THE DEVELOPMENT OF AN EDUCATIONAL SOCIAL NETWORK TO SUPPORT INTEGRATED-LEARNING IN UNIVERSITIES

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ABSTRACT

Social Networks (SNs) have been successfully used in education, particularly in social knowledge training. However, using universal SNs, such as Facebook or Twitter, to deliver courses, has limited the effect of social training due to the lack of support from educational services. Developing an educational SN can provide a better support for education in a university. This paper describes the development of an educational SN that integrates social features of SNs with academic features of educational training. The developed educational SN has shown certain advantages when comparing the deployment on universal SNs or the usage of Learning Management Systems.

Keywords: Social networking, User modeling, Facebook, Learning Management Systems, Integrated-learning.

TÓM TẮT

Phát triển mạng xã hội giáo dục hỗ trợ học tập kết hợp trong trường đại học

Mạng xã hội (MXH) thông dụng như Facebook, Twitter có nhiều hạn chế về hiệu quả đào tạo xã hội. Bài báo này mô tả việc phát triển một MXH Giáo dục có tích hợp các tính năng xã hội của các MXH với các tính năng học thuật của giáo dục. Việc xây dựng MXH Giáo dục cho thấy lợi thế nhất định của nó so với việc triển khai trên các MXH thông thường hay việc sử dụng các Hệ thống Quản lý Học tập.

Từ khóa: mạng xã hội, mô hình hóa người dùng, Facebook, hệ thống quản lí học tập, học tập tích hợp.

1. Introduction

According to Oxford Dictionary, Social Network (SN) is a dedicated website or other application which enables users to communicate with each other by posting information, comments, messages, images… SNs have provided new ways of learning, especially in universities [10]. Social knowledge and skills, an important part of university training, can be educated through interactions between students in SNs. To facilitate social training, several lecturers have successfully used SNs as a training environment to deliver their courses. However, universal SNs, such as Facebook, LinkedIn, and Twitter, are not designed for teaching and learning, so their educational services are very limited.

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An educational Social Network (eSN) not only can bring educational services to students but also keeps social features of SNs. This paper describes the development of an educational social network, named SoNITS (Social Network for Information Technology Students). In this SN, several useful educational services have been developed. The comparison between an educational SN with universal SN and Learning Management System is further analyzed.

2. Social network in education

SNs were effectively used in education [16]. A web-based forum was deployed as a discussion media to support traditional learning methods and provided a good effect on student performance [10]. SNs were used to encourage students engaging in social communication [9]. This study also showed that the learner outcome was proportional to their relationships and activities in SNs. A SN was also used as an enabler of group learning and collaborative work [8]. This teaching method successfully promoted the creativity and group learning among students.

At the university-wide level, several SNs have been deployed and operated. Ten universities in Texas (Rice, the University of Texas, Texas A&M University, Baylor, Texas Tech, Texas Christian University, Southern Methodist University, the University of North Texas, UTArlington and Texas State University), created their university SNs that are hosted on Facebook [10]. In this attempt, several interesting studies were carried out with a vast amount of information about the student activities collected from these deployed SNs. To support integrated-learning (a blend of traditional and electronic learning [9]), a private SN was constructed in University of Alicante [9] to provide a platform for online teaching and learning, accompanied with traditional teaching methods. This SN promotes the active participation of students and teachers in virtual activities to improve academic performances of students. This SN is successfully deployed and operated to support teaching and learning on several courses of various disciplines.

According to [7], educational usage of social networking is motivated by three following factors:

- Communication: students and instructors use forums for class discussions, following announcements from teachers, departments or schools, deliveries of homework and assignments, informing about resources and links related to courses.
- Collaboration: students can exchange ideas, share information and work together (the most popular Web application that enhances collaboration is Google Doc).
- Resource and material sharing: as people exchange ideas and information, they can also share resources, materials and documents e.g. text documents, multimedia resources, project materials, links, …

These factors are difficult to execute in normal SNs, such as Facebook, due to the lack of organizational structures and user types. Developing a fully educational

university-wide SN with particular features for education can benefit for teaching and learning.

3. Educational social network for information technology students (sonits)

An educational SN is a dedicated SN for education and mainly developed to support teaching and learning in universities [3]. It is a virtual community that brings extra social dimensions to the traditional academic life of students in their universities. It is the combination of the social features of SNs and the academic features of educational environment. With this blending, social interaction can provide a better support for learning and education by enriching the social interaction. Moreover, students spend long period of time in universities, so it is better if educational SNs can provide social services for them to communicate with other students in their learning environment.

A university has several different management and teaching-support systems to back its operation, but all these systems have a rigid structure tied to their business processes. A university portal provides useful information to students, but it is often one-way communication systems in which, only authorized managers can publish information to university's users. Blackboard [1] and Moodle [11] are electronic learning environments that are instructor-oriented and only focus on the delivery of separate courses. Intelligence Tutor Systems (ITS) are developed to support course teaching and in-class activities, but they are only developed for some particular courses so far. E-Learning tools are also constructed to support distance learning and only focus on delivering courses through the Internet. These systems cannot provide a virtual community that containing rich social services for students. Therefore, the development of eSNs will enrich educational environment and play a special role in universities.

Organizational structure is a particular feature of educational SNs in comparison with universal SNs. Universal SNs is often a flat structure with a mainly peer-to-peer communication among their users. In universal SNs, users are free to make their voice, connect to other members or join communities. Social communities have no relationship with others. In an educational SN, both organizational and social communities exist together. Although the freedom of opinion expression is still maintained in educational SNs, students have their learning duties and academic regulations to fulfill in this virtual atmosphere as in traditional academic environment. Therefore, the structure of universities has to be embedded into educational SNs to carry out educational activities. For instance, a person can play the role as a lecturer of a school, a member of a committee or a manager of a department in a university, but in the same time, he/she is also a member of a friendship network with other lecturers or students of different schools. These two relationships both exist in an educational SN.

An educational Social Network for IT Students (SoNITS), which combining features of SN and academic features of universities, is constructed and operated in an Intranet at the School of Computer Science and Engineering, International University –

Vietnam National University HoChiMinh City (SCSE-HCMIU) since 03/2011 to provide a platform for instructors and students communicate together and to evaluate its effect on teaching and learning at the SCSE-HCMIU.

Built on top of Liferay [8], a popular open-sourced portal, SoNITS combines features of a common SN and educational services. The architecture of the SoNITS built in SoNITS is shown in Figure 1. External systems, such as university management systems in Academic Affair Office or Youth Union, provide student information to construct student models, which are managed by Student Model Server. Other educational systems, such as University Portal, Intelligent Tutoring System or Blackboard, can exchange data and co-operate with the educational SN. Users of the educational SN can also connect to popular SN through the interoperability of user profiles between SNs. Inside the educational SN, social and educational services can access student models from Student Model Server to deliver appropriate information to users. Social and educational activities of students are collected by the Behavior Tracking and Analysis Module. Discovered knowledge about students is used to update student models or to create reports about student learning activities. Grading of students' social activities is based on these reports and then their results are sent to academic systems.

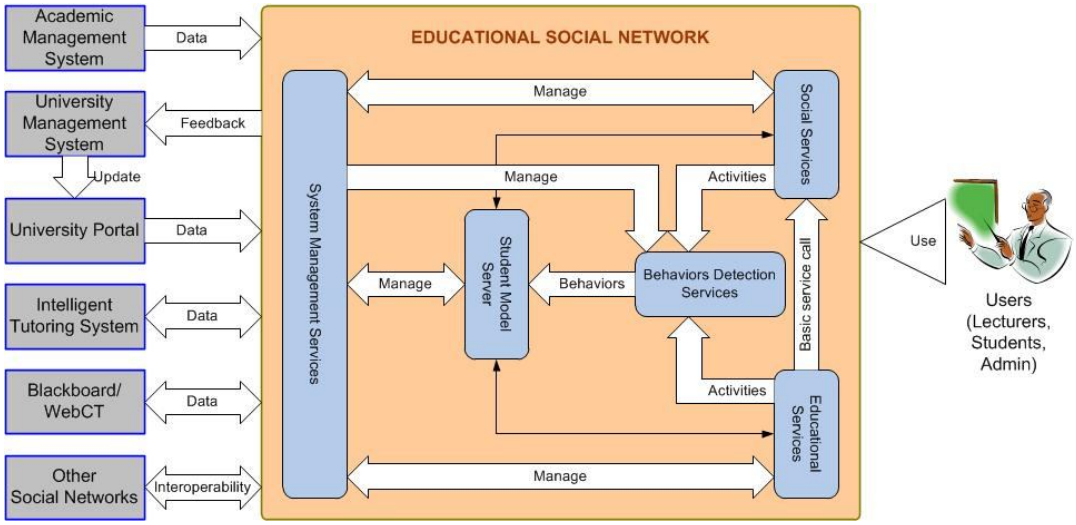


Figure 1. *The architecture of SoNITS at SCSE-HCMIU*

SoNITS combines all existing social services of the Liferay portal with newly developed educational services. Social services consist of essential services, such as mails, chats, forums… that are necessary for social communication [8][12]. Educational services include services to support learning, such as Course Delivery Support Service, Useful Information Recommendation, Career Counseling. In an integrated environment like SoNITS, social and educational services can mutually

support each other. Students only log in the system once and can use both two types of services. Information can also be shared between both services. Therefore, the academic and social lives of a student are blended together.

One of the most advanced features in SoNITS is the modeling of students. The student model in SoNITS is organized as a tree-liked ontology of competencies, including two main parts, social and academic portion. Student model is initialized by the academic records for the academic portion. Throughout the social interaction of students, their activities are traced and then their social behaviors are extracted and updated to the social portion of their student models. The student model gives based data structures for all services in SoNITS. With student model, new features can be added to educational services to improve their quality.

Main social services in the Liferay framework, such as mails, messages, wall comments, etc… are modified to keep all activities in SoNITS. The recorded information of social interaction is only about the senders, the receivers, time to start/end. The content is not stored to avoid the violation of privacy. This recorded information can be used to evaluate the social interaction of students, study about students' behavior to update the student model or make research about social communities [8].

Course delivery is one of the main processes in universities. A course delivery service is developed to facilitate lecturers to create a virtual class on SoNITS. Each virtual class plays a supporting role a traditional class. In this virtual class, lectures and students can socially interact and discuss issues outside classrooms. In this service, a lecturer can create his class by using the students list that is imported from the academic management system. From the beginning, he can know about the abilities of his students, such as their Grade Point Averages (GPAs), their abilities in programming, their performances in the prerequisite courses, etc.. During the course, the lecturer can use all available social services to deliver his course. With the support of SoNITS, he also can know about the social activities of his students, topics which students are interested in...

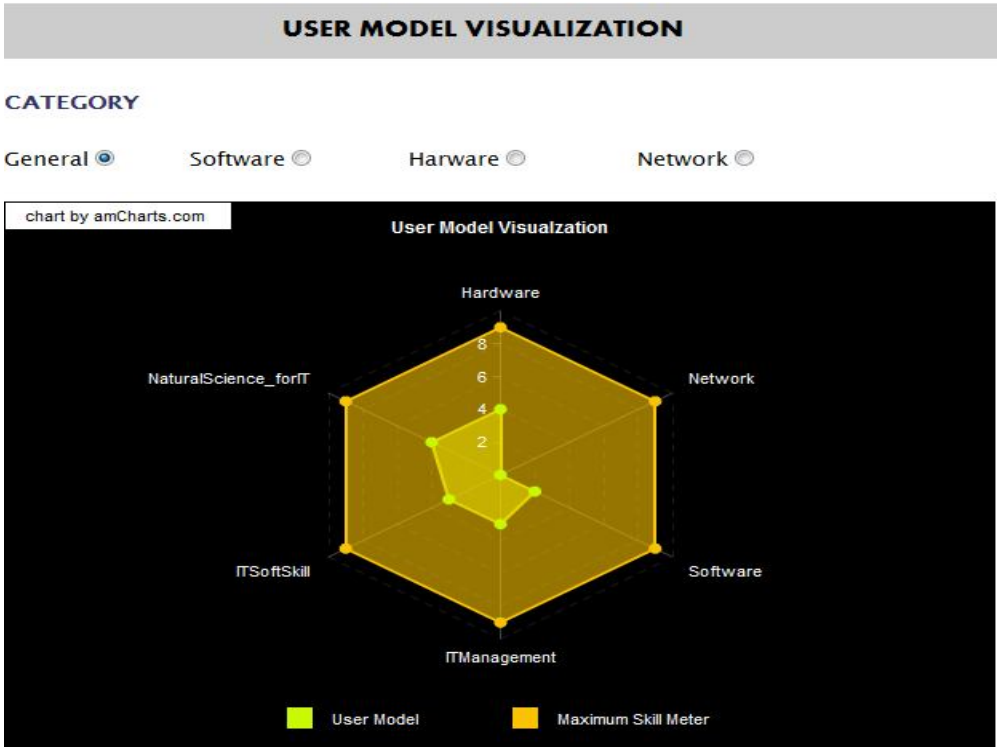
The course delivery service in SoNITS can provide a better service for lecturers and students than Blackboard or universal Social Networks. In comparison with Blackboard, the course delivery service in SoNITS can provide richer information about students based on their student models and provide more social services in an integrated environment. Compared with the deployment of a class on a universal SN like Facebook, roles, rights and activities of the lecturers and students in this service are clearly defined by the business process. This service provides the perfect blended-learning environment because in an integrated environment, students can re-use all their social interactive services and relationships while learning.

A simple Recommender System has been developed to suggest useful courses or learning materials that are suitable for the interest and ability of a student. The student

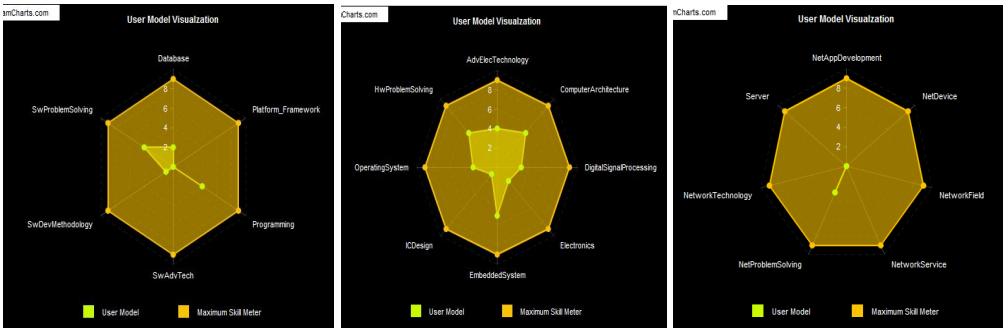
information can be discovered by the mentioned student model. Using the Content-based approach to recommend [14], courses or learning materials are evaluated by the appropriateness with the interest to students to select the most suitable information to display for students.

A student can explore their own model to discover his strengths or weaknesses to plan their study by using the Student Model Visualization service. In details, he/she can see the level of each computing competency and the reason for that level, as in Figure 2. In the general view, competencies are grouped into main discipline and displayed in a radar chart as in Figure 3 (a). He/she also can see three other radar charts about his main competencies in groups Software, Networking or Hardware, as in Figure 3 (b). With this service, a student can have a broader perspective and visual picture about his computing abilities, so he/she can make a right choice for his study major.

Figure 2. *Competencies monitoring and editing of SoNITS at SCSE-HCMIU*



a. General View



Software view *Hardware view* *Network view*

b. Special Perpecstives View

Figure 3. *Perspective of an User Model Visualization of SoNITS at SCSE-HCMIU*

To make the most use of the student models, a Student Counseling service is also developed in SoNITS. This counseling service will examine the current abilities of a student and propose three most suitable IT jobs that he can work well in the industry after his graduation. Eight IT occupations, that are common in Vietnam IT industry, are selected from the Standard Occupational Classification System (SOC) [13] – version 2010, as the aimed jobs for IT students. A matching function is used to compare the student ability with the demand of the job. Using this matching value, the counseling

service suggests which job is suitable for that student, explains the reasons of the suggestion and recommends which courses or skills the student has to improve to fulfill the demand of that IT job. This counseling information is very helpful in assisting students select their major, making their leering plan or studying professional courses to boost their chance in finding a job after graduation.

4. Discussion

Table 1 shows the comparison of an educational social network (eSN), a social network for education deployed on a universally social network (uSN) and a learning management system (LMS). The main difference between an eSN with a uSN and a LMS is an eSN that allows users to bring the organizational structure to SN, in which each user plays the same role in the real life and an eSN. However, an eSN also allows users to freely make social connection to other users as in a uSN. This freedom of making virtual community is a significant difference between an eSN and a LMS. Therefore, a user in an eSN can be a social user as in a uSN as well as a customer of a LMS.

Social services are the core of a uSN and an eSN. In a LMS, social services are limitedly provided because it is designed for teaching. Only some basic social services, such as forums or white boards, are provided in a LMS, and are only used to connect to other students in the same course. Thus, social training in a LMS is much limited in comparison with a uSN and an eSN.

A uSN is not designed as an information system with strict business processes, so it is difficult to develop educational services in uSN. As previously mentioned, there is no user role in a uSN, so deploy a business process on uSN is nearly impossible. For examples, when setting up a class on a uSN, a user is supposed to be a lecturer and other users are presumed as students. There is no different right and activity between this lecturer and his students in this virtual class. Academic regulations are difficult to be applied in this situation.

In a uSN, a user profile often keeps essential information about social connections and preferences of a user. When academic record is not stored, educational services on a uSN is not fully supported as in a LMS or an eSN. In an eSN, the social and academic parts of a user are all kept together to provide a better information about a student.

Course delivery service is one of the core services in any academic system. With the lack of academic support of a uSN, development the course delivery service in a uSN is not efficient. In another side, LMS is an information system dedicated for course delivery. In an eSN, course delivery is only one of the core services. It also enriches this service by integrating social services of a SN.

Finally, user activity tracking is available in all SNs to support social network analysis. In LMSs, user tracking is limited to the interaction between users and the course delivery services. Social interaction is not focused in LMSs.

To sum up, an eSN combines the social features of a uSN and the academic features of a LMS in a integrated environment. Compared with a LMS, an eSN provides enriched social interaction. When developing an educational service, an eSN has a better academic support than a uSN.

Table 1 - The comparison of an educational social network, a social network for education deployed on a universal social network and a learning management system [1], [15], [11].

Features	**Universal Social Network (Facebook, …)** [15]	**Learning Management System (Blackboard** [1]**, Moodle** [11]**, …)**	**Educational Social Network (SoNITS)**
Community	No hierarchy	No hierarchy	No hierarchy (for community) Hierarchical structure (for organization)
User role	Social user	Strict role in a information system	Both
Social service	Support Fully integrated No limit in making connection to other users	Limited Some basic service Limit connection to the community of a course	Support Fully integrated No limit in making connection to other users
Educational service development	Not much support	Fully support	Fully support
User model	Simple profile	Academic record	Student model of competencies + academic record
Course delivery service	Not dedicated support No academic role for a user No business process	A dedicated system Strict academic role for a user Strict business process	A dedicated service of the system Strict academic role for a user Strict business process
Social interaction tracking	Support	Less support	Support

5. Conclusion

The paper discussed the need of developing a particular social network for education, named educational social network. The features of this new social network type were explained by the experience through the development of an educational social network, named SoNITS. Finally, the benefits of using educational social network in education are discussed and compared with the deployment on universal network or the usage of learning management systems. The integration of social and academic features in educational SNs is a promising platform to construct several other useful educational social networks in the future.

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