

## Five practical strategies to get a grip on large group cooperative virtual learning in medical education Cinq stratégies pratiques pour réussir l'apprentissage coopératif virtuel en grand groupe dans programmes de médecine

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Published ahead of issue: May 30, 2023; published: Sept 8, 2023. CMEJ 2023, 14(4). Available at <https://doi.org/10.36834/cmej.74240>

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### Abstract

The COVID-19 pandemic has led to the rapid replacement of in-person classroom learning with virtual large group learning. Done well, virtual large group learning can be an effective tool that provides flexibility, accessibility, and collaboration between learners. However, despite its potential benefits, human and technological challenges limit engagement and overall efficacy of large group virtual learning. The following account provides an evidence-based framework to maximize cooperative learning, learner engagement and retention of medical education in the virtual setting.

### Résumé

La pandémie de la COVID-19 a rapidement entraîné le remplacement de l'apprentissage en classe en personne par l'apprentissage virtuel en grand groupe. Bien conçu, l'apprentissage virtuel en groupe peut être un outil efficace qui offre souplesse, accessibilité et possibilités de collaboration entre apprenants. Malgré ces avantages potentiels, les défis humains et technologiques limitent la participation à l'apprentissage virtuel en grand groupe et son efficacité générale. L'exposé suivant propose un cadre fondé sur des données probantes permettant de maximiser l'apprentissage coopératif, la participation des apprenants et la rétention des connaissances enseignées virtuellement dans les programmes de médecine.

### Introduction

With the COVID-19 pandemic, medical education has rapidly transitioned, resulting in the accelerated uptake of virtual learning.<sup>1,2</sup> Done well, virtual large group learning can reach a broad audience,<sup>1,3</sup> provide flexibility for remote learners,<sup>1</sup> foster meaningful interactions,<sup>2</sup> and support multiple learning styles,<sup>2</sup> offering cost effective and efficient solutions even beyond the pandemic.

Outlined in the framework of cooperative learning, techniques that facilitate a culture of collaboration by cultivating positive interdependence, individual and group accountability, interpersonal and small-group skills, group processing, and face-to-face promotive interaction result in strong cooperative learning.<sup>4</sup> Learning processes that focus on cooperation rather than competition are seen to be

more effective.<sup>5</sup> While large lecture environments erode this cooperative environment, virtual learning may further exacerbate the issue, decreasing interaction and immediate feedback between peers and teachers.<sup>6</sup> This is particularly troublesome in medical education, which unlike other branches of science, heavily incorporates peer-to-peer and student-teacher feedback through interactive simulations, case-based learning, and supervised patient interactions to teach communication, history, physical exam, and clinical reasoning skills that are unique.

Virtual learning may also be monotonous, have technical delays, and typically does not engage learners to the same degree as traditional face-to-face environments.<sup>1-3</sup> As student engagement with course material is an important predictor in their learning,<sup>3</sup> there is a need to make virtual

learning cooperative, engaging and adaptable in medical education. As such, we will discuss five practical strategies that our institute has implemented to promote engagement and encourage best practices in cooperative learning, a novel approach to facilitate virtual learning in medical education.

### 1. Small group engagement in large group learning

The online, asynchronous nature of virtual learning can be isolating and tiring for learners and can often deprive them of social interaction.<sup>3,7</sup> To overcome this passivity,<sup>2</sup> small group sessions, where learners become not only recipients but active participants, can create an interactive environment.<sup>2</sup> These small group activities during large group virtual learning capitalize on positive interdependence and promotive interaction;<sup>5</sup> learners are able to interact and learn from each other while engaging in a shared activity, promoting consolidation of the course content.<sup>2,7</sup> This emphasis on active, collaborative interaction leads to more sustained learner effort and greater satisfaction and knowledge acquisition.<sup>3,8</sup> Throughout the pandemic, commonly used virtual platforms in medical education consisted of Zoom, Google Meet, or Microsoft Teams. Each of these platforms allows the teacher to create small “breakout rooms” within a large group session. In this way, a group of students can be assigned to numerous small breakout rooms to collaborate. These options also allow teachers to switch between breakout rooms, allowing for a greater degree of teacher-learner engagement while offering distant supervision.

The use of small group sessions during large group learning can be used in numerous ways. At our institution, incorporating breakout rooms during a large group session has allowed students to work through clinical cases together to further develop their clinical reasoning. For instance, after a lecture about congestive heart failure, a pertinent case can be presented to the class. Numerous breakout rooms can then be created allowing small groups of students to work through the different components of the clinical case—history, physical examination, investigations, differential diagnoses, and management. Within these small groups, the students can then use their respective academic strengths, coupled with the learning in large group sessions, to teach one another while engaging in a shared process of clinical reasoning, in keeping with a promotive interaction and positive interdependence framework.<sup>5</sup> The teacher can further switch between breakout rooms, acting as a facilitator,

assessing team dynamics, and answering questions as small student groups work through the clinical problem at hand. This later can be consolidated back in a larger group.

### 2. Collaborative virtual tools

Virtual collaborative tools are available in the form of free text or free form writing. Options such as Microsoft Whiteboard, MURAL, Zoom Whiteboard, Google Jamboard or Miro are free or low-cost options that allow for real-time collaboration on a shared medium, where teachers and learners can directly participate, writing down thoughts, ideas or answers to questions posed, thus promoting positive interdependence. While all such tools require internet access and a compatible device, these as well as access to many paid services may be provided through the institution. While virtual collaborative tools may come with a steep learning curve and some may find them hard to use, they also can be very beneficial to the learning process. Many collaborative virtual tools are secure<sup>9</sup> and dynamic. They can further allow teachers to include multimedia resources which can be very useful in instances such as teaching ECG interpretation. For example, through these virtual tools a teacher can import an ECG directly onto the platform, allowing students to examine the ECG in real time as the teacher annotates the ECG on the platform with key pertinent findings. Such tools therefore provide a virtual “surface” for mind mapping, brainstorming, and linking connections between concepts, enhancing collaborative skills as students and teachers discuss ideas on one virtual platform. Tools such as these can allow learners to work collectively and independently and examine their collaborative actions. Activities such as a debriefing to address issues recognized throughout the process can be performed via the free form writing feature available on many of these tools.<sup>5</sup>

### 3. Virtual quizzes and polls

Online learning allows teachers to test, in real-time, understanding of course content through virtual quizzes and polls such as Kahoot and Poll Everywhere. The use of virtual quizzes and polls focused on the content can help increase individual accountability, stimulate learner engagement and interest during virtual learning, and allow teachers to directly engage learners in challenging concepts.<sup>10</sup> Virtual polling tools such as these can be used to support the learning process through gamification, using game mechanisms in education to enhance collaboration, creativity and self guided study, in turn improving engagement.<sup>11</sup> This engagement leads to a greater degree of learning of course material by learners,<sup>10</sup> and is in

keeping with educational theories such as constructive alignment.

In a virtual setting, active polling and quizzing can further assist teachers in navigating and monitoring student understanding remotely, both pre and post either individually or as a group. This helps overcome the lack of traditional visual cues such as student expressions of understanding that may be masked by lack of video input. Additionally, quizzes and polls may be completed asynchronously online by students as a way to check their learning and consolidate concepts outside of class time. Quizzes and polls can be very versatile as they provide learners feedback on their understanding but also allow teachers to punctuate key points and maintain engagement. For example, in our institution? during a discussion about acid base abnormalities teachers have the ability to interchange between content and quizzes in order to maintain student attention and highlight core concepts. After this discussion has ended, students can review these concepts and test their understanding by completing an asynchronous online quiz.

In a group work setting, virtual quizzes can also be used to keep members individually accountable. The inherent structure and flexibility of virtual quiz or poll tools allows instructors to ask questions that may be used monitor the contributions of an individual in a small group setting. These tools may also assess the team dynamic to ensure all members feel that work is being done and distributed in an equitable way.<sup>5</sup>

#### 4. Streamlining the learner experience

The passivity of large group learning in general limits a learner's ability to maintain attention and retain information.<sup>12</sup> It is important to create virtual learning that is streamlined and structured to capture and maintain learner attention. One possible means to do this is through signposting throughout the lecture. For instance, with virtual learning, teachers are able to use various online tools, whether it be simple highlighting, advanced slide designs to maintain engagement, animations, or embedded videos, to illustrate and draw attention to key points. Objectives can have clear transitions, signifying to learners the completion of one component of the teaching activity and the beginning of the next. Similarly, slides can be set to timers to assist in time management, ensuring each topic is adequately discussed without delays. Additionally, promoting small group work with positive interdependence by assigning specific tasks to each team member may be useful in maintaining the attention of

learners by making each contribution integral to the success of the team as a whole. This also allows for different viewpoints and strengths to be brought to the group by each learner.<sup>5</sup> Each of these tactics alone and combined can enhance learner experience and are all building blocks that can be used in creating a positive virtual learning experience.

#### 5. Preparation for seamless delivery by the instructor

Unlike in-person education, where whiteboard or verbal teaching can be used if a technical difficulty arises, the rapid adoption to a largely virtual curriculum does not afford this opportunity. As such, technical difficulties can significantly hinder proper delivery and lead to frustration and poor perceptions by learners.<sup>3</sup> Teachers must therefore prepare not only the content but also the processes and delivery of virtual teaching as well as ways of providing students with relevant information in the event of technical difficulties. Ensuring that extraneous documents on the teacher's computer are closed, downloading and opening multimedia prior to teaching, and having webpages already open that will be referenced during teaching, will help make transitions in online teaching seamless. Knowing the unique functionality of different virtual platforms such as Microsoft Teams or Zoom will allow the teacher to focus on delivering content, assessing student understanding, and fostering interpersonal and small group skills during breakout rooms rather than the operation of the overall platform.<sup>5,7</sup> Developing this comfort with the platform can be done by completing a "dry run" of the teaching activity prior to the scheduled session. While this may not eliminate technical issues altogether, thorough preparation can aid teachers when such issues occur.

Obtaining simple, consistent feedback from learners about the delivery of online teaching is also beneficial and can help finetune delivery. This can be done by asking learners at the end of teaching to provide feedback on two strengths, two weaknesses and two suggestions about the session using the same virtual platform or a dedicated tool like Microsoft Forms or Survey Monkey. In doing so, necessary changes can be implemented to help ensure learning sessions operate smoothly with dynamic alignment to learner needs.

## Conclusion

The current pandemic has accelerated the use of virtual learning in medical education and has established itself as an integral part of learning. Optimizing virtual learning to

engage learners and assist in their retention should be sought. Strategies that focus on cooperative learning best practices such as those based on collaboration, small group learning, interactive quizzing or polling, structured agendas, and pre-lecture preparation for online delivery are pragmatic means backed by evidence that our institution has adapted with success. The application of such practices to remote learning in medical education is an innovative way to improve learner experience through pedagogical practices. With online learning here to stay, future research should be directed at the effectiveness of online learning versus in-person learning in medical education. Learner and teacher experiences with virtual learning, feasibility studies regarding implementing fully virtual learning, and performance measures with virtual versus in-person learning are future avenues of research that may have implications for optimization of these practices to ensure high-quality delivery of virtual learning.

**Conflicts of Interest:** The examples provided are for the purposes of demonstration and are not an exhaustive list. The authors have no affiliation or conflict of interest with any of these resources.

**Funding:** There was no funding provided for this project.

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