EDUCAUSE LEARNING INITIATIVE

BRIEF

Next-Generation Medical Education: Facilitating Student-Centered Learning Environments

March 2016

David P. Green, University of Miami Miller School of Medicine

- **The University of Miami Miller School of Medicine launched an initiative called 'Cane Academy to pursue flipped courses to replace passive learning with high-impact educational practices.**
- **A key concern for the academy is engaging and supporting interested faculty who want development and assistance.**
- **To support faculty, an infrastructure was developed that provides a roadmap strategy, describes the development process, and examines content from two courses.**

Medical education has historically relied on passive-learning and didactic exercises in which students essentially memorize content to maximize performance on the United States Medical Licensing Examination Step 1 national board exam. Meanwhile, blended course designs offer the potential to replace passive learning with high-impact educational practices.[1] This divide has prompted calls for medical education to be "reimagined," and current medical education reforms are trying to link nontraditional and experiential classroom strategies with accepted national physician competencies earlier in the preclinical medical education curriculum.[2] In this climate, medical education learning environments are evolving, and technology support is essential to ensuring that faculty members are successful within this culture change. But how do we ensure success in the next-generation medical education environment?

In October 2014, the University of Miami Miller School of Medicine launched an initiative called 'Cane Academy to flip the classroom by replacing traditional didactic sessions with short "Khan-style videos" accompanied by learning objectives, self-assessment questions, and supplemental content. 'Cane Academy fosters teaching and learning environments where self-guided mobile learning is blended with enhanced face-to-face opportunities that promote deeper learning. The primary challenges to the initiative included adapting to faculty resistance, ensuring that students are prepared for the nontraditional learning experiences, and creating mechanisms to engage and support interested instructors who want development and assistance. This article explores how we created an infrastructure that supports faculty by:

- Explaining a **roadmap strategy** that facilitates faculty development during the blended course design process
- Describing the **development process** for online assets that map learning objectives to content and self-assessment
- Examining **actual course content** from recent ophthalmology and dermatology modules

© 2016 EDUCAUSE. CC by-nc-nd.

Faculty Development and Support: The Roadmap and Precourse Checklist

To ensure effective course redesigns and the long-term sustainability of our efforts, a top priority has been developing the infrastructure faculty members need as they begin teaching their courses in nontraditional ways and incorporating unfamiliar tools or strategies. To facilitate this support, we created the 'Cane Academy Roadmap for Course Redesign, which includes a Blended Course Design Approval Checklist alongside an expected Course Design and Development Timeline. To redesign one of our medical education courses, the following phases are completed using an agile design process:

- **Consultations, precourse faculty surveys, and introductory coaching sessions:** Project scope is determined through introductory meetings. Faculty members also provide their initial perspectives on the role change from "teller" to "academic coach" as they begin transitioning into using new teaching styles and strategies.
- **Course planning and LMS training:** Logistics for course implementation are considered and basic training in LMS usage is completed. Additionally, teaching strategies are mapped to appropriate technology choices.
- **Curricular design and course blueprint:** Measureable learning objectives are written and mapped to self-guided and face-to-face learning opportunities. A course blueprint (as outlined in the BlendKit Course) describes the blended course and helps visualize how class activities (learning outcomes) are mapped to objectives, course goals, and national competencies. In the blueprint (see the blueprint for the dermatology course), green boxes represent online, self-guided learning modules, and orange boxes represent in-class learning sessions. A variety of collaborative and learner-centered approaches are incorporated into course designs to deliver content.
- **Course evaluation plan:** All necessary institutional review board (IRB) applications are submitted. Course evaluation strategies and needs are considered.
- **Scheduling and generation of course syllabus:** Important dates, milestones, and academic events are scheduled within a course syllabus. An orientation session is planned to help students with online learning preparation and technology demonstrations.
- **Content development:** Faculty members work in an iterative manner with an instructional designer and a medical education student fellow to create course content.
  - **Khan-style video production:** Original lectures are streamlined and organized at the concept-level to facilitate production of animated instructional videos that average between 8 and 10 minutes in run time. Each video is "packaged" with learning objectives, a content outline, a summary image, and additional supplements (i.e., a digital image repository).
  - **In-class learning sessions:** Transformational learning opportunities are created where students reflect on course content, apply knowledge gains, evaluate information, synthesize a deliverable, and forge meaningful interactions.
- **Production of digital learning assets:** Self-guided learning objects are created to package content and are published to the LMS.
- **Peer-review of content:** If desired by the faculty member, subject matter experts and/or departmental faculty are recruited to peer review the course content.
- **Usability testing:** Online components of the course are tested on a variety of browsers and devices. Known issues are documented and fixed (when possible). A video tutorial is created that supplements the course introduction.

- **Edits, corrections, and modifications of digital content:** All online components are given a final review before being made available to students.
- **Publication of course, online teaching support, and classroom observations:** Real-time support is provided to assist faculty with issues that might arise with online teaching and learning. Classroom observations of teaching are conducted, and video critiques are made with the goal of improving future efforts.

Partnering with Faculty during the Development Process to Promote Deep Learning

Student engagement in learner-centered activities is enhanced only when students find value in exercises that connect higher-order thinking skills with properly designed assessments. Properly mapping learning outcomes to teaching strategies and technological choices fosters high-impact educational environments. Indeed, care must be taken in blended course designs to ensure alignment between the online and face-to-face components. To assist with this, coaching sessions revolve around a rubric that guides conversations around assessing and improving the face-to-face learning opportunities. The six criteria in the rubric are:

- Reflection on knowledge gains from self-guided modules
- Application of academic content
- Evaluation of content under the context of challenging scenarios
- Synthesis of a product that demonstrates learning
- Forging of meaningful interactions
- Faculty preparation

For many instructors, the change in role from “sage on the stage” to “academic coach” is no easy feat. To support changes in teaching styles, we offer a variety of options. Classroom observations provide direct opportunities to observe instructors managing an activity-based classroom. Because all of our classroom sessions are recorded, we can also conduct formal video critiques. To inform decisions and guide our conversations, we collect data via student and faculty pre/post perspectives surveys. Informal discussion groups, called Coffee Breaks, are small groups of three to five participants that promote discussions around unifying themes in friendly, low-stakes settings. Lastly, a workshop series creates learning opportunities for faculty members in advance of one-on-one coaching sessions. Collectively, these opportunities promote faculty growth and ensure learner-centered sessions maximize student performance.

Examining Recent Successes: Course Content from Dermatology and Ophthalmology

Our recent course redesigns provide self-paced, active-learning opportunities for students, while remaining time-neutral compared to traditional course offerings (see figure 1). The courses are supported by a variety of e-tools that facilitate collaboration, file-sharing, and presentation.

Passive learning: Lecturing

Activity	Length of Time
Lectures	15 hours
One faculty-led small group session	1 hour
Total	**16 hours**

Active learning: Student-centered, self-paced activities

Activity	Length of Time
Self-guided learning modules (with self-assessment activities)	7 hours
Orientation & Introduction	2 hours
Interactive, face-to-face sessions	4 hours
Two review sessions	1 hour each
One faculty-led small group session	1 hour
Total	**16 hours**

Figure 1. Evolving from passive learning to student-centered learning

Examples from two recent efforts, in dermatology and ophthalmology, help demonstrate the value of the project. Student perspectives on the learning experiences provide valuable insight as we continually adapt to meet learners' needs.

Highlights from Dermatology

- 200 students (MD and MDMPH)
- In a precourse survey, fewer than one-third of the students (29%) reported they had previous "good" or "excellent" experiences participating in a blended course.
- In a postcourse survey, 80% of students agreed or strongly agreed that the case studies related academic content to real-world scenarios.
- Following completion of the course, nearly three-quarters of the class agreed or strongly agreed that 'Cane Academy methods are favorable for future lessons.
- Students who participated in this blended learning opportunity slightly exceeded final exam performance of students in previous semesters that used traditional teaching methods.
- Video example: Types of Wounds.
- Supplemental content: Types of Wounds Outline.

Highlights from Ophthalmology

- 200 students (MD and MDMPH)
- In a precourse survey, 79% of students indicated they had never participated in a flipped course.
- In a postcourse survey, 80% of students agreed or strongly agreed that the case studies related academic content to real-world scenarios.
- Following completion of the course, 71% of the students agreed or strongly agreed that 'Cane Academy methods are favorable for future lessons; 13% were neutral.
- Students who participated in this blended learning opportunity exceeded final exam performance of students in four previous semesters that used traditional teaching methods.
- Video example: Ptosis and Dermatochalasis.
- Supplemental content: Ptosis and Dermatochalasis Outline.

Conclusion

Educational models using nontraditional forms of instruction, hypermedia, and disruptive innovations are incorporated as solutions for student-centered medical education, yet gaining appreciation for the learning experiences is sometimes challenging. Matching learner-centered strategies with appropriate technologies in next-generation medical education curricula requires culture-changing faculty development. Our recent course redesigns, student feedback, and faculty partnerships demonstrate that:

- Faculty ownership promotes increased student excitement, interest, and engagement.
- Student feedback is generally positive, and academic performance is consistent with or better than that of courses taught using a traditional lecture-based format.
- Effective communication between administration and faculty is critical to success.
- Experiential learning opportunities provide necessary skills for future physicians that relate to real-world scenarios and map to national competencies.
- Thoughtful implementation of this approach has the potential to accelerate student progress through the curriculum.

Related Resources

- BlendKit Course, The Blended Learning Toolkit.
- Group on Information Resources, Association of American Medical Colleges.
- Instructional Technology, Stanford Medicine, Information Resources & Technology.
- The Lead. Serve. Inspire. (LSI) Curriculum, The Ohio State University College of Medicine.
- Teaching Technology Resources, Ohio University, Heritage College of Osteopathic Medicine.

Acknowledgments

- Alex J. Mechaber, MD, FACP, Senior Associate Dean for Undergraduate Medical Education
- Mark O'Connell, MD, Former Senior Associate Dean for Educational Development (*retired*)
- Laurence Gardner, MD, MACP, Executive Dean for Education and Policy
- Solomon Pikarsky, Director of IT for Medical Education
- Rishi Desai, MD, Osmosis (formerly of Khan Academy)
- Allan Gyorke, Assistant Vice President for IT and Chief Academic Technology Officer
- Hannah Inzko, Director, Learning Innovation and Faculty Engagement
- David Faber, Medical Education Student Fellow
- Matthew Kofoed, Medical Education Student Fellow
- Robert Kirsner, MD, Dermatology Course Director
- Carol Karp, MD, Ophthalmology Co-Course Director
- Chris Alabiad, MD, Ophthalmology Co-Course Director
- Monique Datta, University of Southern California Rossier School of Education

Notes

1. George D. Kuh, "High-Impact Educational Practices: What They Are, Who Has Access to Them, and Why They Matter," *Peer Review* 14, no. 3, 2012: 29.
2. Charles G. Prober and Salman Khan, "Medical Education Reimagined: A Call to Action," *Academic Medicine* 88, no. 10, 2013: 1407–10, doi:10.1097/ACM.0b013e3182a368bd; N. B. Mehta, A. L. Hull, J. B. Young, and J. K. Stoller, "Just Imagine: New Paradigms for Medical Education," *Academic Medicine* 88, no. 10, 2013: 1418–23, doi:10.1097/ACM.0b013e3182a36a07; Larry Hurtubise, Elissa Hall, Leah Sheridan and Heeyoung Han, "The Flipped Classroom in Medical Education: Engaging Students to Build Competency," *Journal of Medical Education and Curricular Development*, no. 2, April 27, 2015: 35–43, doi:10.4137/JMECD.S23895; Charles G. Prober and Chip Heath, "Lecture Halls without Lectures—A Proposal for Medical Education," *New England Journal of Medicine* 366, no. 18, 2012: 1657–59, doi:10.1056/NEJMp1202451; and Englander et al., "Toward a Common Taxonomy of Competency Domains for the Health Professions and Competencies for Physicians," *Academic Medicine* 88, no. 8, 2013: 1–7, doi:10.1097/ACM.0b013e31829a3b2b.