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ORIGINAL PAPER

GroupMe: Investigating Use of Mobile Instant Messaging in Higher Education Courses

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Abstract
In this study, the use of the mobile instant messaging (MIM) tool *GroupMe* was explored in the higher education context. The tool was used to facilitate online course discussions, small group work, and other course communications in face-to-face and online sections of two graduate educational technology courses. Over 900 postings were generated from 29 participants, then coded and analyzed by the researchers. Qualitative data was also obtained through an e-mail follow-up questionnaire. Findings indicate that the MIM platform afforded students opportunities to engage in productive course-relevant conversations and provided additional ways for learners to exhibit online social presence through tool features. Recommendations for the use of MIM to support teaching and learning and suggestions for further scholarly inquiry are discussed.

Keywords Mobile instant messaging · Online discussion · Higher education · Instructional technology

Introduction

Online Course Discussions

Online learning technologies can be used to expand educational offerings and facilitate global educational connections. An essential component of online learning is discussion, as performance tends to improve with active engagement in online course discussions (Cheng et al. 2011; Dalelio 2013; Goggins and Xing 2016; Thomas 2013). These computer-mediated communication (CMC) exchanges can be synchronous (in real-time) or asynchronous (at different times) (Winiecki 2003). Course discussion boards and other asynchronous discussion platforms provide opportunities for flexibility in interactions and active engagement among students and faculty through text, audio, shared files, and video (Devers et al. 2016). However, interactions between instructors and learners are challenged by a transactional distance that spans more than just a physical separation but involves educational and psychological distances as well (Moore 1993). *Dialog*, a core factor of transactional distance, is central to learner success and significantly influences learner intention to return for an e-learning experience (Goel et al. 2012).

Mobile Instant Messaging

Mobile instant messaging (MIM) apps can be used as part of an inclusive digital learning strategy (Gronseth and Zhang 2018). These apps can address the transactional distance through quick and simple text message communication between students and instructors, thus fostering a closer relationship between instructors and students and leading to better academic achievement (Nitza and Roman 2016). So (2016, p. 33) defines text messaging or "texting" as "the asynchronous mobile communication service between mobile handsets using SMS." Many students are familiar with texting in their personal lives, and using MIM tools as part of a course instructional strategy can build upon this prior familiarity (So 2016; Timmis 2012). Student reactions to the use of their personal mobile devices during learning have been quite positive (Lauricella and Kay 2013).

MIM tools enhance social presence (Tang and Hew 2017), foster communication and collaboration among students (Nitza and Roman 2016), improve access to learning materials (Bouhnik and Deshen 2014), and provide opportunities for

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peer support (Timmis 2012). MIM tools can support all four of Rovai's (2001) components of classroom community – spirit, trust, interaction, and learning – by facilitating anywhere, anytime connectivity to course interactions. MIM tools also facilitate peer support outside of required discussion groups (Timmis 2012), with some students using the apps to create new groups or continue existing groups beyond the end of a class (Bouhnik and Deshen 2014).

MIM tools can help instructors get to know their students and better tailor instruction to address specific issues in learning as they arise (Bouhnik and Deshen 2014; Nitza and Roman 2016; Wang and Morgan 2008). Bouhnik and Deshen (2014) found that students were more comfortable approaching instructors with questions when MIM tools had been a regular part of the course. MIM tools may be able to foster the kind of successful collaboration that Harris-John (2006, p. 1) identified happens "when there was instructor support, when classmates and instructors became acquainted with each other, when effective communication was established, and when trust was developed."

Conceptual Framework and Research Questions

It is important to note that the use of MIM apps can involve additional time commitments for instructors and students to engage in the instant messaging communication (Lauricella and Kay 2013). For instance, students and instructors may have problems with the amount of messages being sent and received outside of regular working hours. One way to address this is to mute or silence notifications (Bouhnik and Deshen 2014).

MIM apps tend to be quite cost effective for professors and students (Bouhnik and Deshen 2014), as they are often free and offer many features to support group communication and sharing of multiple media. With both mobile app and Web access, students and instructors can participate in course discussions using MIM from their preferred smart device or computer. Even with such promising benefits, MIM is still an emerging technology in which much of the support for its use in teaching and learning is anecdotal (such as Carpenter and Green 2017), and empirical support is limited.

In this study, we sought to understand the application of a MIM tool, hereafter referred to as *GroupMe*, as part of intra-course interactions. GroupMe facilitates discussion through short text messages (up to 450 characters), images, Web links, polls, and calendar items.

This study addressed the following research questions:

1. In what ways are learner activities evident in the GroupMe group?
2. How can GroupMe be used to support content- and general course-related activities?
3. What are learner perceptions regarding use, benefits, and challenges of GroupMe as part of course discussions?

GroupMe Mobile Instant Messaging Study

The use of GroupMe in two courses was examined using a case study research design in which data was collected within the specific and bounded time period of the courses in order to study and understand this singular technology. The technology is cross-platform (iOS/Android) and can also be accessed through a Web browser. Based on the research regarding MIM tools in education, our hypothesis is that the use of the MIM tool *GroupMe* would support social presence in the courses and facilitate immediate access to course interactions and activities.

Participants and Context

This study examines the use of GroupMe in two courses in a Learning, Design, and Technology graduate program at a public University in the south central US. "Integrating Technology into the Curriculum" (*Course 1*) was taught in Spring 2017, and "Seminar in Learning, Design, and Technology" (*Course 2*) was taught in Fall 2017. The first author was the instructor for these courses, and they each had face-to-face and online sections. Each course spanned 15 weeks.

The participants in this study were 29 master's and doctoral students between the ages of 24 to 54 years old who were enrolled in the courses and contributed to the course discussions on GroupMe. Twenty students participated as part of Course 1, and sixteen students participated as part of Course 2. Seven students were enrolled in the face-to-face sections of the courses, and 22 students were enrolled in the online sections of the courses (with seven students enrolled in online sections of both courses). Institutional Review Board approval was obtained for this study.

Data Collection and Analysis Procedures

A GroupMe group was created for each course, and students in both the face-to-face and online sections were invited to the course group via the email addresses from the course rosters. Written instructions for how to join the group were also provided as part of course materials in the initial weeks of the courses (see Fig. 1).

Discussion prompts were embedded into the activities throughout both courses (see Table 1). The prompts tended to be personal application and reflection questions in which students could connect course content to their related prior, current, and future educational experiences and work. Many of the discussions incorporated a student discussion leader who contributed to the writing of the discussion prompt and the facilitation of the class discussion. Supported conversation was embedded into the prompts through directions to tag other users in follow-ups and replies. Students were also

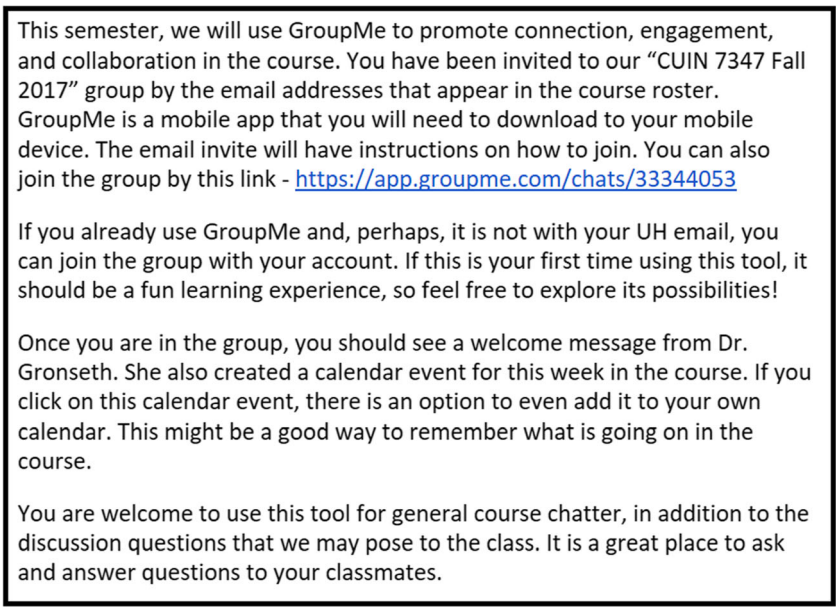

Fig. 1 Instructions to students for joining course GroupMe group

Table 1 GroupMe discussion prompts from two educational technology graduate courses

Course 1 Discussion Prompts

- *Week 2a* - What are two to three key takeaways from the "Teaching with Tech" article?
- *Week 2b* - Complete the Marshmallow Challenge with a few friends or family members. All you need are 20 sticks of spaghetti, one yard of string, 1 standard size marshmallow, and one yard of masking tape. Set a timer for 18 min and see how high you can build your structure! The marshmallow needs to go on top, and the structure should be free-standing for you to measure at the end of 18 min. Post the height of your structure and share pictures.
- *Week 3* - Explore question archives and shared resources from Week 2, and identify something of interest, such as a new tool, an article, a website resource, an idea, a tip, a story, etc. that you think is useful/helpful/insightful to our study of technology integration in teaching and learning. Share your finding.
- *Week 4* - Select and explore one of the instructional technology tools from the resource list. Write an engaging blog post in which you describe the educationally relevant tool and how the tool could be used in the teaching context in which you are most interested. Share the link to your post.
- *Week 6* - Reflect on your biggest takeaways from the Module 2 activities. Write an interesting blog post about this and share the link to your post.
- *Week 10* - Identify a key takeaway from this week's presentation and/or a reflective thought stemming from this week's readings and share it.
- *Weeks 12 and 13* - (Within breakout groups) Share updates with your group about what you are working on for the UDL Project and the progress you have made thus far (text description, web link, photo, screenshot, etc.).
- *Week 14* - (Within breakout groups) Share your completed UDL Project. Review two or more of your classmates' work, and write at least two positive feedback comments and one way to improve for each project you review.

Course 2 Discussion Prompts

- *Week 3a* - Consider your next steps after graduation and target career goals. Post your thoughts and reply to a couple of your classmates (you can use @mention to identify them by name).
- *Week 3b* - Come up with a metaphor for educational technology. The text mentions "cement" because the blend is adjusted based on needs, it is outcome-oriented, and is used to support and sustain something for a long time. Share the description of your metaphor and be sure to mention how values are represented in it.
- *Week 4* - Are teaching and training that different? Choose a position to argue - either the differences or the overlaps between teaching and training. You can support your argument with references and/or examples.
- *Week 5* - Describe how educational technology is systematic. Post your thoughts, example ideas, and any supporting resources.
- *Week 6* - What are two highlights from your critique paper? What did you find most challenging about this assignment? Are there any lingering questions that you have about your article or writing a critique paper?
- *Week 7* - In an effort to enhance student engagement and effective learning, give an example of how you can create or have created a smart learning environment in your classroom.
- *Week 8* - What are some ways the future of educational technology can emerge in regard to emerging technology like flipped classroom, gamification, and 3D printing?
- *Week 9* - As technology becomes an integral part of education in the future, how do you see the roles of the teacher and the learner shifting during this change? Also, how much of a necessity is it for classrooms to be equipped with individual learning devices for all students?
- *Week 11* - What are the major barriers of successful technology integration? What can be done to ensure effective integration of technology into learning, instruction, and performance? Suggest some solutions.

encouraged to use the platform to ask questions and share ideas and resources. During one of the Course 1 modules, breakout groups consisting of 4–6 students each were created out of the main course group to facilitate focused discussions around course sub-topics.

After the courses concluded, the activity within the GroupMe groups was analyzed using the GroupMe Posting Analysis Instrument (see Appendix Table 2). Postings included activity status updates that recorded participant actions within the GroupMe group (such as joining the group and "going to" an event), poll and event items, and text and shared media messages. The analysis instrument was developed by the researchers to consistently record posting details of message text, length of posting, post type, post category, post date/timestamp, GroupMe features applied, and additional reviewer comments. Both researchers initially coded 53 postings with 94% inter-rater agreement. Coding differences were reviewed and discussed until 100% agreement was reached. Coding of the remaining postings was divided between the two researchers.

In addition to the posting analysis, qualitative data was obtained from four participants through a follow-up email questionnaire. The questionnaire was based on So's (2016) validated instrument on the use of another MIM tool, *WhatsApp*, in instruction. The questionnaire addressed student perceptions of the utility of GroupMe as part of their course experiences and its impact on their social presence in the courses. It also contained open-ended questions that provided insight into some of the benefits and challenges that students experienced when using the tool.

Results

A total of 1061 postings were collected from the two courses. Of these, 942 postings were completed by the student participants, and these were coded and analyzed for this study. There were 654 postings from Course 1 and 288 postings from Course 2. Messages were the primary posting activity in the courses, with 82% of postings ($N = 769$) composed of messages; the remaining 18% of postings ($N = 173$) were activity status updates [such as "(Participant name) is going to 'Week 8 - 3.1 Emerging Technologies'"] and polling items. Participants averaged 26 postings each, with a range of 6–65 postings per participant. Postings per participant were higher in Course 1 (M = 32.7, SD = 15.74) than in Course 2 (M = 18, SD = 10.32); t(34) = 3.219, $p = .003$.

Lengths of each posting were automatically calculated using the Google Sheets formula = COUNTA(SPLIT(C2, """)). The average post length for all postings, including both messages and activity status updates, was found to be 37 words. Regarding the message type only, the average post length was slightly higher at 43 words. There was found to be a significant difference in the average post length for message type only between the courses, with Course 1 (M = 35.28, SD = 38.06) less than Course 2 (M = 60.35, SD = 41.16); t(767) = −7.989, $p = .000$.

About 71% of the postings were directly related to course content (such as posting a response to a discussion prompt). The remaining activity consisted of 26% general non-content course-related (such as asking a question about how to access a course reading), 2% general academic (such as asking for reading app suggestions), and 1% social non-academic (such as sharing about one's family). Figure 2 illustrates the distribution of posting categories.

Participants employed several features of the GroupMe platform. Messages and shared media offered the capability for users to tag others, and about 18% ($N = 173$) of the postings across both courses contained tagged users. Users had the option to "like" postings, and about 18% ($N = 171$) of the postings from the courses received one or more "likes." Though there were a variety of types of postings including messages, events, shared media, and activity updates, users tended to mainly "like" message-type postings. About 57% of messages that included a shared photo received one or more "likes" as compared to 20% of text message postings that received at least one "like".

The instructor posted the weekly course materials as calendar "events" in the platform. The events included direct links to instructional handouts and offered the ability to be easily added to one's personal calendar (see Fig. 3).

Users could indicate whether they were "going," "undecided," or "not going" to a course event, and this appeared as an activity status update in the group's message stream. Activity status updates also included actions such as being invited to and joining the group, and they offered another glimpse into ways that users were interacting on the GroupMe platform. Most (70%) of the activity status updates analyzed related to users "going to" a course event.

About 62% of platform activities ($N = 584$) were completed during the typical American work week (Monday-Friday), with the remaining postings completed on weekends (Saturday/Sunday). About 56% of the platform activity ($N = 525$) occurred in the evening to late evening hours (4:01 pm to midnight). The most popular timeframe was 4:01–8 PM (29.6% of postings), and the least platform activity was recorded in the overnight hours between 12:01-4 AM (3.5% of postings). Figure 4 displays the daily timings of all posting activity.

An analysis of postings by face-to-face and online students was conducted to investigate if there were differences in GroupMe activity between course delivery formats. Postings per participant were not significantly different between face-to-face (M = 29, SD = 22.55) and online (M = 25.48, SD = 13.50) sections of the courses [t(34) = 0.540, $p = .593$].

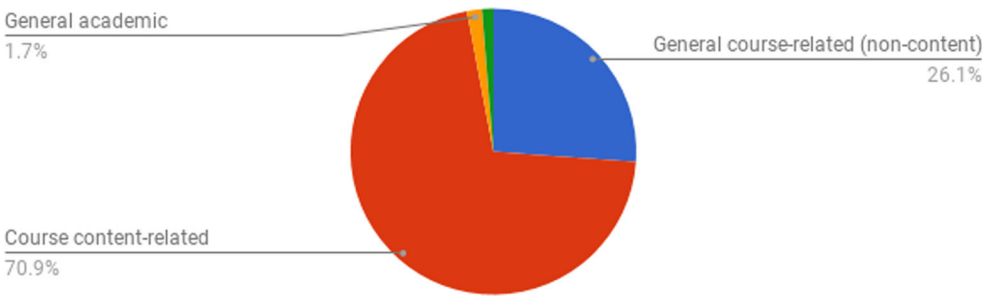

Fig. 2 Categorization of postings

However, the average word count length of message postings was significantly higher by those in the online sections (M = 46.16, SD = 41.95) than postings by those enrolled in the face-to-face format (M = 33.13, SD = 34.76); t(767) = 3.820, $p = .000$.

From the follow-up e-mail questionnaire, participants seemed to find GroupMe to be an easy-to-use technology and overall indicated that they felt comfortable engaging in conversations on the platform. The "ease of use and multimedia capabilities" were listed as benefits, and the tool provided "an inviting atmosphere through an easy-to-navigate platform" and encouraged "thoughtful and impacting engagement."

Participants described how their use of GroupMe impacted their learning experiences. One student described how the platform was conducive to open conversation –

> It let me to hear others opinion about a subject matter. In GroupMe, we openly discussed about questions, assignment, and other subjects related to our course, even if it wasn't assignment. Student collaborated with each other and were respectful for others [*sic*].

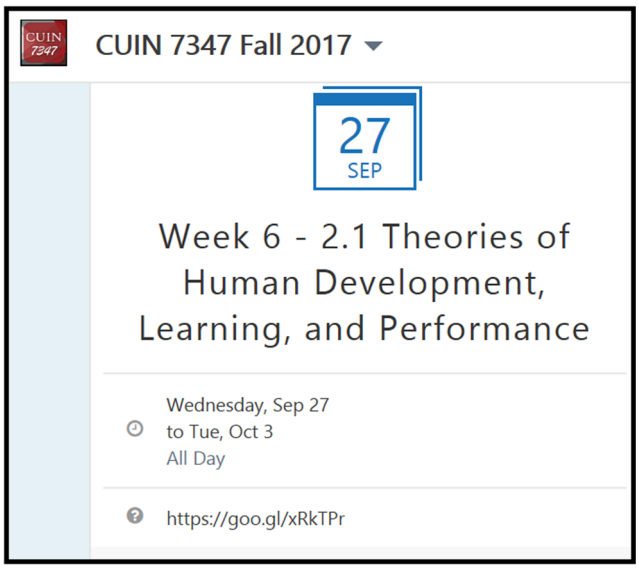

Fig. 3 Course event posting for a weekly unit of course activities

Another participant highlighted the characteristic *instantness* in mobile *instant* messaging, remarking that, "The quick access to group discussions was helpful." There seems to be a limit to the benefit of immediacy, with some participants wanting to create more space between themselves and course interactions. This was the perception of one of the face-to-face students - "I had to uninstall the app on my phone. I found the constant updates a bit irritating. When class was over, class was over for me."

As part of the course group, students could easily create and invite classmates to other groups on the platform, and some students took the initiative to do this during the two courses. One of the students described this further –

> In one assignment, our group chose to use it as our way of contact and sharing with each other. It was not required, but others and myself felt it was the best way to work on a team project.

As a tool external to the LMS, it is possible for group members to continue access and conversations beyond the conclusion of a course. One student mentioned her desire to maintain the connections established during the course and continue the discussions -

> I wish students would continued their collaboration after course finishes. But, they looked at it as an assignment that should be done. For me, it was more like a collaboration and communication tool for online course [*sic*].

Discussion

This exploratory case study of the use of GroupMe as part of discussion activities within two educational technology graduate courses in face-to-face and online formats offers instructors and course designers insights into learner perceptions and instructional applications of the tool. The course groups afforded students opportunities to respond to discussion prompts through text-based, asynchronous messages. Productive, course content-related discussions were observed

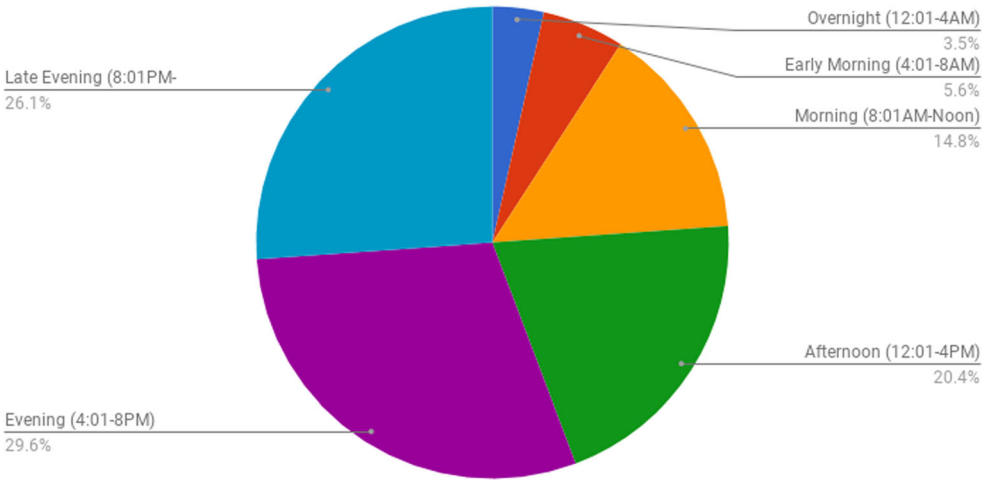

Fig. 4 Time of day posting activity

during its use in both courses. It also offered other ways for learners to exhibit their online social presence, including shared photos and resources, activity status updates (such as "going" to a course event), and "likes" on other postings.

Course 1 had a significantly higher rate of postings per participant than Course 2. However, GroupMe was the primary platform used for discussion in Course 1 and was one of several discussion tools used in Course 2. Posts also tended to be longer in Course 2 than in Course 1. This may have related to the ways that the discussion prompts were structured. As is shown in Table 1, most of the discussion prompts in Course 1 were open-ended, experience-based questions. This is contrasted with the prompts from Course 2 that were often connected to concepts introduced in the course readings and presentations. Because GroupMe postings are not threaded, the group discussion space can be better optimized when discussions are focused on one topic at a time.

Topics that would require extensive specific feedback and replies may not be best suited for the platform. As was used in the latter part of Course 1, breakout groups can facilitate peer feedback and simultaneous sub-topic discussions within smaller groups. Breakout groups can also support group work and enable instructors to monitor individual contributions to group collaboration and assist with answering questions, as needed. Breakout and small groups may also be initiated by the learners and provide opportunities for learners to be socially present (e.g., Tang and Hew 2017) in actively discussing course concepts and activities within their sub-groups.

Though face-to-face students attended on-campus sessions in addition to engaging with their classmates (both face-to-face and online) in the course groups on GroupMe, their posting frequency was similar to the online students. Sometimes, the asynchronous GroupMe discussions were extended into the face-to-face class time so that learners could further reflect on and communicate their thoughts on discussed topics. Thus, the face-to-face postings tended to be more succinct than those from online learners.

The instantness of the mobile instant messaging platform was seen as both a benefit and a challenge by participants. Some students are likely to prefer class activities to occur during regular working hours, while others may embrace the always-on characteristic of the platform. Discussions using MIM tools can occur over extended periods of time, such as through a unit or module. For such extended discussions, app notifications can be enabled so that users are notified when new messages are posted, or they can be turned off. It is worthwhile to note that some users are likely to enjoy the immediate access to discussions, but the notifications can become disruptive to other activities. When using GroupMe, instructors can provide students with instructions on how to mute notifications after hours or suggest that students use the GroupMe website if phone notifications become bothersome.

Learners in this study found the GroupMe app to be accessible and mobile friendly. It could be accessed more easily than the course LMS that had a lengthy login process. Further, though GroupMe and other MIM tools can support group conversation within courses, they can also provide opportunities for learners to continue conversations and collaborations beyond courses. Even when student access to an LMS course site is discontinued at course close, it is possible for conversation to continue in the MIM group. These tools may also offer such connective spaces for other groups of learners who may share similar programs of study, research areas, or social interests.

MIM tools like GroupMe can contribute to effective pedagogical practices for face-to-face and online instruction at the higher education level (e.g., Bailey and Card 2009; Chickering and Gamson 1987; Chickering and Ehrmann 1996). For instance, the immediacy of connections to course discussions and ability to ask questions and share relevant thoughts and ideas supports engagement, timeliness, and communication, as advocated by Bailey and Card (2009). MIM tools can provide another means for contact between students and faculty, which offers an additional pathway to span

transactional distance challenges of the online format (Moore 1993), support reciprocal learning among students, and contribute to promptness of feedback (Chickering and Gamson 1987). They can also help to maximize student time on task (Chickering and Ehrmann 1996), as they offer mobile and Web access to the group discussion spaces in an asynchronous, flexible format.

Limitations and Areas of Further Research

The findings of this case study reflect the uses and perceptions of students relating to the incorporation of GroupMe as part of the instructional strategy for two educational technology graduate courses. The findings and interpretations are meant to inspire further investigation and consideration of MIM technologies in higher education course design, and further research is needed to support greater generalizability. The application of MIM in the two courses for this study was not only part of the teaching strategy of the courses, but it was also relevant to the instructional technology focus of the courses. Learners in these courses may have been more willing to try this new, emerging technology during course activities than learners in other content courses might have been.

Several avenues await follow-up investigations, including the use and impacts of MIM tool features in the educational context. In the present study, more than half of the shared photo messages received "likes" by others in the course group, and a follow-up study could explore student motivation impacts in regard to the use of "likes" and emoji reactions. Another area of further research relates to instructor perceptions in using course announcements, instructor-student direct messaging, class polls, and general course communications within the MIM app. Follow-up studies could investigate the utility of instructor sharing of course material links, study guides, and calendar items through an MIM platform.

Conclusion

MIM tools, such as GroupMe, can support timely interactions as part of face-to-face and online courses. MIM can foster instant connectedness that may contribute to community building and student-to-student collaboration. The present study offers some initial insights into uses of GroupMe in graduate educational technology courses. Further exploration can equip instructors to use MIM to design engaging and motivating activities that maximize the affordances of this educational technology. This knowledge may also contribute to understandings about how learners can benefit from using MIM tools for discussion activities and for the development of the classroom community.

Compliance with Ethical Standards

Ethical Approval This study was approved by the researchers' Institutional Review Board, and all procedures involving human participants were in accordance with these ethical standards.

Conflict of Interest The authors declare that they have no conflict of interest.

Informed Consent Informed consent was waived per the IRB approval as this was retrospective.

Appendix

Table 2 GroupMe Posting Analysis Instrument

1. Message text
2. Post length (automatically calculated)
3. Type of post
   - ○ Activity status update
   - ○ Message
   - ○ Event
   - ○ Poll
4. Post category
   - ○ Course content-related
   - ○ General course-related (non-content)
   - ○ General academic
   - ○ Social (non-academic)
5. Posting date/timestamp
6. GroupMe features applied
   - ○ Tagged user
   - ○ Like
   - ○ Web link
7. Additional comments: _____

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