Creating Virtual Learning for 3-Year Accelerated MD Students During the COVID Pandemic

Shou Ling Leong, MD | Jessica A. Parascando, MPH | Erika VanDyke, MPH | Alyssa Anderson, MD | Lawrence Kass, MD, MEd | Jennifer Grana, DO | Eric Messner, PhD, FNP-BC

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Introduction

In March 2020, with the onset of the COVID-19 pandemic and in compliance with recommendations from the Association of American Medical Colleges (AAMC), Penn State College of Medicine (PSCOM) suspended all in-person patient encounters for medical students. To keep education on track, PSCOM transitioned to a virtual learning format.

In a 2021 review, Park et al reported that 84.2% of published articles on the development of virtual learning were targeted for clinical clerkships. Article topics included virtual clerkships, telemedicine, virtual rounds, virtual acting internships, and virtual electives for visiting students. While there have been many reports on virtual learning during the pandemic, there is a paucity of reports addressing how accelerated programs responded to the pandemic. This qualitative study reports the strategies used and the effects of virtual learning on accelerated MD students at PSCOM.

Methods

The PSCOM Institutional Review Board approved this study (Study#15567).

PSCOM offers 3-year accelerated MD programs where students achieve graduation competencies in 3 years instead of 4. Because of this shortened time frame, students in these accelerated programs are especially threatened by the loss of learning opportunities resulting from pauses in clinical exposure. To minimize the impact, remote learning was developed with the goal of front-loading knowledge and skills acquisition, to allow the students to function at a higher level once in-person learning resumed. Accelerated students participated in additional virtual learning activities, including telemedicine, virtual hospital rounds, virtual emergency rounds, and COVID-19 acute care clinic (virtually), to afford them additional clinical exposure to increase clinical skills competencies.

Our focus in developing virtual learning activities was to simulate in-person activities. Due to safety concerns, medical students were not allowed to participate in the care of patients with or under investigation for COVID-19 in-person. Virtual involvement in the COVID-19 acute care clinic allowed the unique advantage of engaging students with a patient population they otherwise would have been unable to care for. Faculty mentored students on the practice of oral presentations with a focus on clinical reasoning. Family medicine inpatient faculty felt that virtual student involvement mirrored in-person student involvement well (Table 1).
All five students enrolled in a PSCOM 3-year accelerated program were invited to participate in a semistructured interview at the completion of all clerkships. Questions asked about perception of the virtual learning experiences, comparative strengths and weaknesses of the clerkship activities, and recommended changes. Table 1 lists descriptions of the virtual learning environments.

Following the Standards for Reporting Qualitative Research framework, we transcribed and analyzed student comments using NVivo 12 (NVivo, QSR International, Cambridge, MA).

**Results**

A total of four interviews were conducted (response rate=80%). Three themes emerged from the data (Table 2).

_Theme 1: Virtual Medical Training Is Considered the Strongest When Physicians Leverage Video Technology and Provide Individualized Feedback._

Participants enjoyed virtual interaction with patients and immediate feedback from the preceptors and clinicians, making the experience feel genuine and similar to in-person visits.

_Theme 2: For Virtual Medical Training, Small Group Sessions Were Preferred Over Large Group Didactic Zoom Sessions._

Students’ least appreciated virtual activity was large-group Zoom didactic sessions where there was little to no engagement, leaving students feeling distracted and/or fatigued.

_Theme 3: In Both the Virtual and Traditional In-Person Learning Environment, Medical Students Craved Additional Opportunities for Engagement With Faculty, Physicians, and Peers._

Participants emphasized the wish for more engagement and feedback from faculty and clinicians as a way to better utilize time and resources in both the virtual and traditional in-person learning environment.

**Conclusions**

The COVID-19 pandemic has significantly disrupted medical education. The pause in in-person learning recommended by the Liaison Committee on Medical Education was a major challenge to keeping education on track, especially for 3-year accelerated MD programs. Virtual learning provides alternatives for this challenge. The students in Penn State’s accelerated MD program successfully graduated on time. Students felt that virtual learning gave them the skills needed when they returned to in-person clinical encounters. Just as with in-person learning, students yearn for timely feedback. Engagement and authentic learning experiences were key to success. Interestingly, students noted that in-person clerkship rotations are no guarantee of meaningful participation, citing examples of long waits in the operating room without active participation.

Overall, these findings help us as educators to design learning experiences that are most likely to be effective in virtual learning. Moving forward, with purposeful planning, all learning experiences, virtual or in-person, should be associated with meaningful engagement and timely feedback.

**Tables and Figures**
| Virtual Learning Clinical Arena | Clinical Description | Rationale |
|--------------------------------|----------------------|-----------|
| COVID-19 outpatient clinic     | Students joined the in-person COVID-19 acute care clinic via virtual means (Zoom). This clinic was utilized early in the pandemic to provide outpatient care to COVID-19 positive and Person Under Investigation (PUI) patients. Providers utilized iPads in patient rooms to facilitate discussion between students, patients, and faculty. | During the COVID-19 pandemic, students were not allowed to interact with COVID-19 positive and Person Under Investigation (PUI) patients. This activity offers a unique opportunity for the student to:  
- Be on the front line as patients were assessed in the ambulatory setting  
- See the full spectrum of the COVID-19 disease process from mild symptoms that were manageable in the outpatient setting to more severe symptoms requiring coordination of care to the inpatient setting  
- Learn while being protected from potential exposure |
| Virtual (master educator) rounds in the emergency department | Using Zoom on an iPad, students observed a resident taking a history and performing a physical exam on patients. They also gathered data in the EMR. The students would then practice note writing and oral presentation skills with attending physicians based on cases observed with an emphasis on clinical reasoning. | During the pandemic, students had limited opportunities to work in the ED due to safety concerns. This activity was in the format of a virtual master educator round, allowing for an in-depth discussion and practice of the skill of oral presentation. The oral presentations were delayed until later in the day after observing the history and physical. This allowed for detailed discussions of the philosophy and thought process behind how to structure and deliver an oral presentation. Students also worked as a team to collect clinical data from the EMR and learn from their peers as they do their presentations. |
| Outpatient family medicine clinic | Students were brought in virtually to outpatient family medicine clinics. Preceptors utilized iPads and telecommunication technology to bring students into exam rooms with patients. Students were assigned patients the day prior to their scheduled clinic time by their clinical preceptor. They would perform a detailed chart review ahead of the visits. When the patient is in-person in the clinic, they would obtain the patient history either synchronously in the patient room with the preceptor, which facilitated direct observation and feedback on communication skills, or asynchronously by calling the patient prior to the visit and presenting history to the preceptor. | This activity simulates in-person visits allowing students to:  
- Do a detailed chart review the day before, yielding a good understanding of the patient’s care before the visit  
- Work on history taking allowing for similar conversations that they would have in the room both for complex chronic history taking and focused histories for acute problems in appointments where patient is in-person and the student is virtual, it was a bit cumbersome for the preceptor, often necessitating two devices being brought into the patient room. This paved the way to bring quarantined students into clinic later in the pandemic. |
| Outpatient family medicine telehealth clinic | Students were invited into telehealth appointments where all three parties (students, faculty, and patients) were virtual. Students were able to actively participate in these appointments with clinical preceptors. Workflows were similar to the above described for outpatient family medicine clinic, except all parties involved were virtual. | This activity simulates in-person visits allowing students to:  
- Practice oral presentations and note-writing in ‘real time’ and get feedback from preceptors, very similar to the workflow in a traditional in-person setting  
- Learn the practice of telemedicine with limitation of doing a detailed physical exam in virtual visits  
There were technology challenges bringing all three parties (student, attending and patient) together virtually. |
| Family medicine inpatient service virtual rounds | Students were assigned a patient to review for morning rounds. Students joined the inpatient team in a group Zoom meeting for morning hand-off and for discharge planning with the social worker and care coordinator. Students interviewed their patients on the iPads via Zoom, and then rejoined the family medicine multidisciplinary team for rounds. They received feedback on their presentations and plans of care, and feedback on their progress notes after attending review. | This activity simulates in-person hospital rounds and offers the student opportunity to see patients, practice presentations, develop differential diagnosis and participate on interdisciplinary rounds remotely.  
The team felt that virtual rounds were similar to having the students in-person.  
With restrictions on visitors, many patients enjoyed interactions with students, helping to reduce the feeling of isolation. |

Abbreviations: ED, emergency department; EMR, electronic medical record.
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**Corresponding Author**
Shou Ling Leong, MD
500 University Drive, Hershey, PA 17033. 717-531-8187
sleong@pennstatehealth.psu.edu

**Author Affiliations**
Shou Ling Leong, MD - Department of Family and Community Medicine, Penn State College of Medicine, Hershey, PA
Jessica A. Parascando, MPH - Department of Family and Community Medicine, Penn State College of Medicine, Hershey, PA
Erika VanDyke, MPH - Department of Medicine, Penn State College of Medicine, Hershey, PA
Alyssa Anderson, MD - Department of Family and Community Medicine, Penn State College of Medicine, Hershey, PA
Lawrence Kass, MD, MEd - Department of Emergency Medicine, Penn State College of Medicine, Hershey, PA
Jennifer Grana, DO - Department of Family and Community Medicine, Penn State College of Medicine, Hershey, PA
Eric Messner, PhD, FNP-BC - Department of Family and Community Medicine, Penn State College of Medicine, Hershey, PA

**References**
1. Guidance on Medical Students’ Participation in Direct In-person Patient Contact Activities. Association of American Medical Colleges; 2020. Accessed March 13, 2022. [https://www.aamc.org/system/files/2020-08/meded-August-14-Guidance-on-Medical-Students-on-Clinical-Rotations.pdf](https://www.aamc.org/system/files/2020-08/meded-August-14-Guidance-on-Medical-Students-on-Clinical-Rotations.pdf)
2. (AAMC) AAOMC. Important Guidance for Medical Students on Clinical Rotations During the Coronavirus (COVID-19) Outbreak. Association of American Medical Colleges; 2020. Accessed March 13, 2022. [https://www.aamc.org/news-insights/press-releases/important-guidance-medical-students-clinical-rotations-during-coronavirus-covid-19-outbreak](https://www.aamc.org/news-insights/press-releases/important-guidance-medical-students-clinical-rotations-during-coronavirus-covid-19-outbreak)
3. Park H, Shim S, Lee Y-M. A scoping review on adaptations of clinical education for medical students during COVID-19. Prim Care Diabetes. 2021;15(6):958-976. doi:10.1016/j.pcd.2021.09.004
4. Rydel TA, Bajra R, Schillinger E. Hands off yet all in: a virtual clerkship pilot in the ambulatory setting during the COVID-19 pandemic. Acad Med. 2021;96(12):1702-1705. doi:10.1097/ACM.0000000000004127
5. Bala L, Kinross J, Martin G, et al. A remote access mixed reality teaching ward round. Clin Teach. 2021;18(4):386-390. doi:10.1111/tct.13338
6. Bhatia RK, Cooley D, Collins PB, Caudle J, Coren J. Transforming a clerkship with telemedicine. J Osteopath Med. 2021;121(1):43-47. doi:10.1515/jom-2020-0131
7. Gummerson CE, Lo BD, Porosnicu Rodriguez KA, et al. Broadening learning communities during COVID-19: developing a curricular framework for telemedicine education in neurology. BMC Med Educ. 2021;21(1):549. doi:10.1186/s12909-021-02979-z
8. Jumreornvong O, Yang E, Race J, Appel J. Telemedicine and medical education in the age of COVID-19. Acad Med. 2020;95(12):1838-1843. doi:10.1097/ACM.0000000000003711
9. Muntz MD, Franco J, Ferguson CC, Ark TK, Kalet A. Telehealth and medical student education in the time...
of COVID-19—and beyond. Acad Med. 2021;96(12):1655-1659. doi:10.1097/ACM.0000000000004014
10. Safdieh JE, Lee JI, Prasad L, Mulcare M, Eiss B, Kang Y. Curricular response to COVID-19: real-time interactive telehealth experience (RITE) program. Med Educ Online. 2021;26(1):1918609. doi:10.1080/10872981.2021.1918609
11. Weber AM, Dua A, Chang K, et al. An outpatient telehealth elective for displaced clinical learners during the COVID-19 pandemic. BMC Med Educ. 2021;21(1):174. doi:10.1186/s12909-021-02604-z
12. Chao TN, Frost AS, Brody RM, et al. Creation of an interactive virtual surgical rotation for undergraduate medical education during the COVID-19 pandemic. J Surg Educ. 2021;78(1):346-350. doi:10.1016/j.jsurg.2020.06.039
13. Sukumar S, Zakaria A, Lai CJ, Sakumoto M, Khanna R, Choi N. Designing and implementing a novel virtual rounds curriculum for medical students' internal medicine clerkship during the COVID-19 pandemic. MedEdPORTAL. 2021;17:11106. doi:10.15766/mep_2374-8265.11106
14. Shoemaker MM, Lippold C, Schreiber R, Levy B. Novel application of telemedicine and an alternate EHR environment for virtual clinical education: A new model for primary care education during the SARS-CoV-2 pandemic. Int J Med Inform. 2021;153:104526. doi:10.1016/j.ijmedinf.2021.104526
15. Whiles BB, Kowalik CG, Mirza M, Wyre H, Thurmon KL. When virtual becomes reality: short term impressions of a two-week virtual urology sub-internship program. Can J Urol. 2021;28(6):10907-10913.
16. Mason MW, Aruma JC. An orthopaedic virtual clinical clerkship for visiting medical students: early successes and future implications. J Surg Educ. 2022;79(2):535-542. doi:10.1016/j.jsurg.2021.09.019
17. Villa S, Janeway H, Preston-Suni K, et al. An emergency medicine virtual clerkship: made for COVID, here to stay. West J Emerg Med. 2021;23(1):33-39. doi:10.5811/westjem.2021.11.54118
18. Cangiarella J, Fancher T, Jones B, et al. Three-year MD programs: perspectives from the consortium of accelerated medical pathway programs (CAMPP). Acad Med. 2017;92(4):483-490. doi:10.1097/ACM.0000000000001465
19. Leong SL, Cangiarella J, Fancher T, et al. Roadmap for creating an accelerated three-year medical education program. Med Educ Online. 2017;22(1):1396172. doi:10.1080/10872981.2017.1396172
20. Leong SL, Gillespie C, Jones B, et al. Accelerated 3-year MD pathway programs: graduates' perspectives on education quality, the learning environment, residency readiness, debt, burnout, and career plans. Acad Med. 2021.
21. Sandhu P, de Wolf M. The impact of COVID-19 on the undergraduate medical curriculum. Med Educ Online. 2020;25(1):1764740. doi:10.1080/10872981.2020.1764740

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