

Supplemental digital content for Posever N, Sehdev M, Sylla M, Mashar R, Mashar M, Abioye A. Addressing equity in global medical education during the COVID-19 pandemic: The Global Medical Education Collaborative. Acad Med.

Supplemental Digital Appendix 1: Global Medical Education Collaborative: Approach . . . 2

The three founders of the Global Medical Education Collaborative established an iterative design process, represented by the arrows in between each phase of the approach. The founders followed David Kern's theory of curriculum design, as outlined in *Curriculum Development for Medical Education: A Six-Step Approach* (Thomas PA, Kern DE, Hughes MT, Chen BY. Baltimore: Johns Hopkins University Press; 2016). The approach to designing and developing the Global Medical Education Collaborative is guided by a needs assessment administered to all student participants when they register on the platform's website (www.gmecollab.org).

Supplemental Digital Appendix 6: Themes and Illustrative Quotations From a Needs Assessment Asking Medical Students (n = 324) From Low- to Middle- Income Countries (LMICs) to Share Their Experiences, Concerns, and Questions About Learning During the COVID-19 Pandemic, May – June 2020 . . . 3

Respondents represented 20+ medical schools in 12 LMICs, primarily Africa and Asia. Using thematic analysis, authors manually coded the students' responses by these themes (code frames) to better understand: (1) what students enrolling in the Global Medical Education Collaborative (GMEC) hope to achieve through their participation, (2) how the pandemic has directly affected their learning, (3) why students may not participate in GMEC, and (4) how students now approach clinical reasoning. To understand which themes are most representative, the authors include a running tally of each theme discussed in these open-ended responses. Please note the students' quotations are not edited.

Global Medical Education Collaborative: Approach

Problem Identification

From Conversations with Educators:

- Clinicians are being pulled into the hospitals to care for ill patients, diverting them out of the classroom
- Students must return home due to concerns about safety while staying on campus

From Conversations with Students:

- Returning home means potentially limited wireless internet and data
- Lack of daily class time structure in conjunction with family needs (such as assisting with childcare and chores) leads to difficulty keeping up with material
- No way to continue practicing clinical skills or thinking while out of the hospital
- Schools limited by lack of virtual curricula

Needs Assessment

Pilot – Administered to students at pilot partnership in Nigeria during May 2020 (n=126)

- Questions regarding:
 - Comfort level (Likert scale) with clinical reasoning skills, physical exam skills, differential diagnosis development, interpreting labs, interpreting images, deciding management plans, and communicating with patients
 - What material they would most like to see covered, by organ system
 - What they hope to achieve by participating in an online learning collaborative
- Space to leave comments or concerns so that we may better understand the current educational needs

Post-Pilot – Administered to partnering students after May 2020, multiple countries represented (n= 198)

- Edited version of above survey; included questions above and including questions on technology barriers, scheduling recommendations, and how COVID-19 has impacted their learning environment

All student participants take needs assessment once at time of registration so that GMEC can continually understand the demographics and needs of new partnering students, schools, and countries

Goals & Objectives

Goals of GMEC:

- Provide free and easy access to interactive and engaging tutorials online for all interested students.
- Bridge the physical distance that may now exist between educators and learners.

Objectives:

- GMEC strives to make each learning session objective oriented. All tutors are asked to provide at most 3 learning objectives.

Educational Strategy

Synchronous learning:

- Tutors may present in the following format:
 - "classes" with 10-20 students for interactive, case-based learning sessions
 - "courses" that have multiple sessions with the same 10-20 students on a grouping of case-based learning sessions
 - "lectures" that are offered to 50-100 students, typically offered if the lecturer is invited by GMEC leadership or the topic lends itself to an overview

Asynchronous learning:

- Tutors email students after each tutorial. Students are provided with a session specific "one-pager" that serves as a one-page primer on the topic they covered during that day's tutorial for individual review. Students are also provided with slides from the session for future reference. More in development.

Implementation

- An online learning platform was created – www.GMECollab.org
- Tutors and students were recruited through educational outlets at various medical schools and teaching hospitals - primarily done through social media, advertisements, and targeted emails/Whatsapp messages.
- External support from the partnering students and faculty at the schools where students matriculated was obtained through phone calls and email; as a part of these connections, targeted objectives were derived from review of partner schools' curricula.
- Pilot program implemented at partner school in Nigeria for 4 weeks; following the conclusion of the pilot, the GMEC team revisited goals and implementation strategy to best meet student needs.
- Post-pilot sessions started at the beginning of May 2020; May to June 2020, 16 tutors have given 52 sessions at time of writing
- Anticipated barriers: further student and tutor recruitment, establishing connections with tutors that may be able to host tutorials in different languages as we are currently limited to tutorials in English, navigating GMEC scheduling once schools begin to start back up after the pandemic, and striking a balance between just enough repetition of sessions vs. just enough unique topics so that as many students can participate in sessions pertaining to each topic as would like (which is both dependent on student sign ups and tutor offerings).

Evaluation

Current:

- Students receive a short feedback survey at the end of each session. They are asked to provide information that is both evaluative of the individual tutor and the GMEC program itself. In this way, tutors and GMEC are able to grow from student input at the conclusion of each session.

Future:

- We plan to begin holding focus groups with student liaisons from each of our partnering schools so that we may learn more about the needs GMEC may fill as a part of their partnership.
- Multiple choice knowledge assessments
- After six months we will reassess the program's success through an in-depth evaluation of this intervention by incorporating perspectives from students, tutors, and academic mentors.

NEXT STEPS

- Expand student and tutor base: utilize social media, advertisements, professional organizations, and LMIC representatives to recruit new partners
- Program improvement: analyze program impact and modify as needed utilizing knowledge assessments (multiple choice) and student focus groups.
- Continue innovating: Develop asynchronous materials, identify ways to implement/expand our tutorials to provide material to lower resourced settings.
- Incorporate LMIC representation: develop a GMEC Student Liaison Committee to help run GMEC, further recruit students, and identify programatic changes that can be made. Identify residents and attendings that could also serve as tutors and on the GMEC leadership team.
- Develop sustainable practices: establish institutional sponsorship in the US, UK, and ideally LMICs. Address COVID and post-COVID learning needs.

Student Quotes from the Needs Assessments

As a part of the GMEC Needs Assessment, we included several open-ended questions so that students may be able to share their experiences, concerns, and questions. Using thematic analysis, we manually coded organized the students' responses by these themes (code frames) to better understand: 1) what they hope to achieve through participating with GMEC, 2) how the pandemic has directly impacted learning, 3) why students may not participate, 4) how students now approach clinical reasoning. To understand which themes are most representative, our analysis includes a running tally of each theme discussed in these open-ended responses.

Theme: Medical Education during the COVID-19 Pandemic

Being a student who was about to begin clinical rotations before this pandemic, I hope to learn how to correctly diagnose a patient as well as manage the condition. With proper guidance, I believe I'll be more confident when we actually start our rotations. - Student from Kenya

It has very much affected medical students from my school as many find it difficult to read at home. And right now, there's no clinical activity of any kind so I fear for what will become of us. - Student from Egypt

Every school in our nation has cancelled the remainder of the school year and since the technology in our country doesn't allow virtual learning we are basically sitting home doing nothing. - Student from Ghana

We don't have any clinical time which I feel has hampered our hands-on learning and experience. We have not even been given any cases or attempts to try clinical skills online. - Student from India

Theme: Student Motivations

My goal is to be a more well-rounded future doctor. I think I can only achieve that if I can learn from a diverse learning resource...I strive to be very knowledgeable in my career and practice, to be connected to a wider knowledge base that doesn't just end in my training but even in my practice in future because medicine is about teamwork and putting knowledge, ideas and clinical experience together to achieve the best outcome for patients. I believe The Global Medical Education Collaborative will equip me with diverse knowledge and help fill the gaps where I am lacking. I believe this Collaborative will also empower me to pay it forward to those who may find themselves learning in a limited resource setting. - Student from Uganda

As a young medical professional, I see this as an opportunity to be exposed to a new realm of knowledge, meeting professionals, and learning new ideas about what I love: medicine. - Student from Nigeria

Directly [motivated by opportunities] to learn clinical skills; assisting learning about how to assess patients, different skills to apply in different clinical scenarios, differential diagnosis experience. Indirectly to be part of the wider medical community; working with other potential medics from many different areas, learning to utilize group members unique medical teaching and experiences and taking that experience into my own learning. - Student from Tanzania

Theme: Barriers to Participation

Internet access remains the most important barrier to e-learning in my country and access remains expensive. Other factors are easily workable. - Student from Nigeria

Time [would be a barrier] because I've been given a lot of work to do in the house, so personal studies are sometimes a problem. [A second barrier] would be money to buy internet bundle for online lectures. - Student from Ghana

Theme: Comments on Clinical Reasoning Skills

When given a clinical case, I can reason my way through the history and physical examination findings. I have a limited understanding of laboratory tests and their results and I have an even more limited grasp on interpreting different imaging modalities. - Student from Uganda

I don't think I've developed [clinical reasoning] enough. My learning has been mostly "book" based, but when it comes to applying the knowledge I get from the books to clinical life, I've found it's rather challenging. - Student from Ghana