The Use of Internet-Based Social Media as a Tool in Enhancing Student's Learning Experiences in Biological Sciences

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Abstract

This study explored the use of social media as a tool in enhancing student's learning experiences, by using online instruction as a supplement to a face-to-face general education course, such as biological sciences. Survey data were collected from 186 students who were enrolled in a Biological Sciences course. The course was taught in a blended format using Facebook and Edmodo online social networks. A four point Likert scale was used to interpret the data collected. Findings indicated that, when traditional face-to-face instruction was combined with online components, students' learning was enhanced. Findings from this study indicate that students had better experience, better engagement, and appreciated both the social learning experience gave by the online social network. Results revealed that students through student-student interaction and student-teacher interaction enhance their own experiences and improved their learning ability. The findings were used as bases in developing new practices and methodologies involving social networking tools for learning. Moreover, findings were used to design a blended format syllabus and blended learning guidelines.

Keywords: e-learning, social network, SNS, social education network, Edmodo, Facebook, biological sciences, blended learning

Introduction

The use of internet-based social media programs to make contacts with family, friends, classmates, and clienteles became popular in recent years. Social media sites such as Facebook, Twitter, Blogs, Edmodo, and Google docs, among other, are online tools that offer individuals "to join free of cost, and allow users to converse and interact with each other" (Prasad & Prasad, 2012).

The development of social network sites (SNS) has created communication tools to aid many methods that can be applied in teaching and learning. Educators must identify the

potential for cultivating student engagement in the classroom using these technologies (Mirabolghasemi & Lahad, 2013). Many Universities in the Philippines and in abroad are now using social networking applications where students and faculty can interact and share resources.

A social networking site which provides free and secure social learning space for teachers and students to connect and collaborate is Edmodo. The corresponding authors have used this website as a learning tool for the past two years. This website is actually very similar to the arrangement and functionality of Facebook, which promotes learning at anytime and anyplace. However, not all teachers are using social media in teaching and there is currently little research regarding the educational benefits of SNS as related to teaching and learning.

According to Prasad and Prasad (2012), "[s]ocial networking applications [are] now being used by many top universities as … alternative spaces wherein student[s] adapt to the campus lifestyle through interacting with peers and faculty". Student and faculty members interact, express their views, and share resources by maintaining their profiles and creating groups on social media sites such as Facebook, Twitter, Blogs, Google docs, and others.

This research dealt with the enhancement of students' learning experiences in a Biological Sciences course facilitated through a social networking platform. The course Biological Sciences, or simply Biology, was part of the general education subjects. This is included in the curriculum of some non-science majors enrolled in the tertiary level of different schools in the Philippines. The course is offered either first semester or second semester, which is equivalent to 18 meetings. The class meets 3 hours per week or 1.5 hours twice a week, depending on the class schedule.

There has not been much research available on social networking services and their academic usage to date. However, there are broader issues related to the employment of technology in the classroom that must be also reviewed. Therefore, results of this study can offer faculty and course designers with information to develop new practices and methodologies involving social networking tools for learning.

In particular, the following research questions were formulated:

1. What is the profile of students who took the Biological Science course in terms of:
   a. age
   b. gender
   c. civil status
   d. academic program/course

2. How does engagement using social network influence student learning?

3. What are the students' learning experiences in Biological Sciences using social networking platform?

4. How do students perceive the use of a social networking platform as the mechanism through which a Biological Science subject is taught?

5. Did students in Biological Sciences perceive improved learning when social networks were combined using blended instruction?

6. How may the findings be utilized in the development of guidelines and syllabus in a blended learning course?

Literature Review

Application of Pedagogical Technology

Social networking is a new technology trend that has recently begun to receive attention from researchers. Social networking sites (SNS) such as Facebook and Edmodo allow users to communicate with a network of friends or colleagues that they intentionally select to be part of the group. Due to their rising popularity, scholars have begun taking notice in the potential of this technology.

Social media as a tool in education. According to Perryman (2011), "[t]he term social networking is prevalent in modern society, yet few people know just exactly what it means". For Perryman, "[s]ocial media and social networking are new terms often used interchangeably by the public and members of industry" (2011). As he describes it,

> [s]ocial media is a noun, and is the platform used for social networking. Social mediawebsites offer products or services that allow users to social network. Thus the action of social networking results from individuals using social media to allow people to communicate with each other. (Perryman, 2011, p. 3)

Facebook as the SNS platform. Bosch (2009) wrote an article that focused on Facebook, a social networking site which is used and applied in one South African University for teaching and learning. As Bosch explained, Facebook was created by Mark Zuckerberg at Harvard University in February 2004 and was originally limited to Ivy League college students (2009, p.185). According to Torgeson (2006), in September 2006, the site was opened to anyone worldwide with a valid email address (as cited in Bosch, 2009, p.185). After one year, "the site had grown to 5.5 million users including 800 collegiate networks, as well as some international and high school networks" (Gutschmidt, 2012, p.3). By March 2012, the site reached over 900 million active users (Gutschmidt, 2012, p.3).

Edmodo as the SNS platform. Edmodo is a private micro-blogging and social learning platform for teachers and students. According to Holotescu and Grosseck (2009), "[m]icroblogging is a Web2.0 technology and a new form of blogging, that let the users publish online brief text updates, usually less than 140-200 characters". Edmodo was initially founded in September of 2008 by Jeff O'Hara and Nic Borg, who wanted to make "an impact internationally by helping teachers and students communicate and collaborate with one another using a next generation social learning platform. Members are able to share ideas, files, events, and assignments in a virtual setting" (Edmodo, 2010; see also Turkmen, 2012). As of March 2013, "the platform has grown to support more than 400 apps while the main service has tripled its total user base, now exceeding 18 million registered users" (Edmodo, 2013).

Blended Learning. According to Mortera-Gutierrez (2006), "[b]lended learning has been defined in many ways in the current specialized literature". For Osguthorpe and Graham (2003) "[t]he most common and current definition states that *blended learning* combines face-to-face instruction with distance education delivery systems" (as cited in Mortera-Gutierrez, 2006). Poon (2012) defined blended learning as "a combination of face-to-face learning experiences and online learning experiences which aim to complement each other in order to support and enhance student learning".

Methodology

The research was conducted to determine the use of social media as a tool in enhancing student's learning in Biological Sciences. A descriptive type of research was employed. This research study used quantitative methods in determining students' learning enhancement. Quantitative data was collected via closed-ended questions with answers associated with a 4-point Likert scale ranging from "strongly agree" to "strongly disagree". The survey itself was sent to students' email addresses and Facebook group after the semester.

Course Outline and Description

The course was delivered as an introduction to Biological Sciences designed for non-science majors at two schools in the Philippines, namely New Era University and Rizal Technological University.

When the study was carried out, two sections from each school were selected. Historically, the course had been taught face-to-face. During the second semester, the principal researcher included the use of social media tools across the four course sections she taught.

To enhance the learning experience, the instructor used SNSs such as Facebook and Edmodo. Multimedia was designed and incorporated in the syllabus, such as PowerPoint slides, online quizzes, study guides, film clips, and hyperlinks. The online activities were followed by an elaborated discussion during face-to-face meetings.

Procedure. In the first face-to-face meeting or traditional method, blended instruction was introduced to students. The appointed class leader was given an instruction to create a group in Facebook and inform the classmates about the group. The teacher handling the subject gave also the group code for Edmodo and told the students to create a profile in the website and sign in as student. The students were also told that the completion of one particular activity, whether assignment or quiz, was counted for their face-to-face components of class standing. Assignments and quizzes were given on a weekly basis. The blended learning approach was adopted during 17 weeks in several sections of a Biological Science course.

Instrument. In the development of student questionnaires, the researchers adapted questions from the existing surveys developed by Owston and York (2012), with some modifications by the researchers in order to address the criteria needed in the study. Name of the respondents was optional. To enhance the validity, 10 pre survey questionnaires were sent to selected students and from the returned survey, the researchers reviewed the survey instrument based on the feedback evaluation before they were sent to the participants.

Participants. The survey was distributed at the end of the course to all four Biological Sciences course sections via email, a note in Edmodo, or posts in the Facebook group. Participants for the study included students from New Era University under the College of Education, comprising of 46 students in NS2 B class, and under the College of Arts and Sciences, comprising of 51 students in MC 2A class. From Rizal Technological University, participants were 56 students in CBET- 02A class and 51 students in CBET-O2 E who were enrolled in face-to-face or traditional method courses during the second semester of

the academic year 2012-2013. Of the 198 students who were enrolled, 186 completed the survey. As a result, the return rate was 93.94%.

Results and Discussion

The present study was proposed to determine the use of social media as a tool in enhancing student learning in Biological Sciences. A descriptive type method was used using a 4-point Likert scale.

Results

A. Student Demographics. Demographic questions were incorporated in the survey in order to gain some basic background information on the enrolled students. Simple summation calculations and percentage were used for this data. Results from the demographic section of the survey are presented in Table 1. Based on the responses, the age of the respondents ranged from 16-20 years old (100%). This is due to the fact that the Biological Science course is offered in the curriculum of freshmen students in New Era University while, in Rizal Technological University, the course is offered in the junior status. Fifty four (29.03%) students were male and 132 (70.97%) were female, pointing to a larger population of female respondents. They were all single in civil status. The students were enrolled in different academic programs. From New Era University, under the College of Arts and Sciences, Mass Communication undergraduates had a frequency of 36 (19.35%), 2 (1.75%) Psychology undergraduates, and 3 (1.61%) in Political Science major. Mass Communication undergraduate students were plenty in number because it was their block/class. Undergraduate Psychology and Political Science majors were few in number probably because of late enrollees or the subjects in their respective courses were already closed. From Rizal Technological University, under the College of Business Education and Technology, there were 53 (28.49%) students enrolled in the Financial Management undergraduate program and 49 (26.34%) students were enrolled in the Office Management one.

Table 1 Demographic Profile of Students

Profile		Frequency	%
Age (16-20)		186	100
Gender:	**Male**	54	29.03
	Female	132	70.97
Civil Status	**Single**	186	100
Academic Programs:			
College of Arts and Sciences			
AB Mass Communication		36	19.35
BS Psychology		2	1.75
AB Political Science		3	1.61
College of Education			
BEEd Special Education		14	7.53
BSEd English		12	6.45
BSEd Mathematics		11	5.91
BSEd Filipino		6	3.23
College of Business Education and Technology			
BSBA Financial Management		53	28.49
BSBA Office Management		49	26.34

B. Type of social media used. Before the start of Biological Science subject, students had multiple social network accounts, such as Facebook, Twitter, LinkedIn, Edmodo, and others. After the semester, the usage of social networking sites increased. Results were presented in Table 2.

Table 2 Type of Social Media Used by the Students

Social Networking Sites	Frequency	%[*]
Before taking Biological Science		
Facebook	178	95.70
Twitter	101	54.30
Edmodo	35	18.82
LinkedIn	15	8.06
Others (Tumbler, instagram, etc.)	23	12.37
After taking Biological Science Course		
Facebook	186	100
Twitter	142	76.34
Edmodo	186	100
LinkedIn	34	18.28
Others (Tumbler, instagram, etc.)	60	32.26
Total	186	

Note: Table 2 will not add up to 100% as respondents were able to select more than one response.
[*] Percentage rounded to the nearest hundredths decimal point.

Participants were asked to indicate the types of social media that they used, and they could select more than one of the categories mentioned above. The largest response before taking the Biological Science course was Facebook (n = 178, 95.70%) and (n = 186, 100%). The second largest was Twitter with 101 or 54.30% response, followed by Edmodo with 35 or 18.82% response. Other networking sites gathered 23 or 12.37% response, followed by LinkedIn with 15 or 8.06% response. The use of all social media increased.

After taking the course, both Facebook and Edmodo got the highest percentage (100%). This was due to the encouragement of the instructor to open an account for those without one. The students were motivated to create their own profile. The two social networking sites were used as a tool in education in the blended learning instruction. Twitter had- 142 or 76.34% response, while others such as tumbler, instagram, etc. had 60 or 32.26%. Lastly, LinkedIn had 34 or 18.28% response. The use of all social media increased in percentage after taking the course.

C. Social networking survey.

Table 3 Perceived Experiences and Learning of Students Using Social Networking

Statements	Weighted Mean	Interpretation
1.　I am satisfied with the course (Biological science subject).	3.88	Strongly agree
2.　Given the opportunity I would like to take another subject in the future that has both online and face-to face components.	3.92	Strongly agree

3. **This subject experience has improved my opportunity to access and use the class content/syllabus.**	3.59	Strongly agree
4. **The online and face-to face course components enhanced each other.**	3.03	Agree
5. **The Facebook site is well organized and easy to navigate.**	3.04	Agree
6. **The Edmodo site is well organized and easy to navigate.**	3.18	Agree
7. **The web resources in this subject are helpful.**	3.19	Agree
Compared to face-to-face learning, using social networking sites as a supplement in learning….		
8. **I am more engaged in this subject.**	3.04	Agree
9. **I am likely to ask questions in this subject.**	3.06	Agree
10. **I feel that the amount of interaction with other students in this subject increased.**	3.04	Agree
11. **I feel that the quality of my interaction with other students in this subject was better.**	3.03	Agree
12. **I feel connected with other students in this subject.**	2.98	Agree
13. **I feel isolated in this subject.**	1.95	Disagree
14. **I feel that the amount of interaction with my teacher in this subject increased.**	3.05	Agree
15. **I feel that the quality of my interaction with my teacher in this subject was better.**	3.51	Strongly agree
16. **I am overwhelmed with information and resources in this subject.**	3.23	Agree
17. **I have trouble using the technologies in this subject.**	1.10	Strongly disagree
18. **I feel more anxious in this subject.**	1.11	Strongly disagree
19. **This subject required more time and effort.**	1.12	Strongly disagree
20. **This subject has improved my understanding of key concepts and contents.**	3.87	Strongly agree
21. **I am excited and become a self-directed individual.**	3.07	Agree
22. **I am motivated to succeed.**	3.13	Agree
23. **This subject help increased my knowledge.**	3.14	Agree
24. **This subject improves my performance**	3.03	Agree
25. **This subject enables me to learn effective.**	3.09	Agree

Better experience students. The findings showed that almost all the items were "strongly agreed" and "agreed" by respondents. Only items number 17, 18 and 19 were strongly disagreed. This means that they are familiar in using social networking sites. Even though online quizzes were given outside the classroom, students were not worried and had a positive attitude towards the subject. As mentioned earlier in the previous results, 7 items such as items number 1, 2, 3, 12, 13, 16 and 19 were used to seek the student's view on their experiences using social networking. A majority felt that they had a better experience when they used social networking sites. These were also experienced by the students in the York University study when Ostown and York (2012) made a survey on e-learning in a Business course.

Better engaged students. Twelve items, specifically items number 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 17 and 18, were used to determine the level of students' engagement in Biological Science course. The respondents had a positive attitude. They perceived that the combination of both traditional and online methods improved their educational outcomes because they had a better engagement in the subject/course. Similar results were gathered by Ostown and York (2012) and Imlawi (2013) in the research they conducted.

Enhance student learning. Items number 20, 21, 22, 23, 24 and 25 were used to determine the student's perception on improved learning. Results revealed that respondents agreed that the use of social media enhanced their learning experience. Similar results were collected by Murphy (2011) in his study. The application of social networking sites complements the traditional method, which enhanced the learning process of students indicating a positive effect on student knowledge acquisition.

D. Use of social media.

Table 4 Students' responses in the use of social media (%)

Purpose	Frequency	%[*]
A. research and study	177	95.16
B. entertainment	144	77.42
C. relationship	0	0
D. advertisement	11	5.91
Total respondents 186		

Note: The table 4 will not add up to 100 % as respondents were able to select more than one response.
[*] Percentage rounded to the nearest hundredths decimal point.

In a multiple answer type question, students used social media (Q26) for different purposes, such as research and study (95.16%), entertainment (77.42%), and advertisement (5.91%). A majority of students used social networking in education.

For the hours they spent on the Internet (Q27), 12 students spent less than 2 hours (6.45%), 98 responded 2 hours (52.69%), 66 students responded that they used the Internet for 4 hours (35.48%), and 28 students spent 6 hours on the Internet (15.05%).

E. Course preference.

Table 5 Students response in course preference (%)

Purpose	Frequency	%
Q28 Course format preferred	A – 13; B – 171; C – 2	A 6.99; B 91.94; C 1.98
Q29 Lecture format preferred	A – 14; B – 6; C – 166	A 7.53; B 3.23; C 89.24
Q30 Best learning format	A – 13; B – 5; C – 168	A 6.99; B 2.69; C 90.32
	Total respondents 186	

When students were asked to choose their most preferred course format (Q28), the majority chose a blended course (meaning some face-to-face activities are replaced with online

activities), with a 91.94%. Surprisingly, a majority preferred the combination of online and face-to-face format for discussions (Q29, 89.24%). Students answered Q30 favoring blended learning as a course format because this gave the best learning experiences (90.32%).

Discussion

The use of social networking applications, as mentioned by Nobles (2011), focuses on what today's learner needs in order to be a self-directed and able to access relevant, current information using technology that allows global access to resources (p. 2-3).

The application of Facebook in Higher Education is an effective medium in teaching and learning undertakings, as mentioned by Harris (2012) in the research he conducted. Similarly, the use of Edmodo as a platform in education helps the student to be actively engaged in the subject matter. The creation of groups and interactions among students helps them to easily access the syllabus and communication becomes faster, leading to a better engaged and better learning experiences.

On the other hand, using Edmodo as a platform encourages the student to be actively engaged in learning. This was also similar to Sanders's (2012) findings, proving that academic networking sites such as Edmodo were an effective tool in encouraging student engagement. Majid (2011) revealed in the survey he conducted that most students find the Edmodo site as very helpful and useful with more than 77% of the population that answered. The use of Edmodo as an educational platform was effective means in practicing the principles of responsible learning. This was similar to Sanders's (2012) results when he evaluated the use of Edmodo as a teaching strategy and employed the technology in class. Majid (2011) also mentioned that the use of social networking improves English learning as perceived by the students at the Telecom Polythechnic.

In the study conducted by Imlawi (2013), he proposed "an engagement model that support[ed] [the] use of course-based online social networks for engaging student[s], and hence, improving their educational outcomes". His research demonstrated that "instructors who create[d] course-based online social networks to communicate with students can increase the student engagement in these online social networks". In particular, he used Facebook as a platform, which is similar with the current study. His findings supported the results of the research presented in this paper regarding and increase in student perceived educational outcomes.

In parallel with other survey studies conducted (Mortera-Gutierrez, 2006; Poon, 2012; Nellman, 2008; Edginton & Holbrook, 2010; Fearon, Starr, & McLaughlin, 2011; Murphy, 2011; and Zhang & Han, 2012), the findings of this study indicated that blended learning is becoming a popular delivery method. Although blended learning has not yet replaced traditional classroom training, the results of this study clearly indicate that blended learning has become increasingly popular due to its beneficial effect. Moreover, the students were more engaged using social networking sites resulting to a better learning and experience.

Amaral and Shank (2010), in an article about how to enhance student learning and retention with blended learning class guides, indicated that "the technological enhancements in the redesigned hybrid course raised the students' course grades to almost passing in the fall semesters and to passing grades in the spring semesters". For Amaral and Shank, "[t]he blended learning class guides provide[d] more than a detailed syllabus or simple online study guide" (2010). According to their results, blended learning could help "lower-level,

general education chemistry students in better understanding course content, which has led to improved student test scores and course retention" (2010). Similarly, blended learning in a general education course like Biological Science, as perceived by the students in New Era University and Rizal technological University, provided better key understanding and learning on the course content.

Conclusions and Recommendations

Conclusions

From the findings of the study, the researchers arrived at the following conclusions:

1. The demographic profile of students who took the Biological Sciences Course has an age range from 16-20 years old, all single in civil status. The majority was female (70.97%), as male students were only 29.03%. Students from undergraduate programs such as Mass Communication (19.35%), Psychology, (1.75%) and Political Science (1.61%) were respondents from the College of Arts and Sciences, New Era University. Students from undergraduate programs such as Financial Management (28.49%) and Office Management (26.34%) were respondents from the College of Business Education and Technology, Rizal Technological University.

2. The majority of students "strongly agreed" and "agreed" with almost 100% equivalent on a better experience on the use of social networking based on the surveyed item Q2, Q3, Q12, Q13, Q16. In Q19 students strongly disagreed with 94.62 %.

3. The majority of students "strongly agreed" and "agreed" that they had better engagement using social networks that influenced their learning, especially when delivered in a blended format.

4. Students perceived the use of a social networking platform as the mechanism through which Biological Science subject is taught as "very essential"; as a matter of fact, usage increased after taking the course.

5. Students in Biological Sciences perceived improved learning when social networks were combined using blended instruction with 100% "strongly agreed" and "agreed" response.

6. The findings were used in developing and designing a blended format syllabus and blended learning guidelines.

Proposed syllabus of Biological Science in a blended format following the study's conclusion. A class guide or syllabus was designed to serve as a pre-class study guide to lead students through a series of key points, activities, and graded assignments (which helped motivate their usage of the resource) to help better prepare them for each class session.

The syllabus contained content that highlights critical information in each of the textbook chapters, as well as a variety of references to help students decipher difficult concepts in the book. These included learning objectives, specific topic, and outcomes based methodology, number of hours in face-to-face and online environment.

Recommendations

From the conclusions of the study, the following recommendations are suggested:

1. Other courses and different schools should be studied and surveyed to determine the use of social media in enhancing students learning.
2. The motivational factors and perceived satisfaction of students should be further studied in a more organized way.
3. A study on the academic performance of students in relation to the use of social media should be carried out to establish a program that will enhance student learning.
4. Other social networking sites, such as Ning and Moodle, should be considered to create a community of learning that combines the best aspects of both face-to-face and online instruction.

References

Amaral, K. E., & Shank, J. D. (2010, December 15). Enhancing student learning and retention with blended learning class guides. *EDUCAUSE Review Online*. Retrieved from http://www.educause.edu/ero

Bosch, T. E. (2009). Using online social networking for teaching and learning: Facebook use at the University of Cape Town. *Communicatio: South African Journal for Communication Theory and Research, 35*(2), 185-200. doi:10.1080/02500160903250648

Edmodo. (2010, February 2). Edmodo, microblogging platform for educators, merges with Revolution Learning's Fusion Project [Press release]. Retrieved from http://www.bizjournals.com/prnewswire/press_releases

Edmodo. (2013, March 5). Edmodo Acquires Education Technology Start-up Root-1 [Blog post]. Retrieved from https://blog.edmodo.com

Fearon, C., Starr, S., & McLaughlin, H. (2011). Value of blended learning in university and the workplace: Some experiences of university students. *Industrial and Commercial Training, 43*(7), 446-450.

Gomez, S., Anderson, H., Park, J., Maw, S., Crook, A., & Orsmond, P. (2013). A digital ecosystems model of assessment feedback on student learning. *Higher Education Studies 3*(2), 41-51. Retrieved from ProQuest Education Journals database (Document ID: 1348705732)

Gutschmidt, A. M. (2012). *A case study investigating the use of facebook as a learning management system in higher education.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (AAT 3538269).

Harris, C. W. (2012). The uses of facebook© technologies in hospitality curriculum on an experiential learning platform for a new generation of students. *Asia Pacific Journal of Marketing and Logistics, 24*(5), 805-825. doi:http://dx.doi.org/10.1108/13555851211278385

Imlawi, J. M. (2013). Improving student engagement using coursed-based social networks [Abstract]. (Doctoral dissertation). Retrieved from Auraria Library Digital Collections database. (ark: 13960/t6pz6sz71)

Majid, A. N. (2011). The use of information technology in teaching English: An attempt to develop student-centered learning at Telkom Polytechnic. In *Prosiding Konferensi Nasional ICT-M Polytechnic Telkom (KNIP)* [Proceedings of the ICT-M Polytechnic Telkom National Conference]. Retrieved from http://openjurnal.politekniktelkom.ac.id/

Marsh, G. E., McFadden, A. C., & Price, B. J. (2003). Blended instruction: Adapting conventional instruction for large classes. *Online Journal of Distance Learning Administration, 6(4).*

Mirabolghasemi, M., & Lahad, N. A. (2013). Social network intervention for the enhancement of students' social presence in relation to satisfaction and perceived learning. *International Journal of Web Based Communities, 9*(2), 233-242. doi:10.1504/IJWBC.2013.053246

Mortera-Gutierrez, F. J. (2006). Faculty best practices using blended learning in E-learning and face-to-face instruction. *International Journal on E-Learning, 5*(3), 313-337. Retrieved from ProQuest Education Journals database (Document ID: 210334991)

Murphy, C. (2011). *An analysis comparing student knowledge acquisition in a traditional face-to-face classroom to a hybrid course.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (AAT 3504114).

Nellman, S. W. (2008). *A formative evaluation of a high school blended learning biology course.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (AAT 3325075).

Nobles, G. J. (2011). *Social networking: Indicators that connect instruction and learning in online courses.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (AAT 3465888).

Owston, R., & York, D. (July, 2012). *Evaluation of blended learning course in the Faculty of Liberal Arts and Professional Studies and the Faculty of Health-Winter Session* (Technical Report No. 2012-3). Toronto, ON: Institute for Research on Learning Technologies.

Perryman, B. E. (2011). *Use of social networking as an instructional aide in higher education.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (AAT 3460068).

Poon, J. (2012). Use of blended learning to enhance the student learning experience and engagement in property education. *Property Management, 30*(2), 129-156. doi:http://dx.doi.org/10.1108/02637471211 213398

Prasad, E., & Prasad, R. (2012). Social media in teaching and learning. *International Journal of Computer Science and Communication Engineering, ICETIE-2012* [Special issue], 10-13.

Ravenscroft, A*.,* Warburton*,* S., Hatzipanagos, S., & Conole, G. (2012). Designing and evaluating social media for learning: Shaping social networking into social learning. *Journal of Computer Assisted Learning, 28*(3), 177-182. doi: 10.1111/j.1365-2729.2012.00484.x

Sanders, K. S. (2012). *An examination of the academic networking site Edmodo on student engagement and responsible learning.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (AAT 3523217).

Veletsianos, G., & Navarrete, C. C. (2012). Online social networks as formal learning environments: Learner experiences and activities. *The International Review of Research in Open and Distance Learning, 13*(1), 144-166*.* Retrieved from http://www.irrodl.org

Zhang, W., & Han, C. (2012). A case study of the application of a blended learning approach to web-based college english teaching platform in a medical university in eastern china. *Theory and Practice in Language Studies, 2*(9), 1961-1970. Retrieved from ProQuest Research Library database. (Document ID: 1330861369).

Zuckerberg, M. (2009, September 15). 300 million and on [Blog post]. Retrieved from http://www.facebook.com/notes/facebook/3 00-million-and-on/136782277130