Microblog Use and Student Engagement in the Large-Classroom Setting

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BACKGROUND AND OBJECTIVES: Encouraging student engagement in the large-classroom setting can be difficult. Challenges include the depersonalized nature of the environment and the fact that students frequently find asking questions and participating in class discussion intimidating. Social media has the potential to address these barriers, but this has not yet been formally evaluated. Our study analyzed the impact of microblog use on students’ question-asking behaviors (an indicator of student engagement) in a large-classroom setting.

METHODS: Formative evaluation of a large-classroom medical humanities course identified microblog use as a potential tool to facilitate greater student engagement. A microblog was thereafter incorporated into the course. Student engagement was operationalized as question-asking behaviors before and after microblog incorporation.

RESULTS: Paired t tests showed that the total number of questions asked was significantly greater in the microblog-available classes, t (2)=12.12. In addition, significantly more individual students asked questions in the microblog-available classes, t (2)=17.39.

CONCLUSIONS: Our study, demonstrating an increase in question-asking behavior after incorporation of a microblog, has important implications for educators who seek to enhance student engagement and learning in the large-classroom setting. In addition, innovative use of emerging technologies (such as microblogs) as educational tools requires continuous assessment and iterative change to maximize benefit. More research is needed to evaluate what specific barriers to engagement are overcome by microblog use and whether microblog use can similarly benefit other courses.

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Student engagement, defined by Alexander Astin in 1984 as the amount of physical and psychological energy that the student devotes to the academic experience, has been demonstrated to enhance student learning and performance. Subsequent studies on student engagement have defined it as an active process in which a student participates in educationally purposeful activities. In the classroom environment, this may be best evaluated through analysis of students’ question-asking, question-answering, and participation behaviors.

Encouraging such behaviors, particularly in the large-classroom setting (defined as a classroom with >30 students) can be difficult. Challenges include the depersonalized nature of the environment and the fact that students frequently find asking questions and participating in class discussion intimidating. While one technique for encouraging participation is the use of small-group sessions, the logistics and expense of coordinating these sessions for a large number of students is often impractical. As a result, in-class lectures predominate in undergraduate and graduate medical education across the country. Consequently, development and incorporation of educational strategies and tools that encourage question-asking, question-answering, and participation behaviors in the large-classroom setting is of particular importance.

One promising strategy is the use of social media—a collection of internet web sites, services, and practices that support collaboration, community building, participation,
and sharing among users. Among these are (examples in parentheses): social networks (Facebook®), bookmarking sites (StumbleUpon®), social news (Reddit®), media sharing (YouTube®), blogs (Blogger®), and Microblogs (Twitter®). Research to date has both demonstrated that today’s tech-savvy students have a desire to utilize online educational tools and that there is a significant correlation between time spent with technology (including social media) and student engagement. Educators have reported that use of social media has encouraged student question asking, sharing, and feedback, promoted students’ discovery and exploration of dissonance, facilitated collaborative writing assignments outside of class, guided students in being more succinct in their writing, and prompted immediate reflection about a clinical or real-life experience, among others.

Among the many different types of social media, microblogs may be the educational tool of choice to facilitate question-asking, question-answering, and participation behaviors in a large-classroom setting. This is attributed, in part, to its ability to facilitate conversion of “cognitive communication 1.0” (in which there is a unidirectional transmission of information from instructor to student) to “cognitive communication 2.0” (in which there is multidirectional transmission of information: instructor→student, student→instructor, student→student, and instructor→instructor). In addition, the ease with which instructors can learn to use and thereafter incorporate microblogs into pedagogical efforts has resulted in their becoming the online platform of choice among teachers who use social media as an educational tool. The effect of microblogs in the educational setting has been to personalize the large lecture environment and decrease the sense of intimidation that stops many students from asking questions and engaging in discussion, thus overcoming two of the most common obstacles to student engagement in the large-classroom setting.

Microblogs allow individuals to post messages of up to 140 characters in length that others can view and to which others can respond. Depending on the site, students can sign in with a username that is identifiable, completely anonymous, or semi-anonymous (where the instructor can determine students’ identities, but the other students cannot). Students’ posts can be directly incorporated into an instructor’s slideshow, presented on a second screen, viewed at preselected break points during a lecture or simply left for the students, faculty, and/or teaching assistants to view, making the instructor aware of questions that they feel should be addressed.

At our institution, changes in a medical humanities course prompted an internal review, which revealed that student needs for engagement were not being met. Given the potential benefits of microblog use for student engagement (to specifically include question asking), we anticipated that its incorporation would address this unmet need. To investigate this further, we conducted formative research to identify an optimal microblog platform and thereafter evaluated its impact on question asking in the large-classroom setting.

Methods

Classroom Setting

All medical students at the Uniformed Services University participated in eight sessions of a medical humanities course called Human Context in Healthcare (HCHC) during their first 16 months of medical school, spaced roughly 2 months apart. During each session, students listen to three panelists tell their first-person narrative as it relates to topics that are both challenging and commonly encountered in medicine. Each panelist talks for 20 minutes, with a 25-minute question-and-answer session after the third panelist finishes.

Students are then tasked with writing a reflective paper, due 48 hours after the panel session. In their paper, they must (1) identify the reactions they had to one or more of the panelists’ stories, (2) explore the sources of that reaction (ie, personal experiences, family/cultural norms, etc), (3) examine the implications of their reactions for patient care, and (4) develop a plan to mitigate the negative and enhance the positive implications of their reactions. One week after the panel session, students participate in a facilitated small-group discussion (one faculty: eight students) during which they have an opportunity to share insights with one another and reflect further on the topic at hand. All panel sessions are audio-recorded, allowing facilitators who are unable to attend the large-classroom sessions to listen to them prior to reading student papers and meeting with their small group. Given the students’ task and the objectives for each session, promoting an environment in which students feel comfortable asking questions and participating in the large-classroom environment is important.

Formative Evaluation

In January 2013, as part of process improvement for HCHC, 14 students in the Class of 2015 participated in a focus group that evaluated the course and potential areas for improvement. Students characterized the large-classroom setting as intimidating and attributed low verbal engagement by students to this intimidation. They identified a microblog platform as a modality likely to decrease this intimidation and improve engagement. Students identified two barriers to social media use in the classroom: (1) a requirement for creation of a user account and (2) a lack of student anonymity.

Following this focus group, survey methodology extended these qualitative findings to the Class of 2016. An eight-item online survey was distributed to the entire class of 2016 (n=176) to assess their openness to
engagement using an electronic forum. A total of 116 students completed the survey, for a response rate of 65.9%. Results revealed that while less than 12% of students were comfortable asking questions verbally in class, more than 72% were comfortable asking a question using an electronic forum.

**Microblog Incorporation**
Starting in March 2013, students were invited to participate in a microblog question forum using TodaysMeet® during the large-classroom sessions of HCHC. The TodaysMeet® microblog neither requires dedicated technical support, additional software, nor creation of user accounts and allows for anonymous usernames, facilitating its use by faculty and meeting the needs identified by our students. Prior to the first session, students were given a 10-minute brief on the use of TodaysMeet® and had the opportunity to ask questions about the medium. Students were informed that the use of the microblog was neither compulsory nor would it affect their grade for the course. At the start of each large-classroom session, students were informed of the web address for the microblog question forum and instructed to use pseudonyms when logging in. Posts were neither tracked by the moderator (first author) nor the panelists during the session. Posts were tracked by a professor who passively observed for professional conduct and delivered student questions to the moderator during the formal question-and-answer time. Microblog transcripts were stored electronically at the end of each large-classroom session.

**Procedures**
Questions asked by the USU medical school classes of 2015 (before the medium was introduced) and 2016 (after the medium was introduced) during panel sessions on the topics of “Illness and Disability,” “Obesity,” and “Sexuality” were transcribed, quantified, and coded. In this way, we controlled for the impact that the topic might have had on question asking. Two medical students (fifth and sixth authors) listened to audio recordings of each session and transcribed verbal questions asked by students verbatim. Microblog questions were transcribed directly from the saved transcripts.

The primary outcome of interest was the number of questions asked per session. The secondary outcome was the number of students who asked questions. The medical humanities course studied here had an enrollment of 176 students. Attendance was not taken, but participation is compulsory, and moderator estimates indicate that the classes received near full participation. Therefore, 176 is used as the class enrollment for percentage calculations. To test for modality differences, paired t tests compared the total number of questions, the modality of questions, and the number of questioners per session before and after the intervention within the same topic. Data was analyzed using SPSS 22.0 (IBM, Armonk, NY).

This study received an exempt determination from the university’s Institutional Review Board.

**Results**
Paired t-tests demonstrated a statistically significant increase in the total number of questions asked in the microblog-available format as compared with the traditional format, \( t(2)=12.12, P<.01 \). There was no difference between the two formats with respect to the number of verbal questions asked; 14 verbal questions were asked over the course of both the three traditional sessions and the three microblog-available sessions (Table 1).

In addition to a statistically significant increase in the total number of questions asked, paired t tests demonstrated a statistically significant

<table>
<thead>
<tr>
<th># Students Who Asked Questions</th>
<th># Questions Asked</th>
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<tbody>
<tr>
<td><strong>Session topic</strong></td>
<td><strong>Traditional Model</strong></td>
</tr>
<tr>
<td></td>
<td>Verbal</td>
</tr>
<tr>
<td>Being ill</td>
<td>5</td>
</tr>
<tr>
<td>Obesity</td>
<td>7</td>
</tr>
<tr>
<td>Sexuality</td>
<td>0</td>
</tr>
<tr>
<td><strong>Mean # questioners per session</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Mean # of questions per session</strong></td>
<td>4.67</td>
</tr>
</tbody>
</table>

µMSG—micromessage
increase in the total number of individual students who asked questions in the microblog available format as compared with the traditional format, \( t (2) = 17.39, P < .01 \) (Table 1).

**Discussion**

We implemented use of a microblog forum to increase student engagement in the large-classroom setting. Implementation followed formative evaluation, offered valuable lessons learned, and led to iterative curriculum improvements. After implementation, students asked questions in a traditional verbal format and through the microblog. The availability of this alternate method for student interaction increased both the total number of questions asked and the number of students asking questions. Use of the microblog did not affect the number of questions asked verbally.

Although we included a focus group in the formative stage, our evaluation methodology was quantitative and cannot tell us why more students asked questions and/or why more total questions were asked. Possible explanations include: students felt less intimidated asking questions due to the anonymous nature of the online forum, students felt a greater sense of interest in (and thereby value of) their questions due to the creation of a second communication channel, students felt validated by peers expressing appreciation for their question in a microblog post and/or asking that question aloud, use of the microblog led to deeper reflection on a given topic by students and prompted more question asking, having an opportunity to ask questions at any time during the class caused students to not forget their questions, normalization of question-asking behaviors as a result seeing others’ questions being asked, students felt more comfortable asking a question in written form, students were more engaged by the kinesthetic experience of using an electronic device to post on the microblog and/or by playing an active role in the learning environment, the novelty of a new modality for engagement, and/or the appeal of technology in and of itself, something that may be of particular importance for today’s medical students. Future research should include qualitative student feedback to discover what barriers are overcome by the availability of the microblogging medium and how the medium overcomes these barriers.

Use of the microblog in our large-classroom setting has both provided lessons learned and helped us identify new educational opportunities for our students. As an example, students now ask far more questions during a session than could be practically answered during the class period. During the timeframe of our study, those questions posted on the microblog but not answered in class went unaddressed after the session ended. For the class of 2016, we changed this practice and sent unanswered questions to small-group facilitators for discussion in their small-group sessions. For the class of 2017, we have started sending unanswered questions to panelists shortly after the large-classroom session and then send panelist replies to all students by the end of the working day. Another example is that use of the microblog has offered students and faculty alike a window through which to view students’ professionalism. In order to decrease the intimidation known to be associated with student engagement and question-asking behaviors, we elected to have students use anonymous usernames. While the moderator instructed students to use a username related to a specific theme for each session (i.e., car make or model) and to be professional in their posts, these are guidelines to which students did not always adhere. Having examples of this behavior from the microblog transcripts facilitated discussion and student reflection on professional behaviors, including those demonstrated when using social media. Since this study was completed, we implemented a mandatory 30-minute class prior to the first HCHC session of the year during which groups discuss professionalism and social media, review examples of posts, and consider whether or not these posts are professional. At the end of this class, all students who want to use the platform in future HCHC sessions are required to sign a professionalism contract. In our first year, 100% of the students elected to sign the contract. In addition, students are each given a four-digit, semi-anonymous username known only to the course director and the student. In the four sessions since implementation of these changes, there have been 0 unprofessional usernames or microblog posts without a decrease in the number of students asking questions or the number of total questions asked per session. Both of the above examples demonstrate the continual process evaluation needed to optimize incorporation of emerging technology into the educational environment. These and other steps we took to optimize microblog incorporation can be seen in Table 2.

While the anonymity of the microblog environment may have increased student participation, it also limited our evaluation of individual factors associated with question-asking behaviors. We are not able to identify the age, gender, or other demographic factors of students who used the microblogs. Therefore, we cannot know how the microblog environment affected question asking among subsets of students.

The technology intervention implemented could facilitate student engagement in any large-classroom setting, but it does require resources. First, students had to have a computer or mobile device that could access the microblog site. This introduces the potential for both digital divide disparities and previously established negative effects of mobile device use in the classroom. Second, in our model, the moderator needed a confederate, such as a teaching assistant or another instructor, logged into the microblogs. Our confederate passively observed for professional
conduct and delivered student questions to the moderator that could be asked during the formal question-and-answer time but did not interact with students on the microblog. Of note, following completion of the second of the three microblog-available sessions in our study, we discovered that not only was the use of a confederate unnecessary, it was also potentially counterproductive. First, our students readily took ownership of delivering questions to the moderator. Second, using a faculty member to deliver such questions may cause students to cede responsibility for question asking to faculty, thus impeding student engagement. Prior to the third microblog-available session in our study, we stopped the practice of using a confederate. This may account for the increase in the number of questions and students asking questions verbally during that session as compared with the previous two.

**Limitations**

There are a number of factors for which our study did not account. The first is the impact of time constraints on our sessions. During the three sessions before implementation of the microblog, two of the three sessions ended without additional questions being asked despite time remaining. By contrast, for all three sessions after implementation, verbal questions were limited only by the amount of time allotted for the session, with multiple hands raised to ask additional questions at the end of each session. Given this, it is likely that the use of the microblog forum does increase verbal question-asking behaviors but that our environment limited our ability to identify this difference.

A second potential limitation is that there could have been an inherent difference in the question-asking propensity between the classes of 2015 and 2016. A third is that the moderator for the class of 2015 was different from the moderator for the class of 2016.

Analysis here neither included question quality nor pertinence to class topic. While it has been posited that questions that are not pertinent to class topic might impede student learning and performance, research to date demonstrates that off-topic

### Table 2: Stepwise Process Improvement to Increase Student Engagement

<table>
<thead>
<tr>
<th></th>
<th>Class of 2015</th>
<th>Class of 2016</th>
<th>Class of 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>• Desire for increased student engagement in the large classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Formative evaluation</strong></td>
<td>• Focus group showed students feel intimidated.</td>
<td>• Surveys showed students were open to a computer-mediated question-asking medium.</td>
<td></td>
</tr>
<tr>
<td><strong>Implemented solution</strong></td>
<td></td>
<td>• Microblog offered as student question-asking medium</td>
<td></td>
</tr>
<tr>
<td><strong>Evaluation</strong></td>
<td></td>
<td>• Increased number of student questions.</td>
<td>• Increased number of students asking questions.</td>
</tr>
<tr>
<td><strong>Lessons learned</strong></td>
<td></td>
<td>• More questions asked than can be answered during the session.</td>
<td>• Professionalism challenges emerged.</td>
</tr>
<tr>
<td><strong>Improvements</strong></td>
<td></td>
<td>• Transcription of unanswered questions given to facilitators before small-group session</td>
<td>• Professionalism contract • Semi-anonymous usernames</td>
</tr>
<tr>
<td><strong>Next steps</strong></td>
<td></td>
<td></td>
<td>• Transcription of unanswered questions given to panelists immediately after session, panelists answer questions, replies sent to students same day.</td>
</tr>
</tbody>
</table>
discussions can increase the quality of learning teams’ performance. In addition, we did not analyze the relationship between number of questions asked and quality of student learning. Finally, while question asking has been associated with student engagement, the relationship between the number of questions asked (either by an individual or a group) in a given time period and the quality of student engagement has yet to be evaluated. All of these serve as fruitful ground for future research.

Conclusions
This study is the first to evaluate question-asking behaviors before and after incorporation of a microblog into a large-classroom setting. Our findings, demonstrating increased question-asking behaviors, have important implications for all educators who seek to enhance student engagement and learning in the large-classroom setting. In addition, innovative use of emerging technologies (such as microblogs) as educational tools requires iterative change to maximize benefit. More research is needed to evaluate what specific barriers to engagement are overcome by microblog use, whether microblog use can similarly benefit other courses, and the impact of microblog use on student learning.

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The opinions and assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the US Department of Defense, the US Air Force, the US Army, or the US Navy.

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References