Enhancing e-learning experience with online social networks

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Abstract: The emergence of Web 2.0 has transformed the web into a more dynamic and interactive environment, offering a set of tools that enhance contact and collaboration between users. Several applications, such as online social networks, wikis and blogs, support such Web vision. This study elaborates on the tremendous potential of online social networks to enhance e-learning experience, creating an atmosphere of cooperation and easy interaction among users (teachers and students). A traditional learning content management system is rigid in nature, limiting the student learning process. As a result, the concepts of community, relationship and interaction among users are needed to overcome its limitations. This contribution addresses the evolution from the traditional content learning management systems to a new conceptual learning approach, using personal learning environments. Improving the learning experience using an e-learning platform is the main motivation for this work. Then, several online social networks-related modules were proposed for an e-learning platform, called personal learning environment box, creating a space for sharing and collaboration turning students more active in shaping their learning process. The proposal was evaluated through a utility survey to users, after four months term of system usage, and the results are extremely promising.

1 Introduction

The traditional world-wide-web, proposed by Tim Berners Lee in 1989, was based on static websites, where information was available for browsing without user interaction. The creation of Web 2.0, came to break with that paradigm, offering users not only the opportunity to consult, but also introduce new content and opinions on existing ones, as well as having a direct interaction with the authors of original content and other users. The structure of Web 2.0 provided online spaces to groups of people with common interests, whether personal or professional, where they share information, opinions and experiences on a variety of issues [1]. These new types of services enhance the relationship between individuals and information sharing in an environment of mutual collaboration [2].

In terms of e-learning, characteristics offered by Web 2.0 are very important because students no longer have a passive role. The possibility of editing and posting new content, as well as participate in discussions with other students (learners) and teachers about subjects under study pushing them to have a more active role in their learning process.

The availability of telecommunication networks and information and communication technologies in education is a key element in the process of changing the current school and education system. The school needs to maintain a harmonious connection with the society in which it operates, and adopt teaching and learning approaches that follow the new social reality. The new information systems should be able to adapt to these changes, answering the needs of the new school community contributing to the promotion of learning environments that are richer in information content and in situations of interaction and collaborative learning.

Communication and information technology and more specifically, the Internet, plays a key role in the innovation process. It occurs, not only as a form of entertainment and information searching (management or teaching) but also in the process of management, and to the level of public disclosure of information through web pages, which begin to be very common in many schools.

The Web 2.0 is the most powerful information technology that exists today. It will bring into the classroom experiences such as interactivity, interdisciplinarity, social interaction, a cultural perspective, a certain kind of experience otherwise unavailable but necessary for active construction and harmonious knowledge. By allowing access to vast amounts of information in various formats, in other way materially impossible to gather in one place, the Internet becomes a global resource centre, at the distance of a mouse click. This new technology will thus facilitate the processes of teaching and learning, fostering educational success, stimulating knowledge sharing and reflection, developing and expanding the educational system [3]. Fig. 1 shows the potential of Web 2.0 and, more specifically, the online social networking for e-learning.
Nowadays, online social networks are increasingly present in people’s lives and are structures of social interaction that foster contact and sharing. Carrying this stimulus to the school environment on an e-learning platform by creating a more collaborative and active sharing environment among users will undoubtedly benefit the improvement of the student learning. Then, this paper starts with a survey about the state-of-the-art and identifies a set of features of the online social networks that owing to its characteristics foster the creation of collaborative environments that are optimal for the development of the student learning process. To demonstrate these features on an e-learning platform, some modules were proposed in order to allow the creation of an environment of sharing and collaboration among e-learning platform users (teachers and students). These modules were integrated in an e-learning platform, called personal learning environmental box (PLEBOX), which was used by a group of more than 187 users for four months. After this period, a survey was assigned to users in order to evaluate their experience in using the proposed system (collecting 187 surveys) and the results are very promising.

The rest of paper is organised as follows. Section 2 elaborates on e-learning, learning content management systems (LCMSs) and online social networks, describing in detail the most significant applications in terms of number of users. It analyses their main characteristics and demonstrates its potential applications for e-learning systems. Section 3 discusses the contribution of online social networks for e-learning while Section 4 addresses the synergies of the available LCMSs and the contributions of online social networks, using them together. Section 5 presents the performance evaluation and validation of the proposed online social networks modules integrated in a personal learning environment system and, finally, Section 6 concludes the paper and points further research directions.

2 Background

This section reviews the relevant related literature for this study, focusing on e-learning key issues that should be considered on new learning technologies to integrate online social networks functionalities. The most relevant available online social networks are identified and their main characteristics are highlighted.

2.1 E-learning

E-learning may be defined as the use of Internet technologies to provide, at the distance, a set of solutions for the improvement or the acquisition of knowledge and practical applicability of the same [4]. The teaching–learning process is being more supported by technological resources that offer different ways of communication between persons, using sophisticated educational software applications. The main advantage of e-learning is that it can be used regardless of time and location.

One of the main problems on e-learning is the lack of ability to stimulate student participation continues until the end of the course. This fact is the main reason why today’s forms of e-learning are more oriented towards communication and collaboration between students and teachers in the learning process [5].

Currently, a fast evolution of Internet connections and a significant improvement of information and communication technologies are observed. These factors turn the Internet an extremely important way of conveying information to students [3]. As a result, the development of software platforms to aid and assist the learning process has become a necessity and plays a key role in e-learning. These applications are referred to as learning management systems (LMSs).

The LMS is an application-software dedicated to the management of all the tasks of online coursework. They are engineered to help teachers delivering course content and tracking student’s progress. In such a platform, a student can download course material, interact with his teacher, participate in discussions and submit homework assignments. One of the main problems of LMSs is the lack of high-quality systems specifically designed to the needs of both teachers and groups of students [6, 7].

A virtual learning environment that integrates the features of Web 2.0 has great potential to innovate and improve the existing e-learning platforms, fostering social interaction and knowledge sharing among their users. However, it is needed to adapt the structure of informal knowledge sharing of existing social networks to a formal system of education with the definition of curricula, content development and objectives to be achieved [8].

Web 2.0 includes applications such as online social networks, wikis and blog environments that foster sharing and collaboration between users. It provides the student with the means to gather information and communicate with others who share the same interests. All these tools and capabilities allow students to build their own personal learning environment (PLE), managed by themselves, in order to improve and facilitate their learning process [9]. Each user can define a PLE as the set of all web services that allow students to produce, store and access information about their learning process and share that information with others.

2.2 Online social networks

Nowadays, websites such as Facebook, MySpace and Twitter are well-known worldwide and used on a daily basis by millions of people. They contribute to this new vision of Web 2.0, a new conceptual web approach, based on software platforms with the enhancement of concepts, such as community, relationship and interaction among users. In Web 2.0 a user acts as a content contributor. This contribution is made in an atmosphere of trust and collaboration with other users. Web 2.0 is composed of small applications that allow interconnecting with each other, thus promoting sharing and socialisation [2]. Fig. 2 illustrates an example of people’s distribution by some websites that make up the Web 2.0.

Taking into account the main functionalities of online social networks, the following should be highlighted: networks of friends, profile visiting, private messaging,
Fig. 2 Illustration of the Web 2.0 community

communities and discussion forums, event management, blogging and media uploading. These main features help to improve the connectivity between people for social and professional purposes [10].

Online social networking appears as an approach to support emotional and professional relationships of human beings among themselves or between their groups of mutual interests. The network is responsible for ideas sharing among people who have common interests and objectives as well as similar values to be shared. Thus, a discussion group is composed of individuals who have related identities. These social networks are mainly located on the Internet because they provide an excellent communication channel for ideas being circulated and absorption of new elements in search of something in common.

Despite all these features, most users use online social networks as a list of contacts. Then, this characteristic became its main feature. Usually, users accept connections, often from unknown people, just to increase their list of friends, but having no more interaction with these people. This behaviour turns the existing networks with little use to something more productive, and the daily usage is very low. Online social networks are excellent to connect people to each other, but offer no reasons for these connections rather than others. Thus, many connections became meaningless. Another problem related with social networks is its inherent characteristic for working alone, without connections to others, forcing users to redefine their profile and build their contacts list again when they register in a new network.

Online social networks have become an important tool for aggregation of people with common interests. However, there is also the negative side of such networks, as privacy issues and moral integrity of certain users. Some people hide behind false identities and exploit this fact to spread racist and xenophobic ideas and to contact potential victims for their crimes.

Nowadays, there are numerous online social networks. The choice for the user is quite extensive. The most common are generalist networks and their main features include personal profile creation, uploading of photos and videos, participation in groups and message sending. They attract millions of people around the world, resulting in the creation of networks with an atmosphere of sharing and collaboration. Some of the best known are the following: Facebook, MySpace, Friendster, badoo, bebo, hi5, Hyves (Netherlands), ibibo, Kaixin001 (China), Meetup, Mixi (Japan), Multiply, NaszaKlasy (Poland), Netlog, Odnoklassniki (Russia), Qzone (China), Renren (China), Skyrock (France), Brazil (Latin America), StudiVZ (Germany), Tagged, Taringa! (Argentina), Tuenti (Spain), Vkontakte (Russia) and Windows Live Spaces.

There are also other networks with more specific character such as Buzznet and Last.fm dedicated to music, deviantART dedicated to the dissemination of art, LinkedIn and Xing as dissemination networks of professional profiles, YouTube and Metacafe networks, for video sharing and Flickr and Fotolog networks as photo sharing sites. Furthermore, there are others to create blogs like Blogger, LiveJournal, My Opera and Xanga, and microblogging websites such as Twitter and Tumblr, and even a website called Ning that allows users to create their own social network. Following, we describe with detail some of the most relevant online social networks taking into account their huge number of users and their contributions to enhance e-learning experience.

2.2.1 Facebook: Facebook is a social networking site launched on 4 February 2004. It was founded by Mark Zuckerberg, a former student of Harvard University. It was initially designed only for students of that university. However, the list of members quickly spread to other universities. It is currently one of the most visited sites around the world. Facebook users have the main following features available: the creation of a personal profile with their personal data; the possibility of uploading photos; creation of lists of personal interests; private and public messaging and participation in groups of friends. All these features have a common requirement – to have friends. Users can import their lists of contacts from an e-mail account in order to invite their friends to join them in their network of friends.

Applications are one of the most interesting features of Facebook, where user can execute a program in his/her user’s area. There are many types of applications available, but the most popular are games and quizzes. All of them are designed to enhance the sharing between friends, whether by posting comments, comparing results or sending gifts. Users of Facebook develop many of these applications. For this purpose, Facebook team as made available a development kit for anyone who wants to give wings to their imagination and create applications for the Facebook.

Facebook and e-learning: Owing to the current large expansion of Facebook and its threaded discussion capability, Facebook has a lot of potential as an application to include in an e-learning platform. It allows users to access and comment friend’s posts in almost real time. The user home page is constantly being updated with information related to his/her list of friends, such as profile updating, new photos uploading, adding new friends or comment posting. This allows the users to keep up-to-date on their friends, depending, of course, on the information provided by them. This feature can be very useful in an e-learning environment, allowing students to keep updated on a particular course.

2.2.2 Twitter: Twitter is a social network that was established in 2006 by Jack Dorsey. Until today it is gaining an extensive prominence and popularity, and now, it is one of the 20 most used sites in the world. It is a social
network of microblogging that allows its users to publish text, up to 140 characters, and read updates from other contacts. Updates are published in real time on the user’s profiles, getting immediately available to their followers. These messages can be found on the official website or via really simple syndication (RSS) or short message service. The users manage the visibility of these messages, and either may be available only for their personal network of contacts, or for the entire network of Twitter.

Currently, companies also use this resource as a means to advertise their products, through constant updates and providing links to external pages where people can find detailed information about the product. Twitter allows a close proximity between users and, therefore, it is an excellent mean of advertising dissemination.

2.2.3 MySpace: MySpace is a social network very similar to other networks such as hi5 and Facebook. It provides basic functionalities such as profile creation, creating or joining interest groups, upload photos, participate in discussion forums, private messaging, among others. However, it stood out from the others by being able to upload music files. This feature has made MySpace very popular among musical artists, who began using MySpace to create their personal page. Another important feature is the ability to edit the hypertext markup language of the page. Thus, for users with minimal technical skills, the customisation of their space is allowed. There are two types of profiles, the normal and the musician profile, that allows uploading several songs. This feature greatly helped to increase his popularity, becoming a well-known platform for artists’ promotion.

2.2.4 Youtube: YouTube is a website for sharing video, which allows users to upload and share videos in several formats. In addition to the display, users can add comments and ratings on the watched videos. The contents of the website cannot be downloaded; however, it is available as a feature that allows the embedding of a YouTube video on an external website. Then, it allows the video watching from that site. YouTube has revolutionised the web and the Internet, because prior to its emergence, there were no easy ways to share videos. With an easy and intuitive interface, YouTube allows anyone to upload his/her own content online.

2.2.5 Blogs: A blog is a website that provides content related to a particular topic, where content can be placed by one or more users. This website is managed by the user, who decides on what can be published and makes available the content to be presented. The site is accessible to anyone, who can see and write individual comments for each post provided by the blog administrator. These comments will be approved or not by the administrator. Once approved, they are visible to all visitors who may add more comments to those already existing. The contents are usually arranged in chronological order, with the comments accessible from each post. This type of architecture allows interaction between users, managed by the blog administrator.

2.2.6 Wikis: A wiki can be defined as software that allows editing documents or pages in a collaborative environment between users. A wiki can also be defined as a set of pages. The wiki users can edit pages and it does not require approval by a third person to be published. The editing and consultation is done through a common web browser. One of the main features of wikis is the ease page creation and modification, allowing users a high degree of interaction between them. What distinguishes wikis from other websites is that all users who require it can edit web pages. This characteristic makes wikis ideal for use as a learning tool, since it encourages collaboration and sharing of information between users in a collaborative environment.

3 Online social networks contributions for e-learning

Nowadays, it is common to use LCMSs in universities around the world. However, these platforms are used mainly for administrative purposes and its educational impact has little relevance. Tasks such as accounting and user’s management, courses management and their content program belong to the main functions of e-learning platforms. From the educational perspective, students have the availability to check the content and they can interact with their classmates and teachers. However, the rigid structure of the common LCMSs, fail to stimulate the student’s proactive participation in the development of the learning process and the subsequent resolution of problems.

There are several available tools to support e-learning environments. They comprise blogs, discussion fora, chats, file sharing, videoconferences, e-portfolios and wikis. All of them can be used to support activities that involve the learning process. Some of these tools are integrated in several e-learning platforms under use. Fig. 3 shows some of the biggest social networks today and its main features. The use of social applications and online social networks provides a different approach to e-learning than that provided by the use of LCMSs. The former enhances the student’s personal definition of the learning process, as well as contact with a larger number of people sharing the same interests and goals [11].
Although most of online social networks that currently exist have not been designed for educational purposes, they have certain features that may prove to be very interesting and important when applied in an educational context. The great social contacts that come from the use of an online social network enhance interaction and information sharing among its users. Such sharing might encourage people to learn together, sharing views and content relating to the matters in question.

The use of online social networks to support e-learning is part of an active and social type of education in which students are oriented to solve problems. The main points of the learning process are the self-regulated activities of problem solving. This takes an approach of social constructivism in which the student must steer his/her own learning process. This type of learning means that it is not possible to structure and pre-define the activities of the student through the learning process. Activities should start with a problem or a project, and it provides tools and resources that will support the student through the process to solve the problem [12].

The use of social software and online social networks enable the student to the self-governed activities. Using its features as tools to access to a wide range of possible contacts and a flexible structure for collaboration, students can take the process of problem solving in a collaborative atmosphere improved with possibility of enriching their learning.

The increased visibility of student work is very relevant through the use of online social networks. This increased visibility will improve and strengthen social relationships with other contacts and teachers, enhancing information sharing and discussion around the topic under study. This kind of discussion is different from those available in a forum included in an LCMS. These discussions are originated by personal entries of each student and the players will discuss a personal content provided by students, with benefits for the concerned student.

Throughout the learning process, the student will be confronted with questions and doubts that need clarification. The easy access to online social networks will allow contact with several people. While different people do not work in the same problems they share common interests and backgrounds, thereby facilitating the sharing of information with one or both parties. This insertion in online social networks and the contact with other people also enhances the contact with new perspectives and viewpoints that can enrich the work in progress by the student. Fig. 4 depicts this sharing and collaborative environment through the use of online social networks and other Web 2.0 services such as wikis and blogs.

Online social networks appear as an important tool for the development of the student learning process that will enable him/her to have a posture of self-government for activities that he/she will develop to solve a given problem. This approach is in contrasts with the rigid structure of an LCMS, where content is made available for student use, and where there is only interaction between students and teachers, greatly limiting the exchange of opinions and point of views. The online social networks provide an atmosphere of collaboration between users, ideal for a student to work on solving problems and progress in their learning process [13].

Learning comes from sharing knowledge. Someone in possession of knowledge shares it with others in order to disseminate and promote the creation of more knowledge. In this context, online social networks can play a major role in disseminating and creating knowledge. E-learning platforms are by definition closed to its group of users. By allowing the connection between e-learning platforms and online social networks, the number of potential participants in the sharing of information increases exponentially. This link enables information previously restricted to the group of users of the platform, to be released over to the network of friends in one or more of these user’s online social networks. In addition, one of the main characteristics of online social networks is the sharing and contacts with others, either through posts, groups, applications and so on. This atmosphere of sharing and social interaction creates an environment highly appealing for information sharing in an academic context. It can therefore be concluded that the two strengths of online social networks are the huge range they have in terms of contacts and sharing environment and social contact they provide. Taking into account that today a majority of the population uses one or more social networks, particularly younger people, it is safe to say that

Fig. 4 Collaborative e-learning environment with online social networks
online social networks are an important resource to the
definition of the learning process of a student and hard to
ignore. Thus, e-learning platforms, in addition to gain
relevance among students with the incorporation of features
available in online social networks, are somehow obliged to
make a bridge with them in order to motivate students for
using them more productively.

4 Integration of online social networks in e-learning platforms

As previously stated, e-learning platforms tend to be closed and
inflexible for users. Its use is restricted to settings created and
defined by their administrators. The role of a student is
passive, passing often by consulting content provided by the
teachers responsible for the materials under study. In
addition, many times, its main features are used for
administration purposes, such as registration of users, courses
and so on. This leads to the creation of environments, little
exciting for students who do not enjoy the full potential of
platforms. The inherent characteristics of online social
networks, such as collaboration, content sharing and reviews
catalyse the creation of active and stimulating environments
for students [14], who are encouraged to share and
communicate among them. These characteristics are very
important for the improvement of learning environments [15].
The ability to stimulate the student interaction with
learning contents and their creators is essential for him/her
to take a critical stance in relation to these contents and also
receive his/her contributions for their improvements. The
development of critical thinking and pro-activity in students
is enhanced in an environment of sharing lived in an online
social network.

Making a student as an active agent able to define the
learning process and solving problems, rather than just a
receiver of knowledge, will be very advantageous in order
to prepare for his/her future career. We live in an age where
the Internet is dominated by social tools [16], which take
the users to interact and share content with users of many
different environments. The trend increasingly visible is to
integrate and establish points of connection in the most
varied existing platforms that make up the Web 2.0.

The creation of modules inside e-learning platforms to
provide services similar to those available in the Web 2.0
and allow access to online social networks is a requisite and
a great asset. Then, it settles the bridge between two worlds
that is completed with a view to improving the environment
for student learning. This vision of global integration could
bring a host of advantages for improving the living
environment on a traditional e-learning platform.

Students can easily share content and communicate with a
much wider group of contacts with access to their favourite
online social networks. This centralisation of functions in
an e-learning platform allows learners to organise and lead
their learning process the best way that they approve.

Table 1 summarises the main characteristics of e-learning
platforms and important contributions from online social
networks.

The proposed system contributes to encourage
communication and collaboration between students and
teachers over the platform. It is encouraged to share
knowledge with colleagues. The information and knowledge
sharing is possible and encouraged in online social networks,
thus reaching a much wider range of people, many different
occupations and different academic backgrounds, which
potentiates the acquisition of eclectic points of view. The
creation of an environment for information and knowledge
sharing among students in an e-learning platform appears as
an important contribution. This space is mainly intended to
courage interaction and sharing between users, thereby
enhancing the development of the learning process and
encouraging the use of collaborative working environments.
Another contribution of this work is the establishment of a
bridge between an e-learning platform, an area normally
closed to its group of users, and users of online social
networks that may be interested in a given related topic. This
link allows users to share information with a much larger
group of people, thereby enhancing their educational experience.

4.1 Created modules

An e-learning platform, called PLEBOX, was used as a basis
for integration of modules with the above-mentioned
characteristics. Fig. 5 shows two of these modules, the
‘Wall’ module that is used to place comments and posts,
and the ‘Chatroom’ module that may be used for chatting in
real time. Other modules for Groups, Links and RSS were
also created. The Groups module is used to create groups
(of interests) that will be later used in the Wall module to
organise the information provided. The Link module offers
the possibility for sharing links (URLs – uniform resource
locators) between users. Finally, the RSS module is used
for sharing RSS feeds, which allows the query of their
feeds and access to the related news. A user can also share
information to an online social network or send an email
from each module, using the buttons provided on the basis
of each module. The construction of these modules is intended to
incorporate features of online social networks and
thereby create an environment of sharing and
collaboration between users within an e-learning platform.

Table 1 Summary of e-learning platforms main characteristics and contributions from online social networks

<table>
<thead>
<tr>
<th>Community</th>
<th>Restricted environment for users of the platform</th>
<th>It covers the entire network of friends and friends of friends, depending on the degree of privacy used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro-activity</td>
<td>The student has a passive role. Access the content provided by the teacher</td>
<td>The student has an active role. Takes initiative in shaping their learning processes</td>
</tr>
<tr>
<td>Content creation and sharing</td>
<td>Contents are designed by the teacher and used by the student</td>
<td>The student creates and shares contents</td>
</tr>
<tr>
<td>Communication</td>
<td>Communication takes place mostly in one direction: teacher -&gt; student</td>
<td>Communication takes place in both directions</td>
</tr>
<tr>
<td>Critical sense</td>
<td>The learner is a recipient of knowledge. His critical sense is not stimulated</td>
<td>Is stimulated a critical sense of the student. Interaction with different people and opinions leads the student to develop their critical sense</td>
</tr>
</tbody>
</table>

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5 Performance evaluation and validation

The performance evaluation of the created prototype was conducted through user’s survey. A survey was conducted regarding the use of the system with 187 users, of which 176 students of information systems and technologies and 11 teachers. The system was used for a period of four months and, after that, the users filled a utility survey (using a Likert scale 1–5) about their experience. The survey questions are shown in Table 2.

Fig. 6 shows the results of the prototype utility survey applied to teachers. As may be seen, over 40% of teachers strongly agree that modules have an attractive design. More than 30% strongly agree and 40% agree that they are easy to use, and 30% strongly agree that they are useful. Around 30% of teachers were fully satisfied after the use of modules, and over 30% strongly agree and 40% agree that the characteristics make them easier to use and work properly. Finally, 90% of teachers agree that the modules help in information sharing.

Fig. 7 presents the results of the prototype utility survey for students. This figure shows that over 70% of students think that platform has an attractive design and over 95% believed that the modules are easy to use. Just over 50% of students strongly agree that the modules are useful and more than 70% were satisfied after use. Finally, all students agreed that the modules are useful for information sharing and over 90% believe that their capabilities are easy to use and working properly.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Prototype utility and user experience survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>question 1</td>
<td>is the design attractive?</td>
</tr>
<tr>
<td>question 2</td>
<td>are the modules easy to use?</td>
</tr>
<tr>
<td>question 3</td>
<td>are the modules useful?</td>
</tr>
<tr>
<td>question 4</td>
<td>was satisfied after using the created modules?</td>
</tr>
<tr>
<td>question 5</td>
<td>are the modules helpful to share information?</td>
</tr>
<tr>
<td>question 6</td>
<td>are the features easy to use and work correctly?</td>
</tr>
</tbody>
</table>

6 Conclusions and future work

This paper discussed the potential of online social networks in the development of students learning process, describing the most relevant available applications. Current LCMSs are platforms with rigid structures that do not promote students
pro-activity, making it unattractive over time. This failure may be overlapped with the dynamic and cooperative environment of online social networks. Websites such as Facebook, MySpace and Twitter belong to the Web 2.0 vision. This new structure gives users spaces to contact each other’s and share information between them. They can have numerous websites with several available services that will allow, for instance, contact with groups of people with common interests or websites where one can make or edit existing content, such as wikis. This paper also presented proposed modules that incorporate these features and demonstrate their integration in an e-learning platform (PLEBOX). It was shown through user’s survey that these services enhance information and knowledge sharing and interaction between users, furnishing tools that improve the contact among students, where they can manage their own learning process. Thus, online social networks enhance e-learning experience.

A performance study to evaluate the best choice, or the best combination, between the possibility of integrating online social networks on e-learning platforms or moving e-learning systems to online social networks may be considered for future work.

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8 References

14 Li, M., Liu, Z.: ‘The role of online social networks in students’ e-learning experiences’. Int. Conf. on Computational Intelligence and Software Engineering (CiSE 2009), Wuhan, China, 11–13 December 2009, pp. 1–4