Classroom Management Strategies to Improve Learning Experiences for Online Courses

Janani Hariharan[a] and Susan Merkel[b]

[a]*School of Integrative Plant Science, College of Agriculture and Life Sciences, Cornell University, Ithaca, New York, USA*
[b]*Department of Microbiology, College of Agriculture and Life Sciences, Cornell University, Ithaca, New York, USA*

INTRODUCTION

Many institutions have seen a surge of hybrid classrooms brought about by the COVID-19 pandemic. However, hybrid learning can be a complicated experience for both instructors and learners (1). Online instructors may find themselves distracted by additional tasks, such as navigating new technology and communicating with different groups simultaneously, especially if they do not have prior online teaching experience (2). Learners must also deal with technological challenges that can diminish their class engagement and increase feelings of disconnect from their peers and instructors.

To explore these concerns, we administered a survey to assess student experiences in a hybrid microbiology classroom, particularly how students interacted with classmates and the impact of modality on grades. Here, we summarize key insights and recommendations that could enhance intentional student engagement in future hybrid, online, or in-person courses.

PROCEDURE

BIOMI 2500: Public Health Microbiology was offered online or in-person at Cornell University in the Fall 2020 semester. Lectures were constructed in flipped-classroom style with readings and reflection questions assigned before class. Class time was evenly distributed between lectures and small-group active-learning activities that built on concepts from the preclass assignments. The class was comprised of about 30 second-, third-, and fourth-year students.

We used Likert-type and open-ended questions to obtain information about student learning preferences and classroom experiences for all students, as well as camera use and breakout room behaviors for the online-only group. Twenty-six students (18 online and 8 in-person) provided consent to use their complete responses for research purposes (IRB protocol no. 2009009851). Mean grades were calculated as the average of three open book tests, with the intention of investigating the relationship between study variables and student outcomes.

CONCLUSION

There was no difference between the mean grades for the in-person and online student groups (mean grades for in-person and online groups were 82.1% and 80.8% respectively; $P = 0.38$, 2-sample t test), which is consistent with other studies (3). Mean grades classified by student group(s) and individual tests are shown in Table 1. However, our survey results suggest that the online and in-person populations displayed differences in their class behaviors and participation. We suggest the following strategies to engage groups of students in a hybrid or online course.

1. Create consistent small groups to increase familiarity, which results in higher engagement and increased class contributions

We assessed participation in small-group activities by asking students to self-report whether they contributed more than, the same as, or less than their peers. Students who perceived themselves as contributing more had a higher mean grade (83.5%) than those who thought they contributed less (79.5%; ANOVA, $P < 0.1$ for the class and $P < 0.05$ for the online group) (Table 1), which is consistent with the idea that helping

TABLE I
Individual and cumulative class assessments grouped by students' chosen modalities and self-contribution ratings

Parameter	Mean grade ± SD			
	Test 1	Test 2	Test 3	Cumulative
Self-contribution rating				
Low	79.8 ± 12.8	78.8 ± 10.4	80.5 ± 11.9	79.5 ± 11.7
High	83.6 ± 10.1	84.2 ± 12.9	82.6 ± 9.9	83.5 ± 10.8
Modality				
In-person	83.5 ± 10.2	81.4 ± 12.8	81.2 ± 11.8	82.1 ± 11.2
Online	80.5 ± 12.7	80.4 ± 11.5	81.4 ± 11.2	80.8 ± 11.6

behaviors and social problem-solving skills are linked with higher achievements in small-group work (4, 5). Consistent groups (in class or in breakout rooms) seem to contribute to students' comfort level in contributing, which may impact how well they understand content. Below are direct quotes from an open-ended question about small-group interactions.

Student A: "It was especially helpful to be in breakout rooms with our [project] groups as it helped create a connection between us and we started to communicate and ask each other questions outside of class."

Student B: "[.. or ...] I find that everyone stays silent in the larger, randomized groups. I recall a discussion on horizontal gene transfer where we all disagreed and pleaded our cases which once we got the answer made it so I remembered it much better."

2. Encourage students to turn their cameras on in breakout rooms by reminding them of the benefits of camera usage

Camera use in Zoom breakout rooms was driven by peer behavior, with 94% of online students reporting that they turned off their cameras because they did not want to be the only ones with cameras turned on, and 80% reporting that their peers were using their cameras less frequently than they did. Following other students' leads was the top reason for keeping cameras turned off, followed by feeling self-conscious about their appearance (65%) and an unstable Internet connection (59%).

Given the last two reasons in particular, we do not condone making camera use mandatory. Students may also wish to maintain their privacy at home for other reasons, and so we did not institute a mandatory camera usage policy in this class. A more detailed discussion of camera use policies in introductory biology courses can be found elsewhere (6).

3. Offer active learning activities that are tailored to the online learning experience

Online students reported feeling less engaged than in-person students, with difficulties focusing and being motivated and citing technical problems, difficulty accessing in-class material, and less attention given to online students during discussions. Strategies like allowing extra time to transition to groupwork in online settings and providing both written and oral instructions for activities would help ameliorate these issues. Students indicated that interactions in Zoom breakout rooms provided important metacognitive benefits and opportunities for perspective taking. Intentional engagement is critical for the online community, as they face different barriers to participation than in-person students (7).

Student 1: "[sic] the in-class assignments are actually pretty helpful in learning some concepts that I didn't immediately understand just from lecture. when a concept from the lecture was unclear. [sic] i could ask group members during breakout room discussions."

Student 2: "This experience pertains to an in-class discussion about which type of test is more appropriate to use in an airport. We had already done the pre-class assignment so we knew what the types are. [sic] however we had varying opinions on which one would be best suitable. This was helpful because we were able to explain which one we thought was best. [sic] therefore helping with our own understanding and providing more information and perspective to others in the group."

4. Lecture recordings and transcripts should be made available for all students

Both online and in-person students noted the increased access to class material as a benefit of online learning. Recordings and transcripts were identified as useful tools for reviewing concepts before tests and excellent tools for students with disabilities, who reported a strong preference for submitting electronic assignments rather than handwritten ones. Online resources can also help compensate for technical issues during synchronous classes and students participating from different time zones.

While online learning may not become the default instruction modality anytime soon, many colleges and universities will likely continue this practice to an increasing degree. Online groups often need more time and intentional practices to connect with instructors and peers. This may require

substantial effort from educators, but such efforts could result in unexpected benefits (8). The challenge moving forward will be to work with changing learning environments and to recognize and retain the potential benefits of different learning modalities.

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