Clinical Learning in a Time of COVID-19: Perspectives from Clerkship Students

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Abstract

During the COVID-19 pandemic, many U.S. medical schools have modified their curriculums to an online format. As clerkship students experiencing online didactics while clinical rotations are paused, we have noticed benefits and drawbacks to various instructional modalities. Here, we highlight the successes and limitations of synchronous and asynchronous learning and provide specific recommendations as to when each should be used. The advantage of synchronous learning is the possibility of student-student and student-teacher interactions. However, large virtual groups intrinsically limit interactions and contribute to video-conferencing fatigue and higher than usual rates of student disengagement. In contrast, asynchronous learning offers flexibility and convenience to students and instructors, especially in situations of time-zone differences and varying degrees of internet access. Due to the ongoing pandemic, a mixed model of learning will also be needed for future classes of medical students. In light of our observations, we recommend that asynchronous learning should be used whenever possible to teach factual information. On the other hand, synchronous learning should be reserved for small-group, case-based, highly interactive sessions that teach synthesis and application, situations where maximizing student engagement is critical. With these considerations, we anticipate that didactic information normally taught during clerkships can be efficiently delivered virtually.

Keywords: undergraduate medical education; synchronous learning; asynchronous learning; COVID-19; clerkships

Analysis of Instructional Modalities

On March 17, 2020, the American Association of Medical Colleges (AAMC) recommended that US medical schools pause clinical rotations due to COVID-19 (Association of American Medical Colleges, 2020). In contrast with pre-clerkship students who have more easily transitioned to online learning as lectures and small groups can be conducted virtually, clerkship students have had a more disruptive transition as the clinical environment is not replicable in a virtual setting. Clerkship students primarily spend their time in the hospital as a member of the care team, learning directly from patients and attendings. Our learning experiences are directly dependent upon our
clinical environment, and we have been particularly impacted by the COVID-19 pandemic.

Under these circumstances, many schools have been flexible by allowing students to determine the best ways to spend their time. Students have chosen to play a number of important roles during this pandemic such as conducting COVID-19 related research, helping clinicians transition to telehealth, and volunteering (childcare, tutoring, grocery shopping, obtaining PPE, etc.) (Soled et al., 2020). While many of the activities that students are doing are valuable and meaningful, they are not the patient interactions that students would encounter in the clinical environment.

As this unprecedented time stretched from weeks to months, with many schools not resuming clerkships until July 2020, it has become clear that new ways of educating clerkship students are necessary. Recognizing this, some medical schools have moved lectures, small groups, discussions, development of interpersonal skills, and readings that are normally incorporated throughout the clerkship curriculum to a concentrated online format, so when students return to clerkships, they can devote more time to patient care. Other medical schools have offered online electives encompassing a wide range of topics such as electrocardiogram reading, virtual emergency medicine simulations, pandemic management, specialty-specific exploration, and telehealth delivery to condense the post-clerkship training period.

As second-year medical students currently experiencing new forms of online clerkship education, we have noticed clear benefits and drawbacks to various instructional modalities. Here, we will highlight the successes and limitations of synchronous and asynchronous learning, in particular, the challenge in balancing teaching modality with the limitations of online meeting size and structure.

Synchronous online instruction is a valuable method of instruction that involves students and teachers being simultaneously engaged in shared material. The primary advantage is the potential for peer-peer interactions and student-teacher interactions. Students can ask questions, and preceptors can assess student understanding and address knowledge gaps in real time. Furthermore, students are able to hear their peers' thoughts and opinions, which spurs additional discussion and comprehension of the presented material. For these reasons, synchronous learning has been made a requirement by several virtual curriculums during the pandemic.

However, we have observed that the virtual learning environment presents clear challenges for synchronous lectures involving large groups of students, most notably higher than usual rates of student disengagement. Some of this can be directly attributed to the limitations of virtual lecture platforms. For example, in large classes, due to constraints of screen size and video-conferencing technologies, not all students are simultaneously visible to the preceptor, making it extremely difficult to gauge student engagement. In addition, when lecturers do pose questions to students, the bystander effect is more prominent than during in-person lectures, potentially due to increased fears of judgement from a large number of virtual, often unseen, participants. This has encouraged a situation where a minority of students engage with the material, while most students remain unseen and unheard, creating an imbalanced learning experience for the majority of students. This situation is further exacerbated by varying degrees of internet access, time-zone differences, and personal circumstances during this difficult time. Because these limitations apply primarily to large-group learning, where students can easily become disengaged, we believe that the benefits of synchronous learning are maximized in small-group, case-based, highly interactive sessions.

Asynchronous online instruction occurs when teachers prepare materials for students to learn independently. Asynchronous instruction lends itself well to remote learning as it offers convenience and flexibility to the student and the instructor. Instructors prepare material, such as lectures, on their own time. One recorded session can substitute for multiple live sessions, reducing the strain on preceptors potentially burdened with additional clinical responsibilities. Students have the ability to rewind, fast-forward, pause, and/or speed-up recorded material as
needed. Furthermore, because many students have returned home, a class of medical students is unlikely to all be in the same time zone. An 8am EST synchronous learning activity works for those who are on the East Coast but is not conducive to students on the West Coast or those outside the United States. Thus, enabling learning to occur on a student’s own time is ever more essential.

Asynchronous instruction clearly has a role to play in teaching medical students. Yet for all its benefits, it has a very clear drawback: isolation. In an asynchronous lecture, students cannot interact with the instructor and ask questions or clarifications, nor can the student interact with peers to learn from shared experiences and understandings. Asynchronous learning silos learners and teachers from each other. Its strength in allowing learning to occur independently is its very weakness in precluding interaction. Given the drawbacks of a completely asynchronous curriculum, particularly when ideas need to be discussed, processed, and synthesized, we believe that the flexibility afforded by asynchronous learning is best utilized in lecture format to deliver new material to a large number of students.

Establishing a viable model for a "new normal" due to the continued impact of COVID-19 and in preparation for potential seasonal resurgence is crucial to successful clerkship student learning (Morning Edition, 2020). Additionally, the delays that this year’s cohort has experienced will impact future classes of students, resulting in an increased need for the creative delivery of learning opportunities (Rose, 2020).

A mixed method of delivery is clearly the best way forward, as clear benefits and limitations exist for both synchronous and asynchronous learning modalities. We believe that asynchronous learning should focus on the learning of factual information, whereas synchronous learning should focus on synthesis and application. This model is supported by well-established educational theories including Bloom’s Taxonomy and Gagne’s Conditions of Learning. Bloom’s Taxonomy asserts that foundational knowledge must come before the synthesis of learned materials, and Gagne’s Conditions of Learning assert that cognitive skills of different complexities require different types of teaching modalities (Vanderbilt University Center for Teaching, 2020). The foundational, low-complexity skills of recognition, remembering, and understanding, focused on learning factual information, can be conducted asynchronously. Contrastingly, the more advanced, high-complexity skills of applying, analyzing, evaluating, and creating, focused on synthesizing, are skills that are best developed by interacting with preceptors and peers in synchronous sessions.

We propose that learning materials should be delivered asynchronously when possible given student circumstances of time zone and internet access as well as preceptors’ increased clinical responsibilities. Potential forms of delivery may utilize tools already common in medical education, such as pre-recorded lectures, self-directed iBooks, and online case-based simulations resources such as Aquifer. However, in situations where the drawbacks of asynchronous learning, particularly lack of interaction, are detrimental to student learning, synchronous learning is necessary to maintain the quality of student education. Examples of such situations include collaborating on clinical vignettes, discussing social determinants of health, as well as practicing with and receiving feedback from standardized patients. For synchronous sessions, we recommend maintaining small group sizes (no more than 10 students), keeping sessions succinct and focused, and prioritizing interaction from all students. We also recommend scheduling sessions at times amenable to multiple time zones.

By combining the strengths of both synchronous and asynchronous teaching modalities, we anticipate that virtual learning can be harnessed to play a useful role in the clerkship curriculum. It is important to recognize that virtual learning experiences, synchronous or asynchronous, are an imperfect substitute for real patient interactions but are becoming a necessary part of medical education. Virtual didactics can be a vital tool in meeting the Liaison Committee on Medical Education (LCME)’s suggestion that medical schools shorten clinical rotations while
maintaining the educational objectives of clerkships (Barzansky and Catanese, 2020). Completion of didactics online will reduce the need for in-person didactic sessions when clinical rotations resume and allow returning students to spend a larger proportion of their time on patient floors, focused wholeheartedly on patient care.

Future cohorts of medical students will also benefit from the development of virtual curriculums, as medical schools recover from the lasting impact of the COVID-19 pandemic. The LCME suggests that medical schools should provide resources to support overlapping classes of students caused by pandemic related delays (Barzansky and Catanese, 2020). Since current students’ clerkships may stretch into the next cohort’s allotted clerkship schedule, virtual didactics can help relieve overburdening of physical resources, such as faculty, patients, and space. Future classes can complete virtual didactics prior to starting clinical rotations, which will allow the current class to finish their clinical rotations and prevent a physical overlap of classes in the hospital. Finally, in the case of seasonal resurgence, virtual didactic curriculums may prevent future interruption of medical education, should rotations have to be resuspended in the future.

**Take Home Messages**

- COVID-19 has necessitated medical school curriculums be modified to involve an online format.
- Asynchronous learning should be used to teach factual information.
- Synchronous learning should be used for small-group, case-based sessions that involve synthesis and application of material.

**Notes On Contributors**

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## Appendices

None.

## Declarations

*The author has declared that there are no conflicts of interest.*

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