Videos help medical students master physiology concepts, study finds

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Director of assessment and evaluation J. Patrick Grenda, left, and medical information science professor Kashif Ahmad, both in the U. of I. College of Medicine, co-wrote a new study in which they found that creating customized videos that explain complex material presented in classroom lectures can be effective teaching tools – and significant time savers for faculty members and medical students. Credit: L. Brian Stauffer

Physiology may be one of the toughest courses that first-year medical students take as part of a curriculum that's filled with daunting amounts of complex information. However, researchers at the University of Illinois College of Medicine and Carle Illinois College of Medicine have found that creating short videos that explain information presented during physiology lectures makes teaching easier for medical educators and learning easier for their students.

"Learning in medical school has been likened to drinking from a fire hose, so when you're stuck on something, it's much better to have someone explain things in a five-minute video than to tough it out on your own for 20 minutes. It makes things a lot more efficient," said Zachariah O. Adham, a second-year medical student at the U. of I. College of Medicine at Peoria.

Adham was one of 131 students enrolled in medical information science professor Kashif A. Ahmad's physiology course at the Urbana campus during the 2016 fall semester, when they conducted a research project about using videos to enhance students' learning.

Adham co-wrote a paper on the topic with Ahmad and J. Patrick Grenda, the director of assessment and evaluation in the University of Illinois College of Medicine at Urbana. Their study was published recently in the journal *Medical Science Educator*.

While other medical educators surely have been using videos in their teaching, few seem to be systemically analyzing and publishing their findings, Adham said.

"Our larger goal was to encourage medical educators, particularly those not already involved in education research, to apply scientific rigor to their normal quality-improvement process for teaching and share those efforts with the education community," Adham said.

Although Ahmad had been working with videos for a couple of years prior to the study, he only more recently began using the medium to help students understand difficult concepts presented in his lectures.

During class, Ahmad distributed index cards to students and asked them to write down the "muddiest or the most difficult concept in that day's lecture." Using the anonymous feedback students provided on the cards and a log of the questions students posed during his office hours, Ahmad identified several concepts that were common stumbling blocks.

Ahmad then recorded eight instructional videos, each less than 10 minutes long, using an interactive software program for teachers that allowed him to narrate, animate and annotate each concept. While creating each video took about 20 minutes, Ahmad said, the amount of time he spent addressing students' questions during his weekly office hours dropped precipitously – by 30 to 40 percent, according to his estimates.

"When I started doing this, I noticed the amount of time I spent answering students' questions dropped tremendously," said Ahmad, who also is a course director and medical education facilitator at Carle Illinois College of Medicine. "The students would write me emails and say, 'This is great. I don't have to come to your office anymore. This saves so much of my time.'"

After viewing the videos, the students who did show up at Ahmad's door were seeking confirmation that they correctly understood the information presented in the lectures and videos, rather than asking him to explain it in painstaking detail again, he said.

Because the videos strengthened students' conceptual foundation, Ahmad said he was able to spend more time engaging them in critical-thinking activities.

"It was very rewarding to see that," Ahmad said. "The videos were helping them not to just succeed in the curriculum but also in managing their time really well. Some of these students were doing dual degrees such as M.D./Ph.D.s, so the time they saved was really valuable to them."

Although the annual subscription to the software program that Ahmad used costs the instructor about $100, access for students is free, he said, and students could view the videos at any time from their cellphone, tablet computer or other devices.

Students' satisfaction with the videos was high: More than 92 percent of the viewers agreed or strongly agreed that the videos helped them better understand complex concepts, according to an online survey administered prior to the first exam in the course.

"Since using the videos is a positive learning experience, we expect that it may lessen the 'fire-hose' experience that many medical students encounter with the high volumes of information they are expected to learn, which can drive many students to a lifelong aversion to these sciences," Ahmad said.

In his role as a medical education facilitator, Ahmad said he is excited to develop different teaching techniques that enhance students' learning and contribute to the new college of medicine's engineering-infused curriculum.

More information: Zachariah O. Adham et al. Developing a Digital Algorithm for Cognitive Apprenticeship in First-Year Medical School Physiology, *Medical Science Educator* (2017). DOI: 10.1007/s40670-017-0517-y