



Didactic Applications of Social Networks – Essays in the 1st cycle in Geography at the University of Porto (UP)

Elsa Pacheco^a, Laura Soares^b, António Costa^c, Cristiana Martinha^d

^a CITCEM, Department of Geography, University of Porto, Porto, Portugal

^b Department of Geography, University of Porto, Porto, Portugal

^c University of Porto, Porto, Portugal

^d University of Porto, Porto, Portugal

Email: elsap@letras.up.pt

Received: October 2015 – Accepted: November 2015

Abstract

The trivialization of the access to and use of new information and communication technology requires changes in the teaching-learning strategies in all education cycles, although running the risk of hindering the purposes of education. This is the starting idea of the didactic essay presented herein, which is in line with the learning theory of Connectivism, aiming to illustrate how social networks can be used as a means of communication, development of teaching resources and evaluation, providing enhanced motivation and learning. The lab of this work focuses on the space of university education, and, in particular, the Curricular Unit of “Land, Transport and Mobility”, within the 1st cycle in Geography of the Faculty of Arts, University of Porto. The methodological design is based, in a first step, on the literature review and the collection of data on the students’ habits regarding the use of social networks. After recognizing the most popular social hub – Facebook – this platform was used, through the creation of a secret group, as a privileged means of communication between students and teacher, sharing ideas, didactic resources and providing the assessment of this strategy. Upon comparison with the “face-to-face” teaching methodologies, it was concluded that the use of this network was an important site to get closer to the daily lives of students, namely through the reinforcement of the significant elements of contents, motivation, participation, and school achievement.

Keywords: Teaching, Geography, ICT, Social Networks, Facebook

1. Learning and teaching process: adapting to new challenges

In the report “New modes of learning and teaching in higher education”, prepared for the European Commission in 2014 by the High Level Group on the Modernisation of Higher Education, the potential of digital technologies in the development of the education processes and methodologies is explicit, emphasizing the need to adapt traditional education to the countless tools that enable the articulation between physical classroom and online learning methods.

Indeed, in 2004, Web 2.0 already appeared as a platform that provided new applications making it possible to create and share content (O’Reilly, 2005). So, in less than a decade, it spread from the professional and business domain to the common user domain (Anderson, 2007). The impact of Web 2.0 in education was such that the term Learning 2.0 emerged associated with the new Information and Communication Technology (ICT) tools, which enabled new challenges following the strong acceptance of young people of the digital world.

The generations of last century’s early 80s are already identified as the “New Millennium Learners” (Howe and Strauss, 2000), “Net Generation”, “Digital Natives” (Prensky, 2001; Oblinger and Oblinger, 2005; Wankel, 2009) or “homo zappiens”, because they grew up surrounded by the digital and social media (Redecker et al., 2009) in a world of mobile, interactive and dynamic tools and devices, which are full of information and which they can control (Veen and Vrakking, 2008). As mentioned by Pedró (2006, p. 13), “it can be reasonably expected that NML are more willing to use ICT in learning activities than schools allow them to do”. While the use of ICT as a didactic resource is currently a matter of extensive scientific publication (Hennessy, Ruthven and Brindley, 2005; Hew and Brush (2007); Angeli and Valanides (2009); Sang et al., 2010), it is a reality that, although being a part of the daily lives of students and teachers, not always does ICT suit the context of formal education. Considering that the great change occurred in the last decades in information and communication systems, which are characterized by instantaneous access, there are various

reasons that justify some resistance to the use of ICT as a resource in tertiary education (university) or in other education cycles (Mumtaz, 2000; Becta, 2004; Hew and Brush, 2007; Grosseck, 2009; Player-Koro, 2012). In this context, Bingimlas (2009) approaches the “barriers” that could hamper the integration of ICT into the teaching-learning process, by emphasizing the lack of confidence, skills and the difficulty in the access to resources at the teacher level – reasons often aggravated by the resistance to change motivated in part by the generational difference (Afshari et al., 2009).

In the meantime, it is vital to change this position in a society that is focused on information and knowledge, a “learning” society in the perspective of Hargreaves (2003, p. 3), in which success is dictated by the capacity to adapt to change: “knowledge society is really a learning society (...) knowledge societies process information and knowledge in ways that maximize learning, stimulate ingenuity and invention, and develop the capacity to initiate and cope with change”.

It is important to bear in mind that the current teaching process is aimed at young people that live in a society anchored in the new digital technologies, so “educating” could become a task as difficult as it is risky (Petarnella and Garcia, 2010). In fact, according to Lejla, Bexheti and Betim (2014, p. 90), “skills needed to succeed in the knowledge society today and into the future are different in kind from those that were required earlier. Therefore, it is essential for teachers to familiarize themselves with the contemporary social tools or they will simply not be prepared to serve the learning needs of their students”. This means that if information and knowledge are moving so fast via the web in the present society, then school must integrate these resources, which are more stimulating and motivating.

2. Connectivism and Neogeography: approaching learning practice to new geographic tools and interfaces

Siemens (2005) proposes a new pedagogic theory that designates “Connectivism”, considering that the existing paradigms are no

longer adequate to a world in which “technology has reorganized how we live, how we communicate, and how we learn”, which requires the definition of a new model of teaching-learning for the “digital era”. According to the author, Connectivism considers that technology has a crucial role in the way individuals grasp information and communicate. This “learning” is a process in permanent construction, which is fed by an interactive network involving contents and individuals whose connections allow developing knowledge through the net. We would then be facing a new form of learning that mainly focuses on the “subject”, but it is the “net” that takes a central position as the means of dissemination and development of “learning”.

This pedagogic “focus” on new web technologies lines up with the principles of NeoGeography, as defined by Eisnor in 2006 (Rana and Joliveau, 2009), establishing the “re-emergence of the importance of geography within Web 2.0 technologies” (Hudson-Smith et al., 2009, p. 119). This “neo-approach” stands the use and communication of geographic information over the Web, involving a set of techniques and tools that allow nonprofessional geographers to create “their own maps, on their own terms and by combining elements of an existing toolset” (Turner, 2006, p. 3). In this sense, NeoGeography seems “more related to some technical and “fun” aspect of (geographical) data acquisition and manipulation”, but cannot be ignored by expertise (Borruso, 2013, p. 45). In fact, within an interconnected world, geographers can assume a leading and supervising role in the field of these “new” forms of producing and exchange spatial knowledge. Introducing in the teaching-learning process the latest information and communication tools, we can “create” more informed people that will be able to better understand, explore and communicate geographical issues with and through the web (Goodchild, 2009; Borruso, 2010; Liu and Palen, 2010).

The indications to urgently adapt teaching methodologies and practices to ICT are vast, whether within school or curriculum development. Whalley et al. (2011), draw attention to the need to develop geographers capable of adjusting to the rapid changes taking place at the local and global scale, which they consider to be

the era of “supercomplexity”, so this aim can only be reached by using the ICT resources. Likewise, Lynch et al. (2008) advocate that the current pedagogic practices can no longer ignore the technologically mediated relational spaces, but above all consider the use and application of new technologies as an intrinsic part of geographical education, in particular when using teaching methodologies that are problem-based and cooperative/collaborative (Dochy et al., 2003; Barkley, Cross and Major, 2014).

In the context of technologies provided by Web 2.0, the social networks have been assuming a major role by consisting of “applications that support a common space in terms of interests, needs and common goals for the collaboration, sharing of knowledge, interaction and communication” (Patrício e Gonçalves, 2010, p. 5). As such, there are several authors that advocate their use as a didactic resource in the domain of formal education, especially at the tertiary level, considering that it makes it possible to develop interactive and collaborative ways among students and teachers, using a tool which they are familiar with (Almeida et al., 2012).

Indeed, in a study that involved several universities from South Eastern Europe, Lejla et al. (2014, p. 90) mention that “social media can be used as an effective teaching tool in higher education because of its ease of use, ready availability, and individual affordability and network effects”, highlighting four dimensions in which social networks can promote innovation in the teaching-learning process, namely: the access to a great content variety; new content creation and publication by teachers and students, encouraging a more active and proactive learning; greater connection among students and teachers through the sharing of knowledge; promotion of the collaboration between students and teachers in view of specific tasks, projects or common goals.

Within this domain, Facebook has been the target of a number of studies focused on its application to higher education, taking advantage of the fact that it is currently the most used social network at global level. Various authors recommend its use in the context of the teaching-learning process, highlighting it as a

tool that encourages the collaboration, communication and interaction of students towards contents, teachers and colleagues through the sharing and creation of information, increasing their interest, as well as their participation in terms of reflection and analytical mind, in an “apparently informal” way (Mason, 2006; Patrício and Gonçalves, 2010; Wang et al., 2011; Singh, 2013). Among the positive factors of Facebook that are more frequently quoted, we highlight:

- its collaborative and interactive dimension associated with an informal style of communication (Ventura and Quero, 2013; Donlan, 2014). These aspects promote the inquiry facilitated by the “freedom of expression” (Sturges, 2012), encouraging a more active participation on the part of students (Maloney, 2007; Huijser, 2008) as they feel more comfortable in sharing information and opinions in an interaction space that is intuitive (Saikaew et al., 2011);
- the positive effect in the relationship between students and teachers, namely due to the fact that teachers provide a faster feedback on the content lectured in the classroom: based on students’ comments, teachers become aware of the contents in which students are experiencing more difficulties and those they are enjoying the most (Mazer, Murphy and Simonds, 2007). On the other hand, the teacher participation in a social network tends to reduce the communication barriers between students and teachers (Juliani et al., 2012), encouraging a better atmosphere in the classroom and a more motivated and effective learning;
- in connection with these two factors, it is worth underlining the increased motivation to share ideas, links and contents, elements that have a positive impact on learning (Baran, 2010), since they will lead to the building of knowledge (Gunawardena et al., 2009);
- the promotion of an analytical mind through the expression of opinions on other contents rather than just “academic” ones is another positive aspect of Facebook, allowing students to develop a greater spirit of

citizenship based on the analysis and discussion of political and social issues, which arise from different points of view (Patrício and Gonçalves, 2010; Sturges, 2012). In this sense, Browsers-Campbell (2008) consider the possibility to promote self-learning through the building of information and knowledge based on an analytical and reflective consciousness (Fernandes, 2011).

- the “widening” of the classroom and facilitated time management, due to the fact that it is possible to “work at home”, makes the teaching-learning process a more flexible and lasting one, as the “resources” remain available even after the teaching period is finished (Juliani et al., 2012; Sturges, 2012; Ventura and Quero, 2013). In this context, as Saikaew et al. mention (2011, p. 1), “Facebook has an excellent potential to serve as a lifelong learning channel for teachers and students”.
- finally, we underline the fact that Facebook contributes to the reduction of the anxiety associated with problem solving, in other words, “the achieved learning by every individual of the group increases the group learning, and their members achieve greater levels of academic success” (Patrício and Gonçalves, 2010, p. 12).

3. Objectives

Considering the previous conceptual framework, the present work envisages illustrating, through a case study focused on the Curricular Unit (CU) of “Land, Transport and Mobility” (TTMOB) – within the 1st cycle in Geography of the Faculty of Arts, University of Porto (FLUP) – the way the most popular digital platform among students – Facebook – can be used as a means of communication, development of didactic resources and assessment, as a reinforcement element towards motivation and learning in Geography.

This objective stems from three key observations: (1) the strong and easy connection of students to mobile devices and internet, resulting, during the academic period, in some lack of attention; (2) the student behavior

towards groups of closer proximity and teachers through social networks, detecting spontaneity in terms of research and participation in discussions on the themes taught in class; the scarce number of curricular units that, in the context of Geography graduation uses Moodle (Modular Object-Oriented Dynamic Learning Environment), which students do not seem to be attracted to.

These aspects are confirmed by statistical data at the national level: around 98% of young Portuguese people between the age of 16 and 24 use a computer and the internet (Pordata, 2014); among these, 86.9% have daily access to various websites, with emphasis on social networks (91.9%) (Lobo, Ferreira and Rowland, 2015); Facebook is the most used application, reaching 98% of the users with created profiles. Regarding Moodle, and although Morais et al. (2014, p. 168) highlight that learning management platforms are, in higher education, “one of the most used technologies by students and teachers, with Moodle being the platform most referred”, at the University of Porto (UP) and, specifically, within Geography graduation, such observation does not apply. In fact, from the 18 curricular units and 14 optional units of the 2014/2015 academic year, only 12 (37.5% of the total) have a registered profile on this platform.

In this sense, the use of systems with low connection by teachers and students may hinder communication, so, the vast range of proven resources with strong adherence by the participants, such as Facebook, are consequently being wasted. We could therefore assume that it is necessary to adjust the “language” in view of ICT in the teaching-learning process, so as not to deviate (mainly teachers) from the communication channels between teachers and students, and, as a consequence, from the educational outcome.

Nonetheless, it is important to say that the choice of Facebook for this case study does not invalidate the efforts made by the University of Porto (UP) in the last years towards the promotion and facilitation of the use of digital media in the access to information and knowledge. Additionally to Moodle, importance has been given to the development of the Massive Open Online Course (MOOC) and

training courses for teachers, a great part of which consists in e-learning and b-learning. In addition, it provides an internet wireless network (Eduroam), to which everyone can have access in the inner and surrounding spaces of the different faculties.

However, if Moodle has more than 71 million users throughout the world (Moodle Statistics, 2015), the reduced adherence to this platform in the UP could be explained by its complexity in getting started and the poor intuitive access, an opinion shared by other users from different universities (Cancela, Freitas and Abreu, 2011). The progressive “ageing” of the university teaching staff in Portugal should also be considered, as they express a lower adaptation capacity and adherence to new communication strategies.

For the reasons given above, which are associated with the growing use of social networks to communicate, configuring a strong alternative to e-mail due to the speed and immediacy of response, we justify our objective to use Facebook as an interactive tool, a way of producing and sharing didactic material, with the aim to assess the levels of participation, follow-up, collaboration and success within an optional curricular unit at the end of the study cycle. As Bishop states (2006, p. 1881), “online communities are increasingly becoming an accepted part of the lives of Internet users, serving to fulfil their desires to interact with and help others”.

4. Methodology

4.1 Curricular Unit Features

TTMOB curricular unit (CU) integrates the Official Study Plan of the 1st cycle in Geography since the 2012 academic year, which is optional within the second semester with 6 ECTS and 56 contact hours, and can be attended by students of the 2nd and 3rd years.

Additionally to items that are more directly connected to the programme contents, which are available on Sigarra (2015), the goals and learning results include the development of an analytical approach, that is geographically sustained, for the observation and analysis of transport networks,

hoping that students are able to discuss and propose solutions, in a sustainable way, to problems related to spatial accessibility in today's society.

In addition to work based on exhibitions under teacher responsibility, as well as extended discussions on the scientific papers that allow a reflection on concepts, notions, relationships and explanatory schemes (lectures and practical lessons), the teaching methodologies involve individual and group research guided by the teacher (tutorial lessons, supplemented by field trips) in order to develop practical works that are discussed in class.

Due to the high number of students enrolled, the assessment includes a final exam, and the calculation of the classification is the weighted average of the results attained in the exam (30%), participation in class (30%) and written work (40%).

4.2 Methodological design

To achieve the objective of the present study, the working methodology was structured in 3 main stages.

The first stage involved the use of an online survey prepared on Google Forms, which was targeted at the CU students, with the aim to collect information on: (i) how they had access to the Internet and since when, (ii) how often they checked the personal and institutional emails, (iii) which social network(s) they used and how often, and finally (iv) their opinion on the interest in using Facebook as a supporting platform to the CU teaching-learning process.

The second stage corresponded to the creation of a secret group on Facebook designated TTMOB2015 – Meeting Point (Figure 1), to which students adhered through invitation by the administrators (teachers). In total, the group was composed of 49 students enrolled in the 2014-2015 academic year, as well as 4 CU former students who participated as speakers in activities promoted during the semester.

Facebook was used by the “administrators” to disseminate/appoint activities to develop within the subject (e.g. study visits, workshops, analytical comments on texts and pictures), insert files and links related to the programme

contents, exchange text or picture messages in order to encourage discussion and photo sharing usually associated with the CU events. With no restrictions to the type of posts, students could also comment and insert files/pictures, as well as raise questions. However, all major files, namely the compulsory bibliography, have been inserted in Sigarra as an attachment to CU summaries.



Figure 1. Homepage of the secret group on Facebook, created for the CU.

We chose to create a specific group with restricted access, considering several studies showing that students face “their page” as a space of “freedom” where they like to share their social activities with friends, but not with teachers (Connell, 2009; Hughes, 2009; Gray, Annabell and Kennedy, 2010). On the other hand, the eventual access to the teacher profile on Facebook can have positive and negative aspects. Mazer, Murphy and Simonds (2007, p. 5) consider that this can optimize the relationship between teacher and students and make learning more “effective” and “affective”, “through the use of humor, stories, enthusiasm, and self-disclosure”, but it can also affect the credibility of the teachers in the face of what students consider to be “appropriate behavior”, once they show great concern “with how the teacher would be perceived as a professional” (ob. cit. p. 14).

In the third working stage, we conducted a comparative analysis of the teacher-student interactions, starting from identical challenges launched in class (face-to-face) and on Face-

book, but also considering the two types of expected responses (Figure 2): the voluntary or spontaneous responses (optional and evaluative of the final classification) triggered by the

exploration of didactic moments with the use of various resources, and the compulsory responses, the breach of which would penalize the final classification of students.

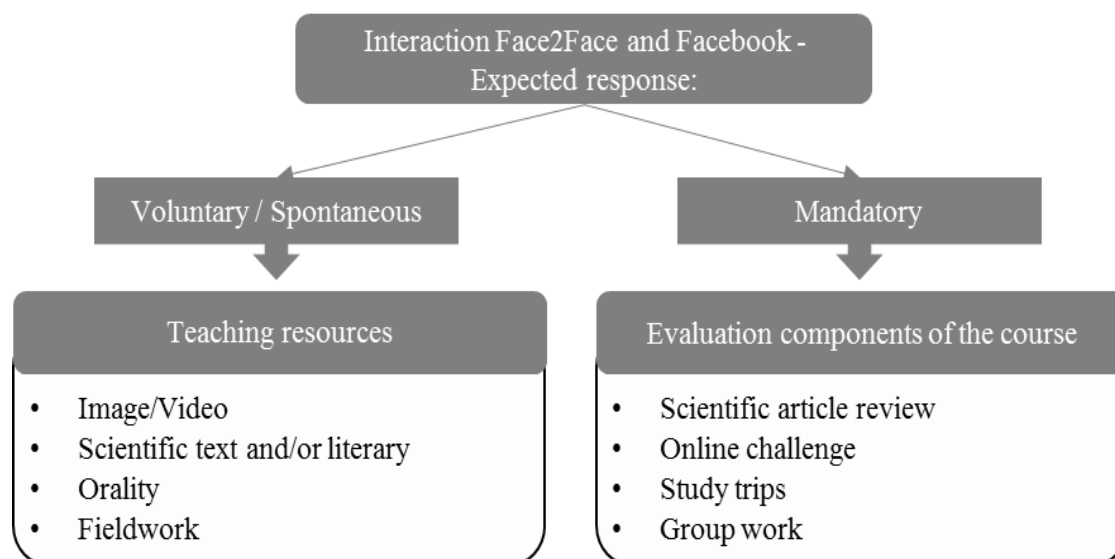


Figure 2. Methodological scheme to collect elements for the behavior observation of responses by the students.

The comparative analysis of the responses obtained in physical and virtual space was conducted by using a student behavior observation matrix, with the help of “social network” structure representation through graphs, based on the NodeXL application.

5. Presentation and discussion of results

5.1 Using internet and social networks

Based on the answers to the survey launched to TTMOB 2014/15 students on the use of internet and social networks, it was possible to observe that:

- 90% own a laptop computer with internet connection and 89% own Smartphones;
- all have used email for more than 5 years;
- 58% check the institutional email on a daily basis, but 75% check their personal email every day;
- 94% use social media platforms, all use Facebook, to which 67% associate Instagram;

- 25% declare they stay permanently connected to these platforms, 36% access the platforms more than 5 times per day, and 30% access these between once to five times per day;
- 100% declare that the average time of receiving an answer to questions put to teachers via personal email is less than one day, when compared to the use of institutional electronic communication channels (also unanimous): always more than 24 hours.

The results obtained clearly demonstrate a student preference towards Facebook, although they usually use it combined with other social networks, mainly Instagram, due to the easy sharing of photos and videos. We should also highlight that 86% access the Internet from Smartphones, which facilitates the immediate dissemination of pictures on Instagram, from where they directly connect to/share on Facebook. Google+ and Twitter follow with a much lower percentage (22% and 19%, respectively), but what is most relevant is the fact that only 2 students state that they do not use social networks.

Also in this context, we should underline the time spent when accessing social networks, considering that 92% access these platforms on a daily basis, 36% of which more than five times per day and 25% stay permanently connected. This indicates that today's students dedicate more time to electronic resources that facilitate the personal and group interaction to the detriment of email checking. In this domain, we see that they privilege the personal email (75% check it daily; from these, 16.7% highlight that they are in permanent contact and the same percentage state that they check it more than five times per day) in comparison to the institutional email. Although the majority checks it every day, only 36.1% say that they check it 1 to 2 times per week.

As such, despite 86% having the Eduroam system installed in their mobile devices this serves mainly the purpose of the relational activities through social networks. Similarly, although most of the teachers consider that communication among teachers-students should use the institutional channels, if this is not compulsory students tend to communicate more openly with teachers and the rest of the class through the preferred personal emails, because they receive an answer faster than via the institutional emails.

With regard to the second part of the questionnaire (filled in after the first experiences), the aim was to find out the opinion of students on the use of Facebook as a supporting platform to the teaching-learning process: 80.6% considered it to be a positive experience and of greater impact compared to Moodle (75%) and even Sigarra (64%), because the disclosure of information is faster (83.4%), it promotes class content discussion (72%), and enhances the interest in the subject (61.1%).

Yet it is important to mention that institutional platforms are still believed to be apparently more "secure", with 25% of the students agreeing with the fact that nothing replaces the disclosure of contents on Sigarra, and 16.7% disagreeing with the opinion that Facebook has more impact than Moodle. These results closely follow some published studies, namely Conole et al. (2008), Madge et al. (2009) or Saikaew et al. (2011), where the stress is

given to the fact that some students see Facebook as a useful tool to exchange information and post questions directly to teachers (obtaining a faster answer), but they do not always see it as a "real" resource for the teaching-learning process, considering it instead as a more important tool "for social reasons, not for formal teaching purposes". In order to justify this position, they give reasons such as being "an appeal to distraction", the preference for a face-to-face interaction "and concerns over how seriously material on Facebook is taken in comparison to other channels for academic work" (Donlan, 2014, p. 578).

5.2 Face-to-face interaction *versus* Facebook

The adherence of students towards the creation of a secret group on Facebook was extremely fast. In effect, in less than one week all those enrolled in the CU had accepted the participation invitation, although we could detect a slight difference at the level of total players at a later stage.

In this context, the total network is composed of 50 "nodes" (actors), of whom 46 are students, 3 correspond to external elements (ex-students) and 1 teacher, and all are interconnected by "lines" or "communication/information flows". After a first analysis of the 516 posted "messages", they were classified into five typologies considering: the participation reaction/content, the compulsory/optional character and the issuer (Figure 3).

As we can observe, the responses of a compulsory nature stand out within the context of "induced" challenges (70.6%), with these also assuming a higher rate (31%) within the total of posts. However, this rate is not significantly higher when compared to the "collaborative" messages (26.7%), and it is worth underlining students' participation (55.8%) in comparison with the teacher's (44.2%) in this domain. As for the value commonly attributed to Facebook within the "informative" messages, these consist of 25.6% of the total, while "spontaneous" posts and those considered as "icebreakers" do not reach 10%. The low adherence to these informal messages (7.6%), with little difference between students and teacher, seems to show that although being an "area of freedom", the

creation of a private group with well-defined goals mainly targeted at the teaching-learning

process was internalized and accepted by students.

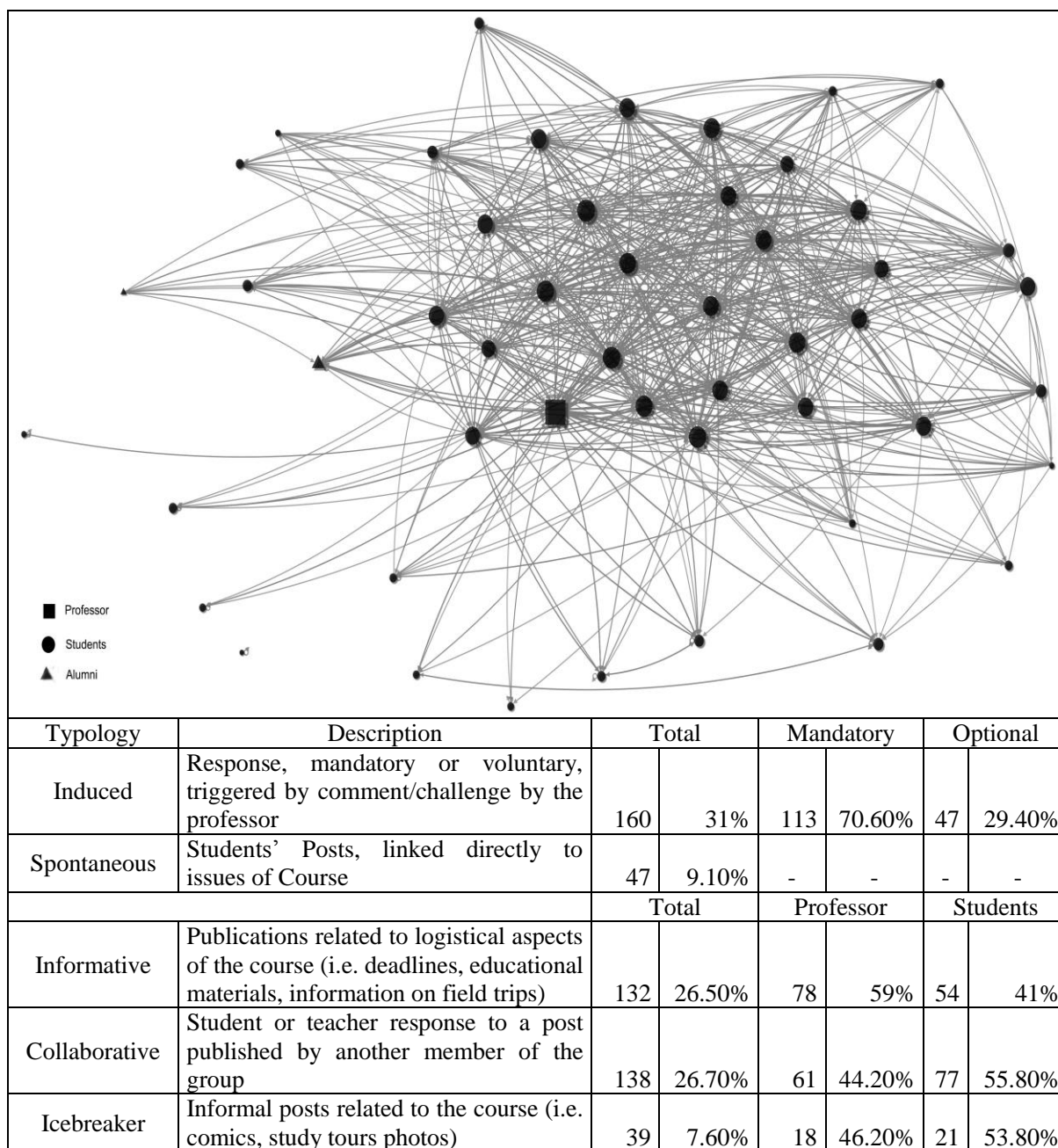


Figure 3. Configuration of the total network of TTMOB Group and Interactions estimated according to the type of participation.

Even though the total number of messages is significant compared to the class dimension, it is necessary to assess whether this way of sharing knowledge allowed the “creation” of a true community, i.e. whether the sharing and interactivity involved all the members of the network, and whether students did actually adhere to the proposed challenge in a clear way.

If we observe the network that is only composed by students, the difference regarding the total network is apparently not different, so they are both polycentric networks (Recuero, 2009) and present similar metrics (Figure 4). However, we can see that the number of unique connections reduces (from 353 to 306), and the same happens to the total of connections (from 3449 to 2345). This demonstrates that the student network could exist only by itself, but it gains another dynamic with the presence of the professor, illustrated by a betweenness centrality (bc) of 311.5 – which is the highest among the total network, greatly contrasting with the highest bc within the students’ group (94.79) –, also stressing the increase of the maximum geodesic distance. In this context, the professor emerges as a network aggregator, mediator and booster, and in spite of being able to work without the professor, it would result more fragile/fragmented, i.e. with less solid connections.

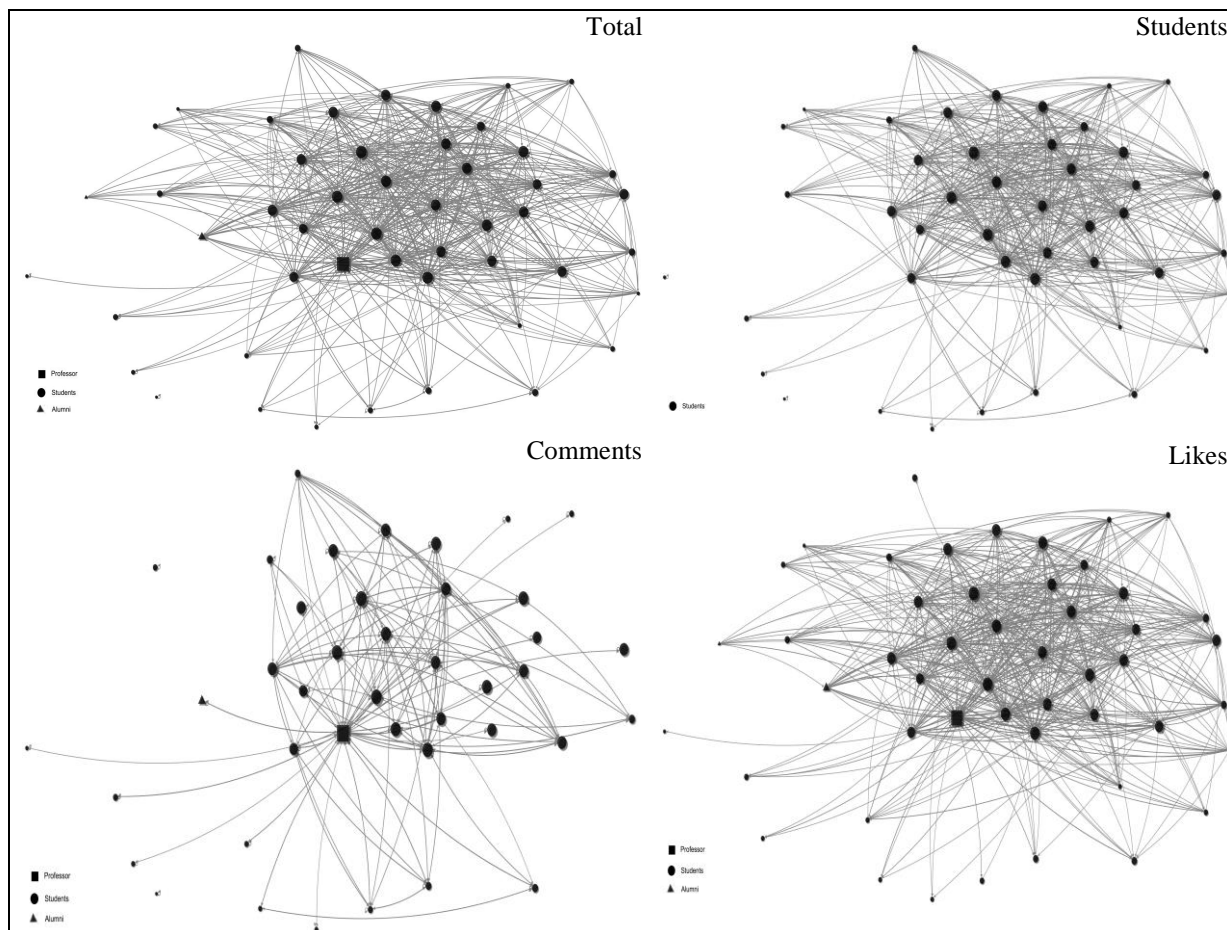
With regard to the type of student participation on Facebook, two types of interaction have been distinguished: in writing (through a comment or post) or simply clicking “like”. The generated networks are indeed substantially different (Figure 4), so we observe that the simple action of “liking” elevates the interactions to 2493 compared to the one of comments, in which the need to write a text reduces the connections to 956. It is worth noticing that in these networks the professor once again emerges as the structuring node for having the highest values of bc (1048.46 in the “comment” network and 336.78 in the “like” network).

Considering now that the majority of the activities developed on Facebook have been repeated in classroom sessions or in study trips, we recognize through this comparison exercise between the students’ behaviors in the social network and in the face-to-face situation, that the participation results are significantly different.

Considering that at the beginning of the academic year students were encouraged to present different materials and documents both in the physical environment (the classroom) and on Facebook, under exactly the same participation and assessment rules, the only difference reported was associated with the time and space for that to happen. In the classroom, time and space would be confined to the 4 hours per week established on the schedule. On Facebook, this could only be limited by internet accessibility.

Going back to the type of actions previously considered and the outcomes of the activities on Facebook, with regard to the responses in the classroom, i.e. the “face-to-face” situation, we recorded the following.

- The total absence of “spontaneous” reactions in the classroom environment compared to what happened on Facebook. Throughout the semester no student took any material regarding the academic contents to the classroom on their own initiative.
- The “collaborative” actions in discussions never took place when first asked for by the professor, so the silence was kept among students, and only when the professor asked for the second or third time would they respond somewhat shyly. On the contrary, when they were asked to write their comment/answer, all responded.
- In this context, the scarce participation, which was not spontaneous or significantly collaborative, only occurred when induced by the professor.
- On the contrary, “icebreaker” actions deserved a global participation here, often by means of the unusual exploration of resources of indirect interpretation of the classroom contents, as elements connected to the graphic arts (paintings, cartoons, etc.) or cinematography (e.g. video clips) and music, but always requiring interpretation, once the reading subjectivity would result in different readings.
- Finally, the “informative” actions were always the subject of feedback upon request, due to the fact that they referred to issues related with delivery dates of work under assessment and/or event scheduling.



	Total	Students	Comments	Likes
Vertices	50	46	41	49
Unique Edges	353	306	97	358
Edges With Duplicates	3096	2039	859	2135
Total Edges	3449	2345	956	2493
Self-Loops	225	132	222	3
Reciprocated Vertex Pair Ratio	0.530017	0.520958	0.878788	0.482206
Reciprocated Edge Ratio	0.692825	0.685039	0.935484	0.65066
Connected Components	2	3	3	1
Single-Vertex Connected Components	1	2	2	0
Maximum Vertices in a Connected Component	49	44	39	49
Maximum Edges in a Connected Component	3447	2342	953	2493
Maximum Geodesic Distance (Diameter)	2	3	2	3
Average Geodesic Distance	1.472939	1.44582	1.772817	1.500208
Graph Density	0.364082	0.368116	0.15122	0.354167
Modularity	0.061286	0.070685	0.055755	0.061584

Figure 4. Network representation and metrics of the total students, comments and likes.

6. Conclusions

With regard to the intersection of outcomes among the academic practices on Facebook and “Face-to-Face”, in addition to the improvement of the direct contact with students, this solution extended the classroom and the CU contents to the everyday life of students.

The obvious success of student participation on Facebook when compared to their participation in the classroom allows us to present some ideas by way of conclusion:

- it was possible, with Facebook, to expand space and time for the discussion of ideas, concepts and news, often initiated by the students themselves outside the academic environments, allowing the arbitration by the teacher;
- the “informal” model of the platform facilitates the establishment of bonds between teacher and students, making it possible to maintain almost real-time contact between students and teachers. Students see Facebook as an informal and collective space to share knowledge, even though the fundamental role of the teacher as an aggregating element, mediating and enforcing the network;
- the possibility to publish (post) something because they just saw, heard or remembered, and which is related to the CU, or because they just could not stop thinking about the contents and therefore searched for further information to share, make social networks an excellent channel to establish bonds with their colleagues (their peers) and with the teacher. As such, they become more mindful and dedicated to the CU, as well as more sensitive to its application within their space of life and the society’s to which they belong;
- because manifestation on Facebook is individual, the possibility to enrich the traditional quantification and qualification of each one’s level of participation constitutes an asset to facilitate and introduce more accuracy in the ongoing evaluation.

We therefore come to the conclusion that the professor’s role is indispensable regardless the way of contact, whether in person or virtually.

Within their educational methodology, the approach to new communication channels is growing in importance. These channels are informal at the beginning, but they can and should be enhanced and integrated into the teaching-learning processes, due to the fact that they not only expand the academic spaces, but also allow the transfer of knowledge to everyday life, offering a sense of utility and realism to what students are supposed to learn as responsible citizens.

Similarly, we could go farther and explain in a more general way this difference in behavior when responding to activities and didactic resources used on Facebook and in a Face-to-Face situation. It is probable that in the virtual space, the individual participation (i.e. isolated and with more time to research and reflect, among other conditional factors that reduce intimidation, responsibility and even disapproval) may constitute the background for an environment that offers more freedom, promotes spontaneity, creativity, participation and success.

However, the use of social networks in education should never forget some concerns that several authors have focused on (i.e. Conole et al., 2008; Madge et al., 2009; Donlan, 2014). Among the issues that arise, there is the fact that often the students have doubts about the legitimacy and value of knowledge and information conveyed through platforms that they normally use as leisure, questioning it as an appropriate resource of the teaching-learning process. The “social” character of these networks leads them to sometimes prefer more common and established platforms (i.e. Moodle), also considering that social ones call for distraction, because “there is so much to click on”. Moreover, many have social networks as a personal space which is not to be invaded by the teacher, whereby the use of a secret group is absolutely necessary to ensure an effective separation between “learning space” and the “space of private life”.

Anyway, there is no doubt that our experience achieved highly positive results from the point of view of increasing knowledge on the use of social networks as a pedagogic and didactic tool in education, in this case within the first cycle of the university degree in Geogra-

phy. Therefore, there is the need to amplify the research on the power of the use of social networks in the teaching-learning process in all study cycles, since it is inevitable that they constitute the emerging forms of privileged communication within the society, particularly among today's young people, and more intensely in the future.

References

1. Afshari M., Bakar K., Su Luan W., Samah B. and Fook F., "Factors affecting teachers' use of information and communication technology", *International Journal of Instruction*, 2, 1, 2009, pp. 77-104.
2. Almeida D., Magalhães A., Freitas D. and Paixão A., "Redes Sociais e Educação: O Facebook Enquanto um Espaço com Potencialidades para o Ensino Superior de Matemática?", *Anais do II Congresso Internacional TIC e Educação*, 2012, <http://www.cibem7.semur.edu.uy/7/actas/pdfs/461.pdf>.
3. Anderson P., "What is Web 2.0? Ideas, technologies and implications for education", *JISC Technology and Standards Watch*, 2007.
4. Angeli C. and Valanides N., "Epistemological and methodological issues for the conceptualization, development, and assessment of ICT-TPCK", *Computers & Education*, 52, 1, 2009, pp. 154-168.
5. Baran B., "Facebook as a formal instructional environment", *British Journal of Educational Technology*, 41, 6, 2010, pp. 146-149.
6. Barkley E., Cross K. and Major C., *Collaborative learning techniques. A Handbook for College Faculty*, John Wiley & Sons, 2014.
7. Bingimlas K., "Barriers to the Successful Integration of ICT in Teaching and Learning Environments: A Review of the Literature", *Eurasia Journal of Mathematics, Science & Technology Education*, 5, 3, 2009, pp. 235-245.
8. Bishop J., "Increasing participation in online communities: A framework for human-computer interaction", *Computers in Human Behaviour*, 23, 2006, pp. 1881-1893.
9. Borruso G., "La 'nuova cartografia' creata dagli utenti. Problemi, prospettive, scenari", *Bollettino dell'Associazione Italiana di Cartografia*, 136, 2010, pp. 231-242.
10. Borruso G., "Web 2.0 and Neogeography. Opportunities for teaching geography", *Journal of Research and Didactics in Geography (J-READING)*, 2, 2, 2013, pp. 43-55.
11. Bowers-Campbell J., "Cyber 'Pokes': motivational antidote for developmental college readers", *Journal of College Reading and Learning*, 39, 1, 2008 pp. 74-87.
12. Cancela I., Freitas L. and Abreu T., "A resistência ao uso do moodle como ferramenta para o ensino à distância", 2011, <http://ueadsl.textolive.pro.br/2011.1/papers/upload/52.pdf>.
13. Cardoso G., Mendonça S., Lima T., Paisana M. and Neves M., *A Internet em Portugal. Sociedade em Rede 2014*, Publicações OberCom, 2014.
14. CNE, *Retenção Escolar nos Ensinos Básico e Secundário*, Relatório Técnico, 2015 http://www.cnedu.pt/content/noticias/CNE/Relatorio_Tecnico_-_Retencao.pdf.
15. Connell R., "Academic libraries, Facebook and MySpace, and student outreach: A survey of student opinion", *Libraries and the Academy*, 9, 1, 2009, pp. 25-36.
16. Conole G., Laat M., Dillon T. and Darby J., "'Disruptive technologies', 'pedagogical innovation': What's new. Findings from an in-depth study of students' use and perception of technology", *Computers & Education*, 50, 2, 2008, pp. 511-524.
17. Crawford-Thomas A., "Five steps for embedding technology use in colleges", 2015, <http://www.jisc.ac.uk/blog/five-steps-for-embedding-technology-use-in-colleges-28-jan-2015>.
18. Dochy F., Segers M., Van den Bossche P. and Gijbels D., "Effects of problem-based learning: a meta-analysis", *Learning and Instruction*, 13, 5, 2003, pp. 533-568.
19. Donlan L., "Exploring the views of students on the use of Facebook in university teaching and learning", *Journal of Further*

- and *Higher Education*, 38, 4, 2014, pp. 572-588.
20. Eisnor D., "Neogeography", 2006, http://platial.typepad.com/news/2006/05/what_is_neogeog.html.
 21. English R. and Duncan-Howell J., "Facebook® Goes to College: Using Social Networking Tools to Support Students Undertaking Teaching Practicum", *MERLOT Journal of Online Learning and Teaching*, 4, 4, 2008, pp. 596-601.
 22. European Commission – High Level Group on the Modernisation of Higher Education, *New modes of learning and teaching in higher education*, Report to the European Commission, Luxembourg: Publications Office of the European Union, 2014, http://ec.europa.eu/education/library/reports/modernisation-universities_en.pdf.
 23. Fernandes L., "Redes Sociais Online e Educação: Contributo do Facebook no Contexto das Comunidades Virtuais de Aprendentes", 2011, http://www.trmef.lfernandes.info/ensaio_TRMEF.pdf.
 24. Goodchild M., "NeoGeography and the nature of geographic expertise", *Journal of Location Based Services*, 3, 2, 2009, pp. 82-96.
 25. Gray K., Annabell L., and Kennedy G., "Medical students' use of Facebook to support learning: Insights from four case studies", *Medical Teacher*, 32, 12, 2010, pp. 971-976.
 26. Grosbeck G., "To use or not to use web 2.0 in higher education?" *Procedia – Social and Behavioral Sciences*, 1, 1, 2009, pp. 478-482.
 27. Gunawardena C., Hermans M., Sanchez D., Richmond C., Bohley M. and Tuttle R., "A theoretical framework for building online communities of practice with social networking tools", *Educational Media International*, 46, 1, 2009, pp. 3-16.
 28. Hansen D., Shneiderman B. and Smith M., *Analyzing social media networks with NodeXL: insights from a connected world*, Elsevier, 2011.
 29. Hargreaves A., *Teaching in the knowledge society. Education in the age of insecurity*, Teachers College Press, 2003.
 30. Hennessy S., Ruthven K. and Brindley S., "Teacher perspectives on integrating ICT into subject teaching: commitment, constraints, caution, and change". *Journal of Curriculum Studies*, 37, 2, 2003, pp. 155-192.
 31. Hew K. and Brush T., "Integrating technology into K-12 teaching and learning: current knowledge gaps and recommendations for future research", *Educational Technology Research and Development*, 55, 3, 2007, pp. 223-252.
 32. Howe N. and Strauss W., *Millennials Rising: The Next Great Generation*, Vintage Books, 2000.
 33. Hudson-Smith A., Crooks A., Gibin M., Milton R. and Batty M., "NeoGeography and Web 2.0: concepts, tools and applications", *Journal of Location Based Services*, 3, 2, 2009, pp. 118-145.
 34. Hughes A., "Higher education in a Web 2.0 world: Report of an independent committee of inquiry into the impact on higher education of students' widespread use of Web 2.0 technologies", 2009, <http://www.jisc.ac.uk/publications/generalpublications/2009/heweb2.aspx>.
 35. Huijser H., "Exploring the educational potential of social networking sites: The fine line between exploiting opportunities and unwelcome imposition", *Studies in Learning, Evaluation Innovation and Development*, 5, 3, 2008, pp. 45-54.
 36. Juliani D., Juliani J., Souza J. and Winkler de Bettio R., "Utilização das redes sociais na educação: guia para o uso do Facebook em uma instituição de ensino superior", *Novas Tecnologias na Educação*, CINTED-UFRGS, 10, 3, 2012, <http://seer.ufrgs.br/renote/article/viewFile/36434/23529>.
 37. Lejla A., Bexheti B. and Betim H., "An Analysis of Social Media Usage in Teaching an Learning: The Case of SEEU", 2014, <http://www.europment.org/library/2014/venice/bypaper/OLA/OLA-14.pdf>.
 38. Lima K., Ribeiro E., Castanheira N. and Bergamo R., "Práticas e modelos pedagógicos do ensino a distância no Brasil e suas relações com as teorias contemporâneas de aprendizagem", 2012, <http://www.abed.org.br/congresso2012/anais/43b.pdf>.
 39. Liu S. and Palen L., "The New Cartogra-

- phers: Crisis Map Mashups and the Emergence of Neogeographic Practice”, *Cartography and Geographic Information Science*, 37, 1, 2010, pp. 69-90.
40. Lobo M., Ferreira V. and Rowland J., “Emprego, mobilidade, política e lazer: situações e atitudes dos jovens portugueses numa perspectiva comparada”, 2015, http://www.presidencia.pt/archive/doc/Roteiros_do_Futuro_-_Estudo_Jovens_2015.pdf.
 41. Lynch K., Bednarz B., Boxall J., Chalmers L., France D. and Kesby J., “E-learning for Geography’s Teaching and Learning Spaces”, *Journal of Geography in Higher Education*, 32, 1, 2008, pp. 135-149.
 42. Madge C., Meek J., Wellens J. and Hooley T., “Facebook, social integration and informal learning at university”, 2009, <https://lra.le.ac.uk/handle/2381/9016>.
 43. Maloney E., “What Web 2.0 can teach us about learning”, *Chronicle of Higher Education*, 53, 18, 2007, p. 26.
 44. Mason R., “Learning technologies for adult continuing education”, *Studies in Continuing Education*, 28, 2, 2006, pp. 121-33.
 45. Mazer J., Murphy R. and Simonds C., “I’ll See You On ‘Facebook’: The Effects of Computer-Mediated Teacher Self-Disclosure on Student Motivation, Affective Learning, and Classroom Climate”, *Communication Education*, 56, 1, 2007, pp. 1-17.
 46. McCarthy J., “Learning in the Café: Pilot testing the collaborative application for education in Facebook”, *Australasian Journal of Educational Technology*, 31, 1, 2015, pp. 67-85.
 47. Moodle Statistics, 2015, <https://moodle.net/stats/>.
 48. Morais N., Pombo L., Batista J., Moreira A. and Ramos F., “Uma Revisão de Literatura sobre o Uso das Tecnologias da Comunicação no Ensino Superior”, *PRISMA.COM*, 24, 2014, pp. 162-185.
 49. Mumtaz S., “Factors affecting teachers’ use of information and communications technology: a review of the literature”, *Journal of Information Technology for Teacher Education*, 9, 3, 2000, pp. 319-341.
 50. Oblinger D. and Oblinger J.L. (Eds.), *Educating the Net Generation*, Boulder, Educause, 2005.
 51. O’Reilly T., “What Is Web 2.0. Design Patterns and Business Models for the Next Generation of Software”, 2005, <http://www.oreilly.com/pub/a/web2/archive/what-is-web-20.html>.
 52. Patrício M. and Gonçalves V., “Utilização educativa do facebook no ensino superior”, 2010, <https://bibliotecadigital.ipb.pt/bitstream/10198/2879/4/7104.pdf>.
 53. Pedró F., “The New Millennium Learners: Challenging our Views on ICT and Learning”, 2006, <http://www.oecd.org/edu/ceri/38358359.pdf>.
 54. Petarnella L. and Garcia E., “Homo Zap- piens: educando na era digital”, *Conjectura*, 15, 2, 2010, pp. 175-179.
 55. Player-Koro C., “Factors Influencing Teachers’ Use of ICT in Education”, *Education Inquiry*, 3, 1, pp. 93-108.
 56. Prensky M., “Digital natives, digital immigrants”, *On The Horizon*, 9, 5, 2012, pp. 1-6.
 57. Rana S. and Joliveau T., “NeoGeography: an extension of mainstream geography for everyone made by everyone?”, *Journal of Location Based Services*, 3, 2, pp. 75-81.
 58. Recuero R., *Redes Sociais na Internet*, Porto Alegre, Editora Meridional, 2009.
 59. Redecker C., Ala-Mutka K., Bacigalupo M., Ferrari A. and Punie Y., *Learning 2.0: The Impact of Web 2.0 Innovations on Education and Training in Europe*, Joint Research Centre Institute for Prospective Technological Studies, European Commission, 2009.
 60. Saikaew K., Krutkam W., Pattaramanon R., Leelathakul N., Chaipa K., and Chaosakul A., “Using Facebook as a supplementary tool for teaching and learning”, 2011, <http://gear.kku.ac.th/~krunapon/research/pub/usingFB4Learning.pdf>.
 61. Sang G., Valcke M., Van Braak J. and Tondeur J., “Student teachers’ thinking processes and ICT integration: predictors of prospective teaching behaviors with educational technology”, *Computers & Education*, 54, 2010, pp. 103-112.
 62. Siemens G., “Connectivism: A learning theory for the digital age”, *International Journal of*

- Instructional Technology and Distance Learning*, 2, 1, 2005, pp. 3-10.
63. Singh A., "Potential of Facebook in Teacher Education: A Comparative Study of Student Teachers and Teacher Educators", *International Journal of Information and Computation Technology*, 3, 3, 2013, pp. 111-118.
64. Sturges M., "Using Facebook as a Teaching Tool in Higher Education Settings: Examining Potentials and Possibilities", 2012, http://conference.pixel-online.net/edu_future2012/common/download/Paper_pdf/182-EL10-FP-Sturges-FOE2012.pdf.
65. Turner A., "Introduction to Neogeography", 2006, <http://highearthorbit.com/neogeography/book.pdf2006>.
66. UNESCO, "World education report – Teachers and teaching in a changing World", 1998, <http://www.unesco.org/education/information/wer/PDFeng/wholewer98.PDF>.
67. Veen W. and Vrakking B., *Homo Zappiens – Educando na Era Digital*. Artmed, 2009.
68. Ventura R. and Quero M., "Using Facebook in University Teaching: A Practical Case Study", *Procedia – Social and Behavioral Sciences*, 83, 2013, pp. 1032-1038.
69. Wang Q., Woo H., Quek C. and Yang Y., "Use of Facebook for Teaching and Learning: A Review of the Research", *International Journal of Continuing Engineering Education and Life Long Learning*, 21, 1, 2011, pp. 72-86.
70. Wankel C., "Management education using social media", *Organization Management Journal*, 6, 4, 2009, pp. 251-262.
71. Whalley W., Saunders A., Robin A., Buenemann M. and Sutton P., "Curriculum Development: Producing Geographers for the 21st Century", *Journal of Geography in Higher Education*, 35, 3, 2011, pp. 379-393.