

Exploring the Educational Capabilities of Social Media in High Schools

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Abstract: Social media constitute an innovative technology that has transformed the way that people communicate and collaborate. Social networks and Web 2.0 tools like wikis and microblogging have the potential to be used by tutors in their courses with the aim to enhance the learning efficiency of educational systems and eLearning procedures. In this work, we study the educational capabilities of social media and web 2.0 technologies like Twitter, Wikispaces and TodaysMeet, exploring their educational potential and learning capabilities and examining their impact on students' learning. The social networks have been extensively evaluated in real classroom conditions and the results collected indicate that the proper utilization of social networks and web 2.0 tools in terms of students' active engagement can motivate and improve students' learning.

1 INTRODUCTION

A school is by nature a social environment. Students interact with peers, teachers and faculty members in a variety of ways, often forming dynamic networks or communities. These networks exist both inside and outside of the classroom. Over the last decade, the advent of the web has changed the way that e-Learning and educational procedures are delivered to students. Social media constitute a trending, innovative technology that has transformed the way that people communicate and collaborate. Social networks and Web 2.0 tools like wikis and microblogging have the potential to be used by tutors in their courses with the aim to enhance the learning efficiency of educational systems and e-Learning procedures (Bennett et al., 2012). In line with the new technologies, the role of the teacher is also changing and is moving from the face-to-face knowledge transmission agent to the specialist who designs the course, utilizes and integrates technological tools and guides the students' learning process (Huertas, 2007). Recently, tutors, researchers and educational instructors are examining and utilizing the emerging and trending technological innovations like social networks and web 2.0 tools for the benefit of students' learning.

The social media technology has become an essential part of personal life as users generate

content, share photos, choose to "like", or interact in web2.0 platform. Young people and students are constantly becoming more aware and familiar with various social platforms and web 2.0 technologies that could become an important mean of communication. Social networking appeals to young people because it is an opportunity for personal sharing of life experiences, venting frustrations and offering reflections on a variety of social issues (Yap et al., 2005). Indeed, microblogging services and social media are increasingly popular among school students and can offer numerous affordances for learning. Learning, as an intensely social activity (McLoughlin and Lee, 2008), is a context that can significantly benefit from the use of social media as they can provide various opportunities for learning both within and outside the classroom and can provide a strong sense of connectedness between students (Hung and Yeun, 2010). Thus, in school education, courses that integrate social media and web2.0 technologies can provide various possibilities for both formal and informal learning activities and knowledge acquisition (Dabbagh and Kitsantas, 2012; Veletsianos and Navarrete, 2012).

In general, social networks such as Twitter and Web 2.0 technologies like wikis, when applied in education and utilized by tutors in their courses can emphasize on students' active participation, the generation of student-centered content and

collaboration and can fit with the kinds of creative and critical activities associated with all levels of education. Moreover, they can scaffold the ways that students learn through exposure to multiple perspectives and abet the communication and teamwork skills necessary for students to develop (Bennett et al., 2012; Veletsianos, 2012). So, the incorporation and utilization of social media and web 2.0 technologies and tools by tutors in their courses can be vital.

In this paper, we study the educational capabilities of social media and web 2.0 technologies, exploring their educational potential and learning capabilities and examining their impact on students' learning. More specifically, we present a study on the way that social networks like Twitter can be used in line with web 2.0 tools such as Wikispaces and TodaysMeet by tutors and students in their courses in various educational activities. Furthermore, we examine the way and the degree that they can benefit students' learning and scaffold their learning needs. An experimental study was conducted in real classroom conditions of high schools, revealing very promising results regarding the learning capabilities of the social media and the web 2.0 technologies studied and their impact on students' study, cooperation and learning.

The rest of the paper is structured as follows. In the next Section, background topics and related work on social networks and web 2.0 technologies are presented. Section 3 explains the research methodology employed in the research and describes the utilization approaches of Twitter network, in line with Wikispaces and TodaysMeet tools in course curriculum. In Section 4, the evaluation study conducted and the findings regarding the learning impact of the social networks on students learning are presented. Finally, Section 5 concludes the paper and presents directions for future work.

2 BACKGROUND TOPICS AND RELATED WORK

Social media are an emerging domain that is becoming an integral part of young peoples' communication. As a term, it is broadly used to describe any number of technological systems related to collaboration and community (Joosten, 2012). In line with the capabilities of the web 2.0 technologies, they can be utilized in the education field and become a new mean of educational technology in the hands of tutors, institutes and

researchers (Perikos et al., 2015b; Schlenkrich and Sewry, 2012). There are many definitions regarding the term and the concepts of Web 2.0, that is defined as the social use of the web that allows people to collaborate, to get actively involved in creating content, to generate knowledge and to share information online (Grosbeck and Holotescu, 2008). Web 2.0 tools and social media can support educational activities, student interaction and make it easy for students and tutors to exchange information and to share their knowledge, thoughts, experiences and interests (Oskouei, 2010). They also offer opportunities for students to create and construct knowledge (Rivera, 2010). Gradually, more individuals are gaining access and familiarizing themselves with these technologies, that makes their introduction into the classroom more seam less (Thoms, 2011). Social media and web 2.0 technologies can be used into courses to assist students learning in almost every area of high school disciplines. Indeed, through social media and innovative web 2.0 technologies, motives are given to students to increase their participation and teachers to implement various learning, collaboration activities between students. What is more, the students can have a framework for better cooperation through instant and constant communication with their peers.

Over the past few years, the utilization of social networks and web 2.0 technologies in education has attracted a lot of interest (Moran et al., 2011; Tess, 2013). Several studies (Laird, 2014; Venkatesh et al. 2014) point out the important role that web 2.0 technologies can play in educational systems and in the e-Learning area in order to assist tutors to enhance the efficiency of their courses' learning activities, engage and motivate students and improve the communication and cooperation among students. In the work presented in (Grosbeck and Holotescu, 2008), authors examine the potential of Twitter network in the educational field. The authors describe its educational capabilities and present various ways it can be utilized by the tutors in their courses. The authors state that Twitter can be very useful and assistive for both tutors' teaching and students' learning enhancing their communication and cooperation. Authors in (Hung and Yeun, 2010) explore how social networking technologies can be used to supplement face to face courses and provide a mean of enhancing the students' sense of community. Authors indicate that the majority of the participants in their experimental study developed a strong feeling of social connectedness and expressed favourable feelings regarding their learning

experiences in the courses where social networks were used as a supporting tool. In (Perikos et al., 2015a) authors presented an educational platform and courses to assist tutors in learning how to utilize social media and web 2.0 tools in classroom. Authors in (Callaghan and Bower, 2012), study the potential of social network integration into course curriculum. The authors point the critical role of the teacher in engaging effective online learning in social networks and indicate that the quality of teacher-student relationships, the extent to which a 'learning' rather than 'social' attitude was established, and the online presence that the teacher exerted in the social network, facilitate more successful student learning. In the work presented in (Ebner et al., 2010), authors present a research study that was carried in an Austrian University regarding the use of microblogging platforms in Higher Education. The authors indicate that microblogging should be seen and handled as a completely new form of communication that can support informal learning beyond the classrooms. Also, in (Grunspan et al., 2014), authors examine the way that class students interact in social networks and formulate communities and in their study indicate that the analysis can give a baseline understanding of classroom network norms and illuminate crucial aspects of learning.

3 APPROACHES OF UTILIZING SOCIAL NETWORKS IN EDUCATION

3.1 Social Networks and Tools Studied

A wide number of social networks and web 2.0 technologies are available for use, each one demonstrating a set of both common and specific functionalities and characteristics. In the study presented in this work, we have designed an educational social framework combining Twitter, Wikispaces and TodaysMeet and studied it in high school courses for a period of one semester. The formulation of the framework and the selection of the tools to be used were carefully conducted by examining a wide range of Web 2.0 tools and the aforementioned were selected since they are very popular and widely used in educational activities and most of all, have complementary characteristics.

Twitter is considered to be the most popular microblogging system that has completely changed the users, transforming them from simple passive

information consumers to active producers. In general, students can use Twitter to communicate, to ask questions, to ask for directions, support, advice, and to validate open-ended interpretations or ideas by discussing with others. Twitter has mashed up personal publishing and communication, the result being a new type of real-time publishing and most of all can support students' active and informal learning (Kassens-Noor, 2012; Reed, 2013) in the context of their courses in high school education. TodaysMeet (<http://todaysmeet.com>) is a cloud based tool that has much potential to offer to tutors and students. It can be used for synchronous communication and can be utilized by tutors for lecturing and presentation procedures. It is very simple for students to use, and provides productive means for students to directly ask questions their peers, get clarification, express their ideas and collaborate in real time. Wikispaces (<http://wikispaces.com>) is one of the wiki facilities that operate in Web 2.0 infrastructure. It is simple and very suitable for class collaborative learning. It offers students the ability to literate and hone their skills and can be used to support collaborative learning, discussions, projects, and uploading and downloading documents and educational material (Sulisworo, 2012).

After the formulation of the framework, various scenarios were designed, describing how Twitter, Wikispaces and TodaysMeet can be utilized by the tutors in their courses, demonstrating what activities could be implemented by students for the best benefit of their learning. By examining the educational capabilities of social media, we can get a deeper understanding of how and at which degree it can scaffold students learning and educational activities inside and outside the classroom's strict borders.

3.2 Pedagogical Approaches and Learning Activities

The pedagogical approaches designed along with the learning activities constitute the vital aspects of the utilization of the social tools in the course curriculum. Specific learning and educational activities were created based on the characteristics offered by each one of the social tools. In Wikispaces, students were initially asked to join the Wiki that had been set up by the tutor based on the parameters and the characteristics of the course. During the course all learning material and announcements were posted in the Wiki. The tutor also separated students into groups and assigned

each group as homework to collaborate in order to create wiki pages about various terms related to the topic that was taught and also connect these pages with other pages of the wiki prepared by them or other groups. Each student had to sign in with his own account and collaborate with his group teammates. The tutor was able to use the monitoring tools offered by Wikispaces to assess students and groups' participation degree and also use the chat tool to communicate and if necessary coordinate the students in a synchronous way. Students were asked to follow the Twitter page of the lesson that had been prepared by the tutor. The tutor would tweet a short recap of the lesson after each lecture. Students were able to reply and comment their questions or feedback regarding the topics covered. As a preparation before the following lecture, the tutor would ask students to use Twitter to "track" specific terms and try to guess their meaning. Using the tracking functionality of Twitter the students would collect various occurrences of these terms in tweets and then try to understand their meaning from the context. Then the students would discuss together (in the classroom or in Twitter) their opinions and collectively deduce their meaning. Students' educational interaction and conversations on Twitter can reflect their educational experiences, knowledge construction and learning process (Chen et al., 2014). The Problem Posing Exercises approach (PPE) (Mishra and Iyer, 2013) is also adopted as a problem posing based instructional strategy to scaffold the learning of concepts, topics and aspects of the course material. Problem posing is an instructional strategy, in which students are naturally or explicitly made to engage in dialog with the instructor or with other peers and present their queries or analytics in the form of questions. Students were asked to state their inquiries in twitter and based on the questions asked, the content of the wiki pages would be expanded in order to provide the background topics and the theoretical aspects regarding the questions stated. The activities aim to scaffold students' engagement and active learning and also support informal learning in the context of their courses. The TodaysMeet tool was used to allow students to synchronously communicate and cooperate in groups regarding their assignments. They were also able to communicate with their group-mates and classmates, work on their assignments and state their questions or remarks about the lesson. Finally, the teacher would schedule and program synchronous lectures to support student's inquires and difficulties. The three social media tools were integrated into high schools

courses for a period of one semester during which their learning capabilities were thoroughly examined in real class conditions.

4 EVALUATION STUDY

An evaluation study was designed and conducted with the aim to assess the way that the social networks and web 2.0 tools assisted the students' learning. The evaluation was conducted in four high schools. More specifically, four classes, five teachers of the classes and a total number of 88 students aged from 16 to 18 took part in the study. The teachers applied the social media tools in their class during STEM courses for a semester. Students formed teams consisting of two or three members and were asked to utilize Wikispaces and work together on creating pages regarding the topics of their courses, use Twitter in line with the specified approaches and also use TodaysMeet to communicate in a synchronous approach as teams, cooperate, and also communicate with their classmates and the teacher.

Initially, all students were asked to fill in a questionnaire and denote their demographic information, their expertise in using social media, the way and frequency of using them and also the amount of time they spend. The aim was to get an insight of the students' familiarity with social media before the start of the utilization in the context of their school courses. The age and the gender information of the students participating in the experimental study are presented in Figure 1 and Figure 2.

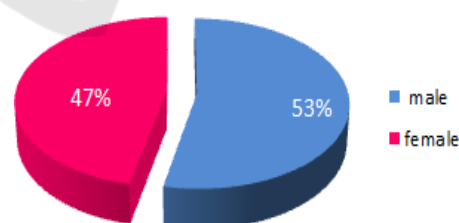


Figure 1: The gender ratio of the students.

The primary descriptive analysis indicates that the respondents are distributed by gender with ratios of 47% boys and 53% girls respectively. The age of the students ranged from 16 to 18 and the distribution is illustrated in Figure 2.

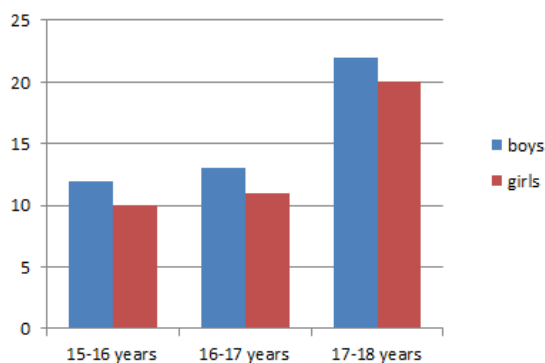


Figure 2: Students age distribution.

Students were also asked to specify if they use any social networks such as popular ones like Facebook, Twitter etc. Furthermore, students that had an account and used a social network, were asked to specify for how long they were using it. In addition, students were asked to indicate how frequently they use a social network and for how many hours on a daily basis they stay connected when they login.

The analysis of the students' answers revealed that the majority of the students have an account and use one (or more) social network. Indeed, the 66% uses a social network while the 34% of the students is unfamiliar and do not use anyone. From the analysis of the students that use a social network, a noticeable portion of the participant students indicates that has been using a social network for more than two year (Figure 3). Indeed, approximately 38% of the students use a social network for more than two years, 28% of them for approximately one to two years, 19% for six months to one year and only 15% for less than six months.

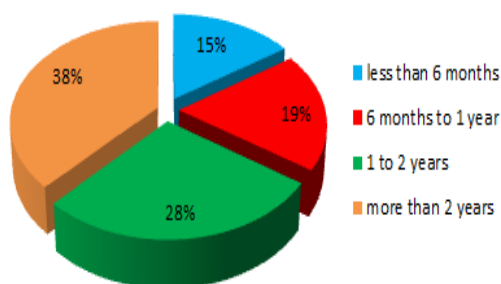


Figure 3: How often students use social media.

Moreover, the students that use a social network were asked to specify how frequent they are using it and also how many hours on a daily basis they stay connected and use it. The analysis of the students' answers is illustrated in Figure 4 and Figure 5 respectively.

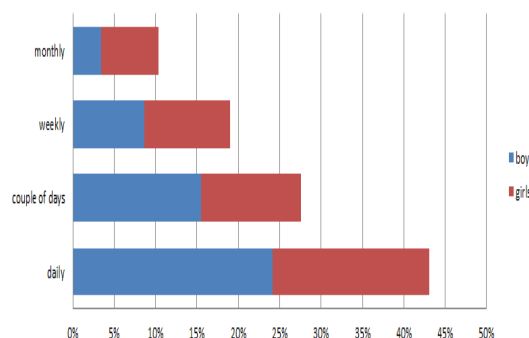


Figure 4: How many hours a day students spend on social media.

The majority of the students (43%), indicated they use social networks on a daily basis. A considerable portion of the participant students (27.5%) indicated they login every couple of days while the portion of the students that login once a week is approximately (19%). Finally, the portions of the students that login every month are substantially lower, and is approximately (10.5%). Moreover, in Figure5 the time they spend connected and using a social network is illustrated.

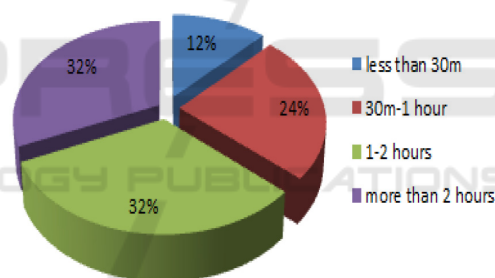


Figure 5: How long students use a social network.

The statistics indicate that that most students are familiar with social media and the majority of them are using almost every day or two a social media and in most cases for more than one hour (64%).

As mentioned above, the pre-questionnaire was given to students at the start of the semester and the analysis of their answers aimed to provide an insight of the familiarity and the way students use the social networks before the integration into their courses. After that, all students were given instructions by the teachers to create accounts on the social tools that they would utilize in the context of the course during the semester in line with the learning scenarios and activities described.

At the end of the semester, another questionnaire was distributed to the participant students of the study in order to collect feedback about their feelings and experiences regarding the integration

and utilization of the social tools in the school courses. The online questionnaire was accessible to all registered students of the classes and remained open for a time period of a week during which all students could fill in the questionnaire anonymously. The questionnaire consisted of twelve questions based on a five point Likert-scale level where the possible answers for each question were “strongly disagree”, “disagree”, “neutral”, “agree”, “strongly agree”. Each question assesses specific aspects of the educational integration of the social networks in the course. The students’ answers and the analysis of the results collected are illustrated in Table 1.

Table 1: Students Questionnaire Analysis.

Q	Questions	Answers (%)				
		1	2	3	4	5
1	The social networks assisted in building and strengthening relationship with my classmates.	0	0	11.36	51.14	37.5
2	The social networks helped me to communicate and cooperate more efficiently with my fellow students.	0	0	13.64	45.45	40.9
3	The social networks increased my learning efforts.	0	0	7.95	45.45	46.5
4	The social networks enhanced my engagement in the course.	0	0	5.68	37.50	56.8
5	The Twitter group assisted in the formulation of a classroom community.		0	11.36	40.91	47.7
6	The Twitter group assisted me to ask questions when facing problems and get answers quickly.	0	0	5.68	39.77	54.5
7	The Problem Posing Exercises approach assisted me to ask/answer questions and efficiently learn in Twitter	0	0	9.09	36.36	54.5
8	Wikispaces assisted in my active participation in educational content creation.	0	0	10.23	47.73	42.0
9	Wikispaces assisted in better understand the course domain.		0	9.09	39.77	51.1
10	I feel that the social networks should be integrated in the course curriculum.	0	0	4.55	28.41	67.0

Students gave very positive responses. The results are promising and indicate that the consistent and well-designed utilization of social networks and tools like Twitter, TodaysMeet and Wikispaces in the course curriculum can enhance students’ motivation and engagement in the educational activities utilized by the teacher. Students indicate that they felt more connected with their classmates and their teacher and also with their team while working on the exercises. Most of the participants agreed that the social networks strengthened their relationships with their teammates (88.6%) and helped them communicate and cooperate more efficiently (86.4%). Most students also indicated that the utilization of the social networks assisted in increasing their learning efforts (92%) and enhanced their engagement in the course (94.3%). Regarding Twitter, students stated that it helped in the formalization of a classroom community (88.6%) and encouraged them in posing inquires and questions and getting answers and help quickly (94.3%) in line with the Problem Posing Exercises approach which they feel that is suitable for Twitter (90.9%). Moreover, Wikispaces is indicated to have assisted the students’ active participation in the creation of educational content (89.7%) and in better understanding the topics and concepts of the course (90.9%). Finally, the majority of participants (95.4%) feel that social networks should be integrated in course curriculum to scaffold students’ learning needs. Students embraced the utilization of the social media tools in their courses, had active engagement and constant participation in the learning activities scheduled during the semester.

Furthermore, in order to get a more complete insight of students’ performance and their feelings from their teachers’ perspectives another questionnaire was formulated. During the semester the role of the teacher was vital in managing the educational activities and giving proper directions to the students. The questionnaire was distributed at the end of the semester to the eight teachers of the classes that participated in the study and was asking them to indicate their experiences of using social media in their courses evaluate their efficiency and also assess their students’ performance. The teacher’s questionnaire consisted of ten Likert-scale and two open-answer questions asking about the strong and the weak aspects of the integration of social tools into their courses. Their answers are presented in Table 2.

The results indicate that teachers’ opinions and feelings were very positive. Indeed, teachers stated that social networks enhanced their relationships

with their students and their students' engagement and efforts in their course during the semester had increased. Regarding the student-created content in Wikispaces, teachers found it to be of high quality and in line with the course's topics and theory. This was a very important aspect as it indicates that students can transform from simple and passive readers of theoretical concepts to active producers of educational content. In most cases, teachers found very encouraging that students spent much time to find content and meticulously created pages on their Wikispaces, something that assisted to learn outside the strict borders of the in-classroom procedures.

Table 2: Results of the teachers' questionnaire.

Q	Questions	Answers (%)				
		1	2	3	4	5
1	The social networks assisted in strengthening my relationships with my students.	0	0	0	2.5	37.5
2	The social networks assisted in strengthening relationships with my students.	0	0	12.5	50	37.5
3	The students' engagement in the course has increased.	0	0	12.5	37.5	50
4	The students' efforts in the course have increased.	0	0	0	37.5	62.5
5	The Wikispaces facilitate students' cooperation.	0	0	12.5	37.5	50
6	How would you rate the quality of the content students created in Wikispaces.	0	0	0	50	50
7	The social networks scaffold and promote students active learning	0	0	25	50	25
8	The problem posing exercises approach seems suitable to be used in Twitter.	0	0	25	50	25
9	Today'sMeet facilitated the instant communication with my students.	0	0	12.5	37.5	50
10	Would you suggest the utilization of social networks to other teachers?	0	0	0	37.5	62.5

Moreover, the teachers found the problem posing exercise approach to be suitable to be used by the class in Twitter and also that the social networks can promote the students active learning. Furthermore, they indicated that they would suggest the utilization of the social networks and the web 2.0 tools to other teachers in order to integrate them into their courses. Finally, the teachers' main concern, as expressed in the open-end questions, concerned the use of the social networks by the students for their educational activities and not for communication and leisure

chatting with other friends. However, teachers indicated that the specific instructions given to the students regarding how to use and what to do at each social platform and the way to work on the platforms as student or class-groups can diminish the students' leisure activities.

5 CONCLUSIONS

The advent of the web has changed completely the way that eLearning and educational procedures are delivered to students and have brought new innovative learning technologies and possibilities. Social media and web 2.0 tools open up new horizons in education and constitute important technologies that can enhance the learning capabilities of educational procedures both in classroom and in distance education. In this paper, we present a study of the educational capabilities of social media and web 2.0 technologies. We explore their educational potential and pedagogical capabilities and also study their impact on students' cooperation and learning. The work examines social media like Twitter and the way they can be utilized by tutors in their courses and be used in line with web 2.0 tools such as Today'sMeet and Wikispaces by the students in various learning scenarios and educational activities designed by the tutor. The evaluation study conducted in real classroom conditions revealed very promising results regarding the learning capabilities of the social networks and the web 2.0 technologies studied and their impact on students' study, cooperation and learning. Most students had a very positive attitude, indicating they would like social media to be integrated in course curriculum to support learning, their communication and cooperation needs.

As a future work, a larger scale evaluation could be designed and conducted with the aim to provide a deeper understanding of the learning and the way each social network or web 2.0 technologies affects students' needs, studying and learning. Finally, we aim to perform a more complete analysis of the way that each student used the social tools, mine all students learning actions in the social networks with the aim to shed light and extract knowledge regarding their behaviour. Finally the analysis could provide gender related information and also focus on how in-class good or underperforming students embraced, performed and behaved in the social platforms. Exploring these directions constitutes a key aspect of our future work.

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