

Leading synchronous virtual teaching sessions

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Abstract

While there has been increasing demand for online education over the past decade, social distancing recommendations during the COVID-19 pandemic have accelerated the transition from the physical to the virtual classroom. Staples of clinical education, such as grand rounds, noon conferences, case conferences and chalk talks, have been abruptly forced to shift into the digital world. There is an immediate need for guidance on synchronous virtual teaching, especially since health professional educators may lack familiarity with the technologies available and theories that guide their use. The following framework can help educators plan, develop and deliver their virtual teaching sessions to optimize student engagement and produce meaningful learning outcomes.

1 | INTRODUCTION

From educational videos and online learning modules to recorded lectures and flipped classrooms, technology has gained a stronghold within medical education;¹ yet, health professional teaching at all learner levels still relies on in-person didactic sessions that fit into the daily scaffolding of clinical work. These sessions, which include case conferences, chalk talks and journal clubs, are paramount to the learning experience. In the face of social distancing guidelines, prompted by the COVID-19 pandemic, many health professional schools and training programs have been forced to transition in-person education to an entirely virtual platform. As a result, various multimedia, that previously supplemented in-person didactics, have become pillars of clinical education.² In this new virtual era, widely accepted adult education theories and best practices should continue to guide use of multimedia for education.

Mayer's work on the cognitive theory of multimedia learning is particularly important to consider as it guides teachers through effective use of multimedia educational platforms, inherent to virtual learning.³ Mayer highlights the importance of designing multimedia instructional methods with human information processing in mind. Specifically, educators should be attentive to cognitive load to engage in an optimal degree of cognitive processing. Too much information can overwhelm learner cognition and detract from learning. With today's added burden of distance learning, technology requirements and flood of COVID-19 information, virtual-based teaching needs to avoid cognitively overloading learners.

Given that virtual didactics are a fairly new phenomenon, the aim of this article is to provide a framework to optimize synchronous, or real-time, virtual teaching in health professional education. Using such a framework will help educators prepare, strategically deliver and assess their teaching sessions. We draw from Mayer's work, our

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own interprofessional programs' experiences, adult learning principles, studies of multimedia in education and best practices put forth by universities and digital technology companies. Since the pandemic has affected all levels of health professionals, these tools are applicable across the spectrum of clinical disciplines and professions.

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2 | SESSION PREPARATION AND DEVELOPMENT

2.1 | Learn your teaching platform

Many software platforms are used for synchronous digital education. While all share the core feature of videoconferencing, many offer additional tools that can be used to enhance learning. Some of these tools emulate mainstays of the traditional classroom environment, while others reveal new modes of communication unique to the virtual domain. The array of features available to teachers vary by third-party application and institutional support. Although new digital platforms require that instructors take extra time to become familiar with the features, many faculty have welcomed the opportunity to learn innovative teaching technology. Common virtual tools are highlighted in Table 1, yet should be used judiciously, recognizing that technology has the potential to detract from educational goals and objectives.

2.2 | Map out learning objectives

Similar to in-person instructors, online teachers need to plan their learning objectives in advance and consider the cognitive load of the intended content.⁴ This is especially important for virtual teaching, as

TABLE 1 Common tools available on virtual platforms

Tools that Emulate Traditional Classroom Environment	<ul style="list-style-type: none"> • Whiteboard • Breakout rooms • Audience response systems (i.e. live-audience polling) • 'Raise hand' action • Customized educational games (e.g. Jeopardy-style content review and Wheel of Fortune-style competitions)
Tools Unique to the Virtual Domain	<ul style="list-style-type: none"> • Chat boxes • Real-time teacher feedback (e.g. 'go slower', 'go faster', 'agree,' and 'disagree') • Screen share • Predetermined group assignments

the nature of digital learning may lead to new or increased distractions for trainees. Teachers should generally choose three to five key points to be emphasized, reiterated and summarized throughout the teaching session.⁵ Presenting too many teaching points has the potential to cause cognitive overload and discourage learning.^{4,5} Virtual teaching sessions may take more time than in-person sessions because of the need to moderate online discussions and troubleshoot technology; therefore, teachers should consider reducing learning objectives and content when adapting a session usually given in-person.

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2.3 | Create slides to promote learner engagement

Educational visuals, such as presentation slides, should aim to engage learners' critical thinking and curiosity. For virtual sessions, it is essential to limit extraneous content and distracting graphics as their display on students' computers will appear even larger and more prominent than a typical in-person PowerPoint presentation. Effective slide techniques are summarized in Table 2 and function to reduce non-essential cognitive processes.^{3,5}

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2.4 | Incorporate tools to promote active learning

Increased interactivity optimizes retention of material and learner engagement and is linked to higher rates of student satisfaction and persistence in online courses.^{6,7} Virtual session instructors should aim for some form of interaction every 10 to 15 minutes.^{6,8} While common

TABLE 2 Strategies to minimize cognitive load of presentation slides

Use	Use Judiciously	Avoid
Sans-serif fonts (e.g. Arial, Helvetica)	Graphs	Text-heavy slides
Monochromatic backgrounds	Images	Textured or colourful backgrounds
High-contrast background/text	Animations	Sound effects
		Transition effects

active learning techniques, such as think-pair-share and role-play, may be more challenging to facilitate virtually, many platforms allow for audience response systems, concept mapping and breakout rooms. The popular 'chalk talk' can be adapted simply by using a blank screen and either typing or drawing with touch capabilities. Teachers should encourage near-peer teaching by having learners type questions in the chat box that are answered in real-time by their colleagues. One significant advantage of online teaching is the ability to invite patients to join virtual sessions without having to ask them to leave their homes. Having patients describe their illness or show what life is like at home leads to rich discussions and provides valuable insights into patients' perspectives.

Virtual session instructors should aim for some form of interaction every 10 to 15 minutes

2.5 | Optimize audio and visuals

The delivery of information through audio and visuals is paramount to an effective virtual conference. To optimize audio for learners, teachers should consider wearing headphones and pre-emptively 'muting' all other participants' microphones.^{9,10} These techniques effectively minimize background noise, which can improve learner engagement.¹¹ To minimize visual distractions, educators should teach in a space with a neutral, uncluttered background with effective lighting that avoids unwanted backlighting and glare.¹⁰

2.6 | Test out all aspects of the session in advance

Rehearsing and testing out equipment is essential for virtual teaching since these sessions rely on various moving parts and technological components to run smoothly. Teachers should practice launching polls, assigning breakout rooms and sharing their screens prior to a session. Each technical component – including audio, visual, digital tools and internet connection – should be tested in advance to minimize glitches. It may be helpful for instructors to practice with colleagues in advance, or even to record a practice lecture for self-guided feedback.⁸

3 | SESSION DELIVERY

3.1 | Make the virtual session feel like a welcoming educational space

Educators can employ certain strategies to create welcoming, inclusive online learning environments. Teachers can start the session by reviewing expectations for mutually respectful dialogue that values

diverse viewpoints, curiosity and open-mindedness. It is also important to address online etiquette, including asking learners to keep their cameras on, adjust their display names to preferred names and mute their microphones unless joining class discussions.^{10,12}

There are several strategies educators can use to help students feel included as valued members of a learning group. When possible, instructors should welcome learners by name as they join the virtual classroom. In lieu of making eye contact with learners, educators should direct their gaze towards the camera and not on the content being shared.¹² Similar to newscasters, teachers should nod their heads when being asked questions to indicate interest in learners' thoughts and inquiries. Student connectedness should be encouraged through breakout room activities, near-peer teaching and group projects assigned post-session.

3.2 | Get to know learners and activate their knowledge

Teachers should understand their learners' prior knowledge and experiences with the session topic and then connect pre-existing knowledge with new teaching points.^{3,5,13} As this may be more challenging in virtual settings, teachers will need to be particularly deliberate at the beginning of their sessions through polling or targeted questioning. Collected information enables teachers to ascertain what their learners already know about a topic. This also activates learners' existing knowledge so they are primed effectively to learn new concepts.

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3.3 | Deliver content strategically to boost learner engagement

To enhance learners' motivation and engagement, the majority of didactic time should be spent on content particularly relevant to learners and delivered in 'meaningful chunks'.³ Teachers leading virtual sessions should incorporate pauses during transition periods, as well as before and after key points, to allow for technology delays and extraneous cognitive load created by e-learning platforms.

Unlike forming small groups in a classroom environment, virtual group activities require clear instructions regarding the task at hand.⁸ Breakout rooms specifically need: logistical

explanations, breakout session timing, instruction on accessing digital handouts and means to contact the educator for assistance. In some circumstances, it may be helpful to assign a facilitator for each room.

3.4 | Be alert to questions – both asking and receiving

Questions are a primary means for learners to provide feedback on their understanding of the concepts being taught. Educators should proactively inform their learners how questions should be raised, such as through chat boxes, 'raise hand' features or vocal interjections, and whether they should be spontaneous or asked during specified times.¹⁰ If silent options are chosen, such as the hand raise function or chat feature, educators should be aware of how notifications will appear, be alert to when someone requires attention and consider using a moderator or co-instructor. A moderator can significantly decrease the cognitive load of the teacher, so they can focus on instruction and discussion.⁸

Educators should proactively inform their learners how questions should be raised

Teachers should facilitate learner curiosity and active processing by asking questions that require knowledge application. After questions are asked, teachers should embrace 'wait-time', recognizing that in the virtual classroom, longer pauses are needed to allow participants time to respond using available technology.^{13,14}

4 | SESSION ASSESSMENT AND FOLLOW-UP

4.1 | Get feedback – the more, the better

Virtual sessions will be increasingly common as clinical education progresses into the 'next normal'. Programmatic feedback should be solicited monthly, if not more frequently, given the fluid, unexpected consequences of the COVID-19 pandemic. For instructors of single sessions, consider checking in *during the session* for feedback on items that can be immediately acted upon, such as pacing or volume. At the *end of the session*, consider a live poll version of the 'one-minute paper' or a commitment to change exercise, which can promote retention in learners while giving educators needed feedback on the learners' comprehension.^{5,13} Virtual platforms allow learners to return several months later to share applied experiences with current participants. Other sources of feedback can include

peer observation or self-evaluation, particularly as many technologies offer the ability to record sessions.¹⁵

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5 | CONCLUSION

Online learning has tremendous potential to change health professional education moving forward. The transition of teaching from the physical classroom to a virtual space can be approached with thoughtful *pre-session preparation*, strategic delivery *during the session* and constructive *assessment after the session*. While some of the techniques and technologies are unique to the realm of digital learning, it is important to note that many of the best practices for giving a traditional didactic teaching session – using active learning techniques and incorporating adult learning principles – continue to apply, with additional understanding of multimedia learning principles. As with any skill, deliberate practice and reflection will enhance an educator's comfort and effectiveness in the virtual space.

CONFLICT OF INTEREST

The authors have no conflict of interest to disclose.

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