AC 2012-3606: MICROBLOGGING IN THE LARGE LECTURE CLASSROOM: FACILITATING PARTICIPATION FOR STUDENTS WITH HIGH COMMUNICATION APPREHENSION

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Microblogging in the Large Lecture Classroom: Facilitating Participation for Students with High Communication Apprehension

The growing popularity of various social media has prompted educators to explore these tools' utility for teaching and learning. Overall, educators and educational technologists agree that social media have good potential applications to support learning [1-3]. Increasingly, abstract arguments about potential applications of social media are followed up with scholarship that documents specific uses of Web 2.0 tools in education and the impact they have on students. This paper presents the results of an exploratory study that investigated the application of a social medium – specifically, microblogging – in the large lecture classroom in order to assess whether microblogging can make participation in the large lecture classroom more comfortable for students with high communication apprehension. We present original data collected in the context of a freshman Technology large-lecture course in which microblogging service Yammer was introduced mid-semester and used for student participation. Students were assessed pre- and post-intervention through online surveys that asked about perceptions of classroom interactions and learning, as well as measures of communication apprehension and technology readiness. We analyze the set of 69 pre- and post-intervention survey pairs in order to identify relationships among communication apprehension, technology readiness, and comfort with classroom participation, both face to face and through microblogging.

Microblogging is a type of social software platform that enables users to post brief messages and to follow and read other users' messages. The most popular public microblogging platform is Twitter[4], however, there are several other microblogging platforms available, some of them specialized for industry use (e.g. Yammer), and even for education (e.g. Edmodo). Four main educational benefits emerge from previous research that has explored the use of microblogging in higher education: community building, collaboration, informal learning, and engagement. These applications and benefits of microblogging are reviewed next.

1. Microblogging and community building

Building a community of inquiry, or a community of learners, is one of the most commonly identified benefits of microblogging. Discussions of benefits and drawbacks of integrating Web 2.0 [5] and microblogging specifically [2,6] into higher education point out the creation of a student community as one of the main advantages. Case studies conducted in the higher education context in different parts of the world have documented that community building is, indeed, a benefit that results from student use of microblogging as part of instruction. For example, integration of informal microblogging in the UK, among two groups of students lead the authors to conclude that community building and peer support were two of the most beneficial impacts of Twitter use[7]. Similar findings were observed among Chinese students who used Twitter as part of their courses: they created a community that provided social support and motivation to learn [8-10]. Beyond enabling relationship and community building among groups of students enrolled in the same course, microblogging was shown to help build international communities of inquiry by connecting students who were taking similar courses in their respective countries.

Two seemingly independent studies have documented this result with students from the USA and Australia[11,12].

2. Microblogging and collaboration

The potential of microblogging to increase student collaboration and collaborative learning is another popular argument in favor of integrating this technology into the classroom[2,6,13,14]. Several specific applications of microblogging for collaborative learning have included collaborative writing and conversation in foreign language classes [8,15-19]. In addition to learning the foreign language, a documented benefit of collaborative writing on microblogging platforms was that of learning a new literacy, that of using microblogging as a form of interaction and collaboration[20]. Moreover, the integration of microblogging along with other Web 2.0 tools in a series of design courses in the UK resulted in successful student communication, collaboration, and virtual work[21]. Even though an examination of the general public's patterns of Twitter use concluded that microblogging is more suitable for communication than collaboration[22], studies of microblogging in higher education did document collaboration benefits derived from student use of microblogging.

3. Microblogging and informal learning

Following other users' updates on a microblogging platform can facilitate the creation of a personal learning network [2,6,13] and thus may lead to informal learning that extends beyond the classroom. The use of microblogging by students at the University of Applied Science of Upper Austria was shown to have facilitated informal learning beyond the classroom[23]. Similarly, the use of microblogging as a backchannel for discussions during a summer school was another application that lead to informal and peer learning[24]. A case study of integration of microblogging in a foreign language course in Greece also showed that microblogging activites that encouraged play increased students' formal and informal learning[19]. Another way in which microblogging facilitates informal learning beyond the classroom is that it enables students to learn not only from the instructor and each other, but also from other users of the same microblogging service[17].

4. Microblogging and student engagement

The multi-way interactivity of microblogging makes it a tool that is likely to facilitate student engagement and participation. Some researchers argue that microblogging can engage and empower learners by enabling them to provide feedback, engage in conversations, and participate in class even if they are shy[25,26]. While evidence of other microblogging benefits can be easily found in the research literatue, few studies, however, document this particular expected benefit of microblogging use. Twitter has been used successfully to collect continuous, formative feedback and ratings from students about the course they were enrolled in[27]. One study provided thorough evidence that student Twitter use at a US educational institution is correlated with high grades and engagement, as defined by the National Survey of Student Engagement (NSSE)[28]. Engagement is defined quite broadly by NSSE and includes measures of involvement in campus activities, not only classroom participation. The use of microblogging for meaningful classroom

participation and student engagement in class discussions has not been addressed by the research literature. The current study is positioned to address this gap.

Existing scholarly research about the uses of microblogging in higher education has argued that its application can lead to several benefits. The main benefits that have emerged from a review of literature are community building, student collaboration, informal learning, and student engagement. These benefits have been documented to various extents with evidence from courses in different disciplines, taught at universities all around the world. Of the four identified benefits of microblogging, student engagement is supported by relatively less evidence than the other ones. This paper attempts to address this gap in existing research by exploring the use of microblogging to increase student comfort with participation in the large lecture classroom. Other efforts to integrate technology in the classroom in order to increase student participation have been documented[29,30]. While successful, these applications have not looked specifically at microblogging nor at the student population that is most vulnerable in terms of classroom participation: students suffering from high communication apprehension.

5. Research focus: Communication apprehension, classroom engagement, and technology readiness

Communication apprehension was conceptualized in the 1970s by communication researcher James McCroskey[31-33]. Communication apprehension is an unpleasant feeling of fear associated with oral communication. Communication apprehension can be measured through valid and reliable instruments that provide values for apprehension in four different communication contexts (interpersonal, group, meetings, and public speaking), and an overall score[34]. In this study, we investigate whether use of microblogging in a large lecture class facilitates participation for students, particularly students who suffer from high communication apprehension. Specifically, we ask whether the use of microblogging for mediated class discussions increases comfort with classroom participation for all students, but specifically for students who suffer from high communication apprehension.

While the focus of this study is on students with high communication apprehension and their perceptions of comfort with classroom participation, we also look at two other factors in this study: technology readiness and a series of interrelated factors likely to predict learning.

Technology readiness, as measured by the Technology Readiness Index[39], is a factor that may explain acceptance of microblogging and comfort with using it for classroom participation. TRI measures individuals' propensity to adopt and embrace new technologies and has been successfully applied before to assess students' acceptance of online education[40]. We inquire whether technology readiness is related to acceptance and comfort with using microblogging for classroom participation.

We also assess a series of factors related to student learning that emerge from by self-determination theory[36,37]. Self-determination theory has been successfully applied to education in the past, and identifies variables such as teacher relationship, enjoyment, and motivation as important predictors of classroom learning[38]. We include these items in our study in order to avoid making the assumption that increased classroom participation is a direct predictor of

learning. We accept the possibility that microblogging may increase students' comfort with classroom participation, but avoid assuming that this will translate directly into learning benefits.

Our research focus is summarized in the following research questions:

1. Does the use of microblogging for mediated class discussion increase students' comfort with classroom participation in a large lecture course?

2. Do students with high communication apprehension report higher comfort with classroom participation through microblogging than students with low communication apprehension?

3. Is there a relationship between the students' TRI and comfort with microblogging as a tool for classroom participation?

4. Does classroom participation through microblogging increase students' perceptions of teacher relationship, class enjoyment, and motivation?

The next section explains the study's setup and methodology.

6. Methods

This study was conducted in the context of a freshman Technology course, Personal Computing Technology and Applications. The course is open to all majors on the campus of a large Midwestern university. During the semester when the Yammer microblogging intervention was conducted, there were 148 students enrolled in the course, with majors as varied as history and mechanical engineering.

We selected microblogging service Yammer, because it provides the possibility to create private groups. We created a group for students enrolled in the course and asked all students to join it on a voluntary basis. Yammer was used for a period of only four weeks, during the once weekly lecture, in weeks 13-16 of the 16-week semester. Students were encouraged to log in to Yammer during lecture and post questions as they arose. The instructor monitored the flow of questions in almost real time and would pause lecture to address them. Participation in Yammer was initially slow, but more and more students joined in each week.

6.1. *Data collection procedures*

The students completed a questionnaire before the introduction of Yammer in the course, and one post-intervention. The questionnaires were constructed to take before and after measures of perceptions of classroom participation and community, teacher relationship, learning, course enjoyment, and motivation to learn. The items used to assess these five dimensions were based upon the inventory used to assess intrinsic motivation[35] as conceptualized by self-determination theory[36,37]. Both questionnaires also included open-ended items asking about overall perceptions of oral class discussion and using Yammer, respectively. The pre-intervention questionnaire

included additional questions about demographic information, as well as scales to assess communication apprehension[34] and technology readiness[39].

7. Results

7.1. *Qualitative results: Perception of class discussion through direct participation and through Yammer*

The pre-intervention questionnaire included two open-ended items that asked students about their perception of class discussion. The first question asked about factors that make the student feel it is easy or difficult to participate in class discussion. The second item asked what about class discussions the student finds helpful or not helpful to learning. A thematic analysis[41] was performed on the answers to these questions provided by all the students who filled out the pre-intervention questionnaire. The results of the thematic analysis show that overall, more than half (51) of the 91 students who responded liked class discussions, in general. The major factor that emerged from the comments as an impediment to class discussion was the large lecture setting. The number of people in the room, and the auditorium setting made students feel uncomfortable speaking up. This theme appears in about one third (27) of the students' comments, and is illustrated by comments such as: *"…it's difficult because its intimidating for most kids including me with hundreds of kids in our lecture."* Some students appreciated how the teacher mitigated the intimidating large class by asking them to engage in small group discussions, as this comment illustrates:

"When the discussion is the class as a whole I find it fairly hard to participate because the to be honest speaking in the big lecture hall scares me a little, no idea why. However participating in the smaller groups is very easy and helpful to me in learning the concepts."

When asked about specific factors related to class discussions that help students learn, the most frequently occurring theme, which appeared in 30 answers, was that hearing others' viewpoints was beneficial. The other major theme that emerged from student comments was that they felt the discussions were overall beneficial to their learning, but the students did not provide specific reasons why.

The post-intervention questionnaire included three open-ended items asking about overall perceptions of Yammer use for classroom interaction in this large lecture course. The results of the thematic analysis for each of the three items are presented next.

The first item inquired about students' perceptions of using Yammer for classroom interaction as compared to speaking. The major theme that emerged from 43 out of 91 answers to this question was that Yammer makes it a lot easier for people to voice their opinions. The following comments illustrate the theme:

"I feel a lot more comfortable communicating using Yammer thank speaking, because it is such a large lecture and it can be intimidating to speak up on a topic even if I know the answer."

"I feel it gives me the option of voicing my opinion out loud or through Yammer. I feel it allows me to voice my opinion even if I don't feel like talking in class."

However, a considerable number of students (19) did not like using Yammer. They found it confusing, unnecessary, or impersonal, as these comments illustrate:

"I prefer speaking more because its [sic] more human interaction."

"i [sic] think that learning to speak in front of others is an important life lesson and yammer prohibits that.... its [sic] also inconvenience"

In terms of ease of use, which was the focus of the second open-ended question on the post-intervention questionnaire, students found Yammer easy to use, overall. The only inconveniences students mentioned were having to log in every time and having to carry a laptop to class.

The third and last open-ended question on the post-intervention questionnaire inquired what about using Yammer helped students learn, and what did not. Of the 74 students who answered this question, 50 reported feeling that Yammer helped them learn because it increased class interaction and made it easier to ask questions of the instructor. Some students (14), however, felt that Yammer did not help them learn, because it was impersonal or distracting. A few students commented that overall the class did not have enough time to get used to Yammer, because it was used for very few class sessions at the end of the semester.

Overall, the students' open-ended answers suggest that students perceived that class discussion was beneficial, primarily because it exposed them to other students' points of view. Regarding Yammer, even though there were some considerable negative attitudes about it, overall students reported feeling that it did make class participation more comfortable, especially for people who experience discomfort when speaking up in a large lecture class.

7.2. *Survey Analysis*

Data were gathered from students to evaluate several constructs related to Yammer usage in the classroom: technology readiness (as measured by the Technology Readiness Index[39]) and communication apprehension[34] were completed prior to using Yammer.

Perceptions of five constructs based on self-determination theory[38]: classroom participation and community, teacher relationship, learning, course enjoyment, and motivation to learn were evaluated both before and after using the Yammer tool. Data were gathered using an online survey tool that allowed each student to log in and respond to survey items with their unique pin number in order to facilitate matching of pre- and post-Yammer survey responses.

Completed pre- and post-intervention survey responses were available from 69 students, a response rate of 46.6%. Student demographic breakdown can be seen in Table 1.

Table 1: Student Demographics

Gender	Academic Year	Most Common

		Academic Majors
Female (43.5%)	Freshman (40.6%)	Organizational Leadership (21.4%)
Male (56.5%)	Sophomore (27.5%)	Retail/Sales/Marketing (21.4%)
	Junior (24.6%)	Industrial Technology (11.4%)
	Senior (7.2%)	

7.2.1. Technology Readiness Index (TRI)

Results from the 10-item version of the TRI[40] indicate a mean student TRI of 2.343 ($\sigma = 0.383$), which is below the mean of the 5-point TRI scale and indicates relatively low technology readiness[39].

7.2.2. Student Perceptions

Analysis was conducted of the paired pre-post survey items to evaluate student attitudes across five construct areas relating to motivation and self-determination theory (classroom participation and community, teacher relationship, learning, course enjoyment, and motivation to learn). Paired t-test analysis of the average scores for each construct area revealed significant changes in perceptions of classroom participation, overall course enjoyment, and learning after Yammer was introduced; unfortunately, for both overall enjoyment and learning, student perceptions showed a significant *decrease* following Yammer introduction.

Student attitudes regarding classroom participation showed significant increases after the introduction of Yammer, from 3.19 ($\sigma = .663$, 5-point scale) to 3.68 ($\sigma = .883$), $t_{68} = -3.719$, $p < 0.001$. For enjoyment, mean perceptions of course enjoyment decreased from 3.61 ($\sigma = .861$) pre-Yammer to 2.90 ($\sigma = .894$) post-Yammer, $t_{68} = 4.40$, $p < 0.001$. For learning, mean perceptions decreased from 3.52 ($\sigma = .701$) to 2.94 ($\sigma = .809$), $t_{68} = 4.48$, $p < 0.001$.

Analysis of individual items showed that, with the exception of two items on class participation, there is a pattern of significant decreases in student attitudes following Yammer introduction, as can be seen in Table 2.

Table 2: Significant Pre-Post Student Perceptions Items ($\alpha = 0.05$)

Item	Pre-Yammer Mean	Post-Yammer Mean
I feel comfortable voicing my viewpoint in this class (post: …using Yammer)	3.25	3.77
I feel comfortable asking questions in this class (post:…using Yammer)	3.26	3.81
I feel I know my classmates better as a result of class discussions(post: …because of using Yammer)	3.07	2.55
I feel more comfortable with my classmates as a result of class discussions (post:…because of using Yammer)	3.21	2.90
The discussions we usually have during class time make me feel like the class instructor respects me (post: Using Yammer for class discussions during class time…)	3.55	3.19
The discussions we usually have during class time help me learn key course concepts (post: Using Yammer for class discussions during class time…)	3.56	3.01
The discussions we usually have during class time are important to my learning (post: Using Yammer for class discussions during class time…)	3.44	2.84
Overall, I enjoy this course (post: Overall, I enjoy this course more since we started using Yammer)	3.61	2.90
The discussions we usually have during class time make me feel like I could succeed in the class (post: Using Yammer for class discussions during class time…)	3.52	3.09
The discussions we usually have during class time give me confidence in my ability to learn about technology (post: Using Yammer for class discussions during class time…)	3.60	3.24
How challenging do you find this course?	2.73	3.28

7.2.3. Communication Apprehension

To evaluate communication apprehension, composite scores were created for each of the four constructs identified in the literature: interpersonal, group, meeting, and public speaking apprehension (see Bowen et al[42] for a discussion of composite score creation for factors). Composite apprehension scores could range from a low of 6 (extremely low comfort with communication) or a high of 30 for each construct; items describing tense or nervous feelings were reverse-scored so that higher composite scores would be indicative of greater comfort when communicating in the described situation.

Mean composite apprehension scores generally indicated moderate levels of comfort in each area, with students reporting the lowest levels of comfort with public speaking ($\mu = 17.69$, $\sigma = 4.71$). Each of the other three constructs had composite scores of 20 or 21.

After creating composite scores for each communication apprehension area, students were categorized as low-, moderate-, or high-comfort in each of the four constructs. A construct score of 6-13 points indicated low comfort with that communication area; 14-21 points indicated moderate comfort; and 22-30 indicated a high degree of comfort in that communication situation. Using these categories, student Yammer usage as it relates to communication apprehension could be evaluated with this data set. More complex modeling analyses to identify the role of communication apprehension (e.g., structure or factor models) would have required a substantially larger sample size than what was presently available.

Results of analyses indicated no significant influence of communication apprehension level on the pre-post perception areas identified as significant.

8. Discussion

The results suggest that using Yammer during this large lecture did indeed increase students' comfort with classroom participation. While that is an important benefit, it did not seem to outweigh the costs of using microblogging in this case. With the exception of classroom participation, other student perceptions collected post-intervention show a decrease in positive attitudes. Several factors may account for the low post-intervention scores.

First, Yammer was introduced in this course rather late in the semester, thus disrupting the interaction patterns the teacher and students had already established. The results suggest that the course instructor was successful at making students feel comfortable interacting in class even before the microblogging intervention. By the 13th week of the semester, the students had already gotten used to certain routines related to the class, which were abruptly disrupted by the introduction of a new tool. This disruption may account for the negative feelings associated with the use of Yammer. Moreover, students did not see the utility of introducing a new practice so late in the semester.

Second, the post-intervention survey was conducted during the most stressful time of the semester. It is possible that students' high stress levels caused by end-of-semester exams and projects may have influenced their overall perceptions and ratings of the course.

Third, it is possible that students do not perceive a strong connection between classroom participation and overall learning, teacher relationship, and motivation. Some of the qualitative responses to the question about what about Yammer helped students learn pointed this out. A few students claimed that Yammer helped them feel more comfortable asking questions, but not learn per se. The students seemed to perceive learning as being very much related to the information covered on tests and exams, and not to classroom discussion.

Fourth, it is possible that students, especially those who suffer from communication apprehension, may not value classroom participation as a method to help them learn, because they are uncomfortable with it in the first place. Also, some of the students stated that classroom participation and discussion are not desirable in a large lecture setting at all, and they prefer the traditional, passive model of listening to the lecture. Students already have a mental model of what a large lecture class is like, and increased participation may not factor well into that.

This study's implications for education are twofold: First, as both the qualitative and quantitative results suggest, microblogging can improve comfort with classroom participation in a large lecture setting. But second, increased comfort with classroom participation may not be sufficient to create a positive overall course experience. Before introducing tools such as microblogging in large lecture settings, instructors should consider the role classroom participation plays in the large lecture in the first place, and the costs and inconveniences associated with the use of a microblogging technology. From a research perspective, it may be that an intervention late in the semester is not desirable, because it disrupts already established interaction patterns.

The research literature on the uses of Web 2.0 tools in education is often very optimistic and enthusiastic about these tools' potential. Thus, many studies are eager to report actual or potential benefits of using social media in education. We contribute to this literature by documenting one of the benefits discussed in previous literature – that of increased participation and engagement. This study shows that microblogging in the large lecture classroom did indeed increase students' comfort with class discussion. However, this study suggests caution is needed when making the connection between class participation and an overall positive course experience. Increased comfort with classroom participation did not translate into increased perceptions of enjoying the course or learning. It is important for educational researchers to be aware of both benefits and drawbacks, and to accumulate data-driven evidence about the specific conditions when social media can help or even hinder student learning. This study makes a contribution to the body of data-driven evidence about the use of social media in higher education as it paints a nuanced picture of what students perceive as both benefits and drawbacks of using microblogging in the large lecture classroom.

9. Conclusion

This study inquired whether the use of microblogging in a large lecture setting could improve comfort with classroom participation for students with high communication apprehension. We introduced and used microblogging service Yammer in a freshman Technology course. We collected data about students' perceptions of classroom participation, teacher relationship, learning, and motivation before and after the introduction of the microblogging tool. The results suggest that using Yammer did increase comfort with classroom participation for all students, but not particularly for students with high communication apprehension. Even though perceptions of comfort with classroom participation improved post-intervention, perceptions of teacher relationship, learning, motivation, and the course overall decreased after the introduction of Yammer. The results need to be considered in light of the study's limitations, which include a relatively small and homogenous sample, the collection of data in one course and one setting, and the introduction of the microblogging tool very late in the semester. Further research is needed to explore how educators can optimize the use of microblogging for increased participation in the large lecture setting.

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