Postdoc Academic Chat #8

The Flipped Classroom and Blended Learning - What you Need to Know

Tuesday, May 15, 2018

Readings

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#1. Flipped Classrooms— Old or New?

The posting below looks at the "flipped classroom" approach and how it has evolved over time. It is by Marilla Svinicki University of Texas at Austinand is #67 in a series of selected excerpts from The *NT&LF* reproduced here as part of our "Shared Mission Partnership." *NT&LF* has a wealth of information on all aspects of teaching and learning. If you are not already a subscriber, you can check it out at [http://ntlf.com/about.aspx] The on-line edition of the Forum - like the printed version - offers subscribers insight from colleagues eager to share new ways of helping students reach the highest levels of learning. *National Teaching and Learning Forum Newsletter*, September, 2013, Volume 22, No. 5.

Rick Reis

There has been a lot of buzz in higher education lately about the flipped classroom model for teaching and learning. I am a strong believer in the underlying theories that support the structure as a good one for learning. I thought a little rumination on the process might help before instructors adopt it completely. It's not as easy as it appears, and it's not as new as others would have us believe.

Perhaps the most important assumption of the flipped classroom (or really any of the many new instructional models being used today) is the idea that learning is strongest when the learner is actively involved in the creation of understanding and the application of understanding to real problems. There is really no argument about this tenet - Active learning is best. The adoption of this philosophy of education can be seen in the increase in the use of

group work, clickers during class time, and technology to both present information and allow practice using it. Technology has been very influential in allowing us to provide and actually monitor these opportunities for all students. So the fact that the flipped classroom depends on active student learning before class using things like class management software and simulation technology AND in class using things like clickers is definitely a plus in the flipped classroom column.

Is it a new technique? Not really. Instructors have been assigning readings and asking questions in class for a long time. But the quality of work students can do and the ability to monitor the students' actual outside of class learning has been greatly enhanced through technology, making the flipped classroom much more feasible.

Which leads us to the second idea of the flipped classroom-coming to the learning with a prepared mind. This idea derives from the principle of learning that having a preview of what is to be learned before attempting to use it makes for a much deeper level of organization in which to insert (or attempt to insert) new ideas and concepts. In the jargon, this is the idea of having an "advance organizer," which is in essence creating a prepared mind. When you know what's coming, you'll get a lot more out of the experience than when you experience it for the first time. This is another very well accepted, research based finding about learning. This is also a key idea in the flipped classroom. Rather than spending class time giving out new information, the students prepare their minds for the applications before class.

Is this a new technique? Again, not really. Instructors provide readings that present new information and are intended to prepare students for class. The problem is getting students to use those readings to prepare. Several problems here. First, students usually are currently not inclined to read in preparation for class, some because they don't know what that involves and others because they feel they learn better using the instructor's lecture as the advance organizer for the reading which is done later. I've discussed the first of these two problems in a previous column ("The Scouts' motto: be prepared"), but I haven't discussed the instructor's typical response to the second, which is to give a "pop quiz" to get students to prepare. I have two objections here. Why make it a surprise? Why not just have an understanding check whenever there's a reading. This is one principle behind team-based learning: read to be prepared to take the quiz. It works, but I have found that doing well on the quizzes rather than seeing what you don't understand now becomes the focus of the class period. Granted that is one of the ways to handle this prior knowledge requirement, but I've found that my insistence on being prepared for the work in class gets overshadowed by the students' desire to be "right" on the quiz. I don't think we've solved this problem yet.

One last benefit of the flipped class design is that instructor expertise is used in ways that are most valuable. Rather than giving a lecture, which would probably be more effective if you just created a video or self-study computer lesson, the instructor's expertise is used in class because it is capable of adapting to student misunderstandings or misconceptions and creating spontaneous examples that help illuminate a concept. The instructor's depth of knowledge also helps identify common problems in understanding, which can be addressed in activities and questions during class.

Is this new? Not really. It has always been the case that instructors' expertise was capable of tailoring instruction to student needs, but the flipped classroom allows that expertise to be used more effectively by engaging common problems during class. This is great for students, but hard on the instructor because one must be prepared to follow any path the class may take if only to lead them back to the best path for understanding. So is flipping the classroom a new or old teaching strategy? The principles are old and valuable, but they haven't been usable because of constraints of time and effort on the parts of both students and teacher. It is the possibility of implementing these key principles that is new, and often enabled by technology's ability to capture their essence. Now we have to reframe the mindsets of both instructor and student about the role of face-to-face class time. Is it a time to receive information or to use it? I vote for the latter. That would be the new part.

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#2. Blended Learning: Introduction

The posting below is the introduction to the new book, Blended Learning: Across the Disciplines, Across the Academy, edited by Francine S. Glazer who is also the author of the introduction. Published in Association with the National Teaching and Learning Forum, by Stylus Publishing, LLC. 22883 Quicksilver Drive Sterling, Virginia 20166- 2102. [http://www.styluspub.com]. –

Rick Reis

Today's college students lead blended lives. In fact, if we loosely define the term blended to mean "partially virtual, partially tangible," then we can safely say all our lives have steadily become more and more blended. We access our news online, we pay bills online, we communicate through e-mail and social networks. People with Internet access go first to the web for information. We access the world via smartphones; why not access education that way too?

At its simplest, blended learning courses are those in which a significant amount of seat time, that is, time spent in the classroom, is replaced with online activities that involve students in meeting course objectives. Educause, a nonprofit organization whose mission is to promote the intelligent use of information technology in higher education, classifies courses based on the amount of time spent in each modality (Allen, Seaman, & Garrett, 2007). According to its classification scheme, blended courses have between 30% and 79% of activities online, face-to-face courses can include up to 29% of online activities, and fully online courses can include up to 20% of face-to-face activities.

Garrison and Vaughan (2008) define blended learning as "the thoughtful fusion of face- to-face and online learning experiences . . . such that the strengths of each are blended into a unique learning experience . . . Blended learning is a fundamental redesign that transforms the structure of, and approach to, teaching and learning" (p. 5).

The unique characteristic of blended learning is that a significant portion of the activities occur in two areas: in person and online. Various other pedagogies - lecture, problem- based learning, Just-in-Time Teaching, cooperative learning, and others - can then be superimposed on the blended framework. The challenge of blended learning is to link, or blend, what happens in each medium so that face-to-face and online activities reinforce each other to create a single, unified, course.

A large body of literature, often categorized as the no significant difference literature, is often cited in support of the contention that there is no discernible benefit in the learning outcomes of students taught online compared to students taught in a face-to-face environment. In fact, careful meta-analyses of this literature reveal an important difference: Online learning, and in particular blended learning, can result in significantly better student learning compared to learning in the conventional classroom.

A meta-analysis conducted by the U.S. Department of Education (2009) winnowed down over 1,000 empirical studies to 51 that used a rigorous research design to measure student learning outcomes in both environments and provided sufficient information to allow calculation of an effect size. The finding was that students in fully online and blended courses tend to perform better than students in face-to-face courses, with students in blended courses performing significantly better. Another finding of the study was that the more time students spent on task, the greater the differential in student performance. These findings are attributable in part to active learning strategies, which include opportunities for reflection and interaction with peers, and in part to the enriched content that characterizes well-designed online and blended courses.

However, a significant caveat is in order: The studies in this meta-analysis do not demonstrate that online learning is superior regardless of how it is implemented. The combination of elements in the treatment conditions produced the observed benefits. In many of the studies showing an advantage for online learning, the online and classroom conditions differed in terms of time spent, curriculum, and pedagogy. The successful courses included additional learning time. Online and blended learning, lacking the time

constraints imposed by face-to-face courses, are much more conducive to the expansion of learning time (U.S. Department of Education [2009] p. xvii). The successful courses also included more interactive materials (learning objects) and additional opportunities for collaboration.

In another meta-analysis of the literature, Zhao, Lei, Yan, Lai, and Tan (2005) identified three types of interactions-instructor and students, students and their peers, and students and content-as essential elements in determining the efficacy of a course's design. They further stated that courses with synchronous and asynchronous components-for example, blended courses-report more positive outcomes than courses that are entirely synchronous or entirely asynchronous.

When the design of the various studies is teased apart, it's possible to group subsets that identify specific variables. Three components of online learning stand out as contributing to more effective learning: discourse, via discussion boards, blogs, or other media; reflection, either public or private; and writing to learn strategies.

To summarize, blended learning courses employ active learning strategies through the use of a variety of pedagogical approaches. The asynchronous nature of the blended component of the courses has the salutary effect of expanding the time students spend on course material. Discussions conducted online encourage reflection and usually reach 100% participation. As a result, the face-to-face time can be used more effectively, with students extending the material beyond what might be achieved in a conventional face-to- face course. The students in a blended course make more and richer connections between what they are learning and what they already know, creating a robust scaffold to organize the information. The following sections contain a more detailed look at some of the characteristics of successful blended learning courses.

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#3. Keep the Lecture, Lose the Lectern

The posting below gives many interesting examples of how the "flipped classroom" is playing out at several institutions. It is by Margaret Loftus and is from the September 2013 issue of Prism, the magazine of the American Society for Engineering Education. [www.asee.org] 1818 N Street, N.W., Suite 600, Washington, DC 20036-2479.

Rick Reis

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 of others' struck a 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 Vanderbilt, charged with developing the university's digital learning strategy. He and other 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 times 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 better prepares students for the realities of industry.

Classroom hybridization - also called flipping the lecture - is cropping up in engineering curricula throughout the country, from lone instructors experimenting with the approach to department- wide efforts. Says Fisher: "Our students have been exploiting online content for their education for a long, long time, [while] instructors are just beginning to." The competition from strictly online courses has also had an impact, observes Eric Holloway, managing director of Purdue's School of Engineering Education. "MOOCs put pressure on all universities to figure out their story on online education."

Changing the Dynamic

Last year, Purdue rolled out a series of online learning modules for its two-semester introductory course Transforming Ideas to Innovation. Developed by Holloway and his team, each module introduces a concept through a five- to 20-minute video lesson, which instructors can use in class or, more typically, assign as homework. "It's enough to change what happens in class, from a lecture to a discussion," he says. "We used to say 'Read Chapter 2 before class.' Now we're starting the class right off. It changes the dynamic."

The modules are also designed to allow flexibility in how instructors operate their classrooms. Purdue School of Engineering Education Associate Professor Alice Pawley was inspired to flip her entire lecture in the sections she teaches. In addition to using the modules, she records her own lectures for students to view before each meeting. A typical class begins with a quiz on the recorded material, and then she, her graduate teaching assistant, and four peer teachers help the

students with homework problems or group projects. "We're trying to spend time in ways that make use of the fact that we're 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 the test. Over a three-year period, Dimas and two colleagues gradually introduce digital elements into their dynamics, finite element analysis, and vibrations classes. By the third year, the team provides students with recorded lectures in addition to the in- class lectures, and institutes online homework submission and short online quizzes. Surprisingly, the majority of students report that the repetition of lectures doesn't diminish their attendance. "What we see is that students consume both," Dimas says. "They see it as another resource." Having access to a recorded lecture resonates with 18-year-olds, who can start and stop them at their leisure. "They are used to YouTube. They are used to these little short segments," he says. "It broadens out the times during the week that the student is engaged with the material."

After teaching control systems for more than 10 years, Greg Mason, a mechanical engineering associate professor at Seattle University, turned to YouTube to break down his course into 40 digestible segments. Like Pawley, he administers a quiz at the start of class, assigns a problem, and then roams the aisles, chiming in when summoned. His goal is to render the material less theoretical 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 if 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 videos?"

Awake and Active

Overall, however, response has been positive. "Students who are traditionally really 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 on board," 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 end moves up," says Cramer.

Perhaps more important, say 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 workload isn't lower, but my stress is." On a larger scale, a willing faculty, 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 sets and [let] it be noisy," he says. "I'm much more excited walking into 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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