

Integrating Social Networking Site into Teaching and Learning

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Abstract: Social networking site (SNS) which is a typical application of Web 2.0 technology has been popular and widespread across multiple age groups in various educational institutions. This study attempted to adopt one of the most popular SNS - Facebook - to implement the WIRE model, a teaching and learning strategy aims to close the cognitive gap of classroom lessons between students and teachers before class, and links up learning experiences from inside to outside of classroom. A quasi-experiment has been performed to study the learning effect according to the achievement, motivation, and interaction. The results were positive and also revealed some issues for future research.

Keywords: Social networking site (SNS), Facebook, WIRE learning model

Introduction

Social networking sites (SNSs) such as Facebook, Ning, and MySpace, which are the typical application of Web 2.0 technology, has been popular and widespread across multiple age groups in different educational institutions over the past few years. They not only allow users to meet strangers but also enable users to articulate and make visible their social networks [2]. According to latest researches about the use of SNSs in higher education, more than 80% students were using social networking sites in their daily lives [12 & 13], and even used SNSs every day [14]. Although the trust on SNSs may obstruct users' willingness to use them [11], most, such as Facebook and MySpace, were used to bridge online and offline friendships without worry about the problem [13].

According to some academic literature, researchers showed that most web-based learning systems were made for just one-shot use and cannot continuously attract people to use them. The SNSs may have the potential to improve this predicament. Therefore, this study attempted to adopt one of the most popular SNS - Facebook - to implement the WIRE model [4], a teaching and learning strategy aims to close the cognitive gap of classroom lessons between students and teachers before class, and links up learning experiences from inside to outside of classroom. A quasi-experiment has been performed to study the learning effect according to the achievement, motivation, and interaction. The results were positive and also revealed some issues for future research.

1. Social Networking Sites in Higher Education

In general, social networking sites allow people to create personal social networks and the groups who have common interests. A wide variety of tools are provided in SNSs for attracting people to interact with their friends, such as message push, discussion tool, blogs, media sharing, third party plug-ins, and so on. Most users of the SNSs are youngsters who were named 'Digital Natives' [9], especially the majority are the students in higher education. They often used SNSs to stay in touch with their offline friends or bolster existing connections rather than to make new relationships [12, 13, & 15]. That revealed an important message that the SNS could be a potential medium to gain more popularity of

online learning than traditional e-Learning platform if the elaborately designed activities can be closely integrated into the features of SNSs.

However, elaborately designed activities in instructional plans must be made prior to the adoption of SNSs in classroom since not all digital natives are eager to have such skills of using these technologies [5]. Furthermore, voluntary interactions among students rarely occurred in asynchronous online discussion and too much instructor intervention also cannot attract more interaction among students [1]. Most digital natives rarely use SNSs for educational purpose but the entertainment and friendship [7]. Therefore, to ensure these arguments, the authors carefully designed a suitable process in appropriate timing with proper use of technology.

2. Modification of the WIRE Model

Based on the ideas of Just-in-Time Teaching (JiTT) [8] and Peer Instruction (PI) [6], the WIRE model was designed to close the cognitive gap of classroom lessons between students and teachers, and to link up the learning experiences from inside to outside of classroom [4]. A specially designed blog-based learning system (BBL) was introduced to support students' warm-up before class, interaction in class, and review and exercises after class. The experiment proved this model can effectively enhance the learning achievement, increase learning motivation, and facilitate the interaction between teacher and students and among students.

With different online discussion environment from the BBL, this study attempted to adopt social networking site, Facebook, to implement the WIRE model. The BBL provides each student a personal space to blog the notes for each learning stage while the Facebook provides a collective and opened space for each group. This study applied a group in Facebook which was dedicated to the experimental group as a common forum. By taking advantage of the interactive feature of SNSs, the authors anticipated the learners would be voluntarily attracted to interact with each other, because, in contrast, this feature is just the weakness for BBL.

In order to exert the Facebook's superiority, the instructional design in this study also has some differences from the original WIRE model. Before class, this study required students to post at least three questions in Facebook while the previous study asked students to answer the assignments on BBL. After class, this study required students to answer the warm-up questions of each other while the previous study asked students to modify the answers in warm-up stage. These changes were made to prevent the plagiarism in answering the warm-up assignments because all group members can publicly view all messages posted in the group discussion board in Facebook.

3. Research method

This study adopted quasi-experimental research method to evaluate how the social networking site can support learning. A long-term instructional experiment was conducted for 16 weeks over 9 lessons in three undergraduate classes of Department of Information Management in a university of science and technology in Taiwan. The subject is 'Data Structure' which is an obligatory course for 2nd graders. Following subsections will detail the participants, instructional design, and evaluation tools.

3.1 Participants

One class with totally 50 students participated as experimental group and another class with 38 students participated as control group. While the control group did not use any web-based learning tool, the experimental group was treated by using the social networking site Facebook. All participants were sophomores who major in Information Management and had studied Computer Programming using Java for one semester. In order to identify that all participants possess the equal level on prior background knowledge for learning the new subject Data Structure, they took a pretest for the concepts of Java programming and basic algebra. The results of t-test for each comparison between the two groups revealed no significant difference ($t=.620$, $p=.537 > .05$).

3.2 Instructional design

Each group was treated by different learning activities in this experiment. Table 1 shows the major learning activities conducted in different stages. Before class, the experimental group was asked to post at least three questions on the Facebook after reading the assigned materials, while the control group also read the same materials but was asked to write down at least three questions on paper. In class, both groups were taught by adopting the peer instruction and group discussion with using the Classroom Response System (CRS) or Personal Response System (PRS), which is a set of remote controls held by each student for quick response to teacher's questions. Teachers can use the system to enable lectures to become more interactive and measure student responses to any variety of instructor questions in real time.

Peer instruction (PI) is one of the collaborative learning strategies in order to facilitate critical thinking, problem solving and decision making skills in a large-scale collective class [3, 6]. Students are engaged in learning activities because they have discussion opportunities with peers for solving the same problems in classroom [6]. Through providing concept tests interweaved with lecturing by the use of Instant Response System, teachers can probe students' comprehension degree of the latest lecturing and then adapt the following instructions.

Group discussion is different from the PI in collaborative members. Students in group discussion activity are divided into some groups with constant members to collaboratively discuss the assigned issues, while the students in PI activities discuss with the peers nearby. The instructional design for the classroom learning adopted both methods to inspire students' abilities of critical thinking and problem solving.

After classroom learning, the experimental group was asked to reply the warm-up questions of each other on the Facebook while the control group was asked to do the assignment on paper. To maintain the same learning content among the three groups, the assignments for control group were designed by referring to the warm-up questions posted in Facebook. In addition, the teacher may occasionally assign additional questions to both groups for further practices.

Table 1. Treatments for each group

Stages	Experimental group	Control group
Warm-up before class	Read printed textbook and post at least three questions encountered on the Facebook's group forum	Read printed textbook and write down at least three questions encountered on paper
Interaction in class	Lecturing and interactive events by peer instruction and group discussions with using the Classroom Response System	
Review and	Answer the questions the students	Answer the assignment on the paper

exercise after class	posted on Facebook's group forum before class Answer additional questions offered by the teacher
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3.3 Evaluation tools

This study used the learning achievement test to evaluate the learning effect, used the questionnaire to survey the degree of agreement about the learning model and learning system, used the IRS response rate and correctness rate to assess the performance of classroom learning, and finally used the focus-group interview to provide the qualitative evidences in explaining the quantitative data.

The learning achievement test consists of pretest and posttest to measure the difference among the three groups. The items of pretest had been validated by three domain experts and had been tested by 32 students, who were selected from the same department of the participants, for the measurement of reliability of internal consistency (Cronbach $\alpha=.822$). During the classroom learning, the CRS provides an interesting and directed evaluation means to attract students in participating in learning activities. All response data from students will be recorded so that we can calculate the response rate and correctness rate to evaluate the learning performance.

After the experiment, the experimental group took a questionnaire using the five-point Likert scale to evaluate the level of agreement with the learning model and the usage of learning systems. In addition, ten participants of the experimental group were selected for focus-group interview by various levels of learning achievement and article posting.

4. Results and Discussion

4.1 Learning achievements

All participants took a pretest before the experiment to verify their homogeneous background knowledge in Java programming and basic algebra which consist of the necessary skills before studying the course Data Structure. After the experiment, they took a posttest to examine the learning achievement. The statistic results are shown in Table 2.

Table 2. Group statistics for the pretest

Test	Group	N	Mean	Std. Deviation	Std. Error Mean	t-test
Pretest	Experimental group	50	46.72	14.054	1.988	$t=.620$
	Control group	38	45.05	10.046	1.630	$p=.537 > .05$
Posttest	Experimental group	50	67.62	20.776	2.938	$t=3.378$
	Control group	38	52.84	19.714	3.198	$p=.001 < .05$

In pretest, the result of t -test between the two groups shows no significant difference between them. That indicates all participants had the homogeneous degree in Java programming and basic algebra to learn the course Data Structure. In posttest, the mean score of experimental group is significantly better than control group. That indicates using social networking sites can enhance learning achievement.

4.2 Learning behavior analysis

Facebook provides an open discussion board for group users to share information together. Users can view all articles in a column to quickly get ideas and post feedback around the discussion topics. However, this feature may cause similar questions posted in warm-up stage and similar replies posted in the stage of review and exercise in this experiment. There were 90 articles for warm-up and 53 articles for review and exercises posted in Facebook discussion board by experimental group. Two students actively replied to and discuss with other students were found. They attracted more students to join the follow-up discussion, although some articles, as predicted, were similar. As mentioned in literature [1], voluntary interactions among students rarely occurred in asynchronous online discussion and too much instructor intervention also cannot attract more interaction among students. In addition to the repurposed use of discussion board like this study, active students can play as the facilitators who can inspire passive students to think and to publish something about the learning topics.

In classroom learning, totally forty-one questions were asked by the CRS. There were seven times over the totally nine lessons that the average CRS response rate was higher in experimental group than in control group (see Figure 1). The overall average of experimental group was also greater than control group, although the results of *t*-test do not reach the significant level (see Table 3). Maybe the students were interested and motivated by the fresh learning technology – CRS.

Table 3. Average CRS response rate and correctness rate for each group

	Experimental group	Control group	<i>t</i> -test
Average CRS response rate	82.31%	77.31%	$t=1.550$ $p=.124 > .05$
Average CRS correctness rate	63.12%	59.36%	$t=2.520$ $p=.013 < .05$

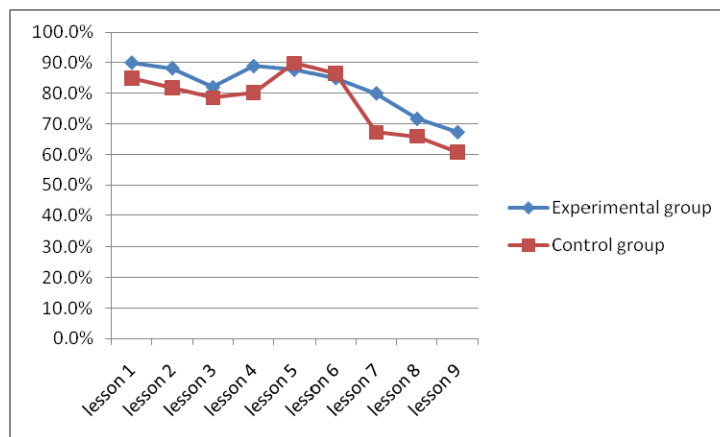


Figure 1. The average CRS response rates of the two groups for each lesson

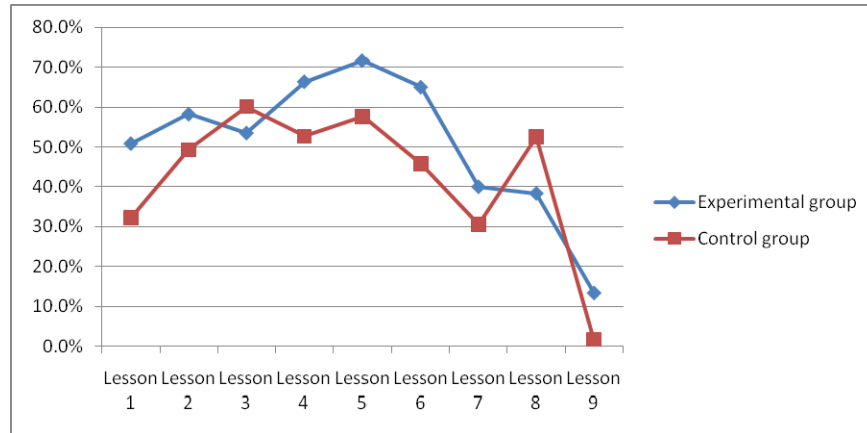


Figure 2. The average CRS correctness rates of the two groups for each lesson

By comparing with the CRS correctness rates of the two groups for each lesson, there also were seven times over the totally nine lessons that the average CRS correctness rate was higher in experimental group than in control group. In particular the overall average of experimental group was significantly greater than control group. That indicates the learning model with using Facebook discussion tool can enhance the effect of warm-up and hence the classroom learning performance.

4.3 Questionnaire and focus-group interview

The questionnaire items fed by experimental group were categorized into three dimensions of learning effect, the motivation, interaction, and sense of achievement (see Table 4). In the dimension of motivation, most respondents agreed the warm-up strategy with using Facebook discussion tool can increase their learning motivation, especially the attention in classroom.

Table 4. Results of the questionnaire*

Categories	Items	M	SD
Motivation	1.1: The warm-up strategy with using Facebook discussion tool increased my learning motivation in studying this course.	3.56	0.915
	1.2: The warm-up strategy with using Facebook discussion tool increased my attention while sitting in classroom.	3.78	0.773
	1.3: I was actively engaged in classroom learning because of the warm-up.	3.67	0.735
	Average:	3.67	
Interaction	2.1: The warm-up strategy with using Facebook discussion tool increased interaction between teacher and me.	3.92	0.877
	2.2: The warm-up strategy with using Facebook discussion tool increased interaction between classmates and me.	3.93	0.785
	2.3: I often discussed the learning content face to face with my classmates before class.	3.12	0.811
	2.4: Using CRS in classroom learning increased	4.03	0.748

	interaction between teacher and me.		
	2.5: Using CRS in classroom learning increased interaction between classmates and me.	4.05	0.660
	2.6: Group discussion facilitated the interaction between classmates and me.	4.24	0.572
	2.7: Group discussion facilitated the collaboration between classmates and me.	4.16	0.644
	Average:		3.92
Sense of achievement	3.1: The warm-up strategy with using Facebook discussion tool improved my understanding of the content the teacher taught in classroom	3.81	0.682
	3.2: I often found questions and misconceptions about the learning content	3.75	0.779
	3.3: The warm-up with using Facebook discussion tool increased my learning effect in classroom.	3.76	0.916
	3.4: The warm-up with using Facebook discussion tool increased my confidence in taking this course.	3.44	0.876
	3.5: The warm-up with using Facebook discussion tool increased my sense of achievement.	3.39	0.831
	3.6: After the classroom learning, I had solved most problems that I asked for warm-up before class.	3.84	0.721
	3.7: Through the reviews and exercises on Facebook, I could link up the knowledge learnt before and after class.	3.67	0.711
	3.8: Through the reviews and exercises on Facebook, I could clarify my misconceptions of the lessons.	3.72	0.812
	Average:		3.76

*Using the five-point Likert scale, in which 1=strongly disagree and 5=strongly agree.

In the dimension of interaction, most respondents gave high rating to the warm-up strategy with using Facebook discussion tool, the use of CRS in classroom learning, and group discussion. However, they rated relatively low score to the face-to-face discussion with classmates before class. This result may implicate the respondents do not have the habit of warm-up before class or preferred to study by themselves. From the focus-group interview, when asked how they chose questions to post on Facebook in warm-up, half interviewees expressed they stopped reading textbook when they had already found three questions, which was the minimum requirement the teacher asked for. That implies some students were passive to study by themselves. Posting warm-up questions and reply to the assignments may be only the perfunctory effort to deal with the learning tasks. One reason explained by two interviewees was that some chapters of the textbook were difficult for them to study by themselves. Therefore, the difficulty of learning materials and careful design of warm-up strategy could be the critical issues in the future.

In the dimension of sense of achievement, most respondents agreed not only the warm-up with using Facebook discussion tool increased their sense of achievement but also the review and exercises improved their understanding of the lessons and solved most problems found in warm-up. From the focus-group interview, most interviewees expressed they felt much sense of achievement since the Facebook discussion tool provided an opportunity for them learning from the articles posted by the outstanding classmates of their class. Furthermore, six interviewees believed that they were really affected by a good learning experienced from the warm-up of lessons.

5. Conclusion

In conclusion, the social networking site - Facebook - can effectively raise students' learning achievement, motivation, and interaction in adopting the modified WIRE model that consists of warm-up, review and exercise of classroom lessons. Facebook effectively inspired more discussions and more learning achievement after the long-term employment. This study also found students were passive in study by themselves and cannot bear the frustration when they encountered questions. The difficulty of learning materials and careful design of warm-up strategy could be the critical issues in the future research.

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