# Videoconferencing: A Steep Learning Curve for Medical Educators

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It has been a long few months since the COVID-19 pandemic hit in the United States.[1] Like a ripple moving outward, medical educators watched their health care systems morph and their ability to deliver in-person curricula disappear due to limitations on group sizes.[2] Educators around the world, many of whom had never used a virtual platform,[3] were forced to move their curricula online.[4] While daunting for those accustomed to in-person teaching,[5] videoconferencing is a popular and common distance learning modality in undergraduate medical education. It has been studied in a variety of educational contexts, with results showing knowledge gained is equal to that of in-person lectures for medical students,[6–9] and that it is an acceptable and sometimes even preferred learning modality.[9–12] Given the reality of our current COVID-19 educational climate and the studied benefits of videoconferencing in education, we created a tutorial for educators to make the "virtual education jump." Our hope is this tutorial can serve as a starting point for transitioning a curriculum from face-to-face to a virtual platform.

## Understand the Options

The first step is to decide how interactive your content will be. The FIGURE depicts a spectrum of online learning modalities from synchronous to asynchronous.[13] It is important you choose a modality that matches your desired degree of interaction.[14,15] If you plan on lecturing without having an interactive discussion, consider an asynchronous format such as a webcast. This will provide your residents flexibility based on their schedules. For those educators attempting to preserve the in-person learning experience, videoconferencing creates a classroom-type environment designed for dialogue between participants (known as a webinar when used in an education context) and is what we will use as our model of online education modality.

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## Create Materials Best Suited for a Webinar

We have adopted 3 curricular design principles to optimize our teaching via webinar. These principles also apply to in-person content; however, we have found deficiencies are magnified in the virtual setting.

### Make It Active

Active learning[16] can be achieved in the virtual format. Synchronous modalities open more potential avenues to engage your residents via the chat function, audience response systems, or breakout rooms. These create varied communication methods for residents to respond. You can also create collaborative activities such as built-in reflection time, case-based discussion utilizing the whiteboard function, or small groups via the breakout rooms.

### Make It Accessible

Follow principles of cognitive load theory to help your residents transition information from working to long-term memory.[17] Build schemas, which are cognitive frameworks that organize information and more readily allow transfer of knowledge to long-term memory. Physicians systematically solve clinical problems using schemas, such as approaching vasculitis in a small, medium, or large vessel framework.[18,19] To further solidify concepts, use bite-sized 15-minute didactic segments or "theory bursts" followed by 15- to 45-minute learning activities. Repeat schemas within and between lectures to allow increasingly complex connections.[18,20]

### Make It Appealing

Learning is most successful when extraneous processing is reduced.[21] For a webinar, this means a well-designed slide deck will improve learning. Limit words on slides, remove unnecessary images, and use verbal narration instead of printed text.[22] Provide landmarks, such as highlighting which objective is being covered. This will help maintain a framework

and reorient residents who might get disconnected from the webinar.

## Host a Webinar Successfully

Becoming an effective host is as important as the content you teach. Technical issues can eat away at your time and diminish audience interaction. Understanding what it takes to be an effective host is essential to working in a virtual learning environment.[23,24]

### Know Your Platform

There are many platforms available. Whichever you choose, make sure you can use it. Knowing how to do the basics like set up audio and video, as well as effectively utilizing screenshare, managing your participants (including muting their audio), and using special functions like whiteboards and breakout rooms, are important items to figure out before your webinar.

### Practice

In our experience, practicing is easy to overlook, but is the single most important step to running a successful webinar. Practice with a colleague to ensure that audio, video, and screensharing of your PowerPoint presentation work. Perform a trial run using any special functions like audience response systems, whiteboards, and breakout rooms to minimize glitches during the session.

### Have a Partner

Technology is finicky, and you should have a partner ready to run the session with you or help problem solve. They can also keep notes, run the chat function, lead breakout rooms, or takeover if your internet connection is lost.

### Establish Ground Rules

Set ground rules for your session up front. We prefer cameras on, mute unless you are speaking, and use of the chat function as an acceptable form of response. The camera rule mitigates the scenario of having an "interactive" discussion with your resident's blank screen. Mute policies decrease extraneous noise distractions. Allowing use of the chat function creates a low barrier way for less vocal residents to share their opinions.

### Create a Learning Environment

Set the tone in the first 5 minutes. Acknowledge that webinars can be awkward. Be enthusiastic. Ask a question that gets residents talking so it becomes clear from the start that the session is going to be interactive.

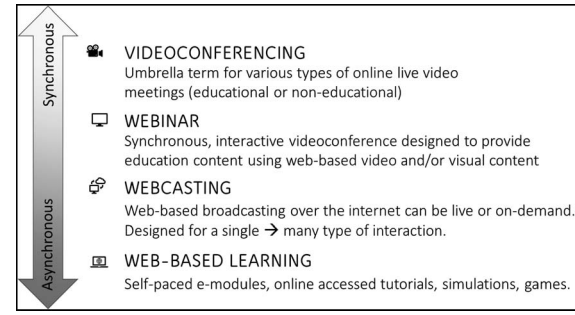


**FIGURE**
Virtual Learning Environment Modalities

### Avoid Pitfalls

If you are screensharing make sure to close any personal windows that are open, even if they are on a different monitor, to avoid accidental sharing. Tabs on your internet browser and search history should be cleared if they contain any private information. Turn email and other communication applications off or utilize "do not disturb" features so no messages pop up on your screen.

## Employ Best Practices in Videoconferencing

Part of teaching online also means looking like a professional in front of a webcam. There are a few simple steps you can take to put your best "virtual" foot forward from your home office whether teaching or meeting with colleagues.

### Lights

Make sure you have sufficient lighting. A computer screen should not be the only source. Your light should be between eye level and 45 degrees to appropriately illuminate your face. To avoid backlighting, ensure the light source is directly in front of you.

### Camera

Place your camera at eye level or slightly above. A common mistake is to use a laptop camera that is sitting on a desk looking up at you. To avoid participants looking up your nose, something as simple as a couple of textbooks will add much-needed height to the camera. If you have multiple monitors, make sure you are looking at the same monitor that contains the camera. Finally, ensure the background behind you is tidy or consider the use of a virtual background.

### Action

When giving the videoconference, try to ensure you either have a quiet space or use a headset to limit background noise and feedback. Stay focused as it becomes obvious quickly if your eyes are darting to

other monitors. Limit movement; the camera is zoomed in on your head and will magnify any movements you make.

## Conclusions

By following these basic principles, it is possible to overcome technical barriers to create an interactive and positive virtual learning experience for your residents. Developing a skillset in videoconferencing will not only help you maintain academic continuity in this time of great uncertainty, but also provide you greater flexibility for teaching in the future.

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