KEEP THE LECTURE, LOSE THE LECTERN

BLENDDED CLASSES—MIXING TRADITIONAL AND DIGITAL TEACHING—ARE GAINING CONVERTS.

By Margaret Loftus
Doug Fisher came to online teaching by happenstance. A temporary leave from Vanderbilt in 2008 had him scrambling to make arrangements for his popular computer science and engineering database class. MOOCs—massive open online courses—were still in their infancy, so Fisher found no help on the Internet, instead, he taught the course via video-conferencing. Yet the notion of incorporating digital content of his own or others’ struck chord, says Fisher. “That’s what planted the seed.”

Fast-forward five years, and Web-based material has become an integral part of Fisher’s courses, prompting his recent appointment as director of the new Institute for Digital Learning at Purdue, charged with developing the university’s digital learning strategy. He and his proponents say “blended learning” is a promising model, leveraging the flexibility of online learning and the social interaction of the classroom. Typically, lectures are filmed and posted online, assigned to students to view on their own. That frees up meeting time for greater interaction and hands-on work. “In a blended format, when you come to class you’re engaged in active learning, as opposed to coming in and sitting down and just listening and trying to absorb,” says Steve Cramer, a professor of civil and environmental engineering at the University of Wisconsin, Madison and associate dean for academic affairs in its engineering college.

What’s more, he notes that the focus on in-class problem solving and associated digital elements into their dynamics, finite element analysis, and vibrations classes. By the third year, the team introduced digital elements into their curriculum. Purdue School of Engineering Education Associate Professor Alice Pawley was inspired to flip her entire lecture in a room with lots of people,” says Pawley. “The approach also fosters teamwork skills, which is built into the course context—a boon for students whose schedules are so tight they have difficulty meeting with their peers.

At the University of California, Irvine, Mechanical Engineering Professor David Dimas is putting a modified blended approach to test. Over a three-year period, Dimas and his colleagues gradually introduced digital elements into their dynamics, finite element analysis, and vibrations classes. By the third year, the team provided students with recorded lectures in addition to the in-class lectures, and instituted online homework submission and short online quizzes. Surprisingly, the majority of students report that the repetition of lecture doesn’t diminish their attendance. “What we see is that students consume both,” Dimas says. “They see it as a supplement, when summoned. His goal is to render the material less abstract and to foster confidence in his seniors, who are taking their last required class. “Now is the time to practice being an independent thinker. When you go to work, they’re not going to hand you a textbook,” Mason says. As an instructor, he has found the move liberating: “You don’t have to follow notes or stay on the syllabus. So a student asks a question, and it takes you down a rabbit trail, that’s OK.”

The University of Wisconsin, Madison is taking a more institutionalized approach. Cramer estimates that 10 to 15 percent of undergraduate engineering classes, mostly entry-level courses such as dynamics and statics, are blended. The extent depends on the instructor: “There’s no saying it has to be 100 percent one way or another.” In his structural engineering course, for example, the class meets less frequently than a standard lecture-based course. When students do gather, most of the time is spent in active problem-solving, which Cramer says more accurately reflects engineering practice today. “Employers are hiring students for what they can do, not what they know. It’s not so much facts and figures, but how they can take that and solve problems.”

Nonetheless, flipping the lecture isn’t universally embraced. “Some professors really like being the ‘sage on stage and some students really like that,” says Holloway, who admits to comments such as “I paid my tuition to have the professor teach me, and now I’m watching video!”

Overall, however, response has been positive. “Students who are traditionally good students tend to be resistant. They have a system, so they don’t want to rock the boat. But in a couple weeks they usually get onboard,” says Mason. Cramer reports that 70 percent of his students prefer the blended to the traditional approach: “An even higher percentage appreciates the in-class problem-solving sessions that we do, but the only way you get those is to remove the lectures,” he adds.

At UC Irvine, Dimas’s research found a slight upward trend in grades: One blended dynamics class saw an average final exam score of 66 percent, up from 61 in the first year of the study. Some instructors report that the students who benefit most may be those who don’t thrive in traditional lecture classes: “The bottom ends move up,” says Cramer.

Perhaps more important, says blended learning advocates, is the increase in student engagement. A UW Madison study found that students in a flipped lecture class performed equally well as those in a traditional class, but they spent more time doing open-ended problems. “We didn’t change the content,” says Cramer. “They just had an opportunity to solve more problems and more complicated problems.”

Classroom design is a crucial component, as stadium-style lecture halls with fixed seating simply are not conducive to collaboration. Cramer recalls his difficulty in a room with that traditional setup: “It had rows of tables that didn’t allow me to circulate among the groups solving problems. I struggled because I couldn’t physically get between chairs and tables. When we moved to a room with round tables, it made a huge difference.” Several of the classrooms at Purdue were built for interaction, with furniture on wheels so teams can sit next to each other and shift when necessary.

To be sure, implementing blended learning commands a considerable chunk of time and energy. Pawley reports that “my work load isn’t lower, but my stress is.” On a larger scale, a supportive administration, and ongoing pedagogical consultation are essential, says Cramer. “It often falls to a few willing faculty, but institutionally, you can’t move a broad spectrum of classes if you don’t have a system in place.”

Ultimately, the approach shifts the role of the instructor from lecturer to coach. Fisher, for one, now finds the traditional format unsatisfying: “I’d much rather go into a classroom and hand out problems and see if they can solve it and learn,” he says. “I’m much more excited sitting in a classroom nowadays. The students seem much more excited. I don’t worry about how to keep them awake; they’re awake and active.”

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