Fostering Student-Student Interactions in a First-Year Experience Course Taught Online during the COVID-19 Pandemic

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Online college courses can lack much-needed student interactions without live synchronous sessions. The need for socialization is particularly important for first-year students and has been of particular concern during the COVID-19 pandemic, when isolation is the new norm outside the classroom. Here we provide a perspective on the use of online synchronous sessions in a first-year biology course that encouraged student-student interactions and employed the culturally responsive teaching approach. We used group assignments, modeled on the jigsaw method, during our meetings and provided extra time outside of the dedicated class period to foster student collaboration, conversation, and social presence. We noted high attendance and participation in the synchronous sessions, suggesting effectiveness of the methods we used in student engagement and satisfaction.

INTRODUCTION

Student-student interactions are key to effective teaching and learning and an important component of community building for undergraduate students (1–3). Instructors of online courses are therefore encouraged to provide a platform for interactions between students. Forums and discussion boards on learning management systems (LMS) are commonly used in online courses to facilitate these interactions (4), yet their asynchronous nature and lack of real-time dialogue can make them feel forced and artificial. Students post but easily disengage from the forum, and they may struggle to get to know their classmates. Given that social contacts for students have been limited by the COVID-19 pandemic and the associated lockdowns, fostering classroom socialization in online courses is particularly important at this time. The importance of student-student interactions is likely even higher for incoming students who are experiencing college courses for the first time and have a strong need for building a community at their institutions (5–7).

One way in which instructors of online courses can foster student-student interactions is by including synchronous class “meetings” using a live videoconferencing platform. These sessions can provide real-time interactions between students and the instructor when a portion of class time is designed to actively involve everyone. For example, interactional activities such as breakout rooms in small groups, where students discuss or work together on a task, allow students to engage in conversation and get to know each other. However, it is important to note that these prescribed activities in live video meetings largely miss out on the “organic” socialization that face-to-face classes afford before or after class session. With the first-year experience for many freshmen students being entirely online and limited to class time, more effort to provide additional space for student-student interactions outside of the dedicated class time is needed.

Here we describe the strategies and tools we used in a first-year general education course for undergraduates that fostered interpersonal interactions and a sense of community among our students. We designed the course with equitable teaching strategies in mind, where all students engaged in activities and had a voice (8). Further, we purposefully provided space for student conversations and for students to establish their social presence (the sense of being present and “real”), which has been shown to positively impact students in an online learning environment (9). Overall, we found high attendance (Fig. 1) and participation among our students, suggesting our approach was effective in maintaining student engagement, creating an interactive learning environment, and developing social connections. Student responses from midpoint and end-of-course evaluations were also favorable (see Student evaluations, below).

Students and course structure

The Men’s Health course in this study was taught online during fall 2020 at Morehouse College, Atlanta, Georgia.
This first-year course is part of the general education curriculum for non-science majors and predominantly consists of first-year and transfer students. In fall 2020, the class size was 21 students. Each week, we held two 50-minute synchronous sessions (using the real-time videoconferencing tool Zoom or Blackboard Collaborate Ultra), in which student attendance was strongly encouraged but not required. We provided a third optional synchronous session that we used as “office hours” and as a back-up session in case of unexpected problems, such as regional power or internet outages, for half of the semester. We avoided traditional hour-long lectures during the synchronous session and instead relied on minilectures that, at most, provided 10 min of information via PowerPoint slides. The class was modeled after the flipped classroom approach (10, 11) where students had access to the course material (reading, videos, supplemental resources, etc.) at least 1 week prior to each synchronous session and were expected to complete specified tasks prior to the synchronous session. We invited questions from students during and following minilectures and implemented inquiry-based activities during the synchronous sessions (see Fostering student-student and student-instructor interactions, below). All synchronous sessions were recorded and posted on the LMS as soon as possible following the session. This allowed students who did not attend the synchronous sessions to view the recordings, as well as to review the videos for the students who did attend the synchronous sessions.

Formative and summative assessments were used to allow both instructors and students to monitor progress toward achieving learning outcomes. Formative assessment tools were designed to identify misconceptions and learning gaps. During the synchronous session we provided the students with a link (in the chat) to a survey or concept quiz to complete during the meeting. For students who did not attend the synchronous session, links to the assessments were posted on the LMS to complete within a week. Additional concept quizzes as well as written assignments (short essays and discussion boards) were posted on the LMS to complete asynchronously within a specified time frame. The synchronous assessments allowed us to adjust delivery of materials and revisit concepts in real time, while the asynchronous assessments assured that the learning of all students was gauged and considered. At the end of each unit was an asynchronous summative assessment consisting of two parts, a timed online test (delivered via LMS) and an open-book essay. Due to COVID-19 pandemic changes to the academic calendar, the fall 2020 semester at Morehouse College was truncated to 14 weeks.

Considerations of first-year students and diverse learners

We strategically designed the course with the first-year students in mind. Foremost, the pacing of the materials covered, assignments due, and reading load ramped up over time. We dedicated a session for a virtual library tour and demonstration of how to search for articles and books, with an associated assignment to practice these skills. Further, during the first half of the semester, we provided quick study tips at the beginning of some sessions. An example of a study tip was to recall and write down two things the students learned during the session; we then asked the students to do this at the end of the session. This form of retrieval practice (12) required students to capture the main points and key details, but also helped students to reflect on their learning. In addition, we created a highly visible section on the course shell of Blackboard Learn, which we called “First-Year Student Advice,” where we posted resources first-year students might find helpful, including short tutorials on using Blackboard Learn, tips on reading textbooks, and tips on succeeding in college. We also included information about the writing center and health center.

Engaging diverse learners

Several strategies were used to engage diverse learners, loosely structured around the five principles of inclusive teaching as outlined in the Guide for Inclusive Teaching at Columbia (13). The principles are: (i) establish and support a class climate that fosters belonging for all students; (ii) set explicit student expectations; (iii) select course content that acknowledges barriers to inclusion; (iv) design all course elements for accessibility; and (v) reflect on one’s beliefs about teaching to maximize self-awareness and commitment to inclusion (13). We will briefly discuss their implementation here and note that many of these strategies are also described in greater detail throughout this article. In alignment with principles (i), (ii), and (iii), in our online
discussions, whether synchronous or asynchronous, we used names and pronouns used by students and provided opportunities for students to engage with each other online to help students feel more connected to each other and build a sense of community. We frequently communicated student goals and expectations and were responsive to student suggestions and requests. As an example, a student shared the following regarding essays: “I want to give my best, but I am still not 100% sure of what the teachers would like to see in my essay responses.” To address this concern, we endeavored to be clearer about assignment instructions and how to submit assignments on the LMS, as well as sharing rubrics and criteria used for assessment. In addition to our virtual office hours, we were responsive to student e-mails within 48 h to most messages, and we periodically checked in with students through our “wellness checks” (see Fostering a sense of community, below). We also intentionally used resources and materials that were relevant to the subject of men’s health and that were sensitive to the social and cultural diversity of our students. In alignment with principles (iv) and (v), we were mindful that all students may not have access to reliable Internet and devices (e.g., webcam, microphone), so we offered alternatives for students to access materials online, for instance, sharing PDFs of PowerPoint slides and embedding videos and links that require less bandwidth for students who might be accessing course material from mobile devices. Additionally, offering synchronous and asynchronous elements and sessions ensured that all students, regardless of time zones, had an opportunity to engage with course materials, peers, and instructors. Providing recordings of the sessions also meant that the material could be viewed at any time and that students could repeat sections of the recording that were unclear. One limitation is that the recordings did not include transcripts and captions. However, as instructors, we were also keen to verbally describe images and diagrams so that students who have difficulty seeing the visuals or those reviewing the recordings could still comprehend visual content. Lastly, we did not presume that all students were in a space that provided them with an optimal or ideal learning environment. We described our own challenges in teaching and learning online from home during COVID-19 to break down barriers and modeled expected online behavior. We also encouraged students to actively share feedback on their learning experience to further build a sense of community and student engagement.

Fostering student-student and student-instructor interactions

Synchronous time together was focused on activities that invited the students to engage with the material and fostered conversation among them. We often included activities based on the jigsaw method, in which students were broken down into groups, with each group working on a distinct task (14). For example, we provided students with online resources, asked them to “investigate” different popular diets (Mediterranean, keto, paleo) and to provide answers to questions about their assigned diet in a Google Doc. A link to a shared folder with the Google Docs (one per diet) was made available to the class and posted on the LMS for all to reference. Students were randomly assigned to breakout rooms and each group reported back to the rest of the class with their answers. The sizes of the groups varied between two and five students, depending on the activity. The leading instructor moved between groups to check in with the students and to provide additional instruction when needed. Breakout rooms allowed all students to collaborate on the assignment and engage in conversation in their group, without distractions from others in the class, as can occur in face-to-face format. Another strategy we used to engage all students was the Think-Pair-Share activity (8) in which we posed an open-ended question (e.g., “Is exercise or how you eat more important to your health?”), paired students to discuss the answer in breakout rooms, and share their thoughts with the rest of the class upon regrouping. Students reported feeling energized after completing group work in breakout rooms (i.e., rooms closed), and we noted increased willingness to speak and contribute to the class conversation.

Fostering a sense of community

In addition to the structured class time, we provided space for student dialogue at the end of the two synchronous sessions by remaining in the meeting room until all students signed off. We set the precedent that dialogue was encouraged by starting a synchronous session once a week with a “wellness check,” where we asked students about their past week. For example, we requested the students to use the chat to provide a flavor of ice cream that best represented their past week and asking several students to share the reason for their choice. While not all students chose to engage, these “wellness check” activities helped us to build rapport with the students. We found that at the end of the synchronous sessions, numerous (~10) students remained in the meeting room for an additional 10 to 30 min past class time to ask questions related to the course, share their thoughts, and discuss their online college experiences. We also used the chat feature to communicate with students. This sometimes included private direct messages, and the chat feature was frequently used for student-to-student conversations. We also offered students the option to go into a separate breakout room to converse. Overall, we strove to offer an open and inclusive environment for our students to express their thoughts, ideas, and concerns during this time. Students engaged with the instructors, and our conversations varied from topics of the collegiate experience to COVID-19-related challenges. The optional synchronous sessions, which were often attended by half the class (Fig. 1), provided additional space for questions and dialogue. Attendance in optional sessions did not provide
Finally, we were intentional about employing culturally responsive teaching strategies in our online learning. Culturally responsive teaching and design creates an environment that acknowledges, celebrates, and builds upon the cultural capital that learners and instructors bring to the classroom (15–17). Recognizing the importance of identity, especially in an online environment during a pandemic where students might feel isolated, whenever possible we included images of African American males and non-white people that our students could relate to (see Fig. S1 in supplemental materials). We included information, questions, essay prompts, and reading that directly addressed some of the challenges faced by the African American population (e.g., health disparities, disproportionate impact of COVID-19; for specific examples, see supplemental materials). Further, we acknowledged current events including civic unrest related to social justice (i.e., protests ignited by the death of George Floyd, Ahmoud Arbery, Breonna Taylor, and other unarmed Black individuals whose deaths drew public attention and elicited a widespread outcry) and environmental disasters (e.g., wildfires in the western United States) that impacted our students.

**Technological tools**

We used freely available technological tools (Table 1), namely, Google Drive and the associated web-based applications, Google Docs, Google Drawing, and Google Slides. We also employed real-time response activities using the polling feature within the videoconferencing tool, Poll Everywhere or Kahoot!, which engage students quickly (Table 1). These tools are easy to use and do not require downloading software or logging in, allowing quick and seamless delivery of activities during the synchronous session. Besides these tools, students independently connected via a phone messaging app GroupMe without our prompt. We took advantage of this student initiative and created a GroupMe group for the course to provide a fast and easy way to connect with the instructors. We favored using Zoom over Blackboard Collaborate for synchronous sessions because it allowed us to view all participants’ video display, which we encouraged. It is important to note that we did not gauge student’s preferences and perception of these tools.

We used Google Drive in several different capacities: (i) sharing one Google Doc with the class and asking each student to answer a question or respond to a prompt (e.g., write out a function of a given organ). Activity prompts were randomly assigned to the students at the start of the session and were based on previously provided reading and videos on the LMS. In a similar fashion, we used Google Drawings and asked each student to label parts of a diagram (see Fig. S2 in supplemental materials). In this approach, one document is used by the entire class, which can be used as a study aid for assessments. (ii) We distributed a copy of a Google Doc as a handout or worksheet that was individually completed by each student during the synchronous session and was “handed in” at the end of the session or by a certain due date. This was achieved by creating a link to share a Google Doc and changing the ending of the link from “/edit?usp=sharing” to “/copy” (for step-by-step instructions see supplemental materials). Upon clicking the new link, a copy is created such that each student has an individual document in which they answer questions and prompts. The document can then be “handed-in” by sharing a link with the instructor or downloaded for submission as .docx into the LMS. This approach allows for a quick distribution of materials to students and bypasses logging into email or the LMS to download the file. (iii) We shared a Google Drive folder which contains multiple Google Docs for group work that was completed during the synchronous session. The shared folder included separate Google Docs for each group with prompts and questions for each to

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**FIG 2.** (A) Total number of sessions attended in relation to points earned in the course. Each point represents an individual student. Simple linear regression indicates the trend is not significant ($P = 0.13$). (B) Number of optional synchronous sessions attended in relation to points earned. Linear regression results show no significant relationship between optional session attendance and total score ($P = 0.68$).
answer during the allotted time for group work. The documents were also provided asynchronously on the LMS to allow for groups of students to complete assignments together or individually. This approach yields the documentation of students’ work and assessment of the group work at a later time, as well as availability of all the files to the students.

Limitations

Our approach to online teaching has limitations. While most of the students attended the encouraged synchronous sessions, those not in attendance did not have the experience of real-time interactions with instructors and completion of inquiry-based activities with peers. This course design is therefore not equitable for all students, a concern that could be remedied by requiring attendance in all synchronous sessions. While the synchronous sessions were recorded and posted on the LMS, viewing these videos does not replace the benefits gained from class attendance. Students who attended more sessions tended to have a higher final point score for the semester, although this trend was not significant ($P=0.13$) (Fig. 2A). It is important to note that shortly before the end of the semester, our institution implemented the option for students to choose pass/fail grading for their course grade, which may have impacted some students’ efforts toward gaining all points possible.

Additional limitations to our approach stem from reliance on the videoconferencing platforms to provide synchronous sessions. We encountered delays of real-time video, audio, and screen sharing when using Blackboard Collaborate, which resulted in class time lost.

Student evaluations

Student evaluations of the course are important, although we note that they may not be a reliable measure of teaching effectiveness (18). Here we include feedback we received from our students regarding the course gleaned from a midpoint course evaluation. The survey was web-based and developed using Qualtrics survey software. The survey was designed to assess attitudes toward this course and contained several types of items: yes/no questions,
rating scales, short-answer item, and space for comments. The items dealt with attitudes toward this course, the logistics of this course, the instructors, and questions about overall student experience. Institutional Review Board (IRB) approval was obtained (protocol #570002057) and student participation in the survey was anonymous and voluntary. Students who clicked on the Web link were directed to the Qualtrics survey, where they were required to consent online before completing the survey.

The response rate for the midpoint survey was 62% (13 out of 21). Results from the midpoint evaluation informed instructors’ approach and allowed us to be mindful of students’ personal situations and barriers to their learning. As an example, the majority of respondents, 54% (7 out of 13) felt that synchronous course activities and assignments were very effective or extremely effective, while 46% (6 out of 13) indicated they were moderately effective. In contrast, 38% of respondents (5 out of 13) felt that asynchronous course activities and assignments were very effective or extremely effective, compared with a total of 62% (8 out of 13) indicating these asynchronous activities were not at all effective to slightly effective (31%, 4 out of 13) and moderately effective (31%, 4 out of 13). Given these responses, and that the majority of students were attending the twice weekly synchronous sessions, the instructors decided to encourage attending synchronous sessions three times a week (Fig. 1). At the midpoint, students also responded favorably to using Google online tools to create, store, and share files, with 69% of respondents (9 out of 13) indicating this was very effective to extremely effective. Students also did not indicate an overwhelmingly negative issue with the pace of the course, as captured in student comments: “For me the course started off a little fast because I still was not able to balance my time effectively for college online courses. But I am glad the speed of the course maintained the same, because it forced me to learn what works best for me and what doesn’t and it helped me create a good study schedule.” Additionally, when provided the opportunity to freely respond to, “What has been most helpful for your learning in this course so far?”, student responses centered around engagements during class, actual discussion, and when the instructor gives small classwork group assignments that are only assigned for in-class completion. While the students rated all the instructors well, we do note that students seemed to respond more favorably toward the instructors who more frequently used active online learning strategies. As an example, in response to the query, “Briefly describe the time(s) in this class when you were most engaged,” several respondents cited sessions when Dr. Majewska was the lead instructor, as exemplified by one of the students responses: “During the lecture when Dr. Majewska was the primary instructor and created group activities every class.” This emphasizes students’ positive response to the frequency of active online learning activities. An end-of-course evaluation was also created and deployed to students. This evaluation focused broadly on the online laboratory experience of this course. It is still being assessed and is therefore not included here.

CONCLUSION

We taught an online course with two synchronous sessions per week that fostered student-student interactions via group work in breakout rooms and student-instructor interactions following class time and an optional third synchronous session once a week. For group work, we employed Google Docs to quickly distribute files to students and to facilitate student contribution to shared documents. While we did not measure the effectiveness of our approach, the degree of participation in our course and dialogue from students strongly suggest our approach to online teaching created an engaging learning environment for first-year students. Future work should examine the use of breakout rooms and the time instructors dedicate to student conversation outside of class time in relation to student learning as well as satisfaction with the online course. Also, more work is needed to investigate culturally responsive teaching design in online courses and how it impacts students, particularly in minority-serving institutions.

SUPPLEMENTAL MATERIALS

Appendix 1: Examples of materials used in the online course and detailed directions on manipulating Google Docs.

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