Exploring the Affordances of Facebook for Teaching and Learning

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Abstract: Facebook is a popular social networking site, which has potential for teaching and learning. In this study, we explored different ways of using Facebook in three cases at a teacher training institute. In these cases, teachers used Facebook as an interactive learning management system to put up announcements, organize weekly sessions, and share resources with students; students used Facebook to support their collaboration in a group assignment; and students explored Facebook apps to identify potentially useful apps for their future subject teaching. The cross-case analysis shows that Facebook has pedagogical, social, and technical affordances for teaching and learning. It has limitations as well. Suggestions for effectively using Facebook are provided.

1 Introduction

Facebook is a virtual social networking site (SNS) where people can gather together to share information and photos, and discuss ideas with one another (Boyd & Ellison, 2008; Raacke & Bonds-Raacke, 2008). Facebook is not initially designed for educational purposes. However, it may have great potential for teaching and learning, simply because students spend a tremendous amount of time on Facebook every day (Mazman & Usluel, 2010; NSBA, 2007).

A number of research studies have investigated the usage profile, answering questions like how many students have Facebook accounts, how often they use Facebook, and what information they often share on Facebook (Dwyer, Hiltz, & Passerini, 2007; Lenhart & Madden, 2007; Mori, 2007). Some studies have started exploring the use of Facebook for teaching and learning in recent years (e.g. Baran, 2010; Greenhow, 2011; Madge, Meek, Wellens, & Hooley, 2009; Mazer, Murphy, & Simonds, 2009; Pempek, Yermolayeva, & Calvert, 2009; Selwyn, 2009).

Research shows that Facebook has pros and cons for teaching and learning. O'Sullivan, Hunt, and Lippert, (2004) and Mazer, Murphy, and Simonds, (2009) found that Facebook was helpful for maintaining and improving relationships between students and students and between students and teachers. However, Teclehaimanot and Hickman (2009) reminded that teachers must be careful when they were using Facebook to interact with students. The information released by teachers must be proper and teachers should avoid actively initiating interactions with students on Facebook when the topics were not subject related.

A study done by Schroeder and Greenbowe (2009) reported that the postings on Facebook raised more complex topics and generated more detailed replies than using WebCT. However, another similar study done by DeSchryver, Mishra, Koehler, and Francis (2009) identified that the students assigned to Facebook did not write longer or more frequent postings than the students assigned to Moodle. Another study carried out by Kirschner and Karpinski (2010) revealed that Facebook users got both a lower mean GPA and spent fewer hours per week studying on average than Facebook nonusers.

Additional literature about using Facebook for teaching and learning is available in Yang, Wang, Woo and Quek (2011). An increasing number of teachers are getting interested in using Facebook for teaching and learning. However, the above literature indicates that Facebook is a double-edged sword. It can be a

positive tool for learning, but can also be a negative one if it is not properly used. It seems that the question for educators is not whether Facebook is useful for teaching and learning but is how to use it appropriately. This study was initiated to explore different ways of using Facebook for teaching and learning and to identify its potential and limitations. This paper presents three cases of using Facebook at a teacher training institute in Singapore. Each case describes how Facebook was used, what the perceived affordances were, and how its limitations were addressed.

2. Methods
2.1. Participants
The participants of this study varied. Most of them were pre-service trainee teachers, who were studying in the teacher training institute as full-time students for one year. They had bachelor degrees in specific subjects such as Maths or English language. During the period of studying in the institute, they were enhanced in teaching pedagogy. They would be secondary schools teachers after finishing the training program.

These participants played two different roles when they were studying in the institute. One role was that they were students of the training program. They had to take and passed some courses. One course was entitled ICT for meaningful learning, which was a compulsory course for all trainee teachers. When they were participating in this study, they were taking this course as students, and Facebook was used to support their learning. The other role was that they would be school teachers after the training program. Therefore, they were encouraged to explore the potential of using Facebook for their future subject teaching when they were participating in this study.

A small group of participants was in-service Master students, who were full-time school teachers or trainers from companies. They were attending an elective course when they took part in this study. Similar to the pre-service teachers, they played the same roles. The only difference was that they could immediately use the tool in their training or teaching practices once they found it was useful. Another class of participants was undergraduate students, who were from different schools of the university where the institute is located. They were taking an elective course when they took part in this study.

2.2. Ways of using Facebook
Facebook was used in slightly different ways in the cases. One way was that Facebook was used by the instructor as an interactive learning management system to put up announcements, share resources, and conduct online discussions. The other two ways aligned with the different roles of the participants. In the second case, the participants, acting as students, were required to use Facebook to support their group work when they were completing their final assignment. They used Facebook to discuss ideas, share resources, and coordinate their collaborative effort. Hopefully by using Facebook in this way, they could identify the affordances of Facebook from a student point of view.
In the third case, the participants, acting as future teachers, were encouraged to explore Facebook apps and to report on their perceived affordances of the apps for their future subject teaching. In this case, they could perceive the affordances of Facebook from a teacher's perspective.

2.3. Research questions
The purpose of the study was to identify the potential, limitations, and concerns of Facebook when it was used for teaching and learning. In addition, this research aimed to suggest some strategies to address the limitations and concerns. This study intended to answer the following research questions:
- What are the perceived affordances and limitations of Facebook for teaching and learning? and
- How to effectively use Facebook to support teaching and learning?

2.4. Data collection and analysis
In different cases, data were collected by using different instruments. In the first case, the data were mainly collected from the teacher's reflection logs, students' post entries on Facebook, and survey results. In the other two cases, data were collected from the post entries on the Facebook and participants' reflections.

Both within-case analysis and cross-case analysis were conducted. For the within-case analysis, this paper describes how Facebook was used in the individual cases and the perceived affordances by the teachers and/or students. For the cross-case analysis, this paper summarizes the common findings from the cases, and reports the pedagogical, social and technical affordances commonly identified from the cases. Table 1 shows an overview of the cases.

Table 1: An overview of the cases

	Purpose	**Way**	**Instrument**
Case 1	Use Facebook as an interactive LMS	Teacher use & Student use	Teacher's reflections, students' posts and survey
Case 2	Use Facebook to support group collaboration	Student use	Students' posts and reflections
Case 3	Explore features and apps	Students as future teachers	Students' posts and reflections

3. Within-Case Analysis

3.1. Case 1: Using Facebook as an interactive LMS

In this case, the Facebook group was used in two different classes as an interactive learning management system (LMS) to put up announcements, share course resources, organize weekly sessions, and conduct online discussions. One class comprised of 16 Master students, aged from 24 to 55. The other included 15 undergraduate students aged from 20 to 23. Both classes used the Facebook group as an LMS for a complete semester of about 12 weeks. Except differences in content, the mode of course delivery and the way of using Facebook were identical.

The posts on the Facebook were analyzed and an online survey was conducted at the end of each course to find out the perceived affordances. The result of this case showed that Facebook had the potential for being used as an LMS. The wall of the Facebook group provided a useful platform for putting up announcements, sharing information and learning resources. As the entries posted to the group page would be automatically delivered to group members through the notification, the group page was a useful place for putting up announcements as well. As Facebook does not support the file formats of DOC and PDF, the teacher had to upload these format files into Google Docs, and put the generated links onto Facebook.

Each tutorial session was organized as an event in Facebook. All materials and discussions for a tutorial were showed on the event page. The participants felt that the Facebook event allowed the instructor to organize weekly learning activities in a meaningful structure. However, as a discussion forum, the Facebook group had limitations. It did not enable the online discussion to be displayed in a threaded structure, which makes responding to a specific comment hard or unnatural.

Facebook enabled students to communicate with the teacher and their peers conveniently. However, the students felt that the Facebook group provided a relatively unsafe environment. To a certain extent they were worried that their academic postings might be viewed by their Facebook friends through the automatic notification. Also, the tutor might 'peek' their personal information or social activities.

Facebook was found easy to use and access speed was fast. However, the students experienced some technical difficulties during the course. For instance, replying to postings in the discussion forum was not straightforward because Facebook did not support threaded discussions. They had to explicitly specify which postings their replies were referring to.

A detailed description of this case is presented in Wang, Woo, Quek, Yang, and Liu (2012). In summary, this study suggests that the Facebook group can be used as an interactive LMS. In schools where commercial LMSs cannot be afforded, the Facebook group can be used as a fully functioning LMS. In other schools where commercial LMSs are already in use, the Facebook group can be used in

extracurricular activities to supplement social interactions and personal profile spaces, which are often insufficient in LMSs.

3.2. Case 2: Using Facebook to support group collaboration

In this case, the Facebook group was experimented in four post-graduate classes to support students' collaborative work when they were completing the group assignment, which was to design an ICT-based lesson plan in groups of four. The main purpose of using the Facebook group was to support group members in: (a) sharing resources among group members; (b) coordinating their collaborative effort; and (c) monitoring their peers' contribution and progress.

A number of 23 groups in the classes participated in the study. They were allowed to choose any tool to support their collaboration. Just in case they did not know what tool to use, three tools were recommended to them: Drop.io, wiki, and Facebook. Additionally, Drop.io was demonstrated in class as a tool to share resources and collect feedback from students. Not surprisingly, a greater number of groups (N=13) were using drop.io, and 5 groups were using the Facebook group, and the others used wiki.

The result showed that the Facebook group provided a useful platform for sharing information and ideas. Group members could easily post ideas onto the group page and gave comments to others. However, similar to the finding in the first case, students had to upload their files to Google Docs and then inserted links to Facebook.

Facebook could enable students to coordinate their collaborative effort. The students used the Facebook group to negotiate when and where they would have face-to-face meetings. They put discussion questions to the group page before the meeting and put minutes after the meeting. The minutes listed down the issues they discussed and the roles they were going to play. Also, some student groups put their progress reports online

The use of Facebook also enabled the group members and the teacher to monitor the collaborative learning process. The use of the Facebook group helped to reveal how the final assignment was gradually completed as the time stamp attached to each post indicated the assignment progress. Also, the use of the group space helped the teacher fairly assess students' individual contribution, as the evidence of their individual contribution (such as the resources collected, ideas shared, or files created) was automatically captured.

More detail of this case is reported in Wang (2010). In summary, this case indicates that the Facebook group, which is similar to the Google group or Yahoo group, can be used to support group collaboration when students are completing their group work. Also, it can be used to coordinate group members' collaboration and monitor their collaborative learning process. Nevertheless, not all evidence, such as the face-to-face meeting discussions, can be captured automatically.

3.3. Case 3: Perceived useful apps

Facebook has a great number of embedded apps. To explore if certain apps are useful for subject teaching, another four post-graduate classes were invited to participate in this study. Each class had 24 to 30 participants. When they were taking the ICT course, they were given three weeks to explore various apps, and required to share in a Facebook group the top five apps which would be useful for their students' subject learning. Table 2 shows the top five apps commonly reported by the participants.

Table 2: Perceived useful apps by students

App		Count
1. Word (http://apps.facebook.com/wordchallenge)	Challenge	27

2.	Geo challenge (http://apps.facebook.com/geochallenge)	8
3.	Honesty Box (http://apps.facebook.com/honesty/index.php)	5
4.	Quiz Creator (http://apps.facebook.com/q-world/)	5
5.	Guess the sketch (http://apps.facebook.com/drawing-game)	4

Word Challenge, as shown in Figure 1, is an online game that allows users to compose words from the six letters provided within two minutes. Marks are given based on the correct words composed. Meanwhile, users can see their friends' performance online. The participants felt that *Word Challenge* could be used to examine students' vocabulary, make learning vocabulary interesting, and trigger students' motivation in learning vocabulary.
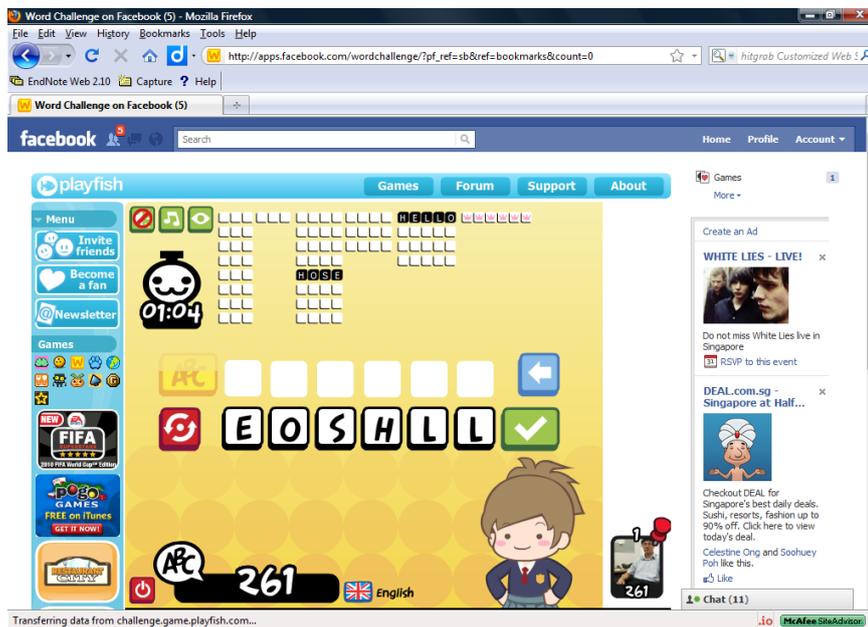

Figure 1. A screen capture of Word Challenge

Geo Challenge takes users on a tour around the world as they put their geography knowledge to the test. Users and their friends can compare who knows more countries, flags, or cities of the world. *Geo Challenge* enables users to check their knowledge levels about Geography. Also, their performance can be compared with that of their friends.

Honesty Box allows users to publish questions and collect anonymous answers from their friends. It is a useful tool for peer evaluation and reflection. *Quiz creator* allows teachers to create quizzes to check students' performance. *Guess the Sketch* enables a user to draw an object and get the other online friends guessing what the object is. Who answers it correctly will get reward points. They felt that this game would be useful for art learning.

In summary, these apps are reported useful mainly because they are subject related or can be used to create learning tasks. Also, the apps are so-called social games (Nickoneill, 2008), which enable students to compete with their friends. Research shows that appropriate competition can motivate and encourage students, in particular high-performing students, to put more effort and perform better (Vockell, 2001).

4. Cross-Case Analysis and Discussion
Although the research focus of each case was different, some common affordances of Facebook for teaching and learning were identified from the cases. This section reports the cross-case analysis result of

the affordances from the pedagogical, social, and technical perspectives based on the framework proposed by Wang (2008).

4.1. Pedagogical affordances
Pedagogical affordances are often defined as the characteristics of an ICT tool that determine if and how a particular learning activity could possibly be implemented within a given educational context (Kirschner, et al., 2004). Based on the study, we found that the obvious pedagogical affordances of Facebook for teaching and learning are as follows.

4.1.1. Sharing ideas and resources
The Facebook group can be a useful platform for sharing ideas and resources. The resources can be in a form of web links, YouTube videos, or pictures. Currently the Facebook group has the limitation of disabling other format files. However, this limitation can be overcome by uploading the files into Google Docs and inserting the links generated from Google Docs to the group page. In the first two cases when the Facebook group was used as an LMS or as a platform for group collaboration, the files in other formats were shared in this way.

4.1.2. Supporting collaborative reflection
The Facebook group enables its members to share ideas and get comments from others. Because of this feature, the Facebook group has potential to be used as a discussion forum. However, in the first two cases, we found that conducting online discussions in the Facebook group was not that natural or convenient as the posts were not listed in the threaded or tree structure. It looks like that all comments were given to the main post.

Facebook seems more suitable for supporting collaborative reflection than online discussion. In collaborative reflection, comments are given to the main reflection, and all comments displayed on the same level are acceptable.

4.1.3. Enabling to monitor the learning process
By reading the questions or comments students posted to the Facebook group, the teacher would be able to find out if the students have understood the topic, what problems they have, or what additional resources they need. This information would enable the teacher to adjust his/her teaching strategies and make the teaching process more effective.

Also, all the posts on the Facebook group page are listed in a reverse chronological order. By reading the entries posted by an individual student, the teacher would be able to identify the student's cognitive development along the time, and provide corresponding support.

In addition, when the students are doing their group assignment in Case 2, certain evidence was captured automatically on the group page, such as the resources they collected, and the ideas they shared. Every entry was attached with a time stamp. This information would enable the teacher to monitor the progress of the group work and also their individual contribution to the group work.

4.1.4. Educational apps
As reported by the students in Case 3, some apps are useful for subject learning. For instance, the Word Challenge would be useful for learning and improving students' vocabulary; the Geo Challenge is useful for checking students' knowledge about geography. Also, some apps may be useful for teachers to design certain learning activities or tasks. For instance, the application of Quiz Creator enables teachers to create online quizzes. Such apps can be used in any subject.

4.2. Social affordances

Social affordances are defined as the perceived and actual properties of an ICT tool that promote users' social interaction (Kirschner, et al., 2004). This study shows that Facebook has the following social affordances.

4.2.1. Extending discussion beyond the classroom
Facebook provides a helpful platform for students to continue their discussion outside the classroom. When the Facebook group was used as an LMS in Case 1, the students could post any questions and reply to the questions after the class. When the students were collaborating with one another on their final assignment in Case 2, they also could continue sharing their ideas after the class. In Case 3, the participants posted their sharing and gave comments after the class. Similar to the findings of other research studies, the online space in Facebook enables students to continue their discussion outside the classroom, and also gives them an equal opportunity to express their opinions (Wang & Woo, 2007).

4.2.2. Fostering interactions between students and students and between students and the teacher
When attending a lesson in the classroom, students have limited time to interact with the teacher or with their peers. The limited time and physical classroom often constrain them from interacting with the teacher or their peers. Obviously, the virtual space provided in Facebook enables students to ask question, give feedback, provide additional resources, and seek for help.

Such interactions were evident in this study. In Case 1, some students asked questions in the Facebook group, the teacher or other students helped to answer the questions. Also some students provided additional resources to share with the whole class. In Case 2, some groups used the Facebook group to communicate and share ideas. Their posts looked like email messages and involved a lot of interactions.

4.2.3. Enabling students to compete with peers
Many Facebook apps have the feature of recording users' highest marks, comparing with the marks of their friends, and ranking them based on the marks. These features encourage them to compete with their peers and motivate them to perform better.

4.3. Technical affordances
Technical affordances refer to the usability of an ICT tool. Facebook was found easy to use and the access speed was fast. The students did not have many technical problems. However, Facebook is changing rapidly, and many new features are added in constantly. Sometimes the students did have technical difficulties in locating certain functions.

4.4. Suggestions
Facebook has potential and limitations for teaching and learning. This section gives some suggestions on effectively using Facebook in learning, based on the findings of the cases.

4.4.1. Keep the learning environment secure
Many research studies have shown that students, particularly females, do not like teachers to be their friends, or they do not like teachers to actively interact with them (e.g. Madge, Meek, Wellens, & Hooley, 2009; Teclehaimanot & Hickman, 2009). In Case 2, we found that some students did not want the teacher to view their personal profiles or their friends to see their academic performance on Facebook. This study suggests that the teacher should not invite students to become their Facebook friends unless the teacher is invited by students. One way to avoid being students' friends is to set the Facebook group open so that anyone can join the group. Once all students have joined the group, the teacher can quickly close it to prevent other unexpected people from visiting the group page.

Another suggestion for keeping a safe learning environment is to create a separate Facebook account for teaching and learning. Their original accounts will not be accessed from the course. However, using a separate account may compromise the popularity of Facebook as students may not visit this account regularly.

4.4.2. Use Facebook with other third-party programs

The study shows that it is quite hard to create a learning environment by using Facebook alone, as it does not support files in other formats like DOC, PPT, or PDF. But, these formats are often necessary for subject learning.

In the first two cases when the Facebook group was used as an LMS or to support group work, the files in other formats were uploaded into Google Docs and shared. The generated URLs from the Google Docs were posted to the Facebook group. In this way, the files could be opened or downloaded when the links were clicked. The students felt that sharing files in this way was acceptable even though it was not that straightforward. This finding suggests that a Facebook-mediated learning environment must be created together with other programs.

4.4.3. Remain face-to-face meetings

Facebook enables students to share resources, discuss ideas, and negotiate meanings. However, this study also found that students still met face-to-face regularly when they were doing their group work in Case 2. This finding supports the notion that the face-to-face meeting has certain advantages over the online discussion, as it is easier to clarify doubts or make an agreement (Wang & Woo, 2007). This study suggests that online discussion should not replace the face-to-face meeting but it can be used as a supplementary means when students cannot meet physically.

In addition, using Facebook cannot capture automatically all evidence of group collaboration. Only the resources shared or discussion occurred on Facebook are recorded. Therefore, fairly assessing individual students' contribution still needs additional indication or strategies.

5. Conclusion

In principle, Facebook is a social networking site. It is mainly used for making new friends, keeping contact with old friends, or sharing information and photos. It has affordances and potential for teaching and learning. The most useful component of Facebook for teaching and learning is its group. It can be used as a learning management system to put up announcements, share resources, organize weekly sessions, and conduct online discussions. It can also be used by students to support their group work. By using the Facebook group, students can share information, negotiate ideas, coordinate their collaboration, and monitor their progress. However, it has limitations. It does not support files in other formats than text, pictures and videos. Also, its discussion is not listed in a threaded structure, which makes replying to a specific comment hard.

In addition to using the Facebook group, some embedded apps are also useful for subject teaching. Many apps are related to subject content, or can be used as a tool to create learning tasks for a subject. When students are using the apps, they do not only compete with the programs or themselves, most attractively, they can compete with their online friends.

Even though Facebook has many potential benefits for teaching and learning, this research reveals that Facebook is not a safe environment for teaching and learning. On the one hand, students do not want their teachers to be their friends because they are worried their teachers may see their personal profiles. On the other hand, they do not want their friends to know their academic performance in a course either. In addition, there might be cyber-wellness issues as well. The information shared may not be reliable and their personal information might be misused by others. Nevertheless, Facebook has the potential for teaching and learning if it is used properly.

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