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Student mental health and engagement of students in a large online classroom setting during a global pandemic

Nina Molin Høyland-Kroghsbo

Department of Plant and Environmental Sciences
University of Copenhagen

Preface

This project addresses student mental health and student engagement in a large online class setting. The challenge of engaging a large group of students during lectures has been exacerbated by the global SARS-CoV-2 pandemic, which has resulted in excessive E-learning. Online teaching formats restrict the classical didactical tools, however new ones are being introduced.

This project was motivated by the challenge of engaging a large crowd of students over zoom during these "corona" times. Now, more than a year into the pandemic, I assumed that the students might be very tired of this format, potentially suffering from "zoom fatigue". Therefore, I planned to engage the students via the online response system Mentimeter during zoom lectures and introduce "walk-and-talk" to allow students to build relationships in smaller groups while at the same time increasing their energy level and their creativity. Simultaneously, mounting accounts of declining student mental health due to social distancing and online teaching and an email from a concerned student spurred me to have an increased focus on student mental health.

Background

This report addresses the course Microbiology, NPLB14012U, which is taught in year 1 or 2 of the B.Sc. programs Biotechnology, Natural Resources, and Animal Science at the University of Copenhagen. Approximately 130 students enroll each year. The course is divided into four modules of two-week laboratory exercises in addition to lectures and theoretical group work. I taught the first module, consisting of laboratory exercises, a group-based laboratory report and theoretical group work and gave five of the lectures. I also graded the assignments for module 1 and designed and graded a part of the written exam. Just weeks prior to course start, the University of Copenhagen decided that we would be teaching exclusively online.

Research question

I aimed to address student mental health and to test and evaluate different learning tools for engaging a large group of students over zoom. My aim was for the students to feel motivated and engaged during my teaching activities to better facilitate their learning process and at the same time counteract "zoom fatigue".

Methods

I intended to engage the students in a large online classroom using the online student response system Mentimeter to allow students to ask questions anonymously and to create interest/maintain focus during zoom lectures by introducing variation in my teaching e.g. via quizzes. I also planned to use "walk-and-talk" while splitting the class up in smaller groups in breakout rooms. I assessed outcomes by evaluating the quantity of questions/engagement via Mentimeter, the zoom chat, and oral participation via the microphone in zoom, combined with student feedback via a questionnaire in Mentimeter.

Walk-and-talk

Famously, physicists Lise Meitner used long walks in the woods to come up with some of her most wild and groundbreaking ideas, such as nuclear fission. Tech entrepreneurs, the late Steve Jobs and Mark Zuckerberg

both used walking meetings to help them spark new ideas. Oppezzo and Schwartz showed that the practice of walking, does indeed improve creative thinking during- and shortly after periods of walking, whether it be indoors or outside. Notably, while walking increases ones capability to generate new ideas or come up with creative solutions, defined close-ended problems are better solved while working stationaryly (Oppezzo & Schwartz, 2014).

Zoom fatigue

"Zoom fatigue" is a condition caused by prolonged video chats via online platforms such as Zoom. The phenomenon has become common due to online teaching and meetings during the social distancing efforts to mitigate the consequences of the pandemic. Bailenson has argued for nonverbal overload as potential cause of zoom fatigue and highlighted four key aspects of prolonged video chats that cause zoom fatigue (Bailenson, 2021). These are:

1. Prolonged eye contact. Everyone can constantly see everyone else and the image of the speaker can become unnaturally large in size on a monitor, causing the brain to interpret that as a threat.
2. Seeing oneself on camera. Constantly seeing oneself is stressful and increases self-awareness.
3. Reduced mobility. The natural physical movement is limited during video chats.
4. Increased cognitive load. Nonverbal communication is more challenging to send and receive during video chats.

I imagine that walk-and-talk would be particularly useful for addressing all these points, while also increasing energy levels and creativity.

Results

Mental health

I was concerned that many of the students would be dealing with mental struggles due to excessive online teaching and social distancing. An internal UCPH survey reported on September 18 2020 that during the 2020

lockdown, many students experienced a lack of social and curricular activities, which resulted in a lack of motivation. International studies similarly show that students are suffering (O'Byrne et al., 2021). Therefore, I chose to address this challenge that many of the students might be facing by creating an anonymous poll in Mentimeter. To the statement "I am totally fine mentally" with 1=strongly disagree, 5= strongly agree, 77% of students answered and the average score was 3.2. Four students stated that they strongly disagreed, which was highly concerning. I followed up by presenting student counselling resources available at UCPH, a free counselling organization for youths and young adults (Headspace.dk), and a website with information to increase sleep quality (JustHuman). Next I explained that I would be using Mentimeter to vary my teaching, and to allow the students to pose questions anonymously (in order to decrease anxiety with speaking in public) and that I would use walk-and-talk to get the students to get fresh air, to get acquainted with the others in their 3-4 person groups and also increase their energy level for the remainder of the afternoon of zoom teaching.

A student noted anonymously: "*you have been particularly good at being aware of our mental health and I feel that you have captured our motivation and have included everyone. Really cool with walk and talk! Some of the best teaching I experienced in a while* " (This quote and all other student quotes have been translated from Danish).

Mentimeter

One pedagogical challenge for teaching large groups of students is to create a welcoming and respectful teaching environment, which will allow all students to feel confident in participating actively. From an earlier interview with students, I learned that speaking up via the microphone during zoom can create more anxiety of speaking up compared to the physical classroom setting. Moreover, in a physical classroom, shy students can approach the teacher before or after the class to pose questions without everyone else listening. This option for direct answers or feedback one-on-one is not readily available during online teaching of a large group of students. Therefore, I chose that the students could pose questions via anonymous speech bubbles in Mentimeter, via the zoom chat, or via their microphones, whichever option was more comfortable to them. These different degrees of anonymity offered the students a range of options for participating according to their comfort level and mental capacity.

I observed that in connection with my first lectures, students initially posted questions via the anonymous option via Mentimeter, as I answered questions from Mentimeter and affirmed and validated their questions, more students posed questions via Mentimeter and via the chat function. Eventually, during later lectures, students began commenting on each other's questions in the chat and some students also voiced follow up questions orally via their microphones. This pattern suggests that the students initially felt more comfortable posing questions anonymously and that they progressively became more comfortable with posing questions connected with their name via the zoom chat or orally via the microphone. After the first two-week module, I asked the students to rate the degree to which they found anonymous questions via Mentimeter, the zoom chat, and orally via the zoom microphone function motivational/useful for posing questions, with 1 being strongly disagree and 5 being strongly agree. 41 % of students answered and they scored 4.0 in agreement with Mentimeter and the zoom chat being motivational/useful, suggesting that most students were comfortable with these two options. The answers regarding using the microphone were more diverse with a score of 3.6, indicating that the students were less comfortable with this option (Figure 1).

A student noted anonymously: "*I experienced… clear engagement regarding answering questions from the chat, and also by using Menti a lot to engage us during the lectures*."

In addition to lecturing during the first module of the class, I also gave the final lecture. During that lecture, I noted that most students preferred posing questions via the chat and their microphone, compared to the anonymous Mentimeter option, suggesting that by the end of the course, the students had collectively gained more confidence in being able to voice their questions in connection with their name.

One student noted anonymously: "*You have managed to create a good and safe space for us, which I have not experienced during zoom teaching, so thanks*!"

This statement, in connection with my observation that the students progressively preferred to ask questions directly, suggests that initially allowing students the option of anonymity in a large class setting can create an environment where also students with anxiety of voicing their questions can contribute, and potentially over time gain confidence and participate orally.

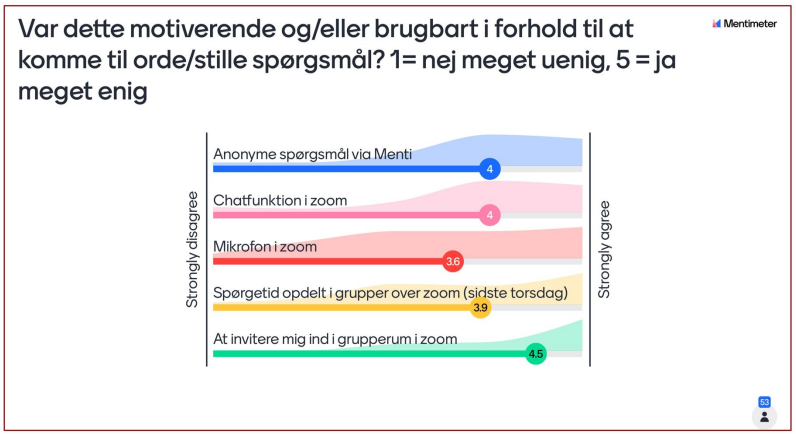

Figure 1. Evaluation of different didactic tools allowing students to ask questions and participate orally. Translation: "Was this motivational/useful in relation to having a say/posing questions? 1=no strongly disagree, 5=yes strongly agree. 1. Anonymous questions via Menti. 2. Chat function in zoom. 3. Microphone in zoom. 4. Office hour divided in groups over zoom (last Thursday). 5. Inviting me into breakout rooms in zoom." The students filled out this evaluation during the final day of the first two-week module during the course. 53 students (41%) evaluated the walk and talk.

Walk-and-talk

In an attempt to mitigate zoom fatigue among the students and to allow them to get acquainted in their 3-4 person groups, before having to write reports and do assignments together, I chose to introduce a walk-and-talk. I planned this on the 2nd course day, which was a full day of morning lectures from 8 AM and group work in the afternoon until 4 PM. I scheduled the walk-and-talk after the two morning lectures, to change the physical environment and increase the students' energy levels for the afternoon group work.

Regarding the timing of the walk-and-talk, students noted anonymously:

"*Walk and talk was also a good way of getting to know the group before group work started (I was new in my group*)."

"*I really like Nina's lectures. Especially Walk-n'-talk. It is scheduled on a pretty good time point (during the day and thematically).*"

"*Walk and talk was fun and I feel that it was a useful element – because these days there is only time for efficient zoom teaching and the "recess" has been taken away from us – walk and talk was like a recess – nice that one was allowed to talk to others*."

The first statement suggests that introducing the walk-and-talk served as an ice-breaker for the students within the groups prior to the more challenging groupwork that followed, an opinion shared by the majority of the students (Figure 3). The other statements indicate that planning a walk-and-talk in the middle of an all-day zoom teaching session can be perceived as a much-welcomed break, although the students were very much engaged with learning during the walk-and-talk (Figure 2).

Since walking is great for enhancing creative problem solving, but not for solving very specific problems, I designed questions with multiple answers, where the students could draw from engaging with- and analyzing their physical environment, demonstrate how to use their theoretical knowledge from my previous lecture and from the curriculum, and apply these skills in group discussions: "Where do I find compounds that inhibit bacterial growth. 1. In my kitchen, 2. In my bathroom, 3. During my walk, 4. On my body"

Figure 2. Student answers to the question "Where do I find compounds that inhibit bacterial growth in my kitchen". The question was discussed in groups of 3-4 students in zoom breakout rooms, while the students were walking with portable devices outside for 30 min. The students answered the question in Mentimeter after the walk. One person from each group answered. The more times the same answer came up, the larger the font appears in the plot.

The group discussions were followed up by a dialogue in plenum. The thematic diversity in the student answers (Figure 2), suggests that the students engaged with the topic and that they demonstrated their competences in analyzing a physical environment by identifying diverse classes of inhibitors of bacterial growth (e.g. agents that affect pH, temperature, salinity, osmolarity, damage DNA, disinfect, and antiseptic agents). During the 30 min session, I joined breakout rooms to check in on the students, and all were in high spirit, enjoying some fresh air. This notion is supported by the following anonymous student statements:

"*You have been good at reformatting the teaching so that it has been more motivating even though one is sitting behind a screen all day. Cool with walk and talk and lots of group work*".

"*Thank you for walk and talk, I think it was a good way to engage the learning process"*.

I asked the students to evaluate the walk-and-talk during the afternoon the same day, and the students were generally very satisfied with this teaching and learning activity (Figure 3). Beyond the students engaging actively in with the topic, which is conductive of learning (Illeris, 2000), the vast majority of the students reported that it increased their energy levels, which likely served to mitigate zoom fatigue during the group work later in the afternoon.

Figure 3. Evaluation of walk and talk. Translation: "Walk and talk: if you participated, to what extend do you: 1=strongly disagree, 5=strongly agree. 1. Walk and talk increased the collaboration in the group (e.g. icebreaker). 2. Walk and talk gave a better sense of being present with the group compared to an ordinary zoom breakout room. 3. Walk and talk helped find creative answers. 4. Walk and talk boosted by energy. 6. I would like more walk and talk's via zoom during this course. 6. I would like to have walk and talk in person in future courses." 36 students (28 %) evaluated the walk and talk.

Regarding the group work that followed after the walk-and-talk icebreaker, I introduced the assignment in plenum and answered immediate questions from the students. Then I sent the students into their groups via breakout rooms. I stayed on zoom and the students could invite me into their zoom rooms as needed. Most groups did this during the 3h group work ses-

sion. I noted that almost all students had their cameras on, which indicates that this interaction was less intimidating and/or less mentally draining for the students. The interaction and the questions from the students in this more intimate setting resembled the interactions I have with smaller groups of students in the physical classroom. The students rated this activity at a 4.5 out of 5, which shows that they felt engaged during this activity (Figure 1). This indicates that even in a large online classroom setting, the use of breakout rooms, under the right circumstances, can create meaningful learning settings for the students.

Discussion

Student participation in polls via Mentimeter ranged from 28-77 % for the data presented here. There is a risk that the students who did not participate in the surveys had opinions that differed significantly from the average student answers that I have based this report on. Nonetheless, the students who did answer gave very detailed feedback, which has enabled this analysis.

While Mentimeter is easy to use for students because it is compatible with multiple devises (computers, smartphones ect.) and shows the replies in real time and anonymously, one student was very vocal about not liking the platform, which disturbed the teaching situation to some extent. Switching between slides, the zoom chat, and Mentimeter, while being relatively easy, still consumed a bit of the time for discussion with the students. Therefore, the use of such technology should be used thoughtfully and introduced only where it facilitates inclusivity or enhances student engagement and intended learning outcomes.

It can be argued that students should be able to participate in an academic debate and pose questions aloud. However, many students, particularly those who have speaking anxiety or suffer from imposter syndrome, will rarely speak up in a large class setting. Montgomery, in her book on academic mentoring, states that when we fail to care for a plant, we do not judge it for its inability to thrive. Instead, "*the caretaker must be able to recognize its current and evolving needs and then identify and acquire the necessary resources*." She argues that in the same way, when students are not thriving, we should not presume that they are weak or have personal deficits, but rather identify and adapt their environment, so that they can grow (Montgomery, 2021). I observed that during my first lecture, most students preferred the option of using Mentimeter for posing questions anony-

mously and progressively during my teaching and particularly during my final lecture at the end of the course, the students preferred to ask questions with their name associated in the zoom chat or aloud. This indicates that allowing students the option of anonymity for posing questions in a large class setting can create an environment where also students with anxiety of voicing their questions can contribute, and as the students grow comfortable in the teaching environment, they are more likely to speak up.

Regarding the walk-and-talk, I worried that most students might not be familiar with this format, and thereby it could cause technical issues. Another risk with this format was that students without a portable zoom compatible devise could not walk outside. This could contribute to inequity during the exercise. However, these students would still be able to participate in the breakout room from their computers and stand or walk around, and therefore I judged that the benefits on student engagement as a whole by participating in this exercise would overall outweigh the risk of detrimental effects. Contrary to this worry, this format turned out to be inclusive for a SARS-CoV-2-positive and quarantined student, who was able to participate in the group work, which would not have been possible prior to the recent explosion in online teaching platforms. Therefore, online tolls can be used in the future to facilitate group work for students who are for whatever reason homebound.

I introduced walk-and-talk in the first module of the course, and because it was not continued throughout the course, it could be perceived as confusing and not in congruence with the rest of the course. However, as most students found that it served as an ice-breaker for the subsequent group-work, which in itself has merit.

Conclusion

My initiatives to increase student engagement in a large online teaching setting were overall successful. The students appreciated that I addressed their mental health. They also generally reported that Mentimeter worked well for allowing them to pose questions and to engage them during zoom lectures. Lastly, the students were extremely positive about the concept of walk-and-talk. They reported that the walk-and-talk facilitated their collaboration in the groups, increased their energy levels, and increased their creativity. Unexpectedly, one student even reported that this teaching and learning activity felt as a “recess”.

Perspectives

Prior to the global SARS-CoV-2 pandemic, poor student mental health was a concern, but the ramifications of the pandemic has now underscored the importance of this topic is for students' wellbeing and ultimately for their learning. The response from the students regarding my focus on their mental health suggests that it would be beneficial to address this topic with the students in the future, and especially during times of enhanced stress. I imagine that addressing student mental health systematically and particularly during major events such as a pandemic or thesis work would benefit the students.

Although this report addresses student engagement in a large online setting, my findings are transferable to the physical classroom as well. Specifically, the use of Mentimeter to engage the students during lectures and as an option allow all students to pose questions anonymously in front of the class, will both serve to increase student learning and also facilitate active participation by students suffering from speaking anxiety, and thereby make the teaching environment more inclusive and allow diverse students to thrive.

Lastly, the students enjoyed the walk-and-talk greatly, in spite of the students communicating virtually while walking. In-person walk-and-talks will likely promote students' group interactions even more when in-person.

Acknowledgements

I would like to acknowledge the brave and hardworking students whom trusted me by engaging in my exercises, by sharing their experiences with me, and offering me their opinions and feedback throughout the Microbiology class of 2021. I have learned a lot from them and I hope the rest of their education will be filled with meaningful in-person teaching activities and "recess".

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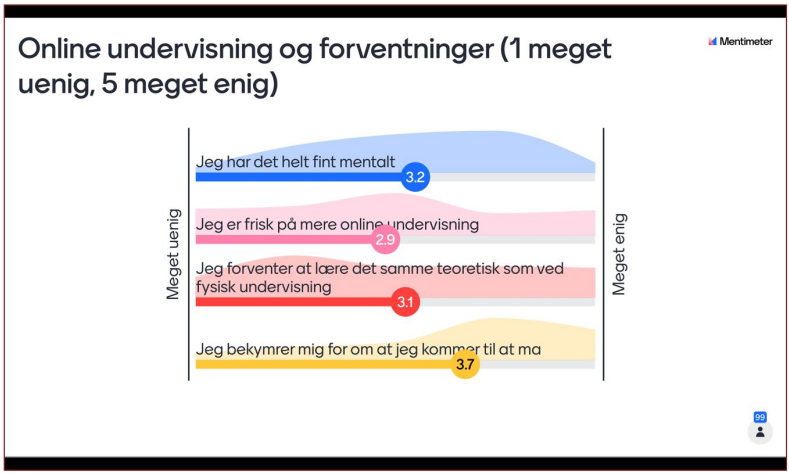

"Online teaching and expectations. 1. I am totally fine mentally. 2. I am ready for more online teaching. 3. I expect to learn the same theoretically as with in-person teaching. 4. I worry that I will [lack specific technical skills]". 1=no strongly disagree, 5=yes strongly agree. Anonymous questions via Mentimeter. 99 students answered (77%).