

Unifying Informal and Formal Learning Environments: Educational Use of Social Network Sites through Implementing Community of Inquiry Framework

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Abstract—In spite of the widespread incorporation of learning management systems (LMSs) into university teaching and learning, lecturers leverage them primarily for delivery of documents such as class syllabus and lecture slides. However, this traditional one-way transformation of knowledge does not encourage students to utilize the collaborative features of LMSs such as discussion forums for enhancing their level of learning. In this article, the researchers explain about the potential of the social network sites (SNSs) for communication and information sharing in higher education system. The capability of SNSs to create personal profiles allows users to maintain connections with students and lecturers from other educational institutions. Furthermore, applying appropriate theoretical frameworks such as community of inquiry (CoI) to the social network platforms provides meaningful environments for collaborative knowledge construction among students. The element of teaching presence in this CoI model is influential in promoting students' academic engagement and higher order thinking skills.

Index Terms—Social network sites, e-learning, higher order thinking, community of inquiry.

I. INTRODUCTION

Nowadays, the second generation of the World Wide Web, known as Web 2.0, has revolutionized the world of education. Web 2.0 applications facilitate users' social interaction, collaboration, sharing and discussing information through audio or video podcasting, blogging, social networking sites (SNSs), and wikis writing [1]. Many learning management systems (LMSs) increasingly used by universities for distance or hybrid education fall under the category of Web 2.0 tools. These web-based systems also known as course management systems (CMSs) fulfill three goals: 1) allow instructors to share learning resources such as lecture presentation slides; 2) make it possible for lecturers to conduct online exams or evaluate students' learning by grading their assignments; and 3) provide an interactive environment through the discussion forums to encourage

collaborative learning. CMSs are generally categorized into two types: open or licensed sources. The open learning management systems such as Moodle (<https://moodle.org/>) are free for users but licensed ones like Blackboard (www.blackboard.com/) should be purchased by educational institutions.

Although the LMSs provide online interaction and collaboration spaces such as chat function and discussion forums, these features are rarely utilized by instructors and students [2]. One of the reasons is that LMSs are teacher-centric. It means that instructors use LMSs primarily for one-way transformation of information through sharing lecture notes and slide presentations [3], [4]. The other reason is that students are restricted to merely interact with their classmates who have officially enrolled in that course. In other words, other people like professionals, alumni, and students from other courses or universities are not allowed to participate in their social network. The aforementioned factors suppress students' motivation to have a discussion through LMSs.

Another disadvantage of LMSs is the fact that the processes of viewing and sharing materials through existing LMSs can be quite difficult and time-consuming. For instance, whenever students want to submit their assignments or download course materials, they have to insert their password to log in and go through numerous pages to find the new postings. Moreover, LMSs are only accessible within the course duration due to their space limitations. It means that students would not have access to course materials inside LMSs after the end of a course or graduation from the institution.

Social network environments can overcome the constraints of LMSs and can be used as a new e-learning platform in higher education. Creating personal profiles in SNSs gives students the ownership of their learning space and improves learner-centred approaches. Students can manage information, create content, and connect with an open social networks all over the world. Furthermore, the existence of interaction facilities such as comment and chat functions as well as content sharing elements together in the same page makes it unavoidable for students to communicate with each other [5]. In the following section, we will define social network sites, explain the purpose of students for using SNSs, and finally, the positive effects of leveraging SNSs as LMSs substitute on engagement and cognitive process of students are discussed.

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II. SOCIAL NETWORK SITES

Boyd and Ellison [6] defined social network sites (SNSs) as “web-based services that allow individuals to 1) construct a public or semi-public profile within a bounded system, 2) articulate a list of other users with whom they share a connection, and 3) view and traverse their list of connections and those made by others within the system”. Social network sites such as Friendster, MySpace, Google+, Twitter, and Facebook are increasingly attracting the attention of millions of users in different age groups.

Facebook (FB) is the most popular social media in the world. In September 2012, Facebook (FB) had over one billion active members around the world. More than half of them were using Facebook on the mobile phone [7]. Individuals over the age of 13 are allowed to create a profile in Facebook, add friends, upload photos or videos, send messages, and chat online. Facebook also offers opportunities for members to create their own groups or join other groups based on their shared interests, professions, political or religious beliefs. The majority of students in the universities have Facebook accounts. Most of the university students use their accounts one time or multiple times, between 10 to 60 minutes per day [8, 9]. Students use SNSs mainly to stay in touch with whom they had a previous connection such as their classmates, family members or neighbours [9], [10].

Malaysia is ranked at the fifth position in Asia for using Facebook with approximate 46.95% of the total population of the country. Sixty-two per cent of these active users are ranged from 18-34 years old [11]. The result of a survey conducted on the 707 Malaysian students, aged between 17 and 30 years old indicated that almost 54% of students visited Facebook between 2 and 5 times every day. Around 36% of them reported spending more than 60 min on Facebook per day. The study explained that one possible reason is due to the substantial average number of 612 Facebook friends in their profiles [12]. According to previous studies, Table I illustrates the percentage, duration, and purpose of FB usage by students in some countries.

Oblinger and Oblinger [13] used the term “Net Generation” for students who were born between the years of 1982 and 1991. This young generation have been gradually extending their use of SNSs from solely social intentions to educational purposes. A survey done in a British university reported that 10% of the undergraduate students discussed their academic work with other students daily or weekly through social network sites [14]. For instance, they use Facebook to ask questions about their assignments, class venues, or share the lecture notes [15]. In Malaysia, sharing information and knowledge in social network sites is currently surpassing the traditional channels such as e-mail and e-learning websites because most of the students have found the SNSs easy to use and helpful for their coursework and assignments [16].

Using social network websites in formal educational contexts can be considered as a powerful idea simply because students spend a lot of time on them [8]. Checking SNSs several times during the day or the week for social purposes, makes it easy and convenient for students to regularly get the course updates. Hence, there is an invaluable opportunity for

educators to establish academically-oriented interactions with learners through the capability of SNSs for communication, collaboration, and resource/material sharing. The implication of good pedagogical principles in social network environments makes these platforms as future ideal learning management systems.

TABLE I: STUDENTS' USE OF FACEBOOK IN DIFFERENT COUNTRIES

Country	Students' percentage	length of time (daily)	Number of FB friends	Main purpose of usage
USA [9], [17]	94%	10-30 min	150 - 200	96% stay connected to former high school classmates
Canada [18], [19]	85%	10-60 min (79%)	An average of 297.07	Social interaction
England [10], [14]	92%	20 min to several hours	Most 100 - 200	Communicate with close offline friends
Turkey [8], [20], [21]	93%	Less than 15 (33.1%) 30 min (38.8%) 60 min (14.9%)	An average of 246	Maintaining existing relationships
Malaysia [12]	99.8%	Less than 30 (31.5%) 30–60 min (32.4%) More than 60 (35.9 %)	An average of 612	Maintaining existing relationships and make new friends

III. SNS AS AN LMS SUBSTITUTE

Social network sites offer many of the same features provided in the learning management systems. Their pedagogical, social and technological affordances allow sharing resources, putting up announcements, taking part in online discussions and collaborative activities [22]. The user-friendly environment makes SNSs more appealing to students than LMSs to collaborate in group projects, although the latter offered the main utilities they wanted to use such as group management, threaded discussion, and file sharing [23]. Higher education administrators have this valuable opportunity to harness Facebook applications in ways that are beneficial to students' engagement and higher order thinking skills.

A. SNSs and Students' Engagement

Kuh [24] defined students' engagement as the time and effort students invest in their academic works which is positively associated with their learning outcomes. Interestingly, Students are engaged more in a digital environment than a traditional physical classroom. A case study showed that the integration of SNS as an LMS substitute led students to complete more tasks while they are online rather than in a classroom setting [25]. The use of social network services as a supplement to learning management systems also increases the engagement of students outside the classroom. In their study, DiVall and

Kirwin [2] used Facebook group page as a “Blackboard” supplement for course-related discussion outside the classroom between pharmacy students and their instructors. The perceptions of students were evaluated using an anonymous in-class survey from 123 students at the end of the course. The results showed that although the use of FB group page was voluntary, twenty-six per cent of students contributed posts on Facebook compared to 11% who posted on the course discussion board in Blackboard. Thus, students were more interested in using Facebook for their academic discussion even when the same platform was available through learning management systems.

The empirical evidence has revealed that integrating SNSs as requirement for the course and the quality of lecturers' online interaction with students are essential factors in students' engagement and their academic achievements. Two experimental studies investigated the effect of using Twitter (<https://twitter.com/>) on undergraduate students' engagement and their grades in two different conditions. In the first study, the instructor imposed a theoretical framework for course-related activities via Twitter and regularly participated in the platform. In contrast, in the second research students were allowed to have a voluntary contribution in the Twitter site and faculty staff rarely interacted online with them. The 19-item National Survey of Student Engagement (NSSE) was adopted as the pre and post-semester instrument. The results showed that in the second study, there was no difference between Twitter users and non-users in terms of the engagement scores and semester GPAs of students. However, the first study demonstrated that the mandatory use of Twitter, implementing a good pedagogy, and instructor's active participation provide incentives for students to be engaged more and gain better academic outcomes than non-users. [26].

The ability of creating individual profiles and uploading personal photos and information encourage more conversation and a sense of belonging among students and as a result a greater sense of engagement in the class [27]. Students are able to maintain their social connections with their teachers and classmates through their personal profiles. In addition, posting to social network sites such as Twitter and Facebook via mobile phones enables learners to contact regularly with others anytime and anywhere. As a result, they do not experience the feeling of social isolation which is the main pitfall of using LMSs especially in distance education systems [28]. The lack of face-to-face interaction in distance learning courses do not provide students sufficient opportunities to socialize and get to know each other outside the virtual classroom environment. This situation may lead to feelings of social isolation, which is a major cause of lower retention rates and academic achievements in distance learning courses [29].

The use of social network sites for educational purpose especially for the first-year students in international universities strengthen the relationship between local and international students and consequently their engagement in the course. Because of the language and cultural barriers, international students do not want to talk and ask their questions in the classroom. McCarthy [30] studied the

experience of 120 first-year architecture students (including 27 international students) about the use of Facebook for submitting their assignments to the peers in order to view and critique them. The findings showed that Facebook integration helped students to overcome language barriers and allowed them to have a discussion at their own pace in the asynchronous platform. When the students continued their discussion from virtual space of Facebook to physical classroom environment, it encouraged more social and academic interaction among students in the classroom.

The interactive quality of social networking technologies has led to lecturers' considerable enthusiasm to implement appropriate pedagogy to enhance collaborative learning in students [22], [31]. Hew [32] in his review on the use of Facebook by students and teachers concluded that “most of the educational use of Facebook is about course related administrative matters such as lecture schedules and assignment requirements instead of pedagogy aspects of teaching and learning such as querying, reflecting and commenting on specific course related topics”. There is scant evidence that shows which appropriate pedagogical methods should be implemented to make social network platforms a useful and meaningful environment for enhancing the level of learning in learners.

B. SNSs and Students' Higher Order Thinking

The asynchronous discussion in the walls of SNS profiles allows students to have plenty of time for posting more critical and thorough feedbacks on each other's work rather than saying them orally in the classroom [27]. Depending on the tasks chosen by the teacher or the way teachers integrate the social network environments, the implementation of SNSs can pedagogically enhance the level of thinking in students [25], [33]. Despite the few studies that have investigated learners' attitudes toward the effects of incorporating SNSs in class, limited attention has been devoted to exploring the learners' cognitive processes involved in online discussions using SNSs [34].

Callaghan and Bower [25] implemented one of SNSs called “Ning” (<http://www.ning.com/>) in two classes of one secondary school in Australia. The design of the course was based on the Andersen and Krathwohl [35] hierarchy of cognitive skills. Some tasks and tools in “Ning” platform require students to extend their thinking skills from lower level of remembering, understanding, and applying to higher level thinking skills of analyzing, evaluating, and creating. Although the identical social network environments and pedagogy were chosen for the two classes, depending on the behaviour and contribution of their teachers, students demonstrated different results. In the first class, the instructor did not log on to Ning and assisted the students with their tasks. As a result, one third of the students only spent their time having social conversation with their peers via “chat” function. They did not finish their tasks and most of their posts were in lower order level of thinking. In contrast, the other teacher in another class actively participated online and permitted students to share their works with her to check and give feedback. As a result, 70% of students utilized all of the tools in Ning platform, 72% of them applied higher order thinking category of “create”, and 90% “evaluate” in their

postings.

The implementation of appropriate pedagogy and learning design such as project-based learning (PBL) in the SNS environment facilitates meaningful and deeper knowledge construction among students [36]. However, the characteristics of the tasks chosen for PBL are influential elements in promoting critical thinking in students. Lin, et al. [34] incorporated the online group project activity in the Facebook environment. The project involved collecting information about a specific artist and presenting in the class. The quantitative content analysis (QCA) was used to analyze the level of cognitive interaction demonstrated in the students' postings. The researchers adopted the six levels of thinking skills in Revised Bloom Taxonomy as a coding scheme to analyze the contents of Facebook discussions. The finding showed that most of the students' contributions (80%) were in the lower level category of understanding the information shared for group project. The higher levels of analyzing and creating comprised a small percentage of the students' online discussions. Based on the authors' points of view, the lack of critical inquiry in the project tasks led students to merely collect the superficial information for sharing on Facebook without spending time to analyze, criticize, and debate over shared content.

IV. SNSS AND COMMUNITY OF INQUIRY

Online social interaction by itself cannot directly create critical discourse to facilitate students' higher level of cognitive capabilities. To create higher levels of learning, educational experiences require appropriate elements of instructional design and facilitation which are provided by teachers [37]. Therefore, the process of creative and critical thinking in online platforms such as SNSSs could be assisted through a comprehensive theoretical framework. One of the most promising frameworks which has been introduced by [38] is community of inquiry (CoI). The ultimate goal of this framework is to create a community of learners by three essential components of social, teaching, and cognitive presence. Social presence is defined as the ability of participants to present themselves as real persons socially and emotionally into the online community. Social presence makes the group enjoyable and sustains the communication, so the members continue their interaction to construct knowledge. Teaching presence which is primarily the responsibility of teacher consists of three categories: designing educational experiences, discourse facilitation, and direct instruction.

The most important element of community of inquiry is cognitive presence that reflects the level of critical thinking and problem solving in students. It is been operationalized by practical inquiry model (PI) which includes four phases to describe cognitive presence: 1) triggering event, where an issue or a problem is identified for further inquiry; (2) exploration, where students explore the issue both individually and corporately through critical reflection and discourse; (3) integration, where learners construct meaning from the ideas developed during exploration; and finally (4) resolution, where learners apply the newly gained knowledge to educational contexts or workplace settings [39]. Structural

equation modeling conducted by [40] has indicated that teaching presence predicted 51% of the observed cognitive presence effect. Also, there is a significant relationship between teaching and social elements. Therefore, cognitive presence is enhanced when social presence is also established. The content analysis of 500 messages of a discussion forum in a group of 16 graduate students at Calgary University showed that when teaching presence was on its high levels in the discussions, the students' perceived learning and satisfaction were also high. The analysis also found a significant relationship between cognitive presence and satisfaction of student [41].

The kind of technology utilized for teaching may have different effects on community of inquiry where students interact with each other, their teacher, and learning materials to construct new knowledge. Some researchers in their study [42] examined the effects of various perceived affordances of two learning management systems (Blackboard and Desire2Learn) on the CoI model and students' satisfaction of the course. They explored how the perception of teachers and students about the specific LMS could influence on the strength of CoI and success of online instruction. The two LMSs differed in terms of ease of use, availability of tools integrated in them, and their communication spaces. Students (605 learners) and lecturers were sent online CoI survey in addition to other items for measuring perceived LMS affordances and satisfaction with the course in the last few weeks of the online course. Regression Analysis yielded that students' perception of the technology affordances in particular the extent to which the LMSs made communication easy were the biggest predictor of teaching presence, and the second largest for social and cognitive presence. It means that when the participants can easily communicate, they develop better community of inquiry. Moreover, satisfaction with the LMS has a significant independent effect on satisfaction with the online course.

Sinnappan and Zutshi [43], in their study used the community of inquiry framework in the Twitter environment. They asked two groups of Business undergraduate students from Australia and America to discuss on a given topic for four weeks via Twitter. The course was offered primarily through face-to-face mode with some online support in Blackboard. Twitter was leveraged as a supplement to Blackboard due to its popularity and instructors' familiarity. The instructors start a discussion about the specific topics and asked students of both groups (47 participants) to continue their discussion beyond the classroom boundaries through posting Tweets. At the end of program, researchers analysed the curriculum-related post using content analysis approach. The findings showed that the pedagogical use of Twitter can facilitate all of the three elements of cognitive, social, and teaching presence in community of inquiry. Surprisingly, the proportion of cognitive presence (67%) was even more than social presence (25%) in the Twitter updates. It means that Twitter have the potential to be used as a tool for meaningful and deep learning. Further researches could investigate the application of CoI model in other social network sites such as Facebook and Google+ to support the formal usage of them in institutions of higher education.

V. LIMITATIONS OF USING SNS AS AN ALTERNATIVE TO LMSS

A. Privacy Issues

Most of the lecturers and students want to keep their personal information on the Facebook separated from their academic works. Lecturers are worried that revealing private information to students jeopardize their professional image and decrease their credibility. Students also do want their Facebook friends to discover their academic postings [2]. This problem turn the students and lecturers into passive observers of content on FB group pages without participation in posting and commenting about the academic information [44]. Currently, the privacy setting in some SNS such as Facebook and Google Plus makes it possible for users to limit the visibility of their profile contents and photos to specific people. The users also can organize their friends in different groups such as friends, family, Classmates, and work colleagues. Therefore, they choose which groups can see shared posts, links or photos and which people are not allowed to access them.

B. Technical Problems

Using some of the social network sites as an alternative to LMS has certain limitations in supporting other file formats to be uploaded directly to your profile (doc, PPT, and PDF formats). However, in Facebook group there is an option which allows members to upload files in maximum size of 25 MB for other users. The integration of third-party applications such as Google Drive can enhance the capability of the Facebook group for sharing bigger files. For example, students can upload various formats to Google Drive, and then copy the address link on the wall of the Facebook group. In Google Plus, one of the latest popular social network sites, the process of sharing different documents is even easier due to its integration with other applications such as Gmail, Google Drive, YouTube, and Google scholar in Google search webpage. Therefore it is convenient for users to navigate between different tools with single sign in (Fig. 1). Lately, Google has added a new sharing feature to Google Drive that enables you to quickly share the files from Google Drive to Google Plus.



Fig. 1. Single sign in to multiple applications integrated in one webpage.

VI. CONCLUSION

Various educational studies have been carried out on the educational use of social network platforms. However, there is serious lack of research on the implementation of effective pedagogy and theoretical framework in the SNS environment to enhance students' learning. Educators should harness the unbelievable popularity of Social network sites and channel it into the effective medium for teaching and learning instead of using LMSSs. Further researches can investigate how to design meaningful learning activities and tasks such as case-based inquiry through social network platforms to encourage engagement and collaborative learning among students. It is argued that case-based questions with regular teaching presence which is a prominent component of COI model enables learners to move to the high cognitive skill of resolution [45].

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