

Facebook in the University Classroom: Do Students Perceive that it Enhances Community of Practice and Sense of Community?

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Abstract

Facebook is growing in popularity as an academic application. With over one billion people accessing it globally, it continues to flourish as a social networking media. Educators wanting to enhance the natural learning environment of their classrooms are finding that Facebook is a beneficial supplement. This study aims to determine the attitudes and perceptions of students participating in Facebook-enhanced higher education courses. In a post-test only research design involving 106 students enrolled in four courses at two large public universities in California and Indiana, USA, it was found that students were favorably disposed toward the classroom use of Facebook. They perceived that it enhanced their sense of social learning, with older students experiencing a stronger effect. To a lesser extent it also enhanced their sense of connectedness. Additionally, students perceived that Facebook facilitated their communities of practice (CoP) in terms of knowledge sharing, collaboration, and learner-centered activities. Implications for course design, classroom management and future research are discussed.

Keywords: Facebook in higher education, Communities of practice, Sense of community, Learner-centered activities, Instructional design

1. Introduction

An increasing number of educational researchers and practitioners believe that Web 2.0 technology has tremendous potential to influence the way people learn (Ractham, Kaewkitipong, & Firpo, 2012; Bosch, 2009). Capitalizing on the social aspect of this technology can potentially create an optimal environment for learning (Hung & Yuen, 2010). Faculty members predisposed to using technology in their classrooms (Crook, 2008) have a strong interest in integrating social media, wikis, blogs, YouTube, and virtual social worlds into the learning process (Grosseck & Holotescu, 2009; Schroeder, Minocha, & Schneider, 2010). This may explain in part why Facebook has worked its way into university course delivery. According to the Higher Education Research Institute (HERI, 2007), 94% of university freshmen use at least one form of social networking media. Indeed, social media such as Facebook represents an important aspect of student life style (Matney & Borland, 2009; Jones & Fox, 2009). Widespread use of Facebook by students is well documented.

The academic use of Facebook for course-related purposes is rapidly increasing among college faculty (Junco, 2011). Some educators, however, are reluctant to acknowledge Facebook as a learning tool (Moran, Seaman, & Tinti-Kane, 2011; Roblyer, McDaniel, Webb, Herman, & Witty, 2010). Research by Kirschner and Karpinski (2010) shows that Facebook users have lower grade point averages and study fewer hours per week compared to non-users. In sum, it seems reasonable to suggest that Facebook is a promising though imperfect instructional tool with the potential to augment the formation of communities of practice that may impact students' sense of learning and sense of connectedness.

Facebook and other forms of social networking media are transforming education and the way many subjects are taught. Social media encourage contributions from everyone who is interested, so anyone can create, edit or share information. In contrast to traditional one-way media (e.g. television), social media are two-way conversations in which control is decentralized and open to masses of users (Barczyk & Duncan, 2012). This has led to faculty members becoming less the authoritative deliverers of knowledge and more the facilitators of exploration and collaboration in pursuit of answers, opportunities and solutions to problems.

This study examines the use of Facebook as a supplement to face to face courses taught in higher education. It focuses on the impact of Facebook in developing a community of practice (CoP) and how it affects students' sense of classroom community. Following this introduction, the paper is organized into four main sections. The first presents four research questions that are developed in the context of a literature review. The second describes the methodology used to examine the research questions. The third summarizes the results. The fourth section discusses the survey findings and presents implications for teaching and research.

2. Review of the Literature and Formation of Four Research Questions

2.1 Community of Practice

Researchers have found that one of Facebook's strengths may be its ability to enhance classroom community and help students to get to know one another and share information in a supportive environment (Hurt, Moss, Bradley, et al, 2012). They suggest that future research investigate how specific features of Facebook facilitate community building.

A study at the University of Cape Town analyzed the content of 150 randomly selected Facebook profiles of students (Bosch, 2009). Qualitative interviews were also conducted with 50 students and 5 lecturers. The study revealed that college students preferred holding discussions using Facebook rather than by using the university's course management system. Facebook made it easier to combine teaching and learning with social interaction. In addition, students indicated that Facebook provided instant access to lecturers and tutors in an informal environment.

A number of studies have shown that teaching, cognitive, and social factors are related to the nurturing of students' sense of classroom community (Garrison, Anderson, & Archer, 2000; Shea, 2006; Shea & Bidjerano, 2008). Summers and Svinicki (2007) specifically examined the relationship between students' perceptions of motivation and classroom community. They found that students in cooperative learning classrooms had a greater motivation to achieve goals and a higher sense of community than those in non-cooperative learning classrooms. As such, a classroom CoP affected students' sense of community. These findings confirm Rovai's (2002b) belief that when learners "feel a sense of community, it is possible that this emotional connectedness may provide the support needed for them not only to complete successfully a class or a program, but also to learn more" (p. 321).

Based on these studies about the impact of social media on learning communities, we seek to further explore this issue and propose the first research question:

What are student's perceptions of the community of practice that evolves in Facebook-enhanced courses?

2.2 Sense of Classroom Community

Relatively few studies have researched the potential of web-based technologies to build classroom communities that engage students in higher education (Hurt, Moss, Bradley, et al (2012). According to Rovai (2002b), a *classroom community* is a "feeling that members have of belonging, a feeling that members matter to one another and to the group, that they have duties and obligations to each other and to the school, and that they possess shared expectations that members' educational needs will be met through their commitment to shared learning goals" (p. 322). Rovai (2002b) contends that classroom community consists of two factors. The first is *connectedness*, which is "the feeling of belonging and acceptance and the creation of bonding relationships" (p. 322). The second is *learning*, which is "the feeling that knowledge and meaning are actively constructed within the community, that the community enhances the acquisition of knowledge and understanding, and that the learning needs of its members are being satisfied" (p. 322). A strong classroom community demonstrates characteristics such as shared common interests, active engagement in two-way communications, and trusting and helping other members (Rovai, 2002b).

It is important that future research investigate how Facebook features specifically help to build classroom community. In their study of 107 students that compared attitudes and perceived learning between Facebook and eLearning Commons (a Blackboard Learning Management System tool), it was found that (1) as a supplement to the classroom, Facebook was preferred over eLearning Commons; many of the students were already familiar with Facebook, used it frequently and found it easy to navigate; (2) Facebook users felt like valued participants and learned more course material; (3) Facebook users reported that they became more acquainted with their classmates; and (4) if used appropriately, Facebook may increase student engagement by cultivating classroom community and stimulating intellectual discourse (Hurt, Moss, Bradley, et al 2012).

These findings show that Facebook can be used effectively for academic discussions. de Villiers (2010) studied the potential of Facebook group and discussion facilities for focused academic use. In a study of 35 postgraduate distance-learning students who joined an optional Facebook group to discuss academic content, it was found that learning and perceptions were enhanced by participating in the discussions, which involved items designed to reach beyond the assigned study materials and make personal contributions.

Ractham, Kaewkitipong and Firpo (2012) used Facebook as a learning tool in an introductory management information systems course to develop an enhanced learning environment that fostered communication and collaboration. Seventy five students participated in their study, which resulted in 55 completed, usable questionnaires. It was found that 55% of the students felt that Facebook helped them in learning. Even more, 78% felt that Facebook was a useful supplemental learning tool. Among the lessons learned by Ractham and his team were that Facebook usage in the classroom is time consuming for instructors, yet it is important to communicate frequently with students in order to maintain a high level of interest and activity in the overall learning environment. They also learned that the Facebook effect was partially dependent on the instructor's skills, personal characteristics and willingness to commit the time needed. In spite of more focus on learner centeredness, faculty members need to provide structure.

Based on these studies indicating that students had favorable attitudes toward social media-enhanced courses, we propose the second research question:

What are student's perceptions of the sense of classroom community that evolves in Facebook-enhanced courses?

2.3 Age, Gender, and Prior Online Experience

We contemplate that there may be differences in students' responsiveness to the community of practice established in classrooms and sense of community involving the integration of Facebook into their university courses. It may be students' perceptions are influenced by their age, gender or prior online experience. Because younger students are more familiar with the Internet and Web 2.0 technologies (Zickuhr & Madden, 2012; Greenhow, Robelia, & Hughes, 2009), they may be more receptive to accepting and benefiting from the use of Facebook in their classroom communities. Similarly, female students, more so than males, may be more socially oriented (Dindia & Allen, 1992) and find that Facebook gives them greater opportunities for engagement in their academic pursuits, i.e., opportunities to make connections and share information (Goudreau, 2000). It may also be that age and gender affect students' sense of community, which impacts perceptions of learning and connectedness. The proposed study is exploratory, but the basis for an age and gender effect is rooted in the organizational behavior and gender studies literature on individual differences.

In a study on sense of classroom community and learning style preference involving 616 rural community college students in the United States, Smith (2008) found limited gender and age effects. He noted that females had a higher perception of their sense of learning using the Classroom Sense of Community scale, an instrument validated by Rovai (2002a and 2003). But he noted a lack of female proclivity for sense of connectedness, and no differences in learning or connectedness based on prior experience with online education or ethnicity. Smith (2008) also found that non-traditional age students (age 26 or more) had a higher sense of learning than traditional age students (age 18-25).

Smith's (2008) findings related to gender appear to be somewhat contrary to an earlier study by Rovai (2001) who surveyed students in a community cohort of 20 adult learners. He found that female students manifested a stronger sense of classroom community than male students.

Females had a higher proclivity for high levels of community in online communication, which was more supportive and helpful in tone than the impersonal and assertive dialogue of male students.

In terms of connectedness, Rovai (2002b) found a gender difference in the sense of community of 316 computer mediated learners. Females had higher scores on connectedness with instructors and fellow students. In terms of learning, Rovai and Baker (2005) also found a gender effect in which female students scored higher than males on perceived learning.

In terms of prior online experience, Muilenburg and Berge (2005) found that students who have had success with all of their prior online courses have fairly high success in future online courses, while students who have had mixed successes and non-successes in the past have distinctly lower future success rates. Arbaugh and Hornik (2006) suggest that students have to deal with content differences in every course for which they enroll. Therefore, the primary transferable knowledge students bring to subsequent courses “is their knowledge of the technology and interaction with others” (p. 13). Even more to the point is a study by Hachey, Wladis and Conway (2012) involving 962 students in 258 course sections offered by an east coast community college. These researchers found a strongly significant correlation between prior online course experience and future online course success. They argue that when students have at least one successful online course experience, learning barriers decrease.

Based on these studies, we propose the third research question:

How do age, gender, and prior online experience affect the community of practice and sense of classroom community that evolve in Facebook-enhanced courses?

2.4 Overall Perceptions

Facebook has the potential to become an exciting instructional tool given its popularity and students’ familiarity with its site. In fact, it has the potential to influence students in the United States and worldwide. Because 81% of Facebook’s one billion users live outside the United States and Canada (Facebook, 2012), it represents a global, engaging information-sharing mechanism that can facilitate intercultural dialogue and critical thinking (Maher & Hoon, 2008). Research suggests that Facebook’s focus on peer-to-peer interactions enhances informal learning (Goodwin, Kennedy, & Vetere, 2010; Madge, Meek, Wellens, & Hooley, 2009; Selwyn, 2009). Studies have also shown that students have effectively used Facebook for learning and activism (Bosch, 2009; Grosseck, Bran, & Tiru, 2011).

Thus, we propose the fourth research question:

What are students’ overall perceptions of Facebook-enhanced courses?

3. Methodology

3.1 Description of a Facebook-Enhanced Course

Students at two universities in California and Indiana were encouraged to voluntarily participate in the Facebook component of four different business courses offered during two academic terms. The courses were accounting, business law, human resource management, and organizational staffing. While the subject matter in these courses was different, the classroom style and teaching philosophy of the instructors were consistent and similar. Both used a participative, student-focused, collaborative approach to learning. Thus, course design and instructor differences were minimized. Only students registered for the course were allowed to access the Facebook group page. This protected privacy and provided an environment conducive to postings and the general use of Facebook. What follows is a description of how Facebook was integrated into the instructional design of the courses in order to create a community of practice (CoP). All four courses used Blackboard as its official course management system and Facebook was employed as an instructional supplement.

Students were assigned a term project in their respective courses and worked in teams, usually comprised of four members. The project was required but incorporating Facebook use into the project was optional. Teams using Facebook held virtual meetings, posted YouTube links and research findings relevant to the team project and commented on one another’s works. Initially some students were quite unfamiliar with social media technology, but the CoP evolved as they became more comfortable with using Facebook. Some students needed reassurance that their postings were private and would only be viewed by members of the class, i.e., participants in the CoP.

They also needed reassurance as to the security of the information posted, because while they had no objections to sharing thoughts and opinions in a classroom CoP, they did not want those ideas revealed to employers, outsiders, or even Facebook “friends.”

It appeared that Facebook, more so than BlackBoard, facilitated student interactions and had an overall positive influence on their sense of learning and connectedness. Students in some teams used Facebook for other course work and discussions, even beyond their assigned term projects. Students’ interactions and engagement exceeded the expectations of their course instructors and involved online activities beyond their scheduled class meeting times.

Students who participated in the four Facebook-enhanced courses were encouraged to complete a paper-based questionnaire, which was designed to assess their course experiences.

3.2 The Questionnaire

The questionnaire consisted of 52 closed and open-ended items, which related to students’ use of technology, perceptions of their classrooms, sense of community associated with the pedagogical use of Facebook in their courses, and demographics. To assess sense of community, a series of items from Rovai’s (2002a) Classroom Community Scale (CCS) was adopted. Ten items that have been validated and used in other studies (Hung & Yuen, 2010; Black, Dawson, & Priem, 2008; Rovai, 2002a, 2003) were used to measure students’ feelings of learning-oriented behaviors and their feelings of connectedness. Students responded to these items using a five-point Likert scale where 1 represented strong disagreement and 5 represented strong agreement. Some items were reversed scored using a five-point Likert scale where 1 represented strong agreement and 5 represented strong disagreement. The analysis was designed so that higher scores on the 10 sense of community items reflected stronger senses of learning and connectedness.

To assess students’ perceptions of the Cop created by the integration of Facebook into the instructional design of the courses studied, a question containing eight sub-items was adapted from a study by Hung and Yuen (2010). The questions assessed the extent to which the Facebook-enhanced course facilitated (1) knowledge sharing, (2) collaboration and interaction, and (3) learner centered activities. Students responded to these items with a Likert scale where 1 represented strong disagreement and 5 represented strong agreement. The questionnaire was administered in a paper-and-pencil format.

3.3 Survey Participants

Respondents to the survey included 106 students from four face-to-face business courses at two public universities situated in California and Indiana, USA. There were a total of 158 registrants in the courses taught by the authors of this paper. Students in the Facebook-enhanced courses voluntarily participated in the survey, which was approved by the universities’ Institutional Review Board. They completed the questionnaire anonymously and were assured that participation in the survey would not affect their course grade.

3.4 Procedure

During the last week of classes, students in the four courses that integrated Facebook into their instructional design were surveyed. Each received a paper questionnaire, was informed that participation in the survey was voluntary, and that all data collected would be maintained anonymously. The questionnaire assessed students’ perception of their Facebook experience in terms of the social media’s ability to create a CoP and facilitate a sense of classroom community, which would measure social learning and feelings of connectedness. Students completed the questionnaire in approximately 12 minutes. Of the 158 total students, 52 were either absent from class or chose not to participate in the survey because they elected not to join Facebook.

4. Results

4.1 Characteristics of the Survey Respondents

There were 158 students enrolled in the four courses analyzed in this study, of which 106 completed the survey questionnaire. This represents a 67% response rate. A total of 49 (48.2%) females and 56 (52.8%) males completed the survey. One respondent failed to indicate gender. The data on age were aggregated into two groups: respondents that were between 18 and 25 years of age and those that were more than 25 years of age. Fifty five respondents (51.8%) were 18-25 years old and 51 (48.1%) were 26 or more years old.

The majority of respondents ($N=82$) had previous online education experience (77.4%). Also, a majority ($N=88$) were full-time students (83.0%). In terms of class level, the majority (91.6%) was upper division students, and a small minority (8.4%) was lower division undergraduate students.

4.2 Analysis of Four Research Questions

4.2.1 Research Question 1

This question aimed to determine students' perceptions of the CoP that evolved in their Facebook-enhanced course. The CoP was assessed using questions that focused on students' perceptions of knowledge sharing, collaboration, and learner-centered activities. These data are summarized in Table 1.

Table 1: Percentage of students indicating agreement and means for items measuring community of practice

Item [#]	P [^]	M [*]	SD
<i>Knowledge Sharing</i>			
Social networking site allows me to share my personal interests	47	3.27	0.95
Social networking site allows me to find and share educational resources	66	3.70	0.86
Social networking site promotes knowledge sharing	74	3.82	0.81
<i>Collaboration and Interaction</i>			
Social networking site allows me to hold forums to discuss topics of interest	67	3.71	0.80
Social networking site allows me to communicate with classmates	78	3.96	0.81
Social networking site provides collaborative learning opportunities	66	3.70	0.84
<i>Learner-Centered Activities</i>			
Social networking site allows me to personalize pages to express individuality and creativity	44	3.25	0.91
Social networking site encourages learner-centered activities	56	3.56	0.77

[#] Items measured using a 5-point Likert scale where 1 = strongly disagree and 5 = strongly agree

[^]Percentages of respondents who agreed or strongly agreed with this item

^{*} $N = 106$

It is apparent that Facebook had the greatest effect on students' ability to collaborate and interact with one another. The percentage of students agreeing or strongly agreeing with the items on collaboration was the highest category of questions designed to assess the impact of Facebook on a classroom CoP. Students overwhelmingly agreed that Facebook allowed them to communicate with classmates (78%) and allowed them to hold forums to discuss topics of interest (67%). Knowledge sharing was the second highest category of questions assessing the Facebook effect on CoP. Students agreed that Facebook promoted knowledge sharing (74%) and allowed them to find educational resources (66%). These data indicate that when Facebook was incorporated into the instructional design of a course, it facilitated the perception that a CoP developed, which impacted learning.

4.2.2 Research Question 2

This question aimed to determine how Facebook-enhanced courses affected students' sense of classroom community. It focused on assessing students' sense of learning and sense of connectedness.

The data, summarized in Table 2, indicate that students perceived that Facebook facilitated a greater impact on learning than on connectedness. The percentage of students agreeing or strongly agreeing with the five items related to sense of learning was substantially higher than the percentage of students agreeing with the five items related to sense of connectedness. Of note is that an overwhelming majority of students agreed that in their Facebook-enhanced course it was not hard to get help with questions (80%), they experienced a desire to learn (77%), and believed that their educational needs were met (75%). Students agreed much less on the five items measuring sense of connectedness, except on a single item related to the perception that they did not feel isolated in their Facebook-enhanced course (70%). The other four items in the sense of connectedness category had percentages of student agreement that ranged between 26 and 49 percent.

Table 2: Percentage of students indicating agreement and means for items measuring sense of classroom community

Item #	P^{\wedge}	M^*	SD
Sense of Connectedness			
Students in course cared about each other	42	3.27	0.91
This course is like a family	26	2.82	1.11
I do not feel isolated in this course +	70	3.91	0.94
I can rely on others in this course	38	3.11	1.04
Others will support me in this course	49	3.45	0.86
Sense of Learning			
I am encouraged to ask questions	74	3.89	0.88
Is not hard to get help with questions +	80	4.02	0.94
My educational needs are being met +	75	3.98	0.92
I am given ample opportunities to learn	71	3.81	0.76
Course promotes a desire to learn	77	4.08	0.89

Items rated on a five-point Likert scale where 1 = strongly disagree and 5 = strongly agree

\wedge Percentage that agreed or strongly agreed with each item

* $N = 105$

4.2.3 Research Question 3

This question aimed to determine whether the demographic variables of age, gender, and prior online experience affected the CoP and sense of classroom community in Facebook-enhanced courses. In terms of CoP, there were no significant effects for gender or prior online course experience. However, there was a weak age effect on CoP. Table 3 summarizes the data for two respondent age groups – students age 25 or less and those over age 25 – on eight items measuring CoP. In general, there were no differences between younger and older students in their perceptions of the CoP in their Facebook-enhanced courses. However, on a single item related to the assertion that Facebook allowed students to communicate with classmates, there was a statistically significant difference in the mean score for students over age 25 ($\chi = 4.14$) as compared to students under age 25 ($\chi = 3.82$) ($t = 1.98$, $df = 97$, $p < .05$).

Table 3: Means for items measuring community of practice and t-tests for students in two age groups

Item [#]	<i>M</i> ^α	<i>SD</i>	<i>M</i> ^β	<i>SD</i>	<i>df</i>	<i>t</i>
<i>Knowledge Sharing</i>						
Social networking site allows me to share my personal interests	3.35	.93	3.18	.98	98	0.88
Social networking site allows me to find and share educational resources	3.80	.73	3.57	1.00	77	1.29
Social networking site promotes knowledge sharing	3.73	.73	3.93	.89	98	-1.27
<i>Collaboration and Interaction</i>						
Social networking site allows me to hold forums to discuss topics of interest	3.67	.77	3.76	.85	99	-0.55
Social networking site allows me to communicate with classmates	3.82	.82	4.14	.77	97	-1.98 *
Social networking site provides collaborative learning opportunities	3.67	.75	3.73	.94	98	-0.36
<i>Learner-Centered Activities</i>						
Social networking site allows me to personalize pages to express individuality and creativity	3.18	.86	3.33	.98	98	-0.82
Social networking site encourages learner-centered activities	3.58	.71	3.53	.84	98	0.31

[#] Items measured using a 5-point Likert scale where 1 = strongly disagree and 5 = strongly agree

^α Mean for group of students age 25 or less

^β Mean for group of students over age 25

* $p < .05$

In terms of sense of classroom community, there were no effects for gender or prior online course experience. There were significant effects for age on students' sense of learning. Table 4 summarizes the data for two respondent age groups – students age 25 or less and those over age 25 – on five items measuring sense of learning. There were statistically significant differences between the means for students age 25 or less and those over age 25 on all five items that assessed their sense of learning. Those that were over 25 had mean scores that were significantly higher compared to those students that were 25 years of age or less.

There was a less pronounced effect for age on students' sense of connectedness. Only one item measuring whether students felt that they were not isolated in the course was statistically significant for age. Students who were more than 25 years of age had a higher mean rating ($\chi = 4.14$) compared to those who were 25 years of age or less ($\chi = 3.71$) ($t = 2.39$, $df = 103$, $p < .05$). There were no significant differences based on age in the mean ratings for the remaining four items that measured students' sense of connectedness.

Table 4: Means for items measuring sense of classroom community and t-tests for students in two age groups

Item #	M^{α}	SD	M^{β}	SD	df	t
Sense of Connectedness						
Students in this course care about each other	3.24	0.86	3.30	0.97	103	0.36
This course is like a family	2.76	1.12	2.88	1.10	103	0.54
I do not feel isolated in this course +	3.71	0.90	4.14	0.95	103	2.39*
I can rely on others in this course	3.16	0.92	3.06	1.17	103	0.51
Others will support me in this course	3.35	0.84	3.57	0.88	104	1.34
Sense of Learning						
I am encouraged to ask questions	3.56	0.94	4.24	0.66	103	4.24***
Is not hard to get help when I have a question +	3.76	1.00	4.30	0.79	103	3.03**
My educational needs are being met +	3.70	0.92	4.28	0.83	102	3.33**
I am given ample opportunities to learn	3.64	0.78	4.00	0.70	103	2.51*
Course promotes a design to learn +	3.89	0.83	4.29	0.91	102	2.31*

Items measured using a 5-point Likert scale where 1 = strongly disagree and 5 = strongly agree

$^{\alpha}$ Mean for group of students age 25 or less

$^{\beta}$ Mean for group of students over age 25

* $p < .05$; ** $p < .01$; *** $p < .001$

4.2.4 Research Question 4

This question aimed to determine students' overall perceptions of Facebook-enhanced courses. Twelve items that measured students' attitudes and perceptions were analyzed to determine the extent to which students agreed or strongly agreed with each of them. Table 5, organized in descending order of agreement, summarizes the data for the twelve items. In general, students had positive attitudes toward their Facebook-enhanced courses. They agreed or strongly agreed that Facebook enabled them to acquire personal or professional growth (76%), enhanced their experience of participation (74%), was convenient for classroom discussions (65%), enabled them to feel more connected to fellow students (54%), and resulted in a very positive course experience (54%). Students also agreed that Facebook was well integrated into their course (51%).

Students were less positive about Facebook's value in their courses that already used Blackboard, the university's official course management system. Only 37% of the students agreed or strongly agreed that they preferred using Facebook over Blackboard and 31% agreed that Facebook was more effective than Blackboard. It appears that while Facebook adds value to students' perceptions of learning, it has less value in courses that use it as a supplement, as contrasted with courses that use it exclusively.

Table 5: Percentage of students indicating agreement and means for items measuring perceptions of Facebook-enhanced courses

Item #	P^{\wedge}	M^*	SD
I acquired personal or professional growth using Facebook	76	3.84	0.87
Facebook enhanced my experience of participation in this course	74	3.87	0.74
Facebook for classroom discussions is very convenient	65	3.61	0.95
Overall experience using Facebook was very positive	54	3.59	0.76
I felt more connected to fellow students using Facebook	54	3.35	1.00
Facebook was well integrated into the course	51	3.40	0.91
Facebook enabled me to contact my instructor more often	44	3.23	1.13
Facebook should be introduced in more courses	43	3.25	0.96
Facebook improved the quality of my course	37	3.10	1.00
I preferred using Facebook over Blackboard	37	2.90	1.20
Facebook changed my overall view of the course	31	3.13	0.81
Facebook was more effective than Blackboard	31	2.84	1.14

Items rated on a five-point Likert scale where 1 = strongly disagree and 5 = strongly agree

\wedge Percentage that agreed or strongly agreed with each item

* $N = 106$

5. Discussion

5.1 Four Research Questions

This study aimed to determine whether Facebook-enhanced courses offered at the university level foster the development of communities of practice and enhance students' sense of classroom community. Four research questions were investigated. The first question focused on whether Facebook facilitated a learning-oriented CoP. It was concluded that incorporating Facebook into a course's instructional design fostered collaboration and interaction among students. This most likely is due to the nature of social networking and Web 2.0 technology. It was found that students were able to engage in discussion forums and communicate with classmates in their Facebook group. They were also able to find and share educational resources and to promote the dissemination of knowledge. Clearly Facebook helped create and foster a CoP that was conducive to teaching and learning. These results are consistent with Bosch's (2009) study revealing that students preferred having discussions using Facebook rather than another instructional technology because it was easier to combine teaching and learning with social interaction. They are also consistent with the findings of Hurt, Moss, Bradley, et al (2012) who found that when Facebook is properly integrated into a course, it enhances student engagement by cultivating a CoP that stimulates intellectual discourse.

The second research question examined whether Facebook-enhanced courses had an impact on students' sense of classroom community. It was found that Facebook had more impact on students' sense of learning than on their sense of connectedness.

This is interpreted as being consistent with the social nature of learning. Facebook encouraged students to ask questions and to get help with concepts related to the subject matter of their courses. It was also perceived as a mechanism that promoted a desire to learn. These findings are aligned with those of Ractham, Kaewkitipong, and Firpo (2012) who found that Facebook-connected students were able to engage in social interactions that created a constructivist learning atmosphere. This facilitated the development of social learning, made possible by enhanced communication and collaboration among students and instructor. In so doing, students are able to maintain a high level of interest in the subject matter, which facilitates learning.

The third research question examined whether demographic variables impacted the Facebook effect on students' perception of their CoP or sense of classroom community. Neither gender nor prior online course experience had an effect on perceptions of their CoP or sense of community. However, there was a significant age effect for students' perceptions of their sense of learning and a mild effect for CoP. Older students, i.e., those above 25 years of age, tended to view Facebook as an enhancement to their classroom instruction. These findings are interpreted as being consistent with the fact that older, returning students may see value in instructional technology that benefits their classroom environment, their ability to interact and collaborate, and ultimately their learning. Those aspects of education are correlated with career success, which may be more apparent for students above 25 than for their younger counterparts. Our results on the age-related effect in Facebook-enhanced courses is in alignment with research by Smith (2009) who found that non-traditional students who were 26 years old or more had a higher sense of learning than traditional age students who were between the ages of 18 and 25.

Our findings with respect to gender and prior online course experience run counter to the literature. Rovai (2001), for example, found that in general, female adult learners manifested a stronger sense of classroom community than male learners. It could be that the gender effect is attenuated with the introduction of social media, which enhances collaboration and interaction, and then levels the playing field between female and male students. This leveling may impact students' sense of classroom community and diminish the effect of gender in Facebook-enhanced courses.

The fourth research question explored students' reactions to courses using Facebook as a classroom supplement. Generally, the students involved in this study were favorably impressed with the use of social media in their courses. They perceived that Facebook facilitated professional or personal growth, was convenient to use, fostered student interaction, and enabled students to actively participate in their learning. These results are consistent with research showing that Facebook-enhanced courses facilitate critical thinking and dialogue (Maher & Hoon, 2008) and promote peer-to-peer interactions that enhance informal learning experiences (Goodwin, Kennedy & Vetere, 2010; Madge, et al, 2009). Some students seem to have had a more positive classroom experience when Facebook was used as an instructional supplement than with Blackboard alone. This was not the experience of the majority of students. It could be that having two instructional technologies operating simultaneously in a course creates additional work for students in that they must not only respond to issues in their Blackboard accounts, but also address the issues and questions that arise among students in their Facebook group. This could pose a time management and information overload problem for students.

5.2 Implications for Teaching

The results of this study indicate that Facebook facilitated students' sense of classroom community, especially their sense of learning. This was likely fostered by the favorable CoP that evolved in the courses that incorporated Facebook into their instructional design. Students experienced heightened levels of interaction and collaboration in their CoPs that apparently cultivated intellectual discourse and learning. When university level students have strong feelings of community, they are more likely to be engaged (Junco, 2012) and to persist in their studies (Rovai, 2002b) compared to students who feel alone or alienated. Using Facebook in the instructional design of a course appears to enhance students' perceptions of their CoP and sense of classroom community, which may impact on learning and engagement, and possibly on retention. These are coveted outcomes in higher education.

Another implication of this study is that Facebook allows students to interact and collaborate beyond their classrooms. While not specifically measured, it was noted that most students' posts in their Facebook CoP occurred outside of their scheduled class meeting times. It is believed that this enhances participation in course-related discussion and ultimately, learning. Instructors in higher education should consider using Facebook as an instructional technology that creates a positive learning community.

They should also consider students' work load and avoid adding supplemental classroom technologies that require additional time or result in information overload. Instructors are advised to develop a strategic instructional plan and a structured process for sharing information and managing interactions. A final implication of this study is that instructors should make a concerted attempt to limit outsider access to group pages so as to protect students' need for privacy and information security. Only members of the CoP, i.e., officially registered students in their courses, as opposed to outsiders or everyone established as a Facebook "friend" should have accessibility to group Facebook pages.

It is thought that instructors should use prudence when enhancing their courses with Facebook or other social media. The instructional efficacy of Web 2.0 technologies is still being explored, so instructors should approach integrating social media into their courses with guarded enthusiasm.

5.3 Implications for Further Research

This study shed some light on the use of Facebook as an instructional technology to facilitate the creation and maintenance of a CoP that impacted students' learning experience. The precise mechanisms by which it facilitates knowledge sharing and collaborative activities are not well understood. Additional research should focus on explaining the processes by which Facebook contributes to the development of a learning-centered CoP.

This study also found that Facebook-enhanced courses contributed to students' sense of learning, and to a lesser extent, their sense of connectedness. These are perceptual findings based on self-reported data. Future research should go beyond these subjective measures of attitudes and perceptions. Studies that assess the extent to which Facebook impacts learning and student performance would enhance our understanding of the value of social media as an instructional technology.

5.4 Limitations

Because of the research methodology employed, this study has three potential limitations. The first relates to its reliance on self-report measures, which can result in a social desirability bias. Even though the students completed their questionnaires anonymously, they may have wanted to respond in ways that made them look positive. While the potential for this effect is possible, the probability that it would impact the study's findings is low, given that students did not know the research questions or the desired responses.

The second limitation relates to the fact that the study used a single survey instrument, which created the potential for common method bias. This survey approach was used because of its efficiency to quickly collect the necessary data. Future research should be designed to minimize the possibility of a common method bias by collecting data through interviews or focus groups. With a mixed methods research design, the study's results would be strengthened and there would be less threat to validity which is occasionally found in educational research (Donaldson & Grant-Vallone, 2002).

The final limitation recognized in this study is that it is not possible to determine the extent to which Facebook enhanced the CoP and sense of classroom community found in the courses examined and the extent to which it is due to more engaged faculty. Crook (2008) found that faculty members play an important role in the integration of social media into their courses. They have a positive attitudinal disposition because of their investment of time and creative involvement in the process. Therefore, when students state that they observe an effective CoP or an increased sense of learning in their Facebook-enhanced courses, it may be more related to the faculty member's attitude about teaching and learning than to the use of social networking technology. It could be that faculty members have an increased interest in their courses and this serves to motivate students to socially connect and learn.

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