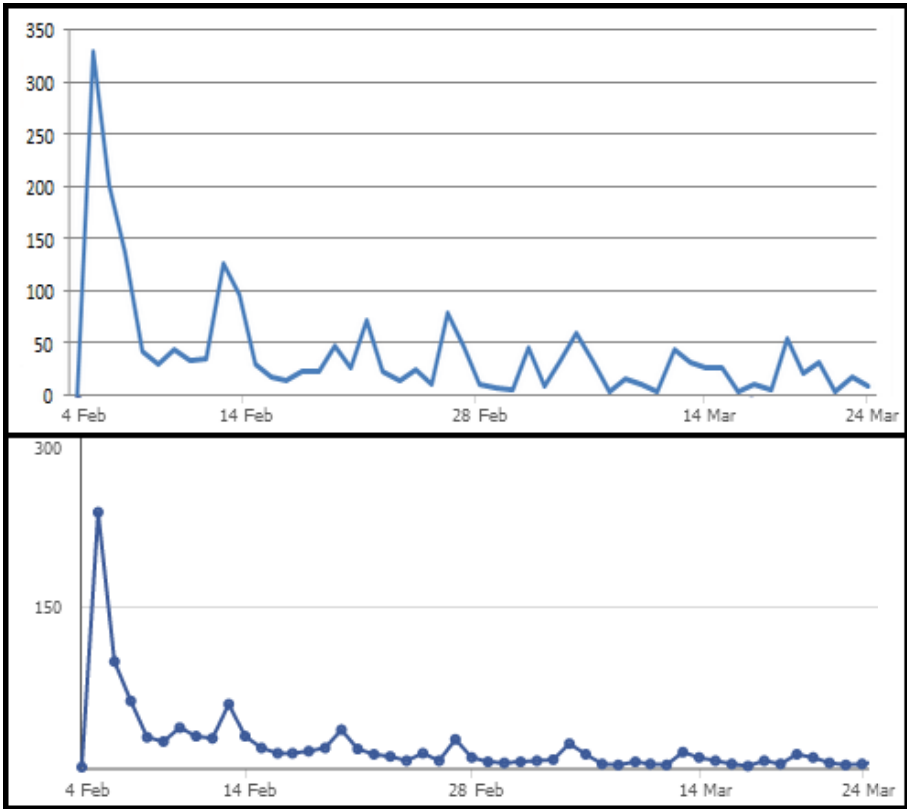
Fig. 3. Facebook impact on MOOC learners: graph on top represents the unique users that talked about this MOOC on Facebook per day; graph on bottom represents the unique users that liked the Facebook site about this MOOC per day. Source: Facebook.
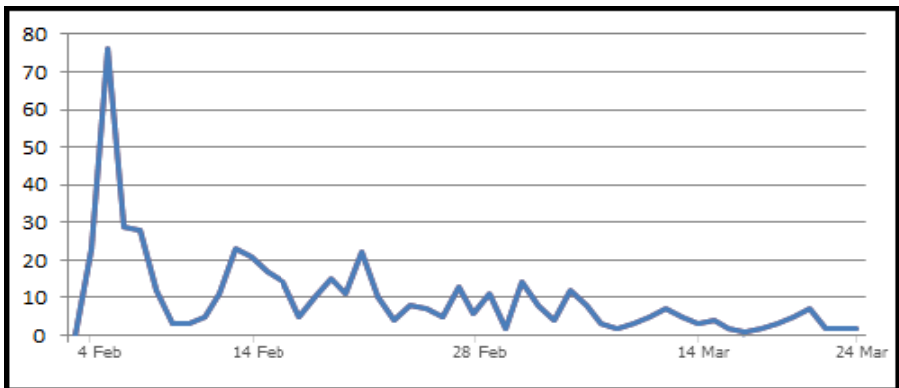

Fig. 4. Twitter impact on MOOC learners: tweets related to the hashtags of this MOOC per day. Source: Twitonomy and Topsy.

Table 2. Contributions from learners in the different social tools

	Built-in		External		
	Q&A	**Forum**	**Facebook**	**Twitter**	**MentorMob**
Number of learners that posted on this social tool	273	730	275	165	32
Number of posts	464	2,382	529	504	43
Number of posts by the most active learner	7	155	12	26	6

5 Discussion about the Use of Social Tools

The analysis of the impact of social tools in this MOOC suggests that built-in tools, and particularly the forum, are preferred by the learners to discuss and contribute to the MOOC. One possible explanation to this finding is that the centralization of tools and contents in one single platform allows participants to work in learning and assessment activities without exposing their personal lives as usually occurs when employing external social tools like Facebook or Twitter. This explanation matches with the results obtained in the study by Kop et al. [7], where people employed more the forums than the Facebook groups for privacy and personal security reasons and for a sense of trust and feeling comfortable and confident to be able to participate.

It is important to take into account that not all the tools cover the same purposes (i.e. while some social tools may be useful for short announcements or posing questions, others are specific for discussions). Further, learners may be used to several social tools in their daily lives, promoting their utilization when working in MOOCs. As an example, despite the low number of learners contributing in Twitter, their average number of posts was higher than the one in Facebook or Q&A, as it was also higher the number of posts of the most active learner. Therefore, it seems appropriate to offer multiple options of social tools when designing and enacting MOOCs in order to cover the wide range of expected learners. This is aligned with the conclusions extracted in [7], where authors point out the importance of different contexts in open courses to get different levels of participation and outcomes.

However, offering multiple social tools has a counterpart, since it also means decentralizing discussion threads and increasing the number of places that learners may need to check to follow their peers' contributions. Thus, it is important that both instructors and participants learn how to filter the massive amount of information that can be crowdsourced in a MOOC. MOOC platforms may include some services to facilitate this filtering (e.g. rankings for most voted posts); although external social tools does not always provide indicators of the quality of the contributions that help learners discard those with a lower relevance. Particularly, we received complaints of information overload diluted in several spaces (forum, Facebook, Twitter…) from some participants. One of them even pointed out that too much information may hinder the learning process. Thus, it would be recommendable to give advice to

learners about how to filter information at the beginning of the MOOC. Moreover, best practices about how to use forums and social tools in a clean and ordered way should be taught and reminded periodically (e.g. not creating unnecessary threads, reading first before writing, etc.). Even though we provided documentation for this purpose at the beginning of the MOOC, the guidelines were not followed by some of the users, who created a bit of mess favoured by the massive context, especially in the forum.

Information overload together with a lack of appropriate searching mechanisms complicated that instructors could solve key questions related to the course topics and support students in advancing on the course. Results show that the students were who assumed the role of mentors, giving advice to those participants with higher problems to follow the course, and offering themselves for queries related to the assessment activities. This happened especially in Q&A, in the forum and in Facebook during the enactment of this MOOC. This supports the conclusions extracted in [7], which stress on building MOOCs based on the learner-in-dialogue model inspired in the conversational framework by Laurillard [19] and on the co-creation of the MOOC environment, with activities for reinforcing orientation for learners, coaching, mentoring and practices of peer facilitation. The role of volunteer mentor demands special features to those playing it, normally: advanced knowledge in the delivery subjects, engagement with the course structure and activities, flexible time to work in the course and attitudes to help the others without financial reward in exchange. From the thousands of people registered in a MOOC it is likely to find a few of them that may voluntarily play the role of mentor, as it was the case here. All this matches with the conclusions in [14], which highlight the high number of student to student interactions that normally occur in MOOCs, to fill the gap regarding student to instructor interactions.

Nonetheless, students do not always employ social tools in MOOCs to critically contribute to the discussions or to help learners in trouble. Their open nature makes that everyone can register and post comments, and so there is a risk that people with negative intentions try to divert attention from learning tasks. For instance, we detected a few users that registered just to post complaints, most times about unrelated subjects (e.g. political nature). Others tried to advertise their products, looking for customers in the mass of participants. Finally, a couple of users made public the answers to some of the multiple choice tests in the forum when others still had time to complete them. Of course, assessment is a very important weakness on current MOOCs that is under research with strategies like proctored exams [20]. However, our experience shows that a few scatterbrained or bad intentioned people may disturb the work of many others willing to learn. To fight against those undermining the learning process, MOOC platforms and external social tools should include options to unregister those users with a bad behaviour and to mark comments as inappropriate when proceeds. However, it is still an open challenge to see how to make these unregistering options open to the community of participants, since instructors cannot face the huge amount of information generated.

Finally, it is noteworthy that participants may decide to employ other social tools, apart from those selected by the instructors. For instance, in the MOOC on educational technologies one of the participants decided to share his work in a P2P activity in Google Documents posting later the URL in the forum to be assessed by his partners. The motivation for this fact was that the deadline for submitting the P2P works

through the platform MiríadaX (as stated by the instructors), had expired and so, the corresponding submission feature was disabled. This is just one example, but there is a great potential in the community of learners for the selection of alternative tools for their communication and discussion within MOOCs.

6   Conclusions and Future Work

Current research points out that the community of learners registered in MOOCs should be responsible for assisting those peers with problems, who cannot find support from instructors due to the massive condition of these courses. Thus, a proper selection of social tools is needed to generate in the participants a sense of "place" and proximity that facilitates answering queries, fostering discussions, and contributing with new resources to the course.

In this paper, we analysed five social tools employed in a MOOC on educational technologies. The forum has revealed as the tool preferred by the learners for social interactions and discussions followed by Facebook and Q&A, although the latter was mainly employed for specific questions about course procedures rather than for deep discussions related to course topics.

One important lesson learnt from this analysis is the trade-off between providing multiple social tools to satisfy most learners' needs during the MOOC enactment, and the information overload that the use of all these tools at the same time causes. This overload may hinder the real learning process if participants get lost in all their partners' posts without properly filtering those that are relevant.

However, this study also poses a new set of open questions: 1) How to design MOOCs to foster and scaffold participation of novel learners while promoting the mentoring role of experts? 2) How to provide tools for supporting MOOC participants' self-regulation to deal with those trying to undermine the learning process? Considering that the forum and Facebook were the tools that received more contributions, 3) Would the activity of participants in social tools increase if we could automatically integrate those Facebook posts related with the forum open threads? These challenges open new research venues for other researchers involved in MOOCs.

Apart from dealing with these open questions, future work will analyse other social tools in MOOCs of a different duration. A different research line will look for mechanisms to engage more MOOC learners to contribute to the discussions in social tools. Finally, the connections between the actual use of social tools and the scores obtained by the learners in MOOCs will be researched.

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