ORIGINAL

Enhancing learning with the social media: student teachers' perceptions on Twitter in a debate activity

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ABSTRACT

This paper presents research focused on the educational experience of students using the microblogging platform Twitter for debate activities in three groups in different teacher education programmes at the University of the Balearic Islands, Spain. The implementation of this technology-based task in a face-to-face class was introduced as an innovative experience as a way of enhancing student learning and fostering participation in the context of formal learning. The educational objectives of these activities, besides working on the topics of the debate, were to empower student teachers' Personal Learning Environments, engage student participation and enhance their use of social media and mobile devices for learning. Student perceptions were assessed by means of a questionnaire completed by them at the end of the courses. Tweets related to the debate were also collected in order to obtain some statistical data on student participation. Data collected allowed the researchers to observe student teacher engagement with the use of Twitter for the debate activity and its impact on their learning and understanding of the debate topic. Results also showed positive perceptions towards the use of social media in education and students' willingness for future use, learning opportunities from Twitter and the use of mobile technology were also envisioned. Finally, conclusions argue the implications for practice of the current study and highlight some issues for further research, such as the exploration of new and innovative uses for teachers' professional development and the empowerment of new activities and habits in learning on the move.

KEYWORDS: HIGHER EDUCATION, TEACHER EDUCATION, STUDENT PARTICIPATION, EDUCATIONAL TECHNOLOGY, EDUCATIONAL STRATEGIES.

1 INTRODUCTION

Since Twitter was launched in 2006, teachers worldwide have introduced it in innovative educational practices (Castañeda, Costa, & Torres Kompen, 2011).

There is an important line of research that has been conducted based on the use of Twitter over a wide range of learning settings. Thus, there are studies within diverse areas, aims and contexts and there seems to be a special interest in both pre-

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service and in-service teacher education. In some studies Twitter is defined as a social media tool (see for example, McArthur & Bostedo-Conway, 2012). In others, Twitter is more specifically defined as a microblogging tool (see for example, Carpenter, 2014).

Microblogging is a "web service that allows the subscriber to broadcast short messages to other subscribers of the service […]. The appeal of microblogging is both its immediacy and portability". Subscribers can read microblog posts online or request that updates be delivered in real time to their desktop or mobile device (Rouse, 2009).

The present study is related to an educational activity suggested as an innovative technology-based task in the context of formal learning in higher education. The activity focuses on Twitter as a microblogging tool in a debate task in initial teacher training in order to extend student teachers' Personal Learning Environments (PLE). Furthermore, Twitter is also used in order to engage the participation of the students and enhance their use of the social media for learning.

2 LITERATURE REVIEW

2.1 The PLE approach to technology in education

The Personal Learning Environment (PLE) has attracted increasing interest since its first conceptualisation at a technical level and its evolution towards a more pedagogical conceptualisation (Fiedler & Väljataga, 2013) although with an important technological base (Attwell, Castañeda, & Buchem, 2013). In this study we opted for a definition that sees PLEs as the activities, connections and resources that one has for learning (Adell & Castañeda, 2010; Attwell, 2007; Hilzensauer & Schaffert, 2008; Vääljataga, Pata, & Tammets, 2011). Therefore, the PLE is divided into three kinds of activities for which tools can be used: reading or accessing information, reflecting and creating one's own knowledge and, sharing and collaborating with others (Adell & Castañeda, 2010; Castañeda & Adell, 2013; Wheeler, 2009b). Social media such as Twitter can have an important impact on the use of the different tools involved in the construction of PLEs (Reed, 2013), and in fact, it has been considered as the central part of a PLE and the driver for the empowerment of one's own network of connections (Simoes & Mota, 2010) for knowledge (Couros, 2010; Downes, 2010; Marín, Negre, & Pérez Garcias, 2014; Salinas, 2013; Sloep & Berlanga, 2011) and so, its persistent use to connect content,

experts and resources has also been recommended (CUE, 2009; Rajagopal, Joosten–ten Brinke, van Brugeen, & Sloep, 2012; Wheeler, 2010a). Therefore, Twitter is powerful for boosting the idea of Personal Learning Networks (PLN), which leads to connected learning or networked learning (Dirckinck-Holmfeld et al., 2012), and serves for personal and professional development.

2.2   Twitter in Education

An institutional usage of Twitter has been noted. In Higher Education institutions it has been used for student recruitment, marketing aims and social communication (Palmer, 2013; Reuben, 2008). Furthermore, the usage of Twitter for learning aims has also been very much implemented and a great deal of research has been carried out. It has been said that Twitter has great potential to extend teaching and learning beyond formal lessons (Ebner, Lienhardt, Rohs, & Meyer, 2010; Evans, 2014).

2.2.1. Learning activities with Twitter

For the educational uses of Twitter, some activities have been listed by many authors –above all, Grosseck and Holotescu (2008) were pioneers with an early article on the wide variety of possible learning activities with Twitter. On the one hand, there are learning tasks based on opinion and content exchange (Conole & Alevizou, 2010, pp. 31-32). On the other hand, there are activities based on collaborative creative writing such as storytelling (Fernández, Revuelta, & Sosa, 2012; Wheeler, 2009). Twitter hashtags are normally used in classroom settings, for example, to expand debate about content or to ask questions (McArthur & Bostedo-Conway, 2012). If Twitter is used to expand interaction that occurs in face-to-face lessons, the activity is called "back channel" and it is commonly used for learning aims (Kwak, Lee, Park, & Moon, 2010; Zhao & Rosson, 2009).

Going beyond single activities, Sample (2010) presents a matrix as a framework for analysing the wide range of possible uses of Twitter in education. The matrix has two axes around which the author organizes nine kinds of activities, describing the uses and benefits of Twitter. The vertical axis represents the activities based on their conversational potential and are ordered from non-conversational to conversational. The horizontal axis organizes student activities from passive to active roles. The activities included in the matrix are the following: institutional communication, tracking activities, in-class back channel, instructor communication, lightly structured activities, out-of-class discussion, pedagogical communication, metacognitive/reflective activities and in-class directed discussion.

The implementation of learning activities on Twitter may present difficulties. Thus, some recommendations have been made such as: considering the importance of providing scaffolding for the use of tools; addressing privacy issues related to the students' need to separate different uses; establishing purpose depending on the aims and types of assignment; and modelling use related to different contexts and aims (Lin, Hoffman, & Borengasser, 2013, pp. 43-44). Scaffolding usage by giving models should be carried out at the beginning of the term so that students can feel confident about what to post (Domizi, 2013). Also, online construction of pre-existing trust has also been used to reduce student anxiety about privacy issues (Stephansen & Couldry, 2014). One interesting point is the debate about language usage, since in a previous paper, the danger of bad grammar was observed (Grosseck & Holotescu, 2008) whereas in recent research grammar has been assessed as stable and correct (Feliz, Ricoy, & Feliz, 2013).

Interest in the integration of mobile technology for the use of social media is also increasing and there is some research into the possibilities of microblogging activities with mobile devices. Holotescu and Grosseck (2011, pp. 7-8) reported in a study the design, implementation and analysis of the experience of using a local microblogging service from Romania with educational participants in an online course. Some changes in educational practices were observed: communication between members and tutors took place in a notational form, learning was personalized, extended opportunities for direct learning were created, psychological comfort and good motivation were achieved, and the development of m-portfolios was developed. Gikas and Grant (2013) demonstrated that the parallel use of social media from mobile technology created opportunities for collaboration and content engagement.

In general, positive perceptions and outcomes are concluded in recent research on Twitter (Badge, Johnson, Moseley & Cann, 2012; Carpenter, 2014; Rinaldo, Tapp & Lavarie, 2011). The relationship between teacher behaviour on Twitter and the positive perceptions of students has been demonstrated (McArthur & Bostedo-Conway, 2012). Moreover, the positive correlation among credibility and the social use of Twitter has also been observed (Johnson, 2011).

2.2.2. Potential and drawbacks

There is evidence that Twitter can increase student engagement and have a positive impact on the improvement of their grades. It has been observed that students' conversations may continue after lessons and that there may be more exchanges among students than in classroom discussions (Junco, Heibergert, & Loken, 2011). In addition, Junco, Elavsky and Heiberger (2013) argue that the way in which teachers use and collaborate on Twitter can also foster student engagement and improve outcomes. Student engagement has been related to the perception of social presence in their use of Twitter in their instructional design and technology courses for real time communication with the local and global community (Dunlap & Lowenthal, 2009).

There is an important line of research based on Twitter as a way to enhance collaboration among pre and in-service teachers. Twitter has also been considered for self-directed professional development of in-service teachers (Visser, Evering, & Barrett, 2014). It has been claimed that in-service teachers have stated that the key role of Twitter is to overcome isolation and to be updated with novelties especially related to technology (Carpenter, 2014; Carpenter & Krutka, 2014a, 2014b). At a scholar level, Twitter usage is also related to the awareness of digital identity (Knight & Kaye, 2014; Veletsianos, 2013).

Drawbacks have also been reported. Some issues on its usability, such as unfamiliarity with Twitter, the overwhelming quantity of tweets that can be generated and the lack of interest in non-educational content have been observed (Lin, Hoffman, & Borengasser, 2013). Also, the limitation of characters that can make self-reflection and critical thinking more difficult to achieve have also been highlighted (Kassens-Noor, 2012).

It is also important to note that Twitter has been observed as a powerful tool for teachers' professional development, both in initial and in-service training courses. In Teacher Education, there is research into the potential of Twitter for reflection in

action (Smith Risser, 2013; Wright, 2010) and for the construction of a networked community of practice for professional development (Lewis & Rush, 2013). Moreover, the research on Twitter in the context of teacher education has also reported barriers for its successful integration, such as resistance of teachers to use Twitter with non-adult students especially because of distraction issues (Lin, Hoffman, & Borengasser, 2013).

3   THE STUDY

3.1   Methodology and research questions

This study is included in a broader research project that is aimed at exploring Twitter for learning from qualitative and quantitative perspectives, following Curtis, Murphy and Shields (2014), who state that both may be necessary in educational research to address it at different levels. The qualitative study is presented by Marín and Tur (2014) and was mainly carried out through content analysis.

Based on a quantitative perspective, the present study is aimed firstly at learning how and when the student teachers used Twitter and their perceptions of it in an educational context. Likewise, it is aimed at knowing their perspectives of usage in their future teaching careers. These issues are explored through the use of Twitter for a debate activity with student teachers, as will be described in the following sections.

The main research question of this study is "has Twitter had a distinctive impact on student learning?" To answer this question and analyse in what way this impact has taken place, the following questions are considered:

To what extent have students engaged in the debate on Twitter?

Do students perceive a better understanding of the educational topic due to the debate on Twitter?

Do students consider the educational affordances of the social media and in particular of Twitter for educational purposes?

3.2   Context and participants

The sample of this study consists of 153 student teachers (both primary and secondary Education) from three different compulsory courses from two studies (Degree in Primary Teacher Training and Master's Degree in Teacher Training) of

the University of the Balearic Islands (UIB), in two physical locations, Mallorca and Ibiza.

3.3   Description of the experiment

The debate activity was carried out as a learning activity separately in different subjects at the UIB during the academic year 2013/14. All the debate activities were carried out between November 2013 and January 2014.

This activity was not directly linked to assessment, although the contents discussed formed part of the course syllabus. Each debate activity ran for two weeks using a hashtag in Twitter, as can be seen in Table 1, where all the information about each group is given. The topics of debate varied in the different groups participating, although they were all related to educational topics.

3.4   Phases of the debate experience with Twitter

The activity and its practical organization were explained face-to-face in class, and had different phases:

Pre-activity session on the basic use of Twitter. At this point, students were introduced to the terminology of Twitter and the use of Twitter and hashtags.

Description of the activity in class and start of the debate activity on Twitter through a defined hashtag. The activity has two phases: face-to-face debate; and an online debate during the previous week.

During the week before the face-to-face session, half of the students supported one point of view while the other half supported the opposite opinion.

At the end of the week, there was a change of roles. This way, all the students had to elaborate reasons to support both points of view of the topic under debate.

The following week, the summary and closure of the activity took place with a face-to-face debate, where conclusions were drawn up.

3.5   Data collection and analysis

The instruments for the data collection consisted of a student questionnaire and the archive of the tweets generated during the debate activity. The questionnaire aimed at collecting information about the student teachers' perceptions of the use of Twitter and its educational affordances, and to explore the increase in the understanding of the topic discussed, whereas the

Table 1. Overview of significant data of the debate activities

Subject	Degree course	Students enrolled	Participants in the discussion activity	Topic of discussion	Period of the activity	Hashtag (#)
Didactic and Curricular Design	1st year of the Degree in Primary Teacher Training (Ibiza)	15	15	Traditional versus constructivist education	8-14 January 2014	#edubateeiv
Technological Means and Resources in the Teaching-Learning Process in Primary Education	3rd year of the Degree in Primary Teacher Training (Mallorca headquarters)	233 in different groups: 76 (group 1), 79 (group 2) and 78 (group 3)	121 in total: 53 (group 1) and 68 (group 3)	Possibilities and drawbacks of social networks in education	7-14 January 2014	#edubate
Educational Contexts and Processes	1st year of the Master's Degree in Teacher Training (Ibiza)	17	17	Traditional versus constructivist education	20-26 November 2013	#edubate

collection of tweets served to ascertain the level of participation in the debate activity.

The questionnaire was designed ad hoc for this activity experience, but was reviewed and validated by another group after a similar activity in the previous academic year. Nevertheless, the instrument generated was originally based on that of Junco et al. (2013) and Reed (2013). It should be mentioned that student teachers were aware that the completion of the questionnaire was voluntary and that their participation was anonymous.

The questionnaire consisted of 22 items divided into 4 categories, which can be summarised in the following table:

Table 2. Questionnaire for data collection

Categories	Items
General data	Age, course, habits related to social networks
Personal Twitter account	Number of followers and followed, type and frequency of use
Discussion activity with Twitter	Impact of Twitter on their engagement in the face-to-face discussion and their future use
Perceptions of the educational and mobile possibilities of Twitter and social networks	Impact of the online activity with Twitter on the perception of the educational possibilities of social networks and mobile devices.

For the tweet archive we used a Google Spreadsheet to collect all the tweets from the hashtags and obtain some basic statistical data of the participants, their tweets and their interactions.

4 RESULTS

As the number of students in each group varies considerably, the amount of data from the debate activities also vary greatly between groups. For this reason, in the section relating to the collection of tweets, we present the data separately for each group. However, the questionnaire presents the answers in conjunction since there are no significant differences between students' use of Twitter and their perceptions.

4.1 Data from the collection of tweets

In the following table data about the amount of tweets generated by students from the different groups are shown:

Table 3. Overview of significant data from the collection of tweets on the debate activities

Real number of participants in the discussion activity	15	121	17
Number of tweets on the discussion	299 (255 unique tweets)	615 (537 unique tweets)	348 (325 unique tweets)
Number of links shared with information about the arguments of the debate	9	87	22
Number of retweets on the discussion	36	137	34
Number of answers to tweets and mentions (@)	161	145	139
Number of tweets per person (average)	13.6	4.6	18.3
Number of tweets per	7	3	16

person (median)			
Number of the most conversational participants (more than 5 mentions)	8	13	15
Number of the most active participants (more than 5 tweets)	11	32 (but only 7 students had more than 15 tweets)	15

From the average and median of the debate activity for each group, it can be seen that in the smaller groups the participation of the students was higher than in the larger group. It appears that the more tweets there were on a hashtag at the same time, the more difficulties students had to stay focused and follow the debate. Also, there is some difference between undergraduate and postgraduate students, as the latter seemed more involved in the debate activity. This is not in line with previous research which has stated that the older the students, the lower the production of tweets (Espuny, González, Lleixà, & Gisbert, 2011; Feliz, Ricoy, & Feliz, 2013). Also, although syntax was not a research object, it can be observed that many tweets contained links and were addressed to other people whereas no communication issue was reported. This syntax pattern is in line with the analysis by Feliz, Ricoy and Feliz (2013).

4.2 Questionnaire

The questionnaire was answered by 54 students from the three participating groups. Data of participants in each group and their average age is summarised in the following table:

Table 4. Data about participants

	Groups			Age	
	Prim. T.T. Ibiza	Prim. T.T. Mallorca	MA T.T. Ibiza	Under 24	Bet. 28-32
Number of students (and Percentage)	n=13 (24.1%)	n=31 (57.4%)	n=10 (18.5%)	n=37 (68.5%)	n=10 (18.5%)

Almost all of them had at least one social network account (96.3%) and the most frequent social networks highlighted by students are shown in Table 5.

Table 5. Social networks

	Facebook	Twitter	Tuenti	Pinterest	Other*
Percentage	98,1%	84,6%	28,9%	7,7%	9,6%

*Instagram, Youtube,Tumblr, Foursquare

As for student use, data showed in Table 6 demonstrate that previous usage of Twitter was not mainly related to education or learning aims. Students were asked about three main uses (a, b, c). However, under the option of others they mainly gave three other reasons (d, e, f).

4.2.1. The experience of using Twitter in the debate activity

We asked the students how the use of Twitter had influenced them in their participation in the debate activity (Figure 1). Most of them said that it had motivated their participation (71.7%).

Table 6. Previous use of Twitter

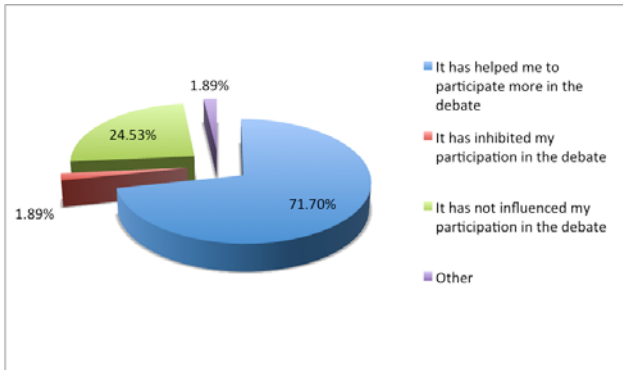|	Following famous people (a)	Connecting with friends (b)	Educational purposes (c)	Sharing quotations (d)	Sharing own's life (e)	Following TV (f)	Others
Percentage	22%	21.1%	20.2%	12.84%	2.75%	7.34	13.8%

Figure 1. Influence of the use of Twitter on student participation in the debate activity

In the question related to the impact on the understanding of the topic and the different arguments of the debate (Figure 2) the ratings were mostly positive. Thus, almost 80% of the participants think that the activity with Twitter had helped them to better understand the topics in the debate.
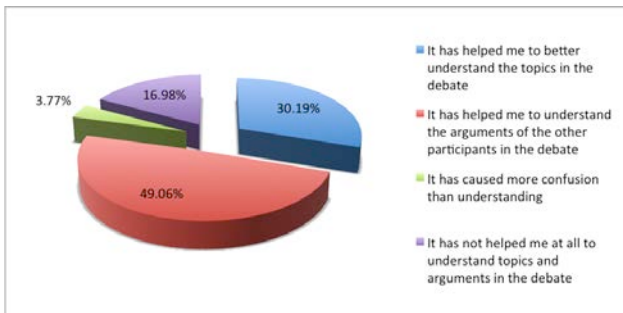

Figure 2. Impact on the understanding of the topic and of the different arguments of the debate

The overall feeling about this experience with Twitter seemed to be positive (Figure 3), since 84.9% of the participants said they had enjoyed and learned from the activity.
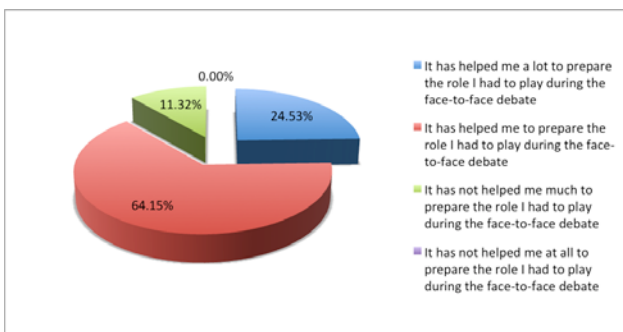

Figure 3. Overall feeling about the experience with Twitter

This online activity seems to have also had positive effects on the preparation of the performance for the face-to-face debate activity (Figure 4). 88.7% of the participants state that this

online activity through Twitter has helped them to prepare the roles they had to play during the face-to-face debate.
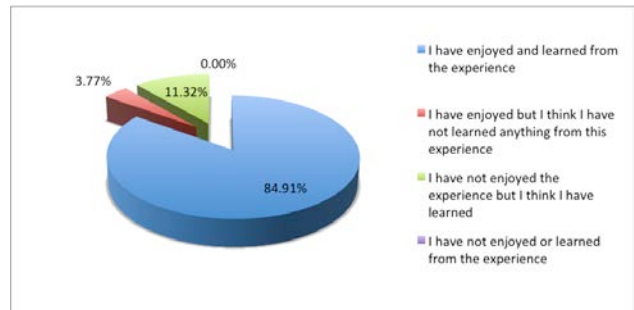

Figure 4. Impact on the preparation of the performance for the face-to-face debate activity

As for the frequency of access to their own Twitter account during the activity, more than half of the students 32.1% report having done it on a daily basis once or more than once daily (58.5%). Only 3.8% say that they have accessed their accounts only twice, one access for each role, and no one said that had not participated. Students were also asked to rate the degree of difficulty of use of Twitter. 90.6% of the participants agree with the ease of learning to use it.

4.2.2. Student perceptions of the educational and mobile possibilities of Twitter and social networks

After this activity, we wanted to know if students thought they would continue using their Twitter account and what use they would give to it. 56.6% of the participants in the survey opted for continuing its use both for educational and personal purposes and other, another 20.8% only for educational purposes, while 23.7% said they would not to use it a great deal from then further on.

Finally, 96.3% of the participants considered that this online activity had made them extend their perception of the educational possibilities of social networks (Figure 5).
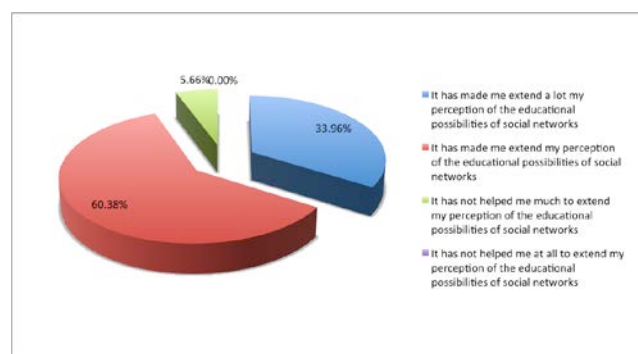

Figure 5. Impact of the online activity with Twitter on perception on the educational possibilities of social networks

Another category of questions of this activity was related to the use of Twitter using mobile devices. The first question asks which technological device students use to access Twitter. The participants could select more than one option between desktop computer, laptop and mobile devices such as tablet or mobile phones. 79.3% of the participants accessed Twitter from a laptop, 58.5% from a mobile device and only 15.1% from a desktop computer.

The following questions were directed exclusively at those who had indicated that they accessed Twitter via some mobile device (n=31, 58.5%). There were also multiple options as to the places from which they used mobile devices for access. Thus, 74.2% of the participants stated that they accessed Twitter from home, while doing other things and at different moments other than study periods. In second place, 58.1% accessed from home, from their workdesk during the normal time reserved for their studies. However, the percentages of participants accessing Twitter from other places are also significant: 48.4% in the street, on the move, doing other activities (free time, relaxing...), and 45.2% from the University, at the library, in regular study moments and with other classmates.

This online activity seems to have also had a positive impact on student perception of the possibilities of mobile technology in education for those who used mobile devices to take part in the online debate activity (Figure 6). 83.9% of the participants stated that using their mobile device for this learning activity extended their perception of the possibilities of mobile technology in education.
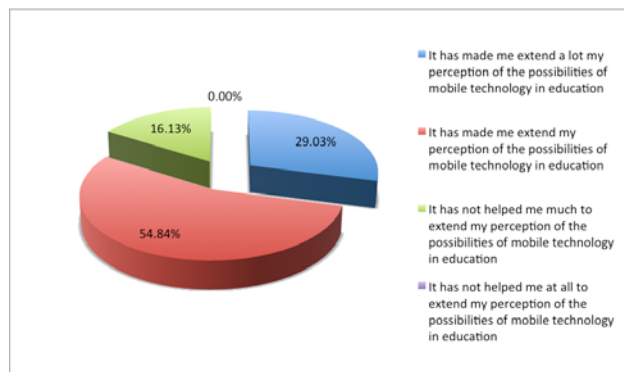

Figure 6. Impact on student perception of the possibilities of mobile technologies

5   DISCUSSION

The introduction of Twitter as an innovative technology-based activity was carried out as an out of class discussion following the matrix suggested by Sample (2010). The fact of fostering students participation out of lessons was a way of expanding the opportunity for learning in the classroom, as suggested by previous research (Ebner, Lienhardt, Rohs, & Meyer, 2010; Evans, 2014), and in this sense, it was a successful innovation that encourages further implementation in the future.

As for the understanding of the topic and classmates' arguments, students confirm that Twitter has had a positive impact. These results support those of Junco et al. (2013) who could conclude that Twitter has a positive influence on student learning. Also, students report having enjoyed the experience of using Twitter for academic purposes. The fact that most of them observe the ease of use of the tools may be one of the reasons for

this general positive impression. As they were previously familiar with the tool, so this was not considered as a barrier for successful usage, a result which is not in line with Domizi (2013). Student engagement results also show the positive perception by student teachers which is also highlighted by previous research (Conole & Alevizou, 2010; Junco, Heibergert & Loken, 2011; Kassens-Noor, 2012; Junco, Elavsky, & Heiberger, 2013). Nevertheless, the differences between the levels of participation of the groups might confirm what has been reported about usability issues (Lin, Hoffman, & Borengasser, 2013). Therefore, it seems that the overwhelming quantity of tweets that can be generated on a hashtag at the same time has made it difficult for students to follow the debate when there are a large number of contributions.

Hence, results about student willingness for future usage and their perceptions of Twitter and social networks in education are also positive, which may contradict previous research by Lin et al. (2013) who observed some level of resistance among student teachers.

As for the usage of Twitter from mobile devices, data show a rather limited access to the service on the move, exploiting the possibilities for mobile devices to learn anywhere at any time. This result confirms the previous research by Tur (2013), related to the creation of podcast, where it was concluded that student teachers do not take advantage of their mobile devices in order to listen or to create their podcast on the move. However, our data show a more innovative use of mobile devices than those observed in previous research; an important habit of use by students accessing Twitter at home although not in traditional moments or places of study as Tur (2013) had observed. Further research should observe the possibilities of mobile technology for the use of Twitter in formal learning contexts.

It can be argued that our educational aim of focusing on Twitter as a microblogging tool in a debate activity in initial teacher training in order to empower student teachers' PLEs, engage the participation of the students and enhance their use of social media has been achieved to a large extent. However, the empowerment of learning processes anywhere and anytime has not been achieved. Despite this, the positive outcome is that firstly students have added another tool to their PLEs, which at the same time has been introduced for learning and, secondly, it has enhanced students' participation as they had to give their opinion through their tweets before and during the debate activity.

In conclusion, it seems that our main research question can be answered in positive terms as indicated by questions on specific aspects of the way the learning impact has taken place. First of all, the collected tweets allow us to conclude that, despite the differences across the groups, students have been highly engaged by tweeting for the development of the debate activity, which has been a pleasurable activity as the questionnaire can also show (Figure 3). Secondly, the questionnaire (Figures 1, 2 and 4) allows us to observe the positive impact on student participation in the debate activity and their understanding of the topic. Twitter has also expanded their learning opportunities from traditional studying habits to more innovative uses with mobile technology (Figure 6). As for student perceptions of the possibilities of Twitter for educational aims, the questionnaire (Table 6 and Figure 5) shows that students' previous main usage was not principally educationally related and that the Twitter task makes them consider it for learning aims.

6   CONCLUSIONS

Since Twitter has been observed as useful to expand learning beyond the classroom, it can be considered powerful for the transformation of educational systems. Despite the relatively small sample, this study contributes with some implications for educational practice as it informs of the possibilities of enriching traditional formal face-to-face settings with the social media. Innovative technology-based activities can be usefully considered as a way of overcoming the passive role of students in the teaching and learning process. The concept of Personal Learning Environment can enhance the use of technology for learning and extending the possibilities of social media for professional development.

As for the limitations of the current study, some drawbacks need to be addressed in further research. First of all, further research should address the relationship between student engagement and learning outcomes for Teacher Education, in line with the work carried out by Junco et al. (2013). Secondly, it is very important to highlight that future use of Twitter in Teacher Education should also include an educational aim for critical thinking and reflective learning. The current study seeks to engage students in active learning but forgets to lead this action towards a more reflexive learning which is one of the most important arguments of the PLE approach (Attwell, 2014). Moreover, future research on social media such as Twitter is needed to discover new and innovative uses for teachers' professional development. Thus, future implementations and research should observe the possibilities of mobile technology for the use of Twitter in formal learning contexts in order to empower new activities and habits in learning on the move (Holotescu & Grosseck, 2011; Tur, 2013). Finally, considering there is research on geolocated tweets, whose conclusions argue that there are different patterns of usage in different cities (Adnan, Leak, & Longley, 2014), in future research it would be extremely interesting to explore these differences in terms of educational practice and learning impact.

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