Insights from using a subject specific Facebook group for student engagement and learning

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Abstract: Although discussion boards have been available in the Learning Management System (LMS) for several years, they have not served well as a means of extending student engagement outside class time. The social media site Facebook was incorporated into an Engineering Mechanics class with the aim of increasing subject specific student engagement. This paper reports a small preliminary study exploring the effect of the introduction of the Facebook group. These students found the Facebook group increased the frequency of their engagement with the subject material compared to other subjects, and they considered it valuable because almost all students and the instructor were involved. However, students emphasised that the Facebook group was a supplement to, and not a substitute for, the face-to-face lecture and tutorial sessions. This study confirmed the value of undertaking focus groups with students to assist interpretation of data collected by more objective methods such as social network analysis.

Introduction

The subject Engineering Mechanics includes concepts fundamental to the development of a civil engineering body of knowledge, but historically has a high failure rate and can have a reputation as being unexciting. Although discussion boards have been available in the subject for several years via the Learning Management System (LMS) there have been very few student posts to these and so they have not served well as a means of extending student engagement outside class time. The social media site Facebook was introduced to Engineering Mechanics in Spring semester of 2014 as a means of increasing subject specific student engagement.

The preliminary study reported in this paper explores the impact of having a subject specific Facebook group on the engagement and learning of students enrolled in the subject Engineering Mechanics.

Background

One of the advantages of using Facebook is the opportunity to communicate with many students. Mack et al (2007) refer to this as allowing them to *"…go where they already are…"* (p.4). Matthews (2006) used Facebook to network with mechanical engineering students about library events and resources because more than three-quarters of his target audience also used Facebook. Roblyer *et al*. (2010) and Goh *et al.* (2013) in separate studies both report that 95% of the students they surveyed were active Facebook users. These

researchers also found that both academics and students mainly use Facebook for social interaction and very few uses for educational purposes were reported by their participants. Palmer (2013) reports a similar result for another social media platform – Twitter. However Roblyer and Wiencke (2003), Luo and Gao (2012) and Sheriff (2012) suggest that using a social network such as Facebook has the potential to increase interaction with and between students and hence increase the quality of engagement with the subject which can create a more effective learning environment.

Mazer *et al*. (2007) studied student response to instructors using Facebook in their teaching. They found that students can respond with increased motivation and affective learning outcomes. However they warn of the potential for instructors to *"…violate student expectations of proper behaviors…"* (p.3-4). Connell (2009) found some students (12% of her 366 participants) felt that use of Facebook by the university infringed on their sense of personal privacy, and Goh *et al*. (2013) report 15% of their student respondents disagreed with the suggestions that Facebook be used as a learning tool. Goh *et al*. (2013) suggest that instructor participation in the discussion on Facebook is an important element in student participation. However, in the context reported by Goh *et al*. (2013) instructors were posting weekly tasks for students to answer thus compelling student participation rather than allowing a Facebook community to develop organically. They also describe a situation where students are Facebook friends rather than belonging to a Facebook group. In this situation students, and the instructor, have much less privacy than in the case where they belong to a specialist group which can both restrict access and allow students some control over how much of their personal Facebook page other group members can see. Finally it is worth noting the advice from Palmer (2013) that the value of any social media application is not the platform used but the way that participants use it.

Approach

At the start of Spring semester 2014, the 166 students enrolled in Engineering Mechanics at the University of Technology Sydney were invited to join a Facebook group restricted to students in that subject. The LMS was used for official subject communication such as posting the subject outline, lecture videos and assessment tasks (tutorials and assignments). However, during semester students posted questions, solutions and/or partial solutions to problems, commented on others' posts and used the 'like' feature to provide feedback on posts on the Facebook group page. The instructor also interacted on the group page by using the 'like' feature, to ask questions about posted solutions or otherwise make comments about various threads and discussions. The description of the group page made it clear that its purpose was to be a place for interaction about the subject material and that any level of question about the subject material could be posted. Students by and large respected this with only two instances where the instructor responded to a negative personal comment from one student to another student's post, and another instance where a student was asked to tone down their language. The aim was to create an online environment that was casual and friendly but 'on topic'. The instructor also did not 'friend' any student on Facebook and the only Facebook interaction with students is through this Facebook group page or the institutional one. At the end of the semester student use of the Facebook group and their perceptions were investigated through a social network analysis, which has not been widely reported in the engineering education literature, along with the more traditional data collection methods of a questionnaire and focus groups.

Social Network Analysis:

The data for the social network analysis was collected from the Facebook page for this group. Connections between participants in the Facebook group were represented in the network data. Analysis of this data can potentially identify strategically important participants and/or events. Interactions were characterised as either posts or comments, which were reactions to posts.

Data from the Facebook group was modelled as a heterogeneous network (Sun & Han, 2012) to organize and represent this complex social activity. Heterogeneous networks are a type of complex network model which can have multi-type objects and relationships and are more advantageous in modelling real-world situations than traditional networks, that is homogenous networks, which can only have one type of object and relationship. The heterogeneous network developed for this analysis contains three objects (participants, posts and comments) and three types of relationships among them (participant-post, post-comment and participant-comment).

This heterogeneous network was visualised by the Gephi program (The Gephi Consortium, 2012) to better understanding participants' behaviours. Participants were represented as 'nodes' with posts and comments linked to the source participant and lines linking participants who commented on another's post or comment.

Questionnaire:

A questionnaire consisting of six questions devised collaboratively by the authors was administered online using SPARK^{PLUS} by an author who was not the subject instructor. The questionnaire consisted of closed form and open ended questions. The questionnaire response rate was 7% of students enrolled in the subject. Students who responded to the survey have final subject marks ranging from 51% to 88% (ie from a pass level to a high distinction level) and include a student repeating the subject so represent a range of levels of performance. However no student with a fail result responded to the questionnaire so we acknowledge that the responses do not represent the entire range of student performance levels in the class. Furthermore, while the low response rate means we cannot claim the results as definitive, the questionnaire responses provide insights into how students used the Facebook group to assist with the interpretation of the social networking analysis.

Focus Groups:

After the final exam but before the semester's results were released students were invited to participate in a focus group to discuss aspects of the subject design. Two focus groups were conducted by one of the authors who was not involved in the delivery of the subject and transcripts were not made available to the instructor author until after subject results had been finalised. Students who participated in the focus groups were given a light lunch and two vouchers to a movie of their choice. Four of the five students who participated in one of the two focus groups had also responded to the survey. The focus groups provided an opportunity to explore further the findings from the survey to potentially gain additional insights into why students used the Facebook group the way they did – not just how.

Findings

There were several key findings from the social network analysis that are explored in more detail or explained in responses to the questionnaire and focus groups.

Of the 166 students enrolled in the subject and invited to join the Facebook group, 159 voluntarily participated in the Facebook group, this represents 96% of students and is similar to the level of Facebook participation found by Roblyer *et al.* (2010) and Goh *et al.* (2013). It was thus a means of connecting with a large proportion of students in the class. In the questionnaire students were asked what they liked about the Facebook page compared to other available forms of communication such as the LMS, email, and asking questions in class. They liked that everyone was involved including the instructor and the speed of the response to a question: *"Facebook is a good way to get all the student involved and the responses are always quick [instructor] is totally into it too! Such quick responses"*. The speed of notification of a new post was also mentioned in both focus groups, as well as the different platforms of access, for example: "...*you get notification straight away when someone posts something – on your phone, on your computer*". This is the major point of difference to discussion boards on the LMS which require a student to specifically login to the

system to access the comments posted there. Students have Facebook open all the time on their phone i.e. they are permanently logged in. This meant that the subject was more frequently brought to their attention than their other subjects:

"... kept getting notifications, so your mind is always on to it, thinking about it" rather than *"...having to look into* [LMS] *to find the forums and stuff"*.

Students who participated in the focus groups also recognised the value in having so many other students involved: *"...we got everyone involved really not only one or two people. Everyone wanted to study it, they got encouraged by students posting questions"*. The Facebook group page became a useful resource because of the involvement of so many students: *"...if there was a question that was on my mind about anything related to the subject, I'd first go on the Facebook page because usually someone would have asked already and there'd be an answer there"*. Students from the focus groups rated it as a close second to the lecture videos in terms of usefulness of online resources. As well as being a source of information, the level of interaction in the Facebook group was also beneficial in creating a sense of connectedness between students in the class:

"I was sure people were going to get in trouble for posting their solutions online. But that was fine, which was good because it actually meant that the student body was connecting a lot more and helping each other out...when you have more than just your lecturer to talk to it works a lot better".

Another student commented on the feeling of community generated on the Facebook page: *"... students rallied together to assist each other by answering questions and sharing resources"*. Somewhat paradoxically two students commented that they were more comfortable asking a question on Facebook than in class, despite the fact that participating students are identified by their name on the Facebook page. Students reported that they found interacting via Facebook less threatening: *"...you're not asking a question in a lecture where 100+ students will suddenly look at you, and that makes me refrain from asking a lot of questions in class"*. Another benefit mentioned by students was an appreciation of the asynchronous nature of interactions on Facebook which meant they had time to reflect on their posts than in class interactions: *"You have more time to think of what you want to ask on Facebook"*.

The network analysis shows that there were many more comments (1959) than posts (336) during the semester and that students varied in their level of participation. Figure 1 shows participants as red nodes S1, S2 etc with posts indicated as blue nodes and comments represented as green nodes. Lines (edges) between red and blue nodes represent that participants write posts. Edges between green and blue nodes indicate which comments are attached to which posts. Edges between red and green nodes indicate comments written by participants. The instructor for this subject is represented as S9. The data represented in Figure 1 indicates that students S5, S50, S55 and S60 contributed more original posts over the semester than the instructor. The instructor did contribute more comments than any one student and the four students above who contributed the most original posts were also the students who contributed the most comments. Two of these students earned a final subject result of high distinction (>85%), one earned a distinction (75 - 84%) and one scored a credit (65 - 74%), indicating that they were high performing students in this subject. So while the students who participated the most on the Facebook group were also high performing students we will not claim that they were high performing students because they participated in the Facebook group.

Students in both focus groups highlighted that they found the participation of the instructor added value to interactions in the Facebook group. The instructor's participation was valuable because the speed of the response meant it was a convenient way for students to ask questions: *"It was very convenient to ask questions, you usually got a response back quickly"* compared to *"...we had to look for the lecturer and then make an appointment with him and then go ask him and that took time"* for another subject. Students also commented

on the way the instructor interacted on Facebook which was to 'like' some posts, for example when a student posted a correct answer to a problem, and to suggest ways to think about a problem or provide "*hints*" when a student posted an incorrect answer or solution. The act of 'liking' a post gave the students reassurance: *"... [the instructor] used to like specific posts....it's like a confirmation"*. Students also valued judicious questions or suggestions rather than explicit instructions on incorrect problem solutions:

"Because sometime when everyone was just struggling with this one question, [the instructor] would come in and comment, give like a couple of hints here and there. That would push us in the right direction...".
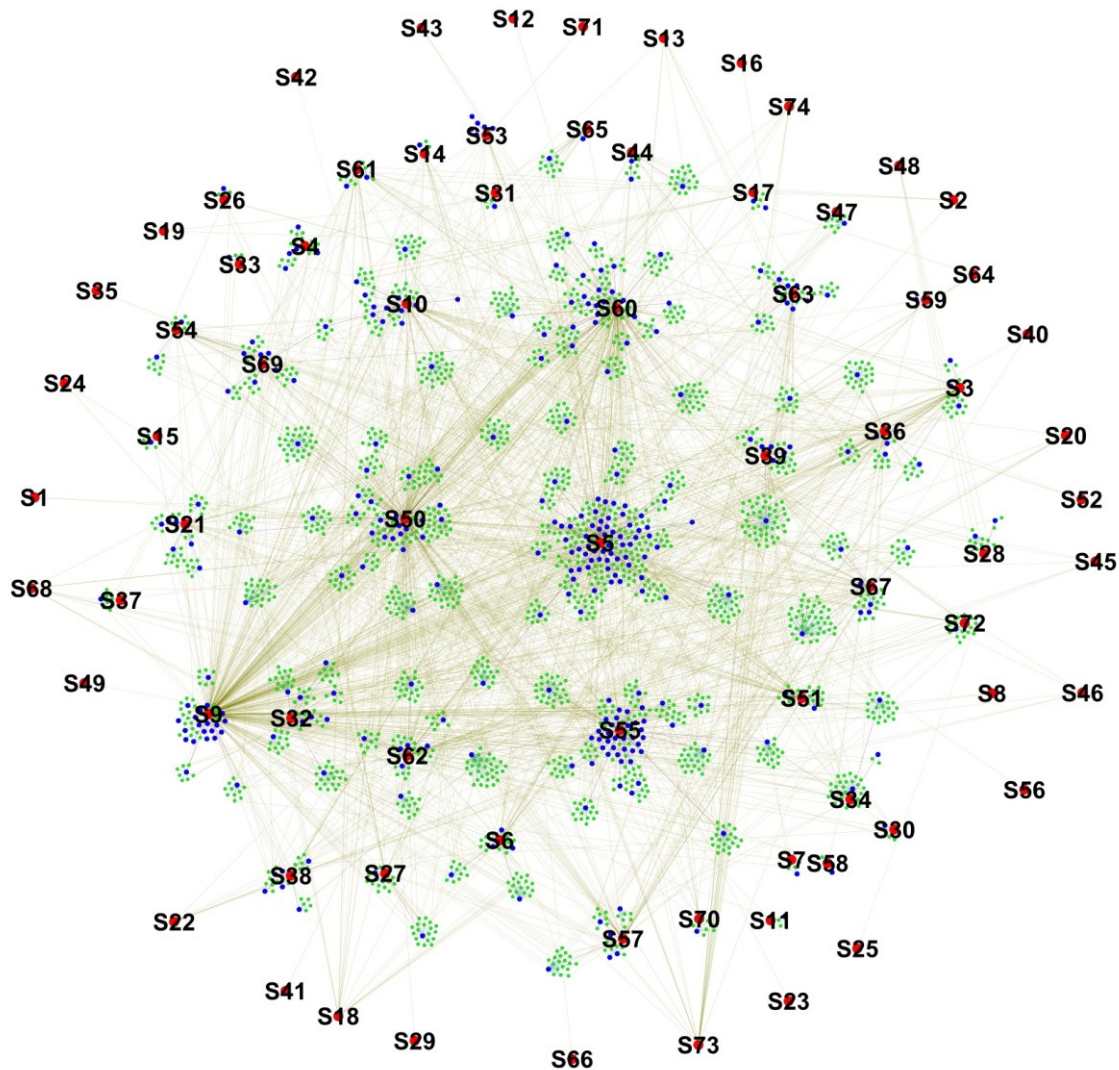

Figure 1: Gephi visualisation of participants' posts and comments to the Facebook group over the Spring 2014 semester (red nodes represent participants, blue nodes represent posts and green nodes represent comments)

Figure 1 also shows that there were 32 students (20%), such as S12, S13 and S42 who did not contribute with either a post or a comment.

Figure 2 indicates that all students who responded to the questionnaire used the Facebook group page and all used it to check their solutions or answers to problems: "*Checking solutions for past paper questions and assisting with checking I was on the right path for assignments was very helpful*". Figure 2 shows the frequency of respondents rather than percentages because of the small number of respondents. The next most popular reason for using the group was to help them revise for exams: "*Revising for the subject by reviewing the*

questions of others was very useful". Neither of these activities (checking solutions and revising for exams) necessarily required students to post or comment, and suggest that the 20% of students identified in Figure 1 as not posting or commenting would still potentially benefit from being in the Facebook group. These students would also have been notified through their smartphone of a new post or comment so would have had the subject brought to their attention frequently.
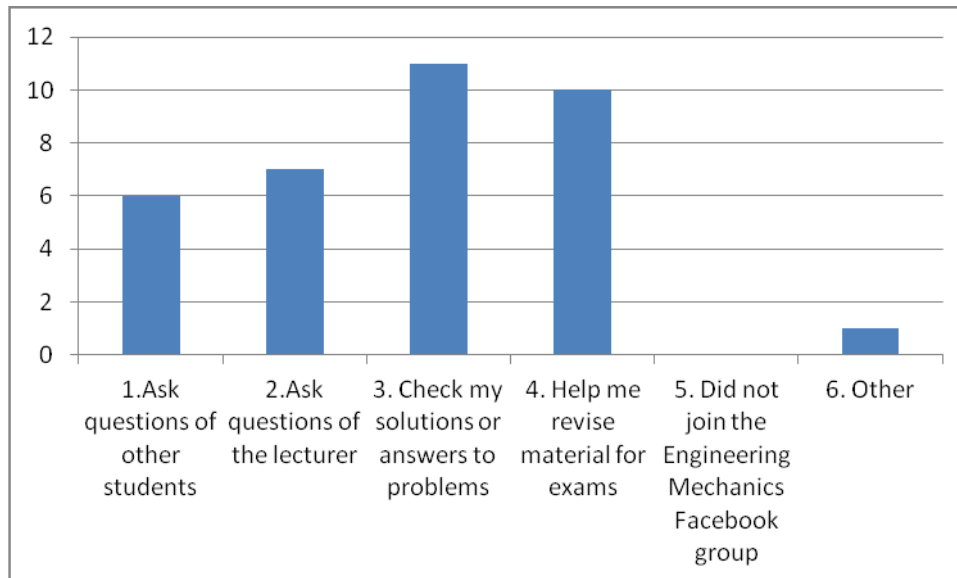

Figure 2: Questionnaire responses to: Which of the following did you use the engineering Mechanics Facebook group for? List all numbers that apply (n=11).

Asking questions of the lecturer and asking questions of other students were also reasons that students used the Facebook group (7 and 6 respondents respectively in Figure 2): *"The facebook group allowed me to get a quick response to any question that I had, by either a well-informed student or the lecturer"*; and *"The Facebook Group was super helpful as I was able to get quick feedback from both my peers as well as the lecturer outside of university contact hours"*.

The questionnaire shows that most students participated in the Facebook group by reading what others posted and 'liking' good comments (6 of 11 respondents). Students who participated this way were mainly those with credit and pass level subject results and made the following comments:

"Generally I would only post when I have a really urgent question to ask. Other than that I'd just do a recent past paper that someone else is also doing on the Facebook Group and compare my answers to that person's. Asking why or how they got this if our answers didn't match";

"I'm not the strongest mechanics student and I found that the stronger ones were very willing to help. So I would go and do questions by myself and then check them later on the fb page to see if they were right for reassurance"; and

"I liked being able to understand and see how to do questions that I had difficulty with or didn't know how to go about. Also if I did a solution or question and I did understand it I would like comments that further contributed to the solutions given by other students".

The next most common way of participating in the Facebook group were those students who both posted material and read what others had posted. These students all had subject grades of distinction or high distinction. One high distinction level student indicated that he mainly posted material and a credit level student mainly read what others posted commenting that: *"Most questions I had on the course I either asked in person or the*

question was answered on the Facebook page. I used the content on the Facebook page to assist my learning and make sure I was on track with the course content".

Figure 3 shows that students were fairly evenly distributed on whether the Facebook group impacted on their capacity to ask questions in tutorials or lectures. It was pleasing to see a repeating student comment that the Facebook group made it easier to ask questions: *"The fb page made me more confident and increased my motivation to study because I was finally getting it. So I went to the tutorials a lot more often and felt more confident in asking my tutor questions because I realised they weren't 'dumb questions'"*. It was also pleasing to see that students felt confident the answers on the Facebook page were correct. Students who responded that they tended not to ask questions in class explained that this was either because most of their questions had already been answered on Facebook or because *"...it just feels easier asking questions behind a computer screen rather than face to face..."*. Other students still asked questions in the face-to-face sessions: *"I thought tutorial sessions were the best out of the three because even though the lecture is good there are so many students willing to ask questions. Also I found that face to face is much better to understand".*
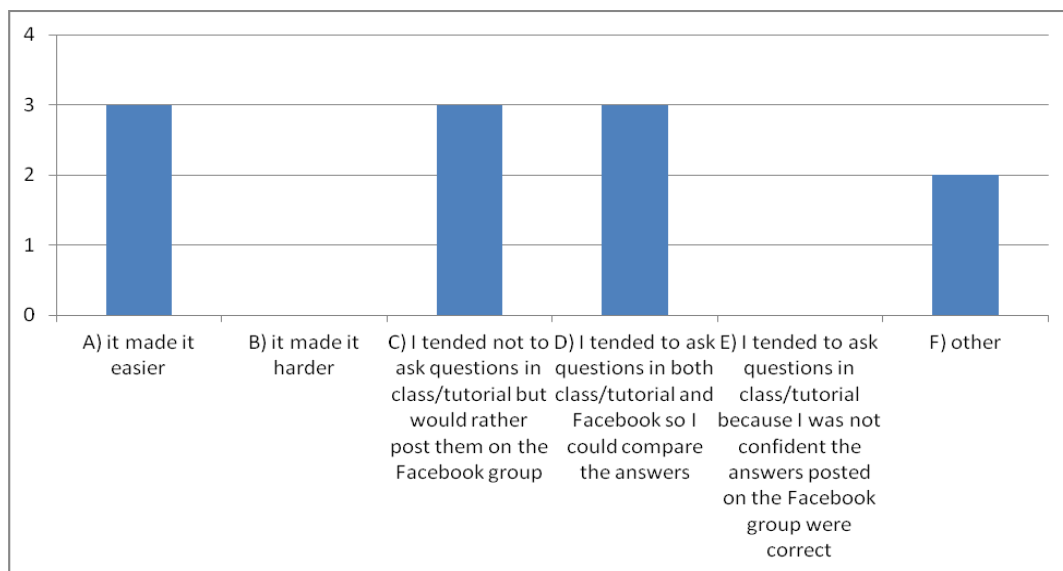

Figure 3: Questionnaire responses to: How did your interactions on the Engineering Mechanics Facebook group impact your capacity to ask questions in tutorials or lectures (choose the most applicable answer)?

The responses in Figures 1, 2 and 3 show that the way that the Facebook group was used accommodated a range of different ways that students wanted to participate. This feature encourages students to take some responsibility for their learning, and still feel that they are part of a supported community. However, Figures 4 shows that there was broad consensus (8 out of 11 respondents) on the continuing importance of attending lectures. There was also agreement that the posts and comments of other students were either very helpful (6) or helpful (5): *"I was able to check my answers against others and also see some of the discussions that went on about different methods to tackle questions".*

Various aspects of the ways students participated in the Facebook group also became apparent from the discussion in the focus groups. Students used the 'like' function on posts from other students to indicate that they were also interested in that question. This was particularly apparent on difficult questions especially past exam questions which were available through the library webpage but were posted or discussed in the Facebook group along with additional questions. They also appreciated confirmation of their work by looking at other students' partial solutions, full solutions, or final answers, as well as confirmation from the instructor.
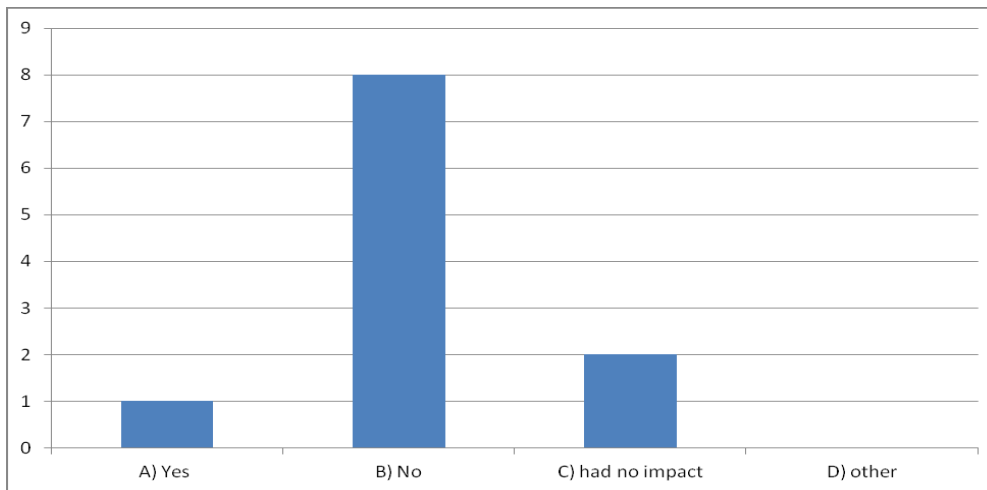
Figure 4: Questionnaire responses to: Did using the Engineering Mechanics Facebook group mean that it was not as important for you to attend lectures?

All students in the focus groups were emphatic that the Facebook group did not replace the face-to-face interaction that occurred in lectures and tutorials. We must bear in mind that students self-selected to come to the focus groups so these comments are from the more engaged students. Students who were not motivated to attend lectures are not likely to want to continue their involvement with the subject by attending a focus group.

Through this preliminary study we have identified some of the important aspects relating to the use of a Facebook group in a single subject context. The use of the heterogeneous network provided a descriptive representation of student participation in the Facebook group. However, the questionnaire responses provided information about student perceptions and the focus groups provided information that had not come out in either the network analysis or the questionnaire. This confirmed for us the continued importance of talking to students to find out not just 'what' happened but 'why'.

Conclusions

This initial study showed that the networking capability between smartphones and Facebook has supported the increased frequency of student interaction with the subject material compared to other subjects and compared to previous use of LMS discussion boards in this subject. This increased frequency of engagement with the subject material was facilitated by the technology since students would receive an aural notification on their smartphone whenever there was a new post or comment. Students emphasised that the Facebook group was a supplement to, and not a substitute for, face-to face lecture and tutorial sessions. For some students their interaction on Facebook gave these first year students the confidence to ask questions in face-to face sessions. Additionally they felt that the instructor's engagement with the Facebook group increased the value of this medium of interaction.

This increased interaction has had a positive effect on student engagement with the content of the subject, but also in their confidence in their ability to learn. However, like all technology, it's not a magic bullet by itself, and how it's used makes a difference. In this case the learning benefits came from the involvement of so many students and the instructor using judgement in providing guidance rather than explicitly posting answers.

References

Connell, S. (2009). Academic libraries, Facebook and MySpace, and student outreach: A survey of student opinion. *Libraries and the Academy*, 9(1), 25−36. Retrieved from http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v009/9.1.connell.html.

Goh, W., Hong, J., Goh, K. (2013) Students' Behavior and Perception of Using Facebook As a Learning Tool. In *Proceedings of the 8th International Conference on Computer Science & Education (ICCSE 2013)*, April 26-28, 2013. Colombo, Sri Lanka

Luo, T. and Gao, F., 2012. Enhancing classroom learning experience by providing structures to microblogging-based activities. *Journal of Information Technology Education*, 11, 199–211.

Mack, D. M., Behler, A., Roberts, B., & Rimland, E. (2007). Reaching students with Facebook: Data and best practices. *Electronic Journal of Academic and Special Librarianship*, 8(2) Retrieved from http://southernlibrarianship.icaap.org/content/v08n02/mack_d01.html.

Matthews, B. (2006). Do you Facebook? Networking with students online. *College & Libraries News*, 67(5), 306−307.

Mazer, J. P., Murphy, R. E., & Simonds, C. S. (2007). I'll see you on "Facebook": The effects of computer-mediated teacher self-disclosure on student motivation, affective learning, and classroom climate. *Communication Education*, 56(1), 1−17.

Murphy, G. & Salomone, S. (2013) Using social media to facilitate knowledge transfer in complex engineering environments: a primer for educators, *European Journal of Engineering Education*, 38:1, 70-84.

Palmer, S. (2013) How Twitter is being used by Australian engineering academic units. In *Proceedings of the 2013 AAEE conference*, 8-11 December, Queensland, Australia.

Roblyer,M. D., & Wiencke,W. (2003). Exploring the interaction equation: Validating a rubric to assess and encourage interaction in distance courses. *The Journal of Asynchronous Learning Networks,* 8(4)*, 24−37.*

Roblyer, M., McDaniel, M., Webb, M., Herman, J. & Witty J. (2010). Findings on Facebook in higher education: a comparison of college faculty and student uses and perceptions of social networking sites, *Internet and Higher Education*, 13, 134-140.

Sheriff, R., 2012. An evaluation of students' and lecturers' use of technologies: an engineering case study. *Engineering Education*, 7 (1), 33–45.

Sun Y. & Han, J., (2012), Mining Heterogeneous Information Networks: Principles and Methodologies, Synthesis Lectures on Data Mining and Knowledge Discovery, Morgan & Claypool Publishers.

The Gephi Consortium. (2012). Gephi (Version 0.8.1). Paris: The Gephi Consortium.