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Abstract

The University of Colorado School of Medicine is implementing comprehensive curricular reform designed to produce physicians with a lifelong dedication to leadership, curiosity, and commitment. The new longitudinally integrated and case-based curriculum interweaves content on basic/medical sciences, clinical skills, and health systems content such as bioethics, interprofessional skills, and social determinants of health. Simultaneously, the school is forming a branch campus in partnership with nearby Colorado State University. The newly formed branch campus faculty team wanted to test delivery of the novel curriculum, practice working together as a team, and examine the practical logistics of human and physical resources at the branch campus. Herein, we describe our approach for running a Mock Week of first year of the new curriculum. This innovative methodology involved teaching a week's worth of the new content and garnering feedback from clinician educators, medical science faculty, and students. Our observations highlight practical insights for implementing an integrated curriculum at an inaugural branch campus. Finally, we provide recommendations for using a Mock Week as a feasible and robust tool for improving and enhancing various facets of medical education.

Introduction

Medical education continues to advance and evolve to meet the ever-changing healthcare needs in the United States. Programmatic changes at medical schools across the country include comprehensive curricular reforms designed to provide earlier clinical experiences, longitudinal integration of the basic and clinical sciences, and expanded use of case-based learning techniques.¹ In addition to curriculum reform, medical schools are embracing the development and expansion of regional medical campuses.^{2,3} Motivations underlying increased interest in branch campuses are varied but often involve increased student enrollment and acquisition of additional resources, expertise, and opportunities. Individually, extensive curriculum reform and the launching of a new branch campus are daunting endeavors. When combined, implementing a reformed curriculum at a new branch campus not only brings additional challenges but also provides novel opportunities. In this era of rapidly evolving health care which impacts educational methods, we share an innovative approach and some

practical tips for piloting a reformed and highly integrated case-based curriculum at a nascent 4-year branch campus.

The University of Colorado School of Medicine (CU SOM) is a state university with ~180 students per class and is the only allopathic medical school in Colorado. The school is currently engaged in curriculum redesign in order to promote the development of physician leaders who are committed to transforming the health of diverse communities and who are curious, lifelong learners. The new longitudinally integrated curriculum will incorporate more clinical skills into the basic science curriculum with additional focus on population health, bioethics, health care policy, interprofessional skills, and health system improvement, collectively termed "health & society." Rather than following a traditional block sequencing with 2 years of basic sciences followed by 2 years of clinical skills, the reformed curriculum focuses on fundamental science content in year one and core clinical content in year 2, with more integration of all content including health and society throughout the 4-year curriculum. The third and fourth years build on and refine basic and clinical concepts, respectively, while maintaining

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the integrated nature of the first 2 years. In order to prepare students for clerkships in the second year, the first-year basic science curriculum is built on 3 pillars: medical sciences, clinical skills, and health and society. The curriculum is also case based, with a “chief concern” scheduled for the beginning of each week during the first year.

Independent of the curriculum reform, CU SOM has partnered with Colorado State University (CSU), another top ranked state university, to establish *de novo* a 4-year branch campus: CU SOM at CSU. CSU is in Fort Collins, approximately an hour north of the main CU SOM Anschutz Medical Campus in the greater Denver area. This branch campus will mirror the new curriculum as designed and delivered on the main campus; the branch campus will utilize the same learning objectives and assessments as the main campus in order to meet accreditation standards. The CU SOM at CSU has recently assembled a small Fort Collins-based medical science faculty to deliver, in parallel with the main campus, the non-clinical portions of the 4-year curriculum. Additionally, a robust group of clinicians throughout Fort Collins have been recruited as part time and volunteer faculty to support the clinical learning experiences across the 4-year curriculum. Of note, the branch campus will start with only 12 students per class and thus will have numerous opportunities for active learning and innovative instructional strategies. Additionally, CSU is also home to a top ranked veterinary medicine program and a department focused on environmental health, thus providing unique opportunities for students to explore interests in One Health (health of people, animals, and the planet)^{4,5} and other concepts integral to a broader vision of health.

The newly formed medical science faculty team at the branch campus wanted to test their ability to work as a team, make use of a newly built classroom space, coordinate and teach the new curriculum, and include evidenced-based active learning practices in their instruction. Two students who had recently completed their first year in the legacy curriculum at the main campus were selected to serve as student ambassadors to help the branch campus team with this pilot project. The team chose to run a what we termed a “Mock Week” of the first year of the new curriculum, which is an innovative technique in medical education development. In short, during the Mock Week process the team prepared and taught a week of content in the new curriculum, including basic/medical sciences, clinical skills, and health & society content. Medical students completed pre-work, attended the sessions, and took an end-of-week assessment. Extensive debrief sessions provided feedback to shape the development of curriculum deployment at the branch campus.

In this paper, we outline how we developed and conducted a first year Mock Week, critique and discuss our experiences,

and provide recommendations to medical schools interested in using this approach. In sum, we found that tangibly going through the process of planning, executing, and debriefing a full week of curricular content provided an abundance of insightful information that exceeded expectations. We also conclude that the Mock Week exercise is an accessible, versatile, and useful tool for gathering insight and improving medical education.

Methods and Process

Timeline

The Mock Week occurred approximately one year before the CU SOM at CSU branch campus is scheduled to matriculate the inaugural 4-year class of students. The main CU SOM campus was still finalizing the reformed curriculum, which would debut the same year as the branch campus. Thus, the Mock Week served as a pilot test of both the new branch campus and the new curriculum.

Core Faculty Team

At the time of the Mock Week exercise, the faculty team working on the first-year curriculum at the branch campus consisted of 4 MD-trained clinician educators and 5 PhD-trained medical science faculty. The clinician educators included the Associate Dean of the branch campus, the Assistant Dean of the branch campus, a liaison between the 2 campuses who has worked at both institutions, and the health and society content director. The Associate Dean has been involved in the main campus medical education for years, the Assistant Dean has previous experience and professional development in medical education, and the liaison also has experience in medical education. The 5 medical science faculty, ranging in academic rank from Assistant Professor to Professor, included the Director of Basic Sciences, who also has a PharmD degree; a faculty member with a primary appointment to teach at the branch campus; and 3 faculty members who had smaller appointments in the branch campus while teaching in other programs at CSU. The medical science faculty had departmental homes in various units within the CSU College of Veterinary Medicine and Biomedical Sciences, including the Department of Microbiology, Immunology, and Pathology, and the Department Biomedical Sciences. At the time of the Mock Week, additional faculty were still being recruited from departments including Environmental and Radiological Health Sciences. Additionally, a few guest speakers were invited to lead sessions on particular topics in their expertise, including a local clinician who is a former Neurology program director at a medical school.

Recruitment of Student Ambassadors

An application for the curriculum ambassador position was sent to all students finishing their first year in the legacy curriculum at the main campus. The position was particularly advertised to students already involved in a curriculum

reform group. The application asked all interested students to write about why they wanted to become a curriculum ambassador and what skills or relevant experiences they had that would help in the position. The applications were reviewed by the Students of Curriculum Reform committee and the Senior Associate Dean for Education. Together they matched applicants with opportunities based on that review. The students live in Denver, only an hour from Fort Collins, and thus drove to Fort Collins daily during the Mock Week. A couple of sessions were held virtually to limit the number of days that students had to drive.

Planning of the Mock Week

The CU SOM at CSU core science faculty planned the Mock Week for a month preceding the on-site exercise. A week within the neurology unit was chosen, since that content had not yet been taught to the student ambassadors in the legacy curriculum; this would provide a more authentic experience with students experiencing the content for the first time. Most of the week was basic sciences content. There were also blocks of time for clinical skills, such as performing a neurological exam, and health and society content related to neurological pathology. The medical sciences faculty divided the content based on expertise and the amount of effort dedicated to teaching in the branch campus; the clinical faculty developed case studies and physical exam sessions; and the health and society director organized extramural guest speakers to speak about the concepts planned for that week. Overall, the faculty utilized 47 learning objectives for the week from the reformed curriculum; these learning objectives were developed by the curriculum build team at the main campus and will be used by both main and branch campuses when the reformed curriculum is deployed. The student ambassadors actively participated in the planning process and provided a perceived pre-ranking of their knowledge and understanding of learning objectives related to the Mock Week content.

Execution of the Mock Week

For the most part, the team followed the schedule that will be used in the new first year curriculum. The medical sciences, clinical skills, and health and society faculty taught sessions on different topics, using a variety of teaching methods. Innovative, evidenced-based teaching methods included problem-based learning and the use of mini cases to teach basic science information.^{6,7} After each learning session, the students and faculty provided verbal feedback on the strengths and weaknesses of the teaching methods in a round table discussion. Some faculty were present for the entirety of the exercise, including sessions where they were not actively teaching, to develop a comprehensive view of the week and provide continuity and insight regarding the curricular elements as a whole. We found this to be critical for effective feedback on teaching methods as well as for

team building. Finally, to provide feedback on the strengths and weaknesses of the instructional methods used, the faculty composed an assessment of a similar form to that used on the CU SOM main campus. (However, when the curriculum is deployed for actual students in a non-Mock setting, both main and branch campuses will use the same assessments.)

Debrief of the Mock Week

To complement and unify the feedback gathered over the previous days, the faculty held a final debriefing session at the end of the week. The post-exercise feedback and brainstorming session yielded several important lines of information. Included was a critique of learning objectives and other curricular components, ideas for improving instructional techniques, and approaches for integrating and creating synergy between the basic and clinical science faculty to provide an optimal first-year medical school experience. The students re-ranked their knowledge of the learning objectives following the Mock Week, providing a subjective assessment of the quality of instruction. Finally, key takeaways were consolidated and presented to the curriculum reform leadership at the main campus so that both main and branch campuses could benefit from the Mock Week. The students and main campus teams were instrumental in providing an objective, unbiased assessment of the branch campus development.

Results and Discussion

There were 47 learning objectives for the Mock Week. The students ranked their knowledge of these learning objectives from 1 (little or no prior knowledge) to 3 (detailed knowledge). Before the Mock Week, the students quantified their perceived knowledge of the learning objectives with a score of 1.21 ± 0.07 . After the mock week, the students reassessed their knowledge of the learning objectives using the same scale as before. Following the Mock Week, the student rankings of their perceived knowledge of the learning objectives increased dramatically to 2.42 ± 0.12 , with a robust effect size (r) of 0.98 (Pearson's r , ranging from -1.0 to 1.0, with 0 indicating no effect; $p < 0.01$; however, this was calculated with an n of 2 students). These encouraging pilot data suggest positive instructional efficacy at an early stage by the CU SOM at CSU branch campus faculty.

Those participating in the Mock Week deemed the exercise insightful and impactful. Faculty appreciated the opportunity to practice functioning as a cohesive academic unit, and it was helpful for the students to see a different format of instruction than what they were used to in the legacy curriculum and provide feedback on the reformed curriculum in contrast to the legacy curriculum. Overall, the Mock Week was critical for practicing implementation of an integrated

central curriculum designed by the main campus into the branch campus environment.

Key takeaway observations and conclusions fell into 3 general categories: 1) faculty development, 2) curriculum innovation, and 3) branch campus development.

1. *Faculty Development:*

- a. *Medical Education:* While some of the medical science faculty at the branch campus had experience in medical education, others were new to medical student education; the mock sessions provided an opportunity to teach medical students, receive feedback, and identify instructional strengths and weaknesses.
- b. *Teamwork:* The branch campus faculty found the opportunity to work together for the first time energizing and informative. The sessions highlighted the unique skills and strengths brought to the group by different individuals and uncovered areas in need of improvement for the evolving planning and execution processes.

2. *Curricular Innovation:*

- a. *Curricular Design:* The new curriculum organizes content by body system instead of by subject area. Challenges regarding longitudinal integration of pervasive subject areas, such as anatomy, pharmacology, and microbiology were discussed (as were potential remedies). There will be pros and cons to using any curriculum. The Mock Week identified potential challenges and enabled the development of potential solutions within the unique context of the branch campus faculty.
- b. *Curricular Integration:* The Mock Week demonstrated in real-time the advantages and challenges of integrating the basic/medical sciences, clinical skills, and health and society content. Throughout the week, and especially during the debrief, the faculty and students considered different approaches for maximizing integration and minimizing compartmentalization. Ideas included complementing the weekly chief concern/case study with multiple mini case studies and having a co-representation of basic science and clinical faculty during as many learning sessions as feasible. Importantly, our Mock Week exercise produced results and outcomes similar to other previous attempts at implementing an integrated curriculum; namely, that

interdisciplinary teaching and a high degree of communication between faculty is critical for success.⁸

3. *Branch Campus Development:*

- a. *Community Networking:* The Mock Week prompted the faculty to connect with clinical faculty and others in the community that may be appropriate guest speakers for a variety of topics in the future. Building this network is critical for a branch campus with a small faculty team. Importantly, establishing community connections well in advance of student matriculation, one year in our case, has allowed the process to develop gradually and organically, as opposed to being rushed and forced. The result has been an enthusiastic community response in support of the CU SOM at CSU branch campus.
- b. *Physical Resources:* A new building houses the branch campus and offers a state-of-the-art, future-forward designed learning environment. Being located on the CSU campus provides other advantages and resources, such as a renowned human anatomy laboratory and the CSU Translational Medicine Institute. The Mock Week helped the faculty identify not only the physical resources available but also provided insight towards practical considerations such as physically traveling to different campus locations.
- c. *Human Resources:* The Mock Week highlighted areas in the curriculum that lacked faculty with expertise in the partially built branch campus team, pinpointing areas for future hires. Once again, recognizing these issues a year in advance provides opportunities to recruit existing CSU faculty or to run new faculty searches.
- d. *Student Resources:* The Mock Week led to important discussions about how students in the branch campus will connect with each other, with students in other programs at CSU, and with medical students at the main campus.

During the debrief process, the faculty team decided that the Mock Week process was so beneficial that we will do this again. The team plans to run another Mock Week approximately 3 months before the first students matriculate. This will allow the team to have more practice working together with additional members and a finalized curricular map. As medical student ambassadors will not be available during the second mock week time period, we will recruit

current CSU students planning on submitting medical school applications to participate and provide student-level input.

As mentioned, the key takeaways from the Mock Week were shared with the curriculum reform leadership on the main campus. In particular, the Assistant Dean leading the curriculum reform team at the main campus was positive about the findings from the branch campus' Mock Week and led the curriculum reform team to implement central changes to the new curricular design based on these findings.

In sum, the Mock Week shed light on several challenges and potential risks to the success of the fledging branch campus and allowed the team to begin to brainstorm solutions to these issues. In contrast, the Mock Week also highlighted several opportunities that are unique to the new branch campus, such as connections with faculty and resources at CSU and in Fort Collins. Finally, this approach executed in one area of a larger program was useful to the overall reform team's work.

Recommendations for Medical Education

We highly recommend the use of a Mock Week as a method for testing innovations in medical education. Specific scenarios where a mock week strategy could prove useful include:

- Evaluating or implementing a centrally mandated curriculum at a branch campus, and providing feedback on that curriculum to the main campus
- Providing faculty new to medical student education or new to a branch campus an opportunity to practice before teaching their actual courses
- Fostering integration and team building within a faculty group
- Practicing implementation of new teaching methods and active learning strategies, such as converting a traditional lecture into team-based learning, even by seasoned faculty
- Examining logistical considerations related to the learning space and the local community
- Piloting new or revised curricula or new pedagogy on a small scale before comprehensive implementation

While we outlined a process for the Mock Week based on our experience, the number of mock/pilot strategies and variations are limited only by the creativity of the participating faculty. For example, an entire week is not necessarily the optimal length for every mock exercise. Pre-medical students or other medical-related students (e.g., veterinary) could fill the role of student ambassadors if necessary.

When feasible, we highly recommend that all participating faculty attend as much of the Mock Week as possible. Overlapping faculty participation facilitates exposure to other

teaching styles, enhances feedback, and builds a culture of integrated teaching and learning. Constructive discussions during and after the Mock Week are essential within and beyond the core team involved. In the end, the success or failure of a mock academic week exercise depends on commitment and effort by the faculty to learning and receiving constructive feedback.⁹

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