

Use of facebook to support module delivery for undergraduate engineering programmes

Mushtak Al-Atabi, Obai Younis

Taylor's University, Selangor, Malaysia
mushtak.t@taylors.edu.my

***Abstract:** The relationship between students' engagement and effective learning is very well established. One of the most effective ways of engaging students is through the use of online interactive tools. This paper reports on the use of a facebook group to support students learning in "Thermodynamics and Heat Transfer Module". The facebook group was mainly used as a discussion forum as well as a means to administer online quizzes. The number of students who joined the facebook group and attempted the online quizzes grew steadily throughout the semester and the average performance in the quizzes improved as well. Students' feedback was solicited and a majority of the students found the use of facebook to support their learning an engaging and useful experience. The authors intend to repeat the experiment in the next semester allowing the students the opportunity to submit their own versions of the quizzes to increase the level of participation and ownership.*

Introduction

Online course management systems, such as Blackboard and WebCT, are currently standard requirements for programme delivery. Students and faculty alike have benefited from the freedom and interactivity that the online course content can provide. Alongside the online course management systems, computer based social networks have been developing at an expanding rate. Nowadays, an increasing number of individuals may develop personal relationships using their social networks more than those who rely mainly on their face-to-face encounters (Walther, 1995).

With the increasing popularity of the online social networks and the sheer number of hours spent by students on these networks, educators attempted to tap on the potential of using these networks for educational purposes to complement and enhance the online course management systems and to improve students' interaction and motivation. Although a lecturer's personal website (which is typically housed on the university's server) may offer a sense of academic credibility (i.e., the.edu link), the professional location of the website might limit the instructor to the types of information that can be disclosed on the webpage. Because administrators often monitor webpage content to protect the university's reputation, student and administrative expectations typically control the type of content a lecturer would post on a university-housed website. Therefore, while lecturers typically restrict their university websites to classroom-related discussions and activities, the online social media offer an alternative site designed to enhance their relational exchanges with students (Manzer et al, 2007). Muñoz (2009) reported that the facebook's networking and social communication capabilities can benefit both the instructor and the student by tapping into a greater number of learning styles, providing an alternative to the traditional lecture format, creating an online classroom community, and increasing teacher-student and student-student interaction. Mazer et al (2007) examined the effects of teacher self-disclosure via facebook on anticipated college student motivation, affective learning, and classroom climate. Although their findings suggested that participants who accessed the Facebook website of a teacher high in self-disclosure anticipated higher levels of motivation and affective learning and a more positive classroom climate, other researcher (Muñoz, 2009) recommended that

teachers create a separate “professional” profile when using social media to enhance students learning to limit students’ access to the lecturer’s personal data.

Crook and Harrison (2008) outlined some of the barriers that inhibit greater use of the online social networks. These include the tension between collaborative learning encouraged by the online media and the current assessment system, concerns about e-safety, lack of adequate bandwidth, and the lack of faculty training and resources.

This paper reports on an attempt to exploit the growing trend of using online social networks by utilising facebook, which is a contemporary social network that is widely used by both faculty and students (Mazer et al, 2007, Selwyn, 2007), to provide an additional platform for students learning and interaction. The module selected for this experiment is Thermodynamics and Heat Transfer offered to the first year second semester students of both mechanical and chemical engineering degree programmes. This module is historically considered to be difficult and it is normally associated with lack of students’ motivation to study and high failure rates.

Thermodynamics and Heat Transfer is a core subject that aims at achieving the following learning outcomes:

1. Describe phases/phase changes.
2. Explain the basic concepts and definitions of thermodynamics.
3. Apply the First and Second Laws to the analysis of simple reversible and irreversible processes.
4. Use thermodynamic tables and diagrams in the analysis of power and refrigeration cycles.
5. Distinguish different modes of heat transfer, and calculate rates of heat transfer in practical situations.
6. Design simple heat exchangers.

Module Delivery

Thermodynamics and Heat Transfer is delivered using a combination of lectures, tutorial classes and lab sessions throughout a 14 week semester. Assessment is done mainly in written format. At the beginning of the semester all the official course materials were made available at Blackboard 7. This included the lesson plan, assessment details, lecture notes and tutorial sheets. Simultaneously, a facebook group was developed for the module and the students were encouraged to join that group. The facebook group was to serve as a discussion forum as well as a platform to administer online quizzes. It was made clear to the students that joining the facebook group is voluntary.

Throughout the semester, feedback was solicited from students on the level of their understanding of the module’s contents. This is normally done through the use of post-it notes provided to the students whereby students are encouraged to provide comments on what went well and what can be improved by writing that on a post-it note. Students are instructed to stick the post-it notes on the classroom door as they leave at the end of each lecture.

The lecturer collects the post-it notes and analyse the feedback. Based on the nature of the feedback provided, a quick corrective action is planned. Corrective actions can be in the form of repeating a certain part of the lecture, solve more problems, provide a peer assisted study session (PASS) or use the facebook page to address the concern. Often, the corrective action is a combination of all the fore mentioned, however, facebook is selectively used to address issues that relate to the basic theory that students may feel embarrassed to enquire about during the lecture time. It is worth mentioning here that quizzes to assess and enhance the development of learning outcomes 1, 2 and 5 were administered even if the students’ feedback did not detect a difficulty in those areas. In this case, facebook is mainly used as a discussion forum as well as a platform to solve carefully constructed quizzes that students can attempt while online and can get immediate feedback on how well did they fare in these quizzes. Attempting these online quizzes was not compulsory and carries no marks. The process of the module delivery is schematically shown in Fig. 1.

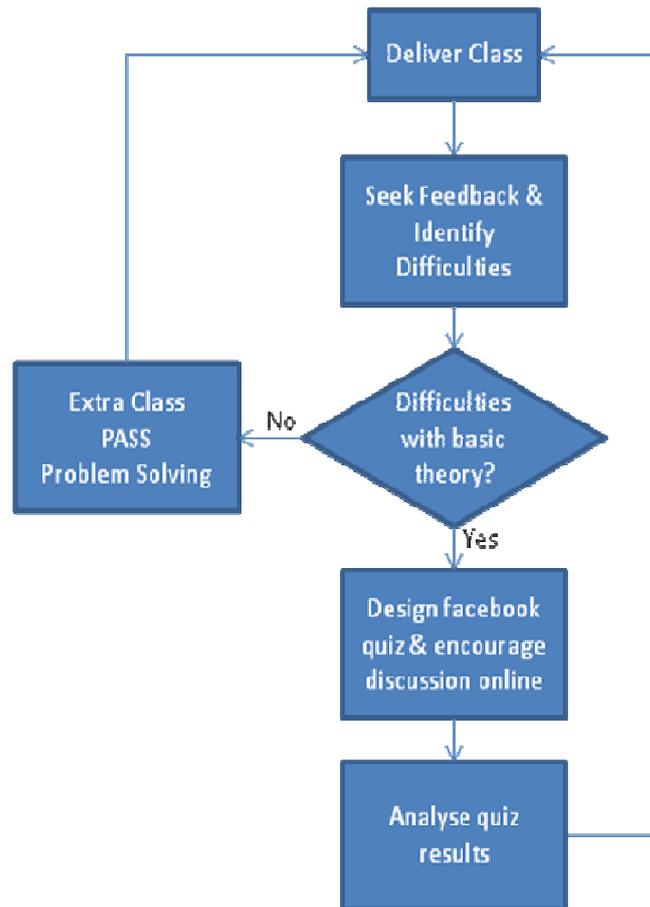


Figure 1: Flow chart of the process of module delivery

Research Methodology

Participants

The participants were 66 undergraduate students (year 1) enrolled for the Thermodynamics and Heat Transfer where a facebook group was created to support and enhance students' learning. The participants were from Mechanical and Chemical engineering programmes. The sample (the entire cohort of students) consisted of 51 males and 15 females, with an average age of 19.28 years (ranging from 18 to 23 years). 97% of the students were locals from Malaysia while the rest were international students. Majority (95%) of the students who took the module indicated that they already have a facebook account that they used to access regularly.

Procedures and Measurement

Towards the end of the course, students were asked to complete a questionnaire that will help the lecturer assess the effectiveness of the use of facebook as a learning support platform. The questionnaire was designed to measure the students' motivation, level of enjoyment and how much did the new approach benefited them. Students also asked if they would like this experiment to be extended to other modules and were requested to provide general comments as well.

The lecturer tracked the numbers of students who joined the facebook group and participated in the quizzes as the semester progressed. The overall performance of students participating in each online quiz was tracked as well.

Results and Discussion

There were a total of 6 online quizzes administered during the semester. The participation in the quizzes was voluntary. Figure 2 shows the percentage of students in the class who joined the facebook group and attempted the administered online quiz. It is very clear that the number of students joining and attempting the online quizzes was progressively increasing. This can be attributed to the fact that more students are finding the quizzes both fun and useful. Also the word of mouth among the students played a role in this.

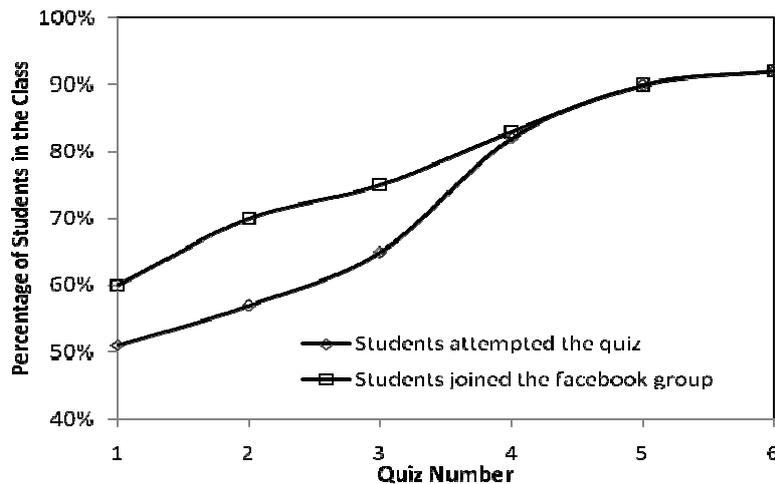


Figure 2: Percentage of students who joined the facebook group and attempted the online quizzes

Figure 3 depicts the passing rate (being able to answer at least 50% of the questions is deemed pass) of each quiz. It is interesting to note that passing rate has increased as the semester progressed despite the fact the level of difficulty is increasing. Although the improvement in performance may be attributed to the general growth of mastery of the subject by the students due to the overall academic activities undertaken, this can be taken as an indication that the students were taking the online quizzes more seriously.

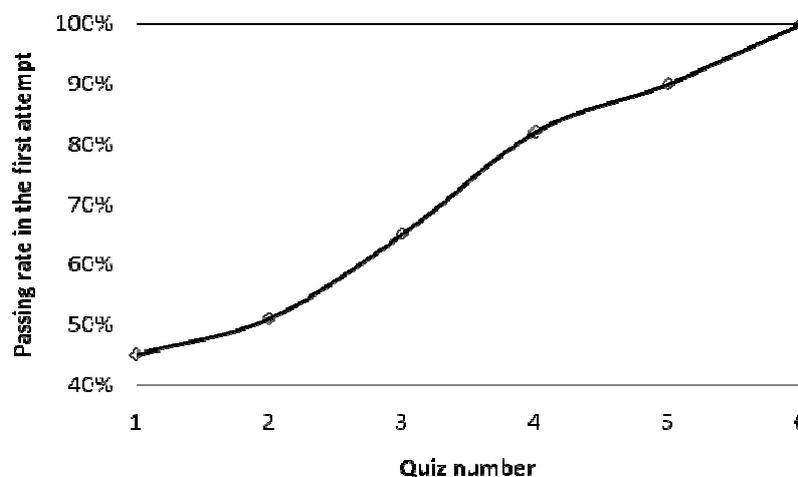


Figure 3: Passing rate for online quizzes

The feedback of the students is analysed and summarised in Fig. 4. Majority of the students thought that using facebook for learning was a good idea and attempting the quizzes online was fun. 75% of the respondents recommended the use of facebook for other modules that they are studying. Interestingly, 62% of the students thought that the use of facebook for learning helped them know their lecturer better. This can be attributed to the perceived improvement in communication between the students and the lecturer as the facebook group contained no specific professional or personal information about the lecturer.

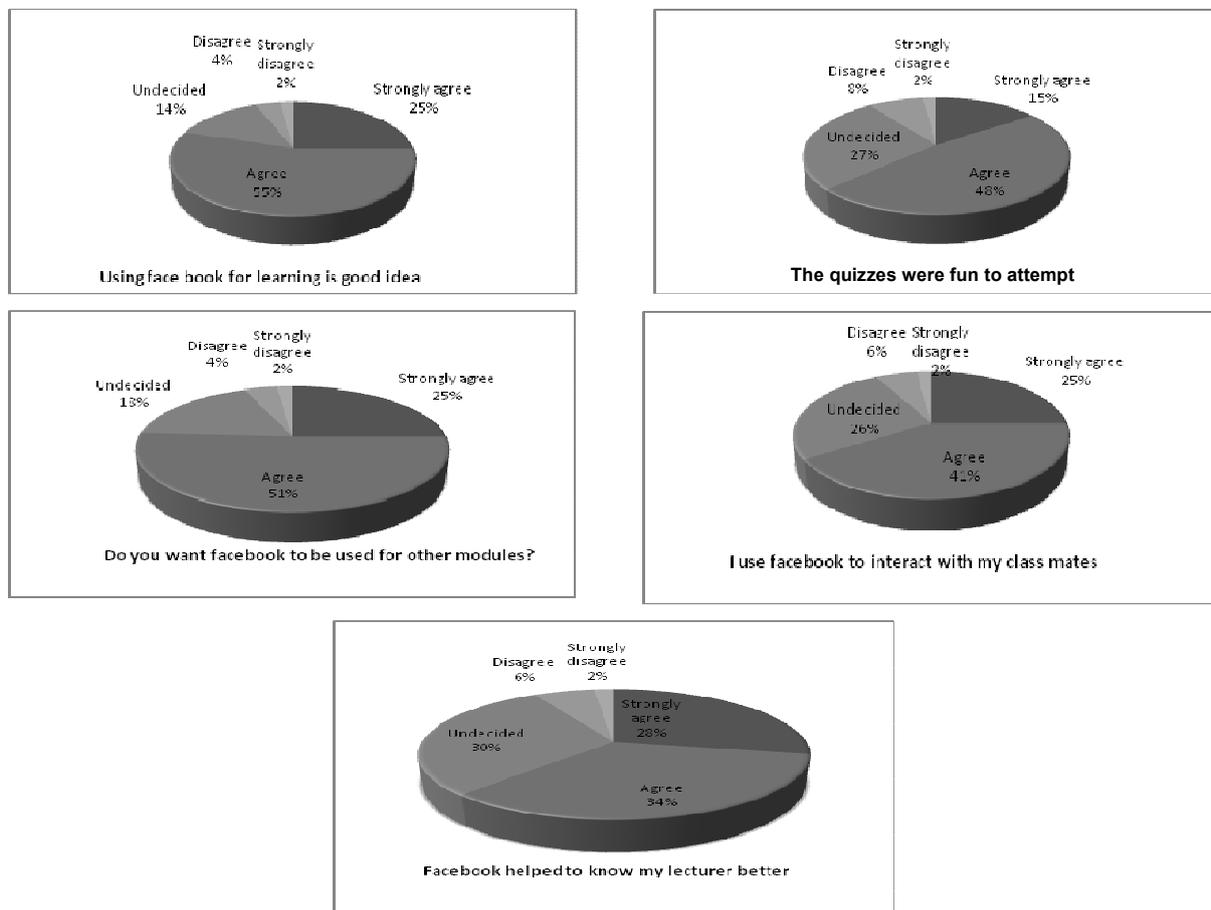


Figure 4: Analysis of students' feedback

Conclusions

A facebook group was developed to support students' learning while studying "Thermodynamics and Heat Transfer" module. The facebook group was used mainly as discussion forum as well as a platform to administer multiple choice online quizzes that addressed the basic theories underlining the module. The students generally liked the idea of using facebook for learning and recommended its use for other modules. The number of students joining the facebook group as well as the performance of the students in the online quizzes grew steadily throughout the semester.

The overall assessment of the experiment indicates that it was a success and it has the potential for further improvement. The authors intend to repeat the experiment in the coming semester with more contribution from the students including involving the students in setting up the quizzes, this is expected to increase the ownership buy in of the students.

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