A LIVELY ELECTRONIC COMPENDIUM OF RESEARCH, NEWS, RESOURCES, AND OPINION

Astronomy Education Review

2013, AER, 12(1), 010103, http://dx.doi.org/10.3847/AER2012031

Increasing Student Participation in Online Group Discussions Via Facebook

Scott T. Miller
Sam Houston State University, Huntsville, Texas 77340
Received: 07/26/12, Accepted: 02/13/13, Published: 06/3/13

Abstract

A comparison study between two different methods of conducting online discussions in an introductory astronomy course was performed to determine if the use of Facebook as an online discussion tool has an impact on student participation as well as student response time. This study shows that students using Facebook for their online discussions participated more frequently and responded more quickly than students using a traditional online discussion forum.

1. INTRODUCTION

According to Garrison's model of a Community of Inquiry (Garrison, Anderson, and Archer 2000), there are three key elements to creating an enriching learning experience: teaching presence, cognitive presence, and social presence. All three need to be present in any course in order for the students to gain a better understanding of the material. Social presence is defined as "the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop interpersonal relationships by way of projecting their individual personalities." (Garrison 2009) Whether a student is enrolled in a traditional "face-to-face" course or an online course, these three aspects of the course are vital to the students' success. While students within a traditional course are automatically provided with an opportunity to interact with their peers if they choose to do so when they attend class, the remote nature of online courses removes this prospect from online students. As more and more students enroll in online courses, it is crucial that instructors present students with the means and opportunities to feel socially engaged.

The easiest way to provide online students with social interaction is via discussion boards, which come standard these days with most learning management systems (LMS). Students who regularly engage in dialogue build a stronger sense of community within a course (Poole 2000), with a stronger correlation occurring when students are more in control of the discussion topics. The use of discussion activities may help provide students with the motivation needed to stay focused throughout a course (Dennen 2008), and students who are more motivated to participate often rate themselves higher in terms of their perceived learning from these online discussions (Wu and Hiltz 2004).

While many LMSs provide instructors a variety of useful tools to help them in the more mundane acts associated with an online course, they also constrain instructors within the confines of the system's organization (Lane 2007). Discussion boards, in particular, are not highly effective at recreating the natural interaction between students in a classroom environment. Given the asynchronous nature of online discussions, a specific topic (or thread) can prematurely end before being completely discussed due to the fact that new threads have been posted and students simply do not take the time to read older posts (Hewitt 2005). This may be due in part to students' attempts to minimize the amount of work they do in an online course, or to the perception of being overloaded with too much material at a time (Peters and Hewitt 2010). In general,

students in online courses—especially those in general education (or gen-ed) courses—may simply desire to present the appearance of effort and understanding, while putting forth as little work as possible. One area where they skimp on their participation is online discussion (Peters and Hewitt 2010). Studies suggest that in this area, students simply post new messages and reply to previous posts because it is a requirement of the course, and do so only at the minimum level required (Webb *et al*. 2004; Palmer, Holt, and Bray 2008). The general structure of discussion boards within most LMSs tends to impede their usage above the minimum level necessary. In order for a student to participate in an online discussion, the student must first log into the course, navigate to the discussion activity, and then figure out how to contribute. Once a student leaves a discussion, he or she has no way of knowing if further discussion has taken place without returning to the course and to the discussion activity.

While students may not regularly participate in online discussions in their everyday lives, most students today are engaged in the use of social networking sites (SNS) such as Twitter and Facebook. According to the 2011 Educause Center for Applied Research National Study of Undergraduate Students and Information Technology (ECAR 2011), 90% of students use Facebook, while 58% report being logged onto Facebook multiple times a day, compared to only 32% who say they participate in online discussions at least one per month. Students use SNSs like Facebook for a variety of reasons, such as communication with friends, building social capital, and informal learning. Their frequency of use is positively correlated with the level of satisfaction they perceive towards achieving the above goals (Joinson 2008). Facebook usage has been suggested to support relationships among friends and increase a person's psychological well-being (Ellison, Steinfield, and Lamp 2007), which could aid in decreasing a student's feeling of isolation within an online course, thus helping to create an online network that facilitates learning (McInnerney and Roberts 2004; Wodzicki, Schwämmlein, and Moskaliuk 2012).

Dunlap and Lowenthal (2009) investigated the use of Twitter as part of an online course and found that it increased students' perception of a social presence within the course, as well as increased their perceptions of cognitive and teaching presences. The advantages of Facebook and Twitter are that students already use these tools in their everyday lives. In order to participate in a discussion topic, students do not need to log into the course and navigate to the discussion activity. Instead, they will simply read the postings on their Facebook status page, and when they see a post from the course, comment on it right then and there. This helps facilitate participation in the discussion activities and foster a sense of community within the course. Appendix shows how to create and Facebook page and post articles.

2. METHODS

2.1 Participants

Participation was offered to students enrolled in one of two introductory astronomy classes offered online during the duration of the study, which took place during the Fall 2010—Spring 2011 academic school year. A total of 59 students agreed to participate. Of the 59 students, 37 were enrolled in an online astronomy course during the fall 2010 semester and were required to complete their discussion activities via Facebook (the "Facebook" students). The remaining 22 students (the "eCollege" students) completed their discussion activities during the spring 2011 semester via the discussion tool packaged with eCollege, the LMS through which the online courses were being offered.

2.2 Procedures

At the beginning of the semester, students were asked to complete a brief survey regarding their previous exposure to Facebook using a 5-point Likert scale. The Mann-Whitney U-test (Mann and Whitney 1947) was used to compare the two sets of pre-semester data to see if there were any inherent differences between the two groups. The Mann-Whitney U-Test determines the significance of the difference between the distributions of two independent sets of ordinal. Typically, p-values less than 0.05 are considered statistically significant. In other words, if the p-value is small enough, then the two sets of data can be considered significantly different. Table 1 lists the relevant data for each of the Facebook survey questions. For each question, we can reject the hypothesis that the survey data from the two students groups are statistically different.

Students were divided into groups of 5-8 participants each based on studies suggesting that this is the ideal group size for group discussion (Kitzinger 1995; Kerr and Tindale 2004). Doing so provides all students with an

Table 1. Facebook survey data.

How frequently do you:	U	Z	p
Post status updates	377	1.57	0.116
Comment on posts from friends	215	1.61	0.107
Comment on posts from Facebook groups	226.5	1.38	0.168
Comment on posts from news sources	283	0.27	0.787
Read old posts you have not read yet	292	0.09	0.928

opportunity to present their ideas, so the vocal students would not drown out the hesitant ones. Students were randomly assigned to a group in an effort to create heterogeneous groups of students with a variety of backgrounds, fields of study, interests, and familiarity with online discussions and social networking.

Throughout the course of a semester, students were required to complete two objectives related to the online discussions. First, students were required to provide links to astronomy-related articles at least once per unit (with a total of four units in the course). Along with the links, students had to discuss highlights of the article, providing factual information along with personal insights as to why they chose the article. Second, students were required to read through and comment on articles posted by others on a weekly basis, providing a reaction to the original post and any subsequent comments left by others. In order to provide students enough articles to choose from (as well as to ensure that students had something to comment on), additional articles were posted by the instructor of the course.

Students were graded based on their level of participation in the discussion activities. Full credit was given to students who simply met the above criteria: (1) post and summarize one article per unit, and (2) comment on another post once per week. Students were instructed that simple comments such as "That is so cool!" or "I never knew that before." were insufficient and would not be awarded any credit. In order to receive participation points, students had to provide thoughtful, substantive comments to the articles.

2.3 Data Analysis

In order to facilitate analysis of the discussions, each post was assigned a set of numbers based on which thread it belonged to along with its order within the thread. The time and date of each post was also recorded. Posts that did not meet the requirements for participation credit were removed along with any posts from students who did not agree to participate in the project.

The focus of this paper is to determine if the use of Facebook as a discussion tool facilitates participation by the students over the more traditional discussion tools found in an LMS. In order to address this question, analysis of the data centered on comparing the frequency and the immediacy of student posts, but not necessarily the content of their posts. This will be covered in a separate study at a later time.

3. RESULTS

3.1 Comparison of Total Responses per Semester

In order to determine whether students participate more frequently via Facebook, the total number of posts plus responses to other posts was counted for each student. During a typical semester, students were required to post a minimum of four articles (once per unit) and respond to other posted articles once per week (over 12 weeks) for a total of sixteen posts and responses. If students only completed the minimum level of participation required, then the total number of posts plus responses is expected to fall close to this value.

Figure 1 presents a histogram of the total number of posts plus responses per student based on the discussion forum used. The vertical black line (at a value of 16) represents the minimum number of posts plus responses required for full participation. The vertical axis is plotted as a function of the percentage of students per class who posted at a given level, in order to account for the different number of students participating in the study

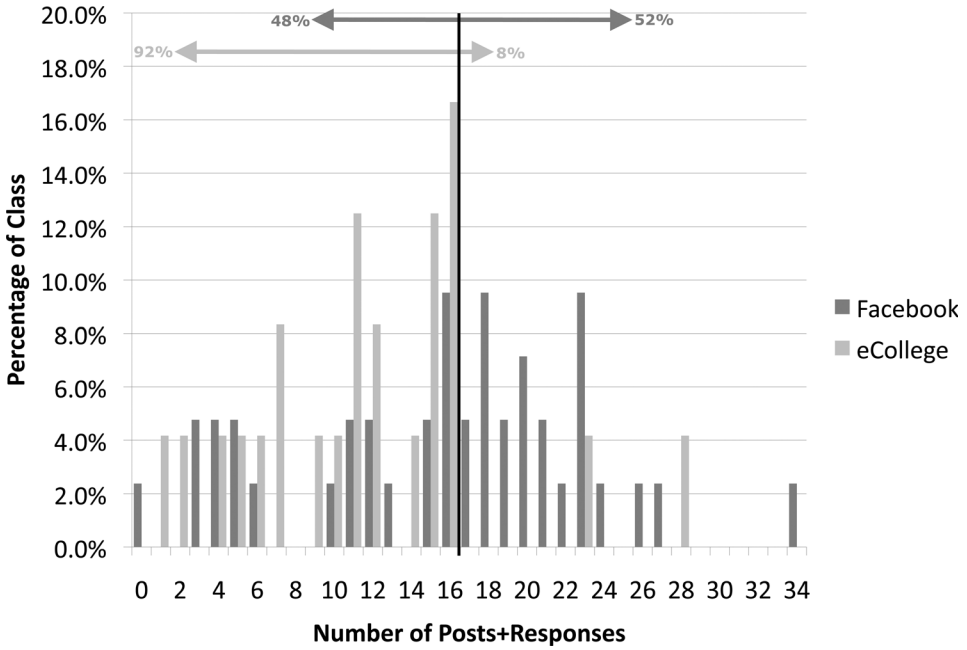

Figure 1. A histogram of the total number of posts and responses in an online discussion forum over two semesters, based on the tool used to host the discussions.

within the two classes. The horizontal ranges at the top of the graph depict the percentage of students in each class that posted above or below the minimum required level.

Based on the plotted results, students in the Facebook section were much more likely to post above the minimum requirement than the eCollege students. Fifty two percentage of the Facebook students participated more than the minimum required, while only 8% of the eCollege students did. A calculation of the median response rate for both classes reveals that the median value for the eCollege students was 11.5 posts throughout the semester, while the median value for the Facebook students was 17 posts, or 48% more often.

3.2 Frequency of Multiple Responses per Week

So when are students contributing? A plot of individuals who posted multiple responses within a week can reveal if the increased frequency in the Facebook class is due to one exciting week of astronomy news, or a sustained trend over the course of the semester. Figure 2 graphs the percentage of students in each section who posted more than

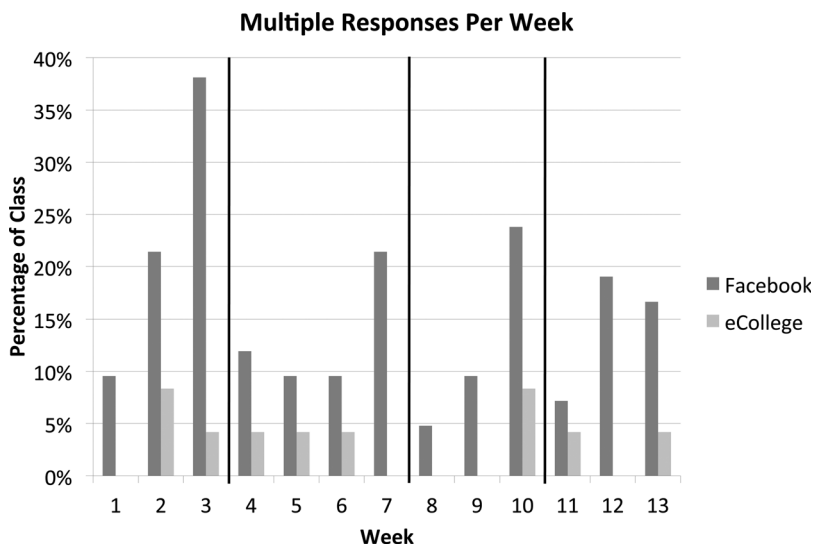

Figure 2. A histogram of the percentage of students in each section who posted more than one response, by week. The vertical black lines indicate the division between units.

one response per week. This figure includes only the number of student responses to posted articles and not posts of articles once per unit. Again, given that the two sections had a different number of participants in this study, the total number of responses is plotted as a percentage of the total number of participants in each section.

Students in the eCollege section rarely responded to more than one post per week, and this was consistent throughout the semester. For most of these students, they only completed the bare minimum assignment each week, if even that much. The same is not true for the Facebook students. Almost every week at least 10% of the students (or just under) responded to multiple posts, and many weeks the multiple response rate was closer to 20%–25%.

3.3 Comparison of Total Responses per Week

Another way to gauge the level of participation is to compare the total number of responses posted per week in each class. Figure 3 displays the number of responses posted per week as a function of the total number of students per class. Values over 100% indicate that there were more posts during that week than students in the class.

The Facebook section of the course consistently participated more frequently than the eCollege section. During many weeks, the participation by the Facebook students was almost twice as frequent as that by the eCollege students. For almost the first half of the semester, participation from the Facebook students was near to exceeding 100%, while participation by the eCollege students never reached more than 75%. The difference between the two classes, though, diminishes over time. By week 8, the Facebook students are posting only 10%–20% more frequently than the eCollege students.

It should be noted that the significant decrease in student responses in the eCollege section during week 7 corresponds to the week before spring break, a week when many instructors hold midterm exams, and many students begin to prepare for their spring break trip, thus accounting for the sharp dip in participation.

3.4 Comparison of Response Times

Along with evaluating whether students using Facebook as a discussion tool participate more frequently than those who are not, the other goal was to determine which group—the Facebook or the eCollege—tended to respond more quickly. Figure 4 presents a quartile plot of how quickly students responded to posts based on the day of the week it was posted. Each bar spans the range over which 25%–75% of the students first responded to an article. The median response time occurs at the color change in the bar.

Articles were posted by the instructor roughly every day of the week while the weekly assignment deadline was Sunday at midnight. This accounts for the quick response rate to Sunday posts. For most days, the fastest 25% of

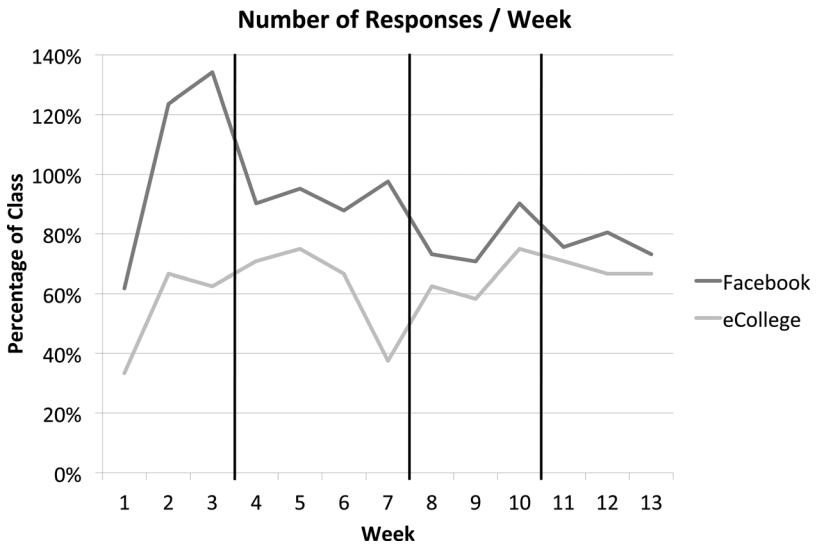

Figure 3. The weekly number of responses to news articles for both sections. A value of 100% corresponds to a number of responses equal to the number of participating students. The vertical black lines indicate the division between units.

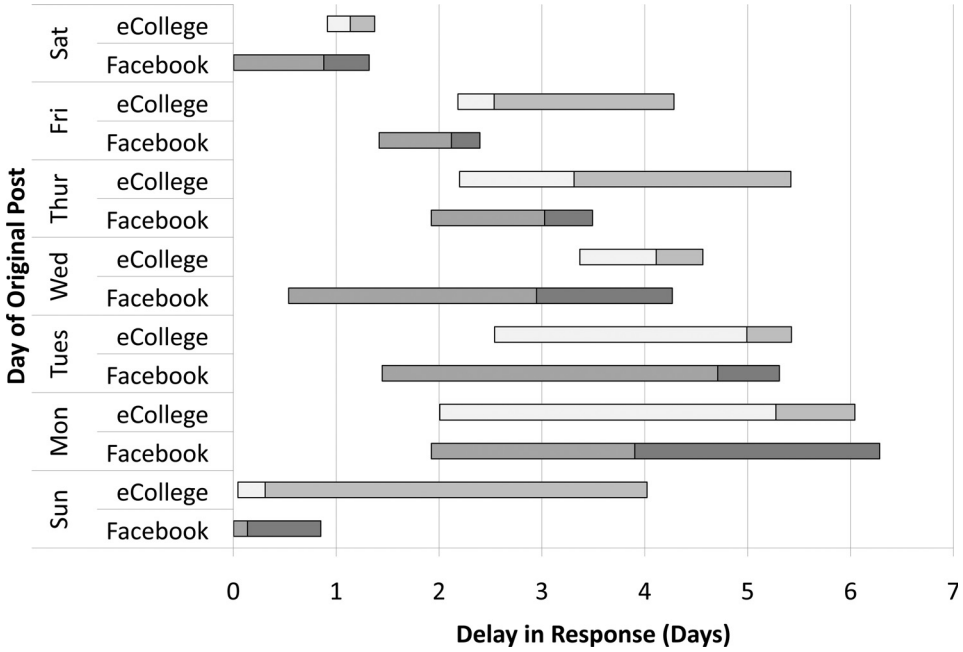

Figure 4. Quartile plots of the lag time between when an article was posted and when students responded, as a function of the day on which the article was posted.

Facebook student responses were almost a full day sooner than the fastest 25% of eCollege student responses, with the exceptions of Mondays (the day after the assignment deadline, when students were less prone to respond quickly) and Thursdays. Comparing the median values, the difference is not as pronounced. With the exception of Mondays and Wednesdays, the differences in the median response times are less than half of a day.

4. DISCUSSION

In a 2009 study comparing the use of discussion boards on Facebook versus discussion boards within Moodle (one of many LMSs), DeSchryver *et al*. found no differences between the two in terms of frequency or length of online discussions (DeSchryver *et al*. 2009). The conclusions presented here differ in that it appears that, at the very least, students using Facebook as the medium for their discussion activities are more likely to participate more frequently than students using a more traditional LMS discussion tool, on average posting 48% more often then the eCollege students. Similar findings were published by Schroeder and Greenbowe (2009). In their course, students were given the opportunity to join the course's Facebook group but not required to do so. They found that while only 41% of the class joined the group, the number of posts was significantly greater than the number of discussion posts within the course LMS.

Performance by the eCollege students is consistent with other studies (Webb *et al*. 2004; Palmer, Holt, and Bray 2008), posting no more than the minimum requirement, while over half of the Facebook students at one time or another posted more than what is simply required. The mode of the distribution of eCollege students posts is exactly 16 times the minimum requirement for the course. This suggests that these students were only posting articles and responding to others as a means of completing the participation assignment for the course. While the number of Facebook students who posted exactly 16 times (less than 10%) is greater than average, they are by no means the largest population of students in this section. For any given week, on average only 3% of the eCollege students responded to posts more than required, while 16% (or over 5x as many) of the Facebook students did.

The students using Facebook for their discussion activities start out strong, posting 95% more responses than the eCollege students during the first unit of the course. This value drops substantially though in subsequent units. By the second unit, the Facebook students are only posting 30% more frequently and by the fourth unit they are only posting 15% more frequently. This can be attributed to a decrease in the response rate of the Facebook students rather than an increase in the response rate of the eCollege students, which is fairly consistent. (They complete the minimum required amount of work and nothing more.) Over the course of a semester, student motivation to contribute to peer discussion has been shown to diminish (Xie, DeBacker, and Ferguson 2006). This can be due to a lack of novelty in posting the same types of assignments as the semester progresses, or to a

decrease in responses to their postings. While the eCollege students' response rate does not diminish below the minimum requirement, given that the Facebook students started the semester at a much higher response rate, over the course of the semester they had the capability to decrease their rate of posting without dropping below the minimum level.

Another possible cause for the decreasing performance of the Facebook students is a lack of time. A lack of time to complete assignments has also been demonstrated to decrease student motivation to participate in online discussions (Xie, DeBacker, and Ferguson 2006). While the Facebook students may find it easier to respond to posts on Facebook and therefore respond more frequently, even they experience an added workload typical for students as the semester progresses. Given that the courses used in this study are general education courses, the students involved may not consider the coursework to be as important as that of their major courses and not devote as much time to it. While the eCollege students maintain their level of commitment (given that they are already at the minimum required level), responses from the Facebook students decrease because, as their workload increases throughout the semester, they compensate by participating less frequently (but still more than the eCollege students!).

Not only did the Facebook students respond to posts more often, but they also responded more quickly. Comparing the two sections based on the swiftness of their responses, the fastest 25% of the Facebook students responded almost a day faster than the eCollege students. This lead drops to slightly more than half of a day when comparing the median response times between the two. Because of the ease with which students can access the discussion posts via Facebook, they were able to respond quicker, rather than having to make a concerted effort to find the discussion posts within the LMS.

While the Facebook students responded faster than the eCollege students, for the majority of them, they did not respond "quickly." The response rate for the fastest 25% of Facebook students was almost one day after the original post, and the median response rate was three days after the original post. Due to the nature of the assignment, students could not simply, or quickly, respond to an article. The assignment required students to read through the article and formulate a response detailing what they learned from it. This format does not facilitate immediate responses. Time constraints such as work or school can also prohibit students from responding until they have free time to complete the assignment. On the other hand, discussions on Facebook allow students to discover new posts more quickly, so they can plan a time to respond sooner.

In comparing the two studies (this one and DeSchryver's), a few differences appear. DeSchryver *et al*. randomly divided students from the same course into two sections, one that used Facebook for discussions and the other that used Moodle. The advantage to this is that it minimizes any differences between the two groups. Other than which discussion forum they used, the course was the same for both groups of students. In this study, data were collected over two semesters, where students enrolled during the fall semester used Facebook for their discussion activities and students enrolled during the spring semester used the LMS discussion tools. While the course material and everything else were held the same over both semesters, there is the possibility that small differences could occur. Because the study was conducted over two semesters, and part of the discussion assignment consisted of posting recent astronomy articles to discuss, this naturally meant that different articles, but the same amount, were posted to the two groups. While this could have had an influence on the level of participation, given that the number of articles was the same, and a significant number of articles were posted each semester, students were given ample opportunity to post on a variety of topics if they wanted to.

The second difference between the two studies is how the discussion activities were conducted. While DeSchryver *et al*. used Facebook groups for their discussions, they held the discussions within a separate discussion tab within the group page. One of their explanations as to why they saw no difference in the frequency of participation is because the discussion responses on Facebook were listed in chronological order rather than as threaded discussions. This made it difficult for students to refer to previous responses without the cumbersome addition of referencing which statement they were responding to, reducing the students' desire to participate in Facebook discussions. A similar finding was presented by Wang *et al*. (2012), who studied the possibility of using a Facebook group as an LMS. In comparison, the discussions in this study were held on the main Facebook group page. Articles were posted as links on the main page, and students responded to them in the comments section. As a result, student responses appeared with the original post and subsequent responses, and so following the thread of the discussion was straightforward. It is likely that students in this study were prone to participate more because it was easy to do so; the discussions were easily accessible on Facebook, and discussions were organized by threads, not chronologically.

There are two concerns that should be mentioned in terms of the use of Facebook within a course, both of which could affect a student's preference for using the SNS. While most students today are familiar with Facebook and already have accounts, there are a few who do not. Some students express concerns over privacy on Facebook. Along with a student's tendency towards social expression, his or her concern over privacy is a strong predictor of Facebook usage (Tufekci 2008). Typically, it is the students who are unaware of Facebook's privacy options that express the greatest worries (Hewitt and Forte 2006). Therefore, it is incumbent upon the instructor to allay the fears of these students and ensure them that there are no inherent threats with Facebook. As with any SNS, the website itself does not pose a problem, but simply becomes a place where pre-existing threats can reappear, albeit in a different form (Weir, Toolan, and Smeed 2011). Helping students understand the privacy controls and how to use them can help the students feel more comfortable using this tool.

Another concern with Facebook usage within a course is the perceptions of the students and/or instructor. While 25% of students believe that Facebook can be a valuable tool when used in an academic setting, 53% believe that its academic value is limited, with 30% stating that they would like to keep their social and academic lives separate (ECAR 2011). Given the nature with which some students use Facebook, a few worry about how they will be perceived by the instructor (Hewitt and Forte 2006). This can influence their level of involvement in the discussions. Because course discussions are set up as groups on Facebook, students do not need to "friend" the instructor or one another in order to have a discussion; they simply need to join the discussion group. This prevents group members from seeing unrelated posts and can minimize embarrassment. Similarly, this minimizes the students' interactions with the professor. While one study suggests that students appreciate higher levels of self-disclosure from their instructor (Mazer, Murphy, and Simonds 2007), instructors need to be careful about being too personal on Facebook. While this may be a cause for alarm for some, this is no different than the need for an instructor to present a professional image in the classroom. The privacy controls within Facebook can help an instructor set the parameters such that students cannot navigate through his or her Facebook profile and investigate personal information, thus helping to maintain the student/instructor relationship online.

5. CONCLUSIONS AND FUTURE WORK

Facebook can be an effective tool for facilitating online discussion among students who are already comfortable using this medium, which in turn can help promote a sense of social presence within the course. Students who regularly engage in online discussions generally feel a greater sense of social presence and perceive a greater sense of learning. Given that most students are familiar with Facebook and use it on a regular basis, it provides a natural forum for online discussion.

In comparing two groups of students, the Facebook students not only responded more frequently to articles posted for discussion, but they also responded more quickly to posted articles. While Facebook students typically posted more frequently, the rate of responses dropped off over the course of the semester, but never down to the level of the eCollege students. It could be that the novelty of using Facebook for online discussions diminished around half way through the semester, or it might be that an increased workload in other courses forced the students to spend less time on a nonmajor course assignment. Administering a post-semester questionnaire surveying students about their online discussion habits and contributions in the course would be an effective way to determine why participation drops over the semester. Additional studies involving majors and/or graduate students would be helpful to see whether or not the same drop in participation would be observed in this population of students.

Instructors considering using Facebook as a discussion tool should keep in mind student concerns regarding privacy issues. For students who already use Facebook, one concern may be how other students as well as the instructor may perceive their private life. Students unfamiliar with Facebook may be concerned about how exposed their lives will be if they create an account. Because of this, it is important for the instructor to be very familiar with the privacy controls that Facebook provides so he or she can instruct the students properly in the way to set up their accounts such that they can separate their private life and their group presence as much as possible.

Acknowledgments

I would like to thank the anonymous reviewer for many insightful comments and suggestions.

Appendix: Creating a Facebook Group and Posting Articles

Creating a Facebook group is straightforward. From within a personal Facebook account, simply click on the "Create Group" link in the left-hand menu, under the "Groups" section header. A window will pop up, asking for some information. First, give the group a unique name. Students will join the group by searching for it, so a unique name will make it easier for them to find. In this study, because multiple groups were created within each course, each group name had a letter appended to it to make them separate. Next, set the privacy setting to "Closed." This will allow students to find the group on Facebook and join, but will not allow non-group members to observe or participate in any of the discussions. After all of the students have joined, it is possible to change the group setting to "Secret" so that non-group members will not even be able to find the group. Once the group has been created, navigate to the group page and click on the gear icon at the top-right in the menu bar, then click on "Edit Group" in the drop down menu. Next to "Membership Approval" choose "Any member can add members, but an admin must approve them" and next to "Posting Permissions" choose "Only members can post in this group." This will keep non-students from joining the group and posting. Once the group is set up, simply inform the students which group to search for and join.

Posting articles to Facebook groups is relatively simple as well. Near the top of the Facebook group page is a box that says, "Write something." Once an article is found online, simply copy the URL and paste it into this box. A link to the article will immediately be created, along with a figure from the article and a brief synopsis. Further text can then be added. An even easier way of posting articles is to "share" them with the group. Many astronomical websites have Facebook pages that one can "like." By doing so, articles will periodically appear in the personal News Feed. At the bottom of each article, the option to "share" appears. Simply clicking on this will allow one to post the article directly to the group page, along with any additional text that may be added. Many astronomical websites also include this "share" option directly on their websites.

References

Dennen, V. P. 2008, "Looking for Evidence of Learning: Assessment and Analysis Methods for Online Discourse," *Computers in Human Behavior*, 24, 205.

DeSchryver, M., Mishra, P., Koehleer, M. and Francis, A. 2009, "Moodle vs. Facebook: Does Using Facebook for Discussions in an Online Course Enhance Perceived Social Presence and Student Interaction?," *Proceedings of Society for Information Technology & Teacher Education International Conference 2009*, ed. I. Gibson, R. Weber, K. McFerrin, R. Carlsen, and D. A. Willis, Chesapeake, VA: AACE, 329.

Dunlap, J. C., and Lowenthal, P. R. 2009, "Tweeting the Night Away: Using Twitter to Enhance Social Presence," *Journal of Information Systems Education*, 20(2), 129.

"ECAR National Study of Undergraduate Students and Information Technology, 2011 Report" (http://www.educause.edu/library/resources/ecar-national-study-undergraduate-students-and-information-technology-2011-report)

Ellison, N. B., Steinfield, C., and Lampe, C. 2007, "The Benefits of Facebook 'Friends:' Social Capital and College Students' Use of Online Social Network Sites," *Journal of Computer-Mediated Communication*, 12, 1143.

Garrison, D. R., Anderson, T., and Archer, W. 1999, "Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education," *The Internet and Higher Education*, 2(2–3), 87.

Garrison, D. R. 2009. "Communities of Inquiry in Online Learning," *Encyclopedia of distance learning*, 2nd ed., ed. P. L. Rogers *et al*., Hershey, PA: IGI Global, 352.

Hewitt, A., and Forte, A. 2006, "Crossing Boundaries: Identity Management and Student/Faculty Relationships on the Facebook," *Proceedings of the ACM 2006 conference on computer supported cooperative work*, November 4–8, 2006, Banff, Alberta, Canada.

Hewitt, J. 2005, "Toward an Understanding of How Threads Die in Asynchronous Computer Conferences," *The Journal of the Learning Sciences*, 14(4), 567.

Joinson, A. N. 2008, "'Looking at', 'Looking up' or 'Keeping up with' People? Motives and Uses of Facebook," *CHI 2008 Proceedings Online Social Networks*, April 5–10, 2008, Florence, Italy.

Kerr, N. L., and Tindale, R. S. 2004, "Group Performance and Decision Making," *Annual Review of Psychology*, 55, 623.

Kitzinger, J. 1995, "Introducing Focus Groups," *BMJ*, 311, 299.

Lane, L. M. 2007, http://lisahistory.net/pages/CMSandPedagogy.htm.

Mann, H. B., and Whitney, D. R. 1947, "On a Test of Whether One of Two Random Variables is Stochastically Larger Than the Other," *Annals of Mathematical Statistics*, 18, 50.

Mazer, J. P., Murphy, R. E., and Simonds, C. J. 2007, "I'll See You On 'Facebook': The Effects of Computer-Mediated Teacher Self-Disclosure on Student Motivation, Affective Learning, and Classroom Climate," *Communication Education*, 56(1), 1.

McInnerney, J. M., and Roberts, T. S. 2004, "Online Learning: Social Interaction and the Creation of a Sense of Community," *Educational Technology & Society*, 7(3), 73.

Palmer, S., Holt, D., and Bray, S. 2008, "Does the Discussion Help? The Impact of a Formally Assessed Online Discussion on Final Student Results," *British Journal of Educational Technology*, 39(5), 847.

Peters, V., and Hewitt, J. 2010, "An Investigation of Student Practices in Asynchronous Computer Conferencing Courses," *Computers in Education*, 54(4), 951.

Poole, D. M. 2000, "Student Participation in a Discussion-Oriented Online Course: A Case Study," *Journal of Research on Computing in Education*, 33, 162.

Schroeder, J., and Greenbowe, T. 2009, "The Chemistry of Facebook: Using social networking to create an online community for the organic chemistry laboratory," *Innovate*, 5(4), http://www.innovateonline.info/pdf/vol5_issue4/The_Chemistry_of_Facebook_Using_Social_Networking_to_Create_an_Online_Community_for_the_Organic_Chemistry_Laboratory.pdf.

Tufekci, Z. 2008, "GROOMING, GOSSIP, FACEBOOK AND MYSPACE: What Can We Learn About These Sites from Those Who Won't Assimilate?," *Information, Communication & Society*, 11(4), 544.

Wang, Q., Woo, H. L., Quek, C. L., Yang, Y., and Liu M. 2012, "Using the Facebook Group as a Learning Management System: An Exploratory Study," *British Journal of Educational Technology*, 43(3), 428.

Webb, E., Jones, A., Barker, P., and van Schaik, P. 2004, "Using E-learning Dialogues in Higher Education," *Innovations in Education and Teaching International*, 41(1), 93.

Weir, G. R. S., Toolan, F., and Smeed, D. 2011, "The Threats of Social Networking: Old Wine in New Bottles?," *Information Security Technical Report*, 16, 38.

Wodzicki, K., Schwämmlein, E., and Moskaliuk, J. 2012, "'Actually, I Wanted to Learn': Study-related Knowledge Exchange on Social Networking Sites," *Internet and Higher Education*, 15, 9.

Wu, D., and Hiltz, S. R. 2004, "Predicting Learning From Asynchronous Online Discussions," *Journal of Asynchronous Learning Networks*, 8, 2.

Xie, K., DeBacker, T. K., and Ferguson, C. 2006, "Extending the Traditional Classroom Through Online Discussion: The Role of Student Motivation," *Journal of Educational Computing Research*, 34(1), 67.