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The Flipped Classroom

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Adobe & Flipped Classrooms

The changing face of learning



By Tridib Roy Chowdhury
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For years, a teacher's primary role was to collect information and disseminate it through a "sage-on-a-stage" model of instruction. However, with the rapid increase in reach of the Internet, information is now freely and easily accessible. The classroom is no longer the single source of information, though it remains a very important one.

Voice of the Student

Students are clearly telling educators that class time should not be spent giving them information they can easily get elsewhere. Instead, the class hours could be used more effectively by helping them resolve the questions they encountered while consuming information elsewhere, typically online. This is the basic idea of a Flipped Classroom.

Popular Channels of Information Consumption

We know that students are increasingly getting their information online—85% comes from online sources, while 15% comes from TV or print. So why do we deliver the classroom information through a face-to-face channel, and not online, dovetailing with the other sources of information?

Creation – The First Mile Problem

This does not seem like much of a problem, until we encounter the challenges that educators have experienced in converting their classrooms to a digital format. Teachers around the world while validating the efficacy of eLearning have felt challenged in creating engaging content.

- The word "engaging" is very important in this context. It is often difficult to gain students' attention in class, and that task is made more difficult when it has to be done remotely. The personality and the passion of the educator needs to be carried through in the digital experience.
- Educators are paid to teach, and they often don't have the time, skill, or money to create content. They needed a tool that allows them to create engaging, professional-looking content using their existing teaching skills and workflow. This tool must have a very fast create-to-publish time and use their current hardware. Without something like that, this process is dead in the water.

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INTRODUCTION

The idea of the “flipped classroom” has taken off in higher education in recent years – and it is used to describe a wide variety of teaching styles. What they have in common is that they largely replace the lecture. For material that might have been delivered in lecture format previously, online instruction is provided in advance of the class. This allows for time in class to be used in different ways – group work, discussion and other forms of highly engaged participatory learning become the norm.

Discussion of the flipped classroom thus is a mix of teaching with technology – and teaching without technology. It’s about pedagogy, learning and the role of the instructor. And in an era in which educators and policy makers alike want to promote student learning and achievement (not just showing up in class), the flipped classroom has become a key strategy.

The news articles and essays in this booklet explore a range of ideas and opinions about the flipped classroom. *Inside Higher Ed* will continue to cover these issues. Please let us know your reactions to these pieces, and your ideas for future coverage.

--The Editors

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News Articles

Flipping Med Ed

By Carl Straumsheim

Stanford University and the Khan Academy present a road map to change medical education -- and to bring students back to lecture halls.

To help medical students progress faster and find their calling in the field, two educators suggest moving content delivery out of the classroom may be the way to bring the students back in.

The plan, featured in the October 2013 edition of *Academic Medicine*, comes from Charles G. Prober, senior associate dean of medical education of the Stanford University School of Medicine, and Salman Khan, founder of the Khan Academy.

Khan and Prober present a three-step road map: First, identifying a core curriculum with concepts and lessons that can be taught through the kinds of short, focused video clips pioneered by the Khan Academy; then, changing static and poorly attended lectures into interactive sessions where students can practice that curriculum; and finally, letting students explore their passion -- from bioengineering to public health -- early on in their med school careers.

"I think the notion of meeting the learner where they are is really important," said Prober, noting "the writing is on the wall" about the flipped

classroom model -- assigning recorded lectures and reserving classroom time for hands-on activities -- in K-12 education. "I do believe that's the future model."

The partnership stems from a video shot on a whim in which Prober is heard, in his words, "spewing stuff out about the stuff I know something about," namely pediatric infectious diseases.

The act of posting abbreviated lectures online is not a groundbreaking idea, nor is it a first for medical education. Sites like MEDtube and UndergroundMed have in recent years sprouted to give lecture-skipping med students more resources to learn the basic competencies needed to pass their introductory courses, but where Stanford and the Khan Academy differ is that they aim to address why students skip class in the first place. As the plan aims to transform medical school, many experts say that the outstanding, well-educated students are just the cohort most likely to succeed with video delivery.

The partnership is headed by Rishi Desai, who leads the Khan Academy's

medical and science initiatives and spends Tuesdays as a clinical instructor at Stanford.

"Like most med students, I never went to class," Desai said. "It's so silly that I spent thousands of dollars on tuition, and I learned it all myself anyway."

Before he joined the partnership one year ago, Desai made "wave after wave of videos" in an attempt to catch Khan's eye. Once hired, he immediately set to work creating videos starring Stanford's best teachers and researchers.

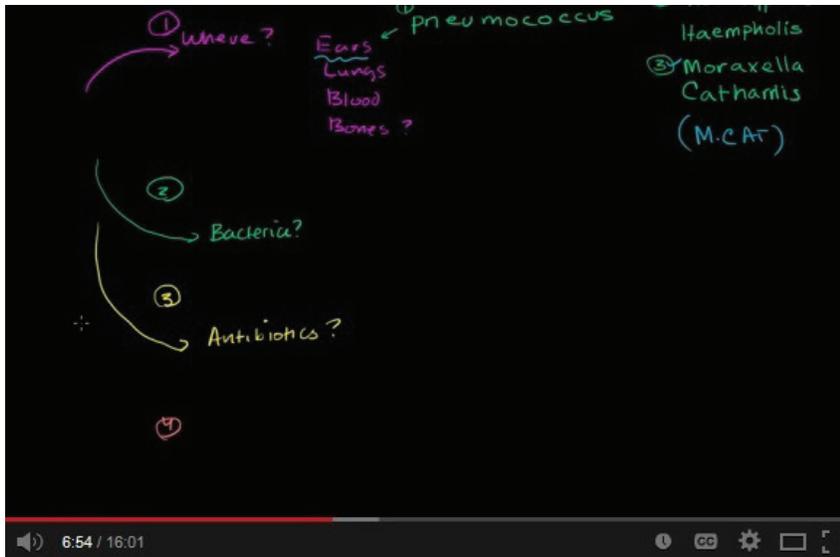
"We tried that strategy, and it was incredibly hard," Desai said. "We spent months trying to get faculty to make videos, and on the side, students were coming into this booth that Stanford had set up, and they were making great content."

In response, Desai flipped the already-flipped model, making students the stars of the videos -- at least in the short term. The Khan Academy has partnered with the Association of American Medical Colleges to produce test prep for the revised Medical College Admission Test, due out in 2015. The resources, set to launch in a few weeks, will feature student-made videos, peer-reviewed by medical professors.

"The big issue now is scalability," Desai said. "To cover medicine, you probably need on the order of thousands of videos."

Which is where Khan and Prober's

“The course went from being mostly rated as poor to being mostly rated from good to excellent. Attendance at lectures went from 20 percent to over 90 percent in the optional interactive session. It was really pretty dramatic.”



roadmap fits in. For the last two years, Stanford has offered an applied biochemistry course that uses the flipped classroom model. The course has so far been successful at raising student participation and engagement.

“The course went from being mostly rated as poor to being mostly rated from good to excellent,” Prober said. “Attendance at lectures went from 20 percent to over 90 percent in the optional interactive session. It was really pretty dramatic.”

Tina Cowan, who teaches the course this fall, said the poor evaluations from when the course featured traditional lectures meant student opinion had nowhere to go than up. “Flipping is hard,” she said. “It’s more work to flip

than to pull the lecture that you used last year out of the drawer.”

Still, four in five students say they prefer the new format, although with an important caveat: The instructional videos and interactive sessions need to be done well. Desai warned that may be a sign their judgment is colored by the novelty of the new format.

“When you’re a med student, and you’ve seen awful, awful lectures day in and day out -- on a scale from 1 to 10, when you’re used to every lecture being a 1 or a 2 -- if someone offers you a 4, you’re going to be ecstatic,” Desai said. “These lectures, even as a good as they are, I sincerely believe they can be 100 times better.”

That sort of improvement can only

come if instructors accept their role in the classroom will change, Desai and Prober said. That does not mean their role will become any less important, however.

“Essentially, the idea is that it’s quite the opposite,” Desai said. In one example, he said data gathered from how students interact with the course materials can be used to produce powerful analytics. In turn, instructors can tailor the in-person part of the course to address specific issues without waiting for students to raise their hands. “They no longer have to fly blind,” he said.

If the model proves successful at changing how students behave, Prober suggested it could be expanded to cover continuing education for practicing physicians. Desai, meanwhile, said he can imagine doctors prescribing patients videos explaining their illnesses along with their pills.

For now, the experiment continues its early stages of one flipped classroom and MCAT test prep resources. “If this is the correct model, the first part is building that core body of knowledge. That’s no small trick,” Prober said.

“It’s a movement that takes time, attention -- and we’re going to stumble. ■

Still in Favor of the Flip

By Carl Straumsheim

Despite a seemingly critical new study, the debate about flipping the classroom still tends to favor those in support.

Go ahead and postpone the conversation about the backlash against the flipped classroom model. Supporters and skeptics alike -- and even the researchers behind a seemingly critical new report -- say the discussion continues to be positive.

Flipping the classroom -- the practice of giving students access to lectures before they come to class and using class time for more engaging activities -- hasn't been nearly as divisive as many other ed tech trends, such as massive open online courses or outsourcing digital services. So when *USA Today* in October 2013 reported on an experiment at Harvey Mudd College that had failed to improve student outcomes, it provided a rare contrast.

Some students "said they felt the flipped classroom had a heavier workload," and professors "had to spend considerably more time making and editing ... videos and crafting engaging, hands-on sessions for their classes." A comparison between the flipped classrooms and their traditional counterparts found "no demonstrable difference" in student outcomes. The researchers, the newspaper wrote, "have bad news for advocates of the trend: it might not make any difference."

The study could have fit into a

growing body of research calling the science behind flipping the classroom into question. Days later, however, the researchers behind the study said their results and words had been misinterpreted.

Yes, the article did point out that the results were preliminary -- twice in one sentence -- but the headline (" 'Flipped classrooms' may not have any impact on learning") and hook drew too many conclusions about a study that is set to continue for another three years, they said.

The researchers -- Karl Haushalter, Nancy Lape, Rachel Levy and Darryl Yong -- in 2012 taught both the flipped and traditional sections of the courses, all of which were in the science, technology, engineering and math (or STEM) fields. They declined to be interviewed for this article, but explained their side of the situation in a social media post after the article was scrutinized by higher education consultant Phil Hill.

"There could be an argument that this article is a case of a reporter trying to find a sensational topic from a nuanced report," Hill wrote. "But the real problems in this article seem to be direct quotes from one of the research professors, despite the qualifier of 'preliminary.'"

Yong warned "that we should be cautious about extrapolating our experience here to other contexts." Harvey Mudd's roughly 800 undergraduates "already spend a lot of time working together in groups in and out of class," and the college's size means there are few of the large lectures that the flipped classroom model aims to supplant.

"Our goal is to better understand the conditions under which flipped classrooms lead to better student outcomes," Yong wrote. "[G]iven our study design and Mudd context, we have not yet seen any difference in student outcomes. Of course, this was only the first year of the study and we are admittedly working out all of the kinks in our flipped classes."

WIDESPREAD SUPPORT

More college and universities are growing comfortable with the idea of recording lectures and making them available online. According to data compiled by the Campus Computing Project, more than two-thirds of institutions see lecture capture as an important tool to deliver instructional content. That share has grown steadily in the past few years.

The widespread support may be why Jonathan Bergmann and Aaron Sams, two of the earliest advocates of the flipped teaching model, said they have not seen a recent surge in criticism. Bergmann called the study out of Harvey Mudd an outlier.

"They're saying they're still in the early stages," Bergmann said. "Most people who have done this have seen positive -- and in some case

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dramatically positive -- results.” In one such example, Mike Garver, a professor at Central Michigan University, flipped his classroom and “noticed a huge increase in the number of students earning top marks on his (admittedly) toughest test.”

Bergmann and Sams co-wrote the book *Flip Your Classroom: Reach Every Student in Every Class Every Day*, which some credit with starting the flipped classroom trend. Today, they serve on the board of the Flipped Learning Network.

Criticism of the flipped classroom model usually stems from arguments between the didactic and progressive camps within higher education, Bergmann said. Members of the didactic camp oppose flipping the classroom to preserve the role of the lecturer, while the progressive camp instead advocates for a move toward project-based learning and inquiry. “That’s where I’m seeing the rub,” he said.

There’s also the knee-jerk reaction to something new. Students in a flipped classroom can no longer expect to sit through a lecture and complete work on their own time. When coupled with challenging course material and a shaky internet connection, the change

has led many to voice their frustration on social media.

The same goes for professors, who can no longer expect to give 90-minute presentations. The extra work that goes into recording videos and planning classroom session has led many faculty members to report an exhausting first year of flipping the classroom.

“Change is a process,” Bergmann said. “By year three it’s culture.”

Even Gary Stager, an education speaker and consultant who has been one of the most vocal opponents of the flipped classroom model, could not point to an intensified debate.

“My first inclination is that when anything becomes that popular, you should be suspicious of it,” Stager said. “In my experience, bad ideas are timeless. In education, good ideas are incredibly fragile. I’m not so optimistic there’s going to be a big backlash.”

Other critics, like Ian Bogost, a professor at the Georgia Institute of Technology who placed himself in the “cautiously cautious” camp on flipped classrooms, said the model is only one of many factors in the larger debate about technology-based educational reform.

“It’s not the flipped classroom

specifically,” Bogost, a game designer and professor in the School of Literature, Media and Communication, said. “It’s kind of the evolving anxiety involved with ... the operation and ownership of institutions.”

Bogost, who has written critically about flipped classrooms, said experiments such as the one at Harvey Mudd could provide valuable data to determine the effectiveness of larger online courses.

“There is reason to believe that continued investment in even the local, non-scaled, modest version of flipped classrooms will at the end of the day benefit these MOOC-like solutions because they will provide evidence and fodder and materials in general,” he said.

Stager agreed, saying institutions will continue to experiment with flipping the classroom as long as there is a promise of reduced instructional costs.

“I suspect that people who have been cheerleading it without evidence will continue to do so,” he said. “There will be academics who continue to demonstrate that it’s ineffective. The question nobody asks is ‘Where’s the bibliography?’” ■

Adapting to Developmental Ed

By Steve Kolowich

With colleges desperate to improve remedial programs, educational tech companies see a growing market for “adaptive” learning software.

With public higher education systems under political pressure to increase completion rates, and foundations offering grants to colleges that are using new technologies to help usher students through to a degree, education technology companies are seeing a ripe market of potential buyers for new e-learning products — in particular, software aimed at high school graduates who lack the basic reading, writing and math skills to succeed at the college level.

Technology geared toward helping students “catch up” has been around for a while, but only recently has it achieved a potentially game-changing level of sophistication, according to Carol Twigg, president of the National Center for Academic Transformation. “These products that 10 years ago were sort of iffy, at best, have now become remarkably mature and high quality products,” she says. And while public higher ed systems are seeing their budgets cut, developmental education is in such bad shape that many colleges are prepared to spend — often with foundation support — on products they think could help bring them more in line with state and national completion goals. There are many contracts to be won, Twigg says.

The education tech industry is responding by mobilizing teams to tweak and re-brand existing software for the developmental market and begin developing new products to sell to desperate colleges.

Most companies are offering variations on a theme: “adaptive” technology that learns the strengths and weaknesses of individual students and tailors its tutorials to address their needs. Unlike a traditional sequence of instructions in a learning exercise, adaptive software adjusts to how well a student appears to understand different concepts. If a student struggles to learn a skill when it is presented one way, the software will detect her confusion and present it another way. The model is highly individualized instruction, without the many instructors that would be needed to adapt to each student’s needs the old-fashioned way.

Since certain standardized tests, such as the GRE, already use adaptive testing that shapes exams to the skill of the test-taker in real time, it might come as no surprise that a number of entrants to the developmental education market, such as Knewton and Grockit, have emerged from the test-prep industry.

Publishers such as Pearson, McGraw-Hill, and Cengage Learning

are also getting in on the action. Pearson earlier this month released MyFoundationsLab, a spinoff of its popular MyMathLab module. The company is marketing the new product, which is adaptive and covers basic reading, writing, and math concepts, directly to colleges for program-wide adoption in addition to selling to individual professors and students. It says it has already signed up 50 colleges.

McGraw-Hill created a unit devoted to pushing its existing adaptive products — LearnSmart and ALEKS — in developmental education, and it plans to brand new iterations of that technology specifically for the developmental market, according to officials there. Cengage also says it recently scrambled a “developmental studies team” and has seen a “significant” uptick in sales of its products in that market, according to a spokeswoman.

Blackboard, long known for its learning management products, made its own move, partnering with another company, K12, to develop remedial courses that the company says use adaptive technology.

And then there are the newcomers from the world of test prep. Knewton, which was founded in 2008 by the former director of new markets at Kaplan, Inc., just inked a deal with Arizona State University that is expected to see the nearly 7,000 students in two Arizona State developmental courses, college math and college algebra, using the Knewton platform next year. David Liu, the chief operating officer at Knewton,



Carol Twigg

says the company is close to similar deals with 10 other colleges, and has had preliminary talks with more than 100 beyond that.

Grockit, which over five years has established itself as a player in test prep, says it is expanding its combination “adaptive” and “social” learning model into the developmental education market. Much like the live support chats that companies sometimes offer through their websites to help perplexed software users, Grockit retains a bullpen of Web-based tutors whom students can ask for help if the company’s adaptive teaching platform is not doing the trick. Grockit says it is close to a number of deals with colleges that it says are similar to

Knewton’s Arizona State partnership.

Hunter R. Boylan, director of the National Center for Developmental Education, says he is happy to see the private sector investing so heavily in technology that might help colleges get students through developmental programs. At the same time, he points out that this is not the first time tech companies have swooped in with a supposed elixir for developmental education. In the past, certain products “failed because the technologies weren’t able to deal with differential learning styles well,” Boylan says.

That’s exactly the problem that the latest generation of commercial products claims to address. “Personalization” — or

“individualization,” depending on whose brochure you’re reading — is their watchword. The technology industry in general has tacked toward personalization, with companies such as Google, Netflix, Facebook and Amazon mining user data to show individual customers what they probably want to see based on their needs and interests, and higher ed has begun to follow suit. Developmental education programs especially could stand to benefit from the application of the same principles in learning design, the companies say.

“With students who are already struggling, [the problem] in teaching to the mean is that you end up alienating students across the entire bell curve,”

says Vineet Madan, vice president for learning ecosystems at McGraw-Hill.

“That’s where the adaptive technology comes in — that personalization,” says Madan.

“It is similar to what Google and Netflix and other web applications are using, where they measure activity that user is doing and bringing back the data ... based upon actions that you’ve taken,” says David Liu, Knewton’s chief operating officer. “Not only do we data mine all [your] activities as a student, but we also begin to understand some of the tendencies you have and compare you to cohorts that we have using the system.”

Knewton, for example, has each student take a diagnostic test to get a sense of his baseline competency in, say, college-level math. Based on the results, it generates a list of concepts a student needs to learn, derived from how well he knows each concept and how well he is expected to know it. As the student takes tutorials and quizzes in an attempt to improve his mastery

of the concepts, the program logs how much time he is spending on various ideas and questions, as well as which questions he is answering wrong and how he is likely to have arrived at those wrong answers.

In doing so, the program can allegedly pinpoint that student’s specific level of understanding of each concept and let him — and his instructor — know what he needs to work on in order to pass.

The personalization extends to professors, who can set expectations for how well they want students to master different concepts based on which ones they want to emphasize. They can also view the data profiles of each student as they evolve in order to prepare them for any necessary human intervention.

Most of the companies, after all, say their products are intended as a supplement to live counseling and instruction, not a replacement. In developmental education especially, the “blended” model — which promotes heavy instructor attention no

matter how smart the software is — is still the best way to improve learning, Twigg says.

Arizona State acknowledged that its recent deal with Knewton was a substantial investment, but says it has no current plans to scale back on instructors and support personnel in its developmental programs. The return on investment, says university spokesman Russ Knocke, comes with seeing fewer students drop out during remediation. “Retaining students who might otherwise fall through the cracks is certainly cost-effective for the long-term,” he says.

“When you’re face-to-face with students, you can track them and encourage them much more directly,” says Twigg. “The online environment is good for lots and lots of things, obviously, but ... these are students who have no study habits. Creating that [classroom] structure is very important.” ■

Don’t Call It a Course

By Carl Straumsheim

Freed from the confines of classrooms, lectures and semesters, online education providers are increasingly using the term “learning experience.”

As ed tech companies and universities search for the most effective way to teach students online, some have found the term “course” no longer captures what it means

to pursue an education. Enter the “learning experience” -- a term being used to describe a module of higher education not anchored to a specific place or time.

The name change is more than just semantics or corporate jargon, its creators argue, but a necessary shift as colleges and universities establish what does and does not work in online education. The traditional 90-minute lecture in particular has proven to be a poor method of delivering content online, and professors have been encouraged to follow the Khan Academy model and split their material into modules often covering no more than one concept. When those modules

are freed from the time constraints of a semester or quarter, the end result bears only some resemblance to a course.

The term no longer fits, they say.

When Harvard University co-founded the massive open online course provider edX in May 2012, faculty director Robert A. Lue said the conversation between faculty members initially revolved around courses, but within a matter of months, “it became very clear that in fact sticking to courses as the only grain size was simply not the way to go.”

A year and a half later, the conversation has gotten to the point where a HarvardX spokesman said “we actually now edit ourselves to not say ‘MOOC’ or even ‘course’ in meetings.”

“It really does reflect in my view a real sea change in how we’re thinking about education,” Lue said. “The word [course] is still meaningful, but I feel strongly that as a defining term, it is increasingly less defining of all the different options that we want to have.”

Lue compared the breakdown of courses into modules to textbooks and chapters. “It’s very hard to use a course in another course, while once you modularize into these more discrete learning experiences, it’s so much easier to share,” he said.

In addition to the term addressing size and scope, some companies believe “learning experience” signals a change in how information is

transmitted to students.

The shift “comes out of a recognition that learning is a very social activity, that it involves and requires a set of experiences that connects students to students, students to faculty, student to ideas, and that it’s not a top-down information transmission process,” said Marie Norman, senior director of educational excellence of Acatar, which unlike edX creates small-scale online and hybrid courses.

“Clearly there’s more to it than just content,” CEO Matthew H. Cooper said. “The learning experience has to do with things that occur by design and all sorts of other things that aren’t on the syllabus that are spontaneous and student-generated.”

Ryan Gialames, senior director of product strategy and user experience, said Acatar has deliberately avoided certain terms -- among them, “course,” “learning management system” and even “online” -- since the Carnegie Mellon University subsidiary was founded. The terms, he said, carry a lot of baggage.

“We too see the boundaries of the traditional course eroding away,” Gialames said. “We’re speaking with folks at CMU who are interested in building this whole body of knowledge, then figuring individual paths to point students through it. It’s also just as important when you’ve got that body of knowledge that you can build maps and paths.”

Other companies have yet to declare

the death of the course, even though they have adopted much of the same rhetoric. Matthew Maurer, vice president of strategic communications for Blackboard, which builds its original learning management system products around courses, said the company is not prepared to make any extreme proclamations, even though it acknowledges more attention is being paid to learning occurring outside traditional courses.

“Like degrees and credits and badging and competency are blurring lines, so too are content and social learning and concept-based learning blurring the lines of the traditional ‘course,’ ” Maurer said. “[It’s likely] that the course will stay on as a concept but there will be increasing acknowledgement, support for and investment in learning outside the course.”

Champions of the course can take heart in the fact that officials of several education companies, including Coursera and Pearson, responded to news of the learning experience with bewilderment.

“There’s of course good reason to be skeptical and critical, but this is not a term that is baseless or just cute-sounding,” Lue said. “There’s corporate speak, there’s academic speak, there’s all sorts of education speak, and this certainly falls into that. You know what, though? These terms and how they are selected carry meaning.” ■



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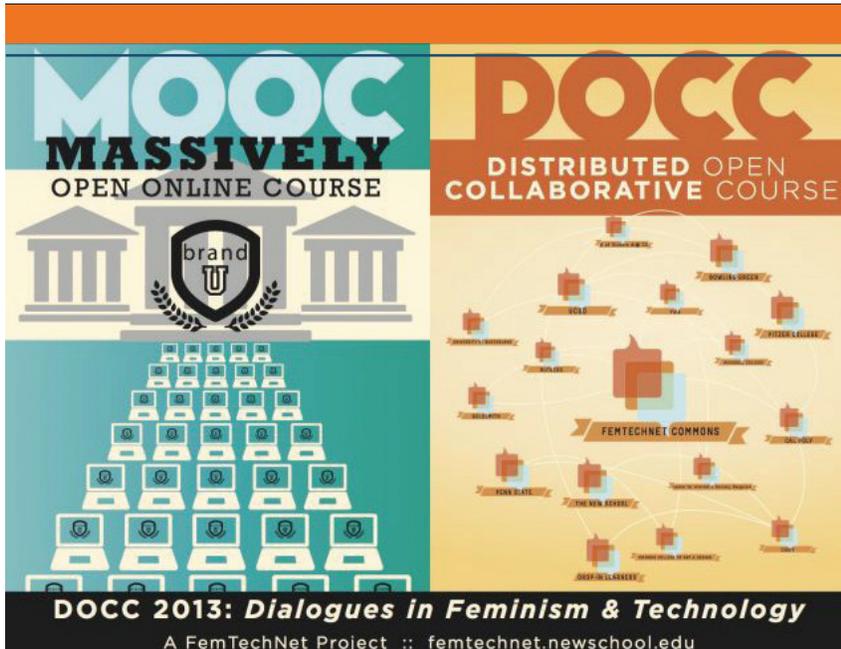


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Feminist Anti-MOOC

By Scott Jaschik

Can education be free and online and yet reject some of the choices made by proponents of massive open online courses?

At first glance, “Feminism and Technology” sounds like another massive open online open course. The course will involve video components, and will be available online to anyone, with no charge. There are paths to credit, and it’s fine for students to take the course without seeking credit. An international student body is expected.

But don’t look for this course in any MOOC catalog. “Feminism and Technology” is trying to take a few MOOC elements, but then to change them in ways consistent with feminist pedagogy to create a distributed open collaborative course or DOCC (pronounced “dock”).

The DOCC aims to challenge MOOC thinking about the role of the instructor, about the role of money, about hierarchy, about the value of “massive,” and many other things. The first DOCC will be offered for credit at 17 colleges in the fall 2013 semester, as well in a more MOOC-style approach in which videos and materials are available online for anyone.

“We’re not saying bad bad MOOCs, but we’re asking how else we might innovate,” said Anne Balsamo, co-facilitator of the DOCC and dean of the School of Media Studies at the New School.

“A DOCC is different from a MOOC

in that it doesn’t deliver a centralized singular syllabus to all the participants. Rather it organizes around a central topic,” Balsamo said. “It recognizes that, based on deep feminist pedagogical commitments, expertise is distributed throughout all the participants in a learning activity,” and does not just reside with one or two individuals.

So each week, a video presentation -- typically a discussion with one, two or three thinkers about feminism and technology -- will set a theme for the week. The first week’s video will feature Balsamo in a discussion with Judy Wajcman, a sociologist at the London School of Economics and Political Science whose 1991 book *Feminism Confronts Technology* led many feminist thinkers to focus more on technology issues. That video is designed to provide a historic overview. Subsequent weeks will feature discussions about more focused topics -- feminism, technology and labor one week; feminism, technology and sexuality another, and so forth.

At participating colleges, professors will base their own courses on each weekly theme, sharing course materials and assignments, but customizing them for their own students. The courses will vary, as some are undergraduate and some are graduate, and the institutions (see list on following page) vary widely by mission and geography -- including institutions in Australia, Britain, Canada and the United States. The class sizes will be between 15 and 30 students each, decidedly non-massive. “There is another pedagogical commitment here,” Balsamo said. “Who you learn

with is as important as what you learn. Learning is a relationship, not just something that can be measured by outcomes or formal metrics.”

The courses at participating colleges will be offered for credit. Balsamo said she’ll meet with her students twice a week for 90 minutes a class, and they will have readings and assignments based on the theme of the week, and will be formally graded.

Other instructors will have their own assignments and grading systems. She hopes that those who are not enrolled at one of the participating colleges may use the various syllabuses that will be posted to add to their experience beyond the videos -- but she’s also fine if they just watch the videos.

With this approach, there may be common works and common lessons, but there is no sense of a single best way to learn the subject, she said.

Another common element in the courses will be participation in “Storming Wikipedia,” in which students will be given lists of women who have played key roles in science and technology, and will study where they are represented (or ignored) in Wikipedia, and draft entries or entry additions to increase the representation of women in discussions of technology.

By using the faculty positions and institutions of participating instructors, Balsamo said, there has been no need to raise large sums of money or seek out corporate sponsors. To pay for the costs of video production, the organizers received \$10,000 grants from the Pembroke Center at Brown

University and from the New School. The project also received \$7,000 in early support from Pitzer College.

The question organizers asked, she said, was “what if we put aside the most hand-wringing parts of the MOOC discussion -- revenue and massive.” By thinking in this way, the organizers have decided not to worry about revenue streams or losing touch with students as individuals, she said. Yet they will be producing video content that will be available to anyone and that could, over time, reach large numbers of students. And they believe this approach could be used for other courses as well.

Alexandra Juhasz, a professor of media studies at Pitzer who is the other co-facilitator of the DOCC, said via e-mail that “our DOCC is built to value situated experience and emphasis, and to share authority and responsibility rather than the MOOC’s top-down, one size fits all, sometimes elitist approach. Attention to discrete learners, teachers, and institutions is valued over simple numbers of participants. While these structures mirror my own feminist values and approaches, I imagine that most educators will be intrigued by this more democratic and responsive model for technology enhanced learning.”

Among the forms of MOOC hype that Balsamo said she hoped the DOCC would combat is the idea that massive online courses allow some “best” professor to interact with students everywhere, so that all can learn from the superstar. It’s not that there aren’t

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very talented professors out there, she said, but the superstar emphasis is wrong (“Is there really a ‘best?’” she asks) and doesn’t encourage group learning.

Said Balsamo: “The idea of the one best talking head, the best expert in the world, that couldn’t be more patriarchal. That displays a hubris that is unthinkable from a feminist perspective.” ■

Views Articles



Let's Scramble, Not Flip, the Classroom

By Pamela E. Barnett

We need a new instructional model to replace the lecture-only format, but let's not simply replace one rigid approach with another, Pamela Barnett argues. Rhetoric matters.

The “flipped classroom” is the idea of the moment, advocated by everyone from Bill Gates to Eric Mazur, the pioneering science educator. This educational innovation is exciting and promising – but I’d argue for a slight revision to the discourse to make sure we don’t replace one rigid format with another. My suggestion: let’s scramble, not flip, the classroom.

Educause, a leading organization for advancing the effective use of instructional technology, defines the flipped classroom “as a model in which the typical lecture and homework elements of a course are reversed.” In the well-known Khan Academy model, students view short video lectures at home, freeing up class time for

heads on and hands on engagement with course content, guided by the instructor. Proponents are definitely on to something – why did practice so often happen as “homework”?

Isn’t it better for a student who is stuck on a problem to have access to an instructor who can ask the right questions, offer feedback or explain difficult concepts or processes? Isn’t it better for students to analyze texts and images together in a community of learners, taking in new perspectives as they build understanding, rather than going it alone and then coming to class to hear what the professor thinks?

The “flipped” classroom seeks to be an antidote to the traditional model in which content is delivered in class by

a lecturer, and homework becomes the site for students to practice. Some of the excitement is due to recognition of the power of active learning, and suspicion about the effectiveness of long lectures. Lecture can be a useful teaching tool, but we now know that lecturing for 50 to 90 minutes straight is money into an incinerator, so to speak. Given limits to students’ attention spans, there is a law of diminishing returns when lecturers persist in “covering the material” past the 20 minute mark. The flipped classroom model uses short, more digestible, lectures.

Yet I believe the lexicon for this change – flipping, reversing, inverting or overturning – is problematic, and might encourage some to stop short of conceptualizing a more promising transformation. Manifestations of the “flipped” could become as rigid as the 19th century “all lecture, all the time” mode being critiqued.

Faculty should not stop lecturing to assembled students in favor of “all active learning, all the time” in classrooms. In the 21st century, the lecture plays an important role in helping students find a path in the avalanche of text and information. How does a disciplinary expert organize and evaluate this information? What ideas rise to the top and what are the relationships among them?

The best lecturers clarify key concepts with concrete, relevant and sometimes timely examples. They

also inspire students, by investing their delivery with passion and enthusiasm. The bottom line: lecture has persisted because students need to hear from teachers. When trimmed down substantially and used intentionally in combination with other methods, lecture need not be relegated to video clips.

While not all proponents are advocating for a simple inversion that places all lecture online and all active learning in class, this reversal is the dominant way of discussing the phenomenon. If we name this innovation more precisely, we could lead some faculty to adopt it in more nuanced and effective ways.

Words matter. If we enact truly flipped or reversed classrooms, we have missed an opportunity.

I think it is time to update our vocabulary, guiding the dominant conceptualization toward a more nuanced practice for the good of our students. What is good for our students is a scramble or mix of direct instruction and practice and feedback. The beauty is that technology affords us opportunities to provide for both needs in both online and face-to-face contexts. We need to use these two teaching approaches -- direct instruction versus facilitated practice -- intentionally to help students meet our learning goals.

What does this look like? Students in a scrambled class might start in the online environment by watching a short lecture or reading a course text, before

engaging in an online discussion with fellow students. After engaging in these learning activities (which entail direct instruction and practice with the course material) they might complete an assessment that would enable the instructor to evaluate student learning and identify areas of difficulty or misconception.

This model of regular assessment before face-to-face class meetings is a key component of Eric Mazur's version of the flipped classroom, known as "Peer Instruction." (Indeed, Mazur has been experimenting and writing about his own robust and flexible version since the early 1990s.) Assessment activities online might include inviting students to submit questions, take a quiz or write a response to a targeted question.

Instead of coming into a "flipped" classroom for the engagement and practice, the mix of content transmission, practice and assessment has already begun.

The scrambled classroom enables a variety of approaches for the face-to-face environment as well. Class meetings in this model could include short lectures which introduce new concepts or address misconceptions that were revealed by online assessment. Direct instruction can then be mixed with active engagement, giving students the opportunity to practice new skills like applying, evaluating or synthesizing course concepts. Ideally, students will have opportunities to collaborate with

each other. Students can also take advantage of the instructor's presence as a responsive facilitator, as they wrestle with new ideas or skills.

The instructor might end face-to-face class sessions by assessing for understanding, using low-tech classroom assessment techniques like the "one-minute paper" or "the muddiest point" or with technological tools like classroom response systems, better known as "clickers." If questions or misconceptions are revealed, the professor might use that knowledge to build his/her next lecture, to be delivered in either the virtual or face-to-face environment.

We are at an exciting moment in education, with an abundance of technological tools to use for delivering content and engaging students. Wherever we teach on the continuum from face-to-face to hybrid to fully online instruction, we can and should be using technology in accordance with best practices.

With the scrambled classroom model, we are challenged to learn new possibilities, but also to design instruction based on principles we have known about for some time. In the scrambled classroom model, the innovation is not so much "online learning," but "human learning" supported by all that the 21st century brings to the table. ■

Pamela E. Barnett is associate vice provost and director of the Teaching & Learning Center at Temple University.

Catching the Foul Balls

By Kim A. Wilcox

It's not just what we teach, writes Kim A. Wilcox, but how we convey the passion of the process.

Imagine a bright sunny day at a major league baseball park. It's the middle innings of a good, but not notable, game. The lead-off batter hits a long ball down the third base side that arcs foul and heads for the seats. Just as it's about to land in the bleachers, a gloved hand seems to appear from nowhere and snags a souvenir. The crowd goes wild and the recipient waves his trophy for all to see.

But what's the big commotion really all about. The ball itself is only worth a few dollars. If that same person found something much more valuable, like a \$20 bill, on the sidewalk, people might congratulate him, but no one, let alone thousands, would stand and cheer. The cheering has little to do with the value of the ball, but rather the process of receiving it. Some in the stands will say to their friends "Nice catch, huh?" Others may remark on the preparation needed for someone to bring a glove to the ballpark and stay alert enough through the entire game to be ready for just that moment. Everyone will appreciate that few get the chance to make such a "big catch." But few will say, "Wow, he got a great baseball out of that!"

This scene provides a lesson to those of us in academe: While the knowledge we create has value, it's the process of creating that knowledge

that generates passion and excitement. This lesson probably seems trivial to many of us who have spent our entire careers pursuing our passions in the lab or the library, but unfortunately, too few of those outside of the academy appreciate this basic reality, and this lack of appreciation is in large part our own fault. More than 1 million students earned bachelor's degrees last year in the United States and more than 600,000 others received associate degrees. That's 1.6 million people who voluntarily signed on to serve as academic apprentices to us. We had the chance to show them how to make the great catch, but too often we simply gave them the baseballs.

Think of an undergraduate history course, for example. If you ask most undergraduate students to tell you about what they learned in their history courses they will talk about dates, or major social-political upheavals, or great battles and their consequences. But surprisingly few can talk about how that history was written, the scarcity of contemporary records for some events, the difficulties of verifying first-person accounts, the recasting of events over time to be consistent with changing political perspectives. In other words, they have received the baseball, examined it, and come to understand it; but we failed to

share with them the excitement of how it came to be. Similarly, too many students come away from our natural science courses thinking that science is knowledge consisting of equations, principles, and specific laboratory techniques, like titration.

I am of course generalizing in many ways. Chemistry majors understand that science is about discovery and history majors have wrestled with trying to reconcile contradictory sources, but most students in history classes are not going to become historians; for many this may be the only history course they take from a real historian. How unfortunate that those students didn't come to appreciate what historians are and what they do. And the same holds true for most students in our introductory science courses.

How the world would be different, if each year more than a million people left our institutions understanding what we, as faculty, do with all of that time that we're not in the classroom, what excitement there is in discovering something no one else has ever known, and the value that these discoveries bring to society. Those million-plus people become voters and taxpayers and some of them become corporate leaders and politicians. The world could be a very different place if they better understood faculty work and why universities are important.

This is not simply another call to include undergraduates in research. That is important, but not sufficient. Clearly, students who spend several years, or even a semester or summer, working closely with a faculty mentor



Source: [istock.com/aceshot](https://www.istock.com/aceshot)

in research are likely to come to understand the importance of knowledge creation and the impact such work has on faculty, students, and society. But, given the pace of expanding national enrollments versus the pace of expanding the faculty, we will not be able to offer that kind of experience to the majority of our students any time in the foreseeable future.

Instead, we must reshape our courses to reflect our passions for discovery as well as the ideas and facts that those passions have generated. The current emphasis on team-centered learning and “flipped” classrooms provides an opportunity to rethink not only how we

teach, but what we teach. Much of the work to date, however, has been on the incorporation of student skills (participation in a team, student-led learning, etc.) into existing courses. We must also use this opportunity to create course objectives that are defined not simply by content and student skills, but also by creating an understanding of the nature of the discipline(s) upon which a course or curriculum is built. In the future, our courses must be designed to help students appreciate the processes of discovery that define our disciplines, and they should make evident to our students the rewards and the excitement that comes from creating knowledge using those

processes.

Just as few of us will have the chance to snag a foul ball at a major league baseball game, so too will few of us succeed in making that really big discovery that redefines a discipline. But, all of us can appreciate the excitement of such a discovery and feel envious that it wasn't us who made it. Those emotions are what drive us as faculty members and our students deserve the opportunity to see and understand that passion, as well. It will make them better students and better future citizens. ■

Kim A. Wilcox is chancellor of the University of California at Riverside.

Year of the Backlash

By Peter Stokes and Sean Gallagher

Might massive online courses from elite institutions -- which have been credited with legitimizing online education -- actually be undermining the public view of other forms of digital learning, Peter Stokes and Sean Gallagher ask?

The *New York Times* famously dubbed 2012 “The Year of the MOOC.” What a difference 365 little days can make. We wonder if 2013 might come to be thought of as “The Year of the Backlash” within the online higher education community.

Even Udacity’s founder, Sebastian Thrun, one of the entrepreneurs whose businesses kicked off MOOC mania, seems to be getting into the backlash game.

According to *Fast Company* magazine, Thrun recently made the following observation regarding the evanescent hype surrounding MOOCs and his own company: “We were on the front pages of newspapers and magazines, and at the same time, I was realizing, we don’t educate people as others wished, or as I wished. We have a lousy product.”

Of course, the hype around this category hasn’t wholly abated. Coursera has just announced another \$20 million infusion of venture capital. And MIT has just released a report embracing the disaggregation of the higher education value chain fomented by platforms such as edX.

But maybe Thrun is right. Maybe MOOCs are a lousy product – at least as initially conceived. And even if MOOCs are meaningfully reimagined,

the mark they have made on the public consciousness to date could have lasting repercussions for the broader field of online learning.

It seems like only last year (in fact it was) that some were crediting elite institutions with “legitimizing” online learning through their experimentation with MOOCs. But what if instead of legitimizing online learning, MOOCs actually delegitimized it?

Perhaps this is why, currently, 56 percent of employers say they prefer an applicant with a traditional degree from an average college to one with an online degree from a top institution, according to a Public Agenda survey undertaken earlier this year.

We’ve been following online learning for a long time, and collectively share experiences in teaching online, earning credentials online, writing about online learning, analyzing the online learning market, and serving as administrators inside a research university with a significant stake in online and hybrid delivery models.

While some MOOC enthusiasts might like you to believe that online learning appeared out of nowhere, *sui generis*, in 2012, the reality is that we’ve been bringing courses and degree programs online for more than 20 years. Hardly born yesterday,

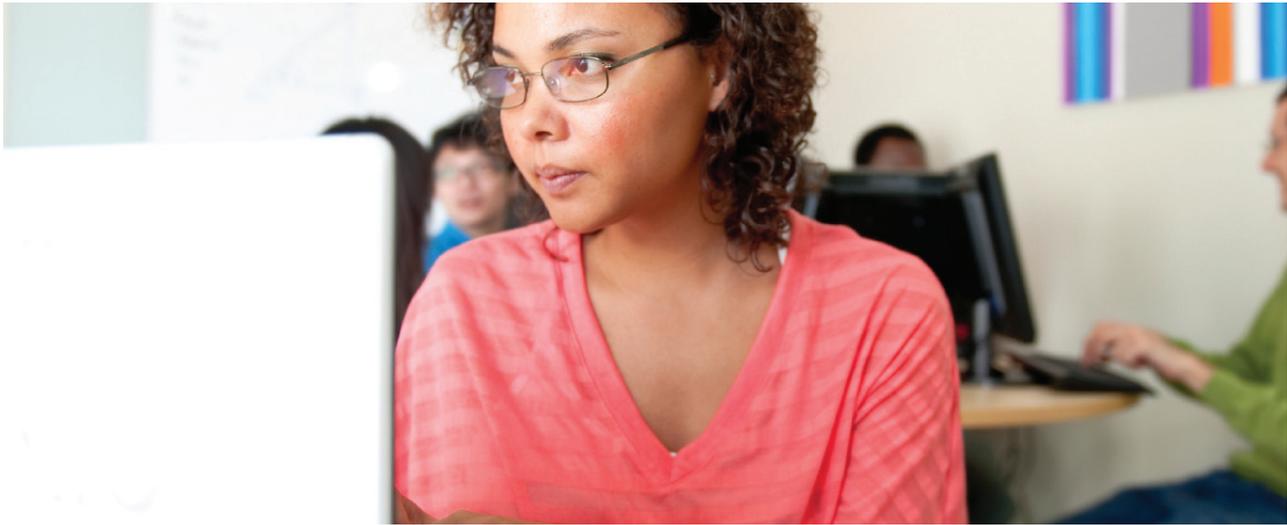
online learning has evolved slowly and steadily, taking these two decades to reach the approximately one-third of all higher education students who have taken at least one online course, and serving as the preferred medium of delivery for roughly one-sixth of all students. The pace of adoption of online learning – among institutions, students, faculty, and employers – has been remarkably steady.

The advent of this so-called “lousy product” – the MOOC – may be triggering a change, however. Indeed, recent survey evidence suggests that the acceptance of online learning among certain constituencies may be plateauing. Is it possible that a backlash against MOOCs could even precipitate a decline in the broader acceptance of online learning?

The long-running Babson Survey Research Group/Sloan-C surveys show relatively little change in faculty acceptance of online instruction between 2002, when they first measured it, and the most recent survey data available, from 2011. The percentage of chief academic officers that indicated they agreed with the statement “faculty at my school accept the value and legitimacy of online education” only grew from 28 percent in 2002, to 31 percent in 2009, and 32 percent in 2011.

According to a more recent *Inside Higher Ed*/Gallup survey, “only one in five [faculty agree] that online courses can achieve learning outcomes equivalent to those of in-person courses.”

We have to be careful making



Source: istock.com/Leontura

comparisons across surveys, audiences and time spans, of course. But there is a palpable sense here that something may have shifted for online learning in the last year or so, and that as a result of that shift, online learning may be in danger -- for the first time in some 20 years -- of losing momentum.

In recent months, we've witnessed faculty rebelling against online learning initiatives at institutions as diverse as Harvard, Duke, Rutgers, and San Jose State, to name a few.

In the latter case, faculty rallied to resist the use of Udacity courses on campus, but other instances of resistance did not even pertain to MOOCs -- such as Duke's decision to withdraw from the 2U-sponsored Semester Online consortium, or the vote from Rutgers University's Graduate School faculty to block the university's planned rollout of online degree programs through its partnership with Pearson.

Our hypothesis is that MOOCs are playing a role here -- chiefly by confusing higher education

stakeholders about what online learning really is. By and large, of course, online learning isn't massive and it isn't open. And by and large, it does actually involve real courses, genuine coursework and assessment, meaningful faculty interaction, and the awarding of credentials -- namely, degrees.

In numerous focus groups and surveys we have conducted over the course of 2013, both prospective students and employers have raised concerns about online learning that we had not been hearing in years past -- concerns that have been chiefly related to the level of faculty interaction with students, the relationship between quality and price, and the utility of courses that don't lead to recognized credentials.

The net contribution of the MOOC phenomenon, for the moment at least, may be a backsliding in the general acceptance of online learning -- not least among faculty, who may fear they have the most to lose from MOOC mania, especially in the wake

of controversial legislative proposals in a variety of states mandating that MOOCs be deemed creditworthy, thereby threatening further public divestment in higher education.

For those of us that have nurtured the growth and strengthening of online learning over many years, this would be an unfortunate outcome of the MOOC moment.

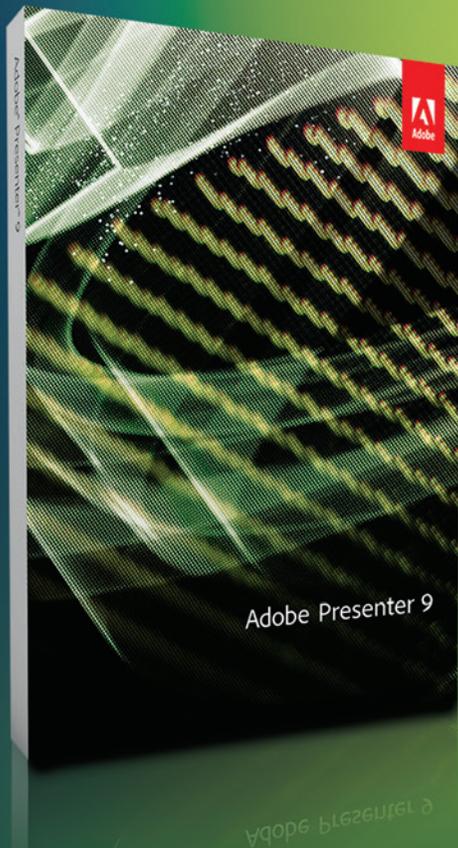
If there is a backlash under way, and if that backlash is contributing to an erosion in the confidence in the quality of online learning generally, that is something that won't be overcome in a single hype cycle -- it will take time, just as the establishment of degree-bearing online learning programs took time to develop and bolster. Possibly even more than one year. ■

Peter Stokes is vice president of global strategy and business development at Northeastern University, and author of the Peripheral Vision column. Sean Gallagher is chief strategy officer at Northeastern University.



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Flipping the learning paradigm



We Are Not Hypnotized

By John Raucci Jr.

Responding to another essay, John Raucci Jr. says that professors can be skeptical of online learning and want to experiment with technology-enabled education.

An article in these pages, “We Are Not Luddites,” by Brooks Kohler, argues that being skeptical of online learning does not make one a Luddite.

Very well, then. I think most academics would agree. If his article had gone on to critique the tendency of tech folks to alienate skeptics of online learning by labeling them backward or hopelessly outdated, I would have been on board.

But Kohler takes a curious turn when he writes that liberal arts instructors who welcome online learning are in a state of “technological hypnosis.” Students, according to Kohler, are in a “fixative trance.” Apparently digital technology is a dangling medallion swinging back and forth, and we are all getting very, very sleepy.

Kohler goes on to describe a “pathetically sad” scene in which “a classroom could be reduced to a rectangle (sic) screen on a distant wall, or thought to be comparable to that of an interior space where a qualified human stands as the moderator before eyes that are watching.” Online learning to Kohler is inherently dystopian, akin to Orwell’s 1984, while the face-to-face classroom is, in contrast, natural and human.

This conversation calls to mind Plato’s Phaedrus. In this dialogue,

Socrates laments the technology of writing because he fears it will diminish memory skills if Athenian citizens no longer have to memorize and practice oral discourse.

Worse yet, writing is inferior to speech, according to Socrates, because we can’t argue with a piece of paper like a living person; writing only has the appearance of wisdom, not wisdom itself.

Frankly, I’m not interested in reinforcing such a strict for/against dichotomy when discussing online learning and new digital technologies. I think such binary thinking is part of the problem.

I teach face-to-face, online, and blended sections of composition at a small rural state university and I see strengths and limitations in all three approaches. My online classes look nothing like Kohler’s panoptic nightmare. Or, at least, I hope they do not -- now that I think of it, perhaps students calling me Big Brother isn’t a term of endearment after all.

Kohler does not take kindly to being called a Luddite, yet he suggests teachers and students working hard to make online learning rigorous, academic and accessible are hypnotized dupes attracted to shiny surfaces and entranced by blinking

lights. Worse yet, he charges that online learning encourages contingent academic labor and the demise of tenure-track positions when in fact this erosion has been a decades-long process with roots extending long before online learning.

Notice I’ve been using the term “online learning” and not “MOOCs,” the latter against which I harbor a much deeper skepticism, but that’s a story for another time. I highlight this distinction because a sleight of hand occurs when Kohler begins his article by discussing MOOCs only to substitute that digital phenomenon with a more generalized “online learning” later in the same paragraph.

I’m not just splitting hairs. MOOCs and online learning are too often conflated. They are, of course, not the same thing. Suggesting otherwise is merely shoving stuffing into a straw man. The problems of MOOCs do not automatically extend to online learning in general.

A similar game of three-card monte is performed when Kohler uses a generalized “technology” when he really means new digital technologies. This slippage leads to historical and theoretical quandaries.

For example, when Kohler chortles “as if a pen and pad were inherently inferior” he fails to recognize that pen and paper are technologies, and that writing itself is a technology, as Walter Ong famously argued. Conflating new digital technologies that facilitate online learning with technology in general results in a fixed, narrow, and uncomplicated definition of technology.

Again, this isn't academic hair-splitting. Such a distinction is helpful because it leads our dialogue away from dystopic visions and forces us to confront the fact that even analog technology like Kohler's "pen and pad" shape how and what we learn.

Because teachers believe that online learning can be a worthwhile experience does not mean that we are hypnotized, nor does it mean that we are chasing fads and abandoning "literature and writing" and a "fine attention to detail," as Kohler claims.

Instead of charging one another as either entranced by new technologies or a Luddite, we should be cultivating dialogue, criticism and best practices to make online education better.

We should also pay more attention to issues of race, class and access when it comes to online learning. And we should be building space and time into our online courses for students to reflect on their own skepticism and concerns with digital learning. Including students in this dialogue is essential.

I too am skeptical of online learning. However, this skepticism does not lead me away from online teaching, but toward it. I want to make it better. I believe it's our duty to make it better. Drawing broad caricatures of online teachers and students only reinforces the importance of not devolving into a strict for/against dichotomy in our dialogue. ■

John F. Raucci Jr. is an assistant professor of English at Frostburg State University.

Higher Ed Disruption: Not So New

By Alexandra W. Logue

Many of the hot ideas about technology and teaching reflect a century of research, writes Alexandra W. Logue.

Are you a faculty member or administrator who thinks that the latest technologies are finally going to enable us to teach our students well, or do you at least hope that's the case? If so, you should reconsider, because the vaunted elements of the latest technologies have been around for some 100 years. It isn't having the technology, but using the technology that is key to helping students learn well.

For at least the past decade there has been much talk about the advantages of highly sophisticated online courses and the use of online tools in traditional courses. One of the significant advantages of technology-enhanced courses, it is said, is that they can be

tailored to individual students' needs, and thus achieve desired learning outcomes for each student better and faster.

Consider for example, this quote from the website of the Apollo Group, the parent company of the University of Phoenix: "Based upon the belief that learning is not a one-size-fits-all experience, Apollo Technology developed the technology to deliver data-driven, personalized education tailored to the individual. Apollo Technology's unique student data system collects and analyzes individual student data, and delivers automatic just-in-time guidance that can significantly improve student outcomes." In 2010, the University of

Phoenix announced a new Learning Management System, the Learning Genome Project, that "gets to know each of its 400,000 students personally and adapts to accommodate the idiosyncrasies of their 'learning DNA.'" Similarly, a recent article in *The New York Times* stated: "Because of technological advances — among them, the greatly improved quality of online delivery platforms, the ability to personalize material ... MOOCs [massive open online courses] are likely to be a game changer."

These statements are evidence of the general belief that now, using technology, we can achieve all sorts of personalized instruction, which constitutes a revolution in how we can help students learn.

But using technology to individualize student learning is not at all a new idea — it does not originate with online courses or with the technology developments of the past decade, or two, or even three. Using technology

to individualize student learning is an idea going back at least 100 years. One of the original learning theorists of the modern era, Edward Thorndike, stated in his 1912 book: "If, by a miracle of mechanical ingenuity, a book could be so arranged that only to him who had done what was directed on page one would page two become visible, and so on, much that now requires personal instruction could be managed by print."

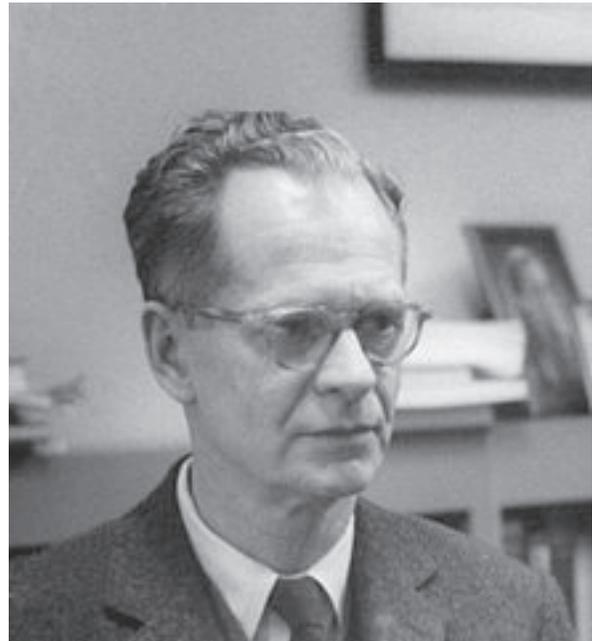
A couple of World Wars later, one of Thorndike's intellectual descendants, B.F. Skinner, recognized as the most eminent psychologist of the 20th century, was developing and crystallizing the field of operant conditioning, the form of learning in which so-called voluntary behavior changes as a result of its consequences. In the third and final volume of his autobiography, Skinner relates that in 1953, in seeing how his daughters were being educated at the Shady Hill School, "I suddenly realized that something had to be done. Possibly through no fault of her own, the teacher was violating two fundamental principles: the students were not being told at once whether their work was right or wrong (a corrected paper seen 24 hours later could not act as a reinforcer), and they were all moving at the same pace regardless of preparation or ability. But how could a teacher reinforce the behavior of each of 20 or 30 students at the right time and on the material for which he or she was just then ready?... A few days later I built a primitive teaching machine."

Skinner later developed more

sophisticated versions of teaching machines, demonstrating one at the University of Pittsburgh in 1954. These machines presented math problems one at a time, with students having to solve each problem before being able to go on to the next.

In 1961 Skinner took a somewhat different approach to personalized instruction when he published, with Holland, the programmed textbook *The Analysis of Behavior*. This book focused on the principles of learning, more specifically, the principles of classical (Pavlovian) and operant conditioning, with an emphasis on the latter. The introductory pages of the book, echoing Thorndike in 1912, state that "the material was designed for use in a teaching machine.... Where machines are not available, a programmed textbook such as this may be used. The correct response to each item appears on the following page, along with the next item in the sequence."

Students wrote down their answers before turning the page, and repeated a section if more than 10 percent of the answers in that section were incorrect. I first encountered this book in the summer of 1968, as a 15-year-old student in a psychology course taught



B.F. Skinner

under the auspices of the National Science Foundation. Similar to other students in my group that summer, I finished this text within weeks and loved it. In 1964, in seventh grade, I had been the beneficiary of another programmed textbook, English 3200. This book was part of a very successful series that taught English grammar.

Another well-known figure in the origins of operant conditioning, Fred Keller, published his iconic article, "Good-bye Teacher..." in 1968. In this article he essentially advocates breaking down the entire teaching process to its elements, and conducting each of those elements more efficiently. The prime function of the teacher becomes, not to lecture, which is best left to automated means, but to engage in direct interaction with students in support of their individualized instruction. More specifically, Keller

The Flipped Classroom

points out as important the following teaching elements:

1. Highly individualized instruction that allows students to progress at their own speed.
2. Clear specification of learning outcomes (the specific skills to be achieved).
3. Clear specification of the steps needed to achieve these learning outcomes.
4. A goal of perfection for each student and for each stage in the learning process.
5. Two types of teachers: Classroom teachers whose duties include “guiding, clarifying, demonstrating, testing, grading,” and other teachers who deal with “course logistics, the interpretation of training manuals, the construction of lesson plans and guides, the evaluation of student progress, the selection of [classroom teachers], and the writing of reports for superiors.”
6. Using lectures as little as possible — more as a way to motivate students, and using student participation as much as possible.
7. Lots of testing, all with immediate feedback to students, which helps to ensure student learning.

This breakdown of the learning process makes large parts of that process, parts that are ordinarily done in classrooms involving direct human interaction, well suited for being done by technology. However, humans are clearly still needed for specifying the learning outcomes and the steps required to reach them, as well as other tasks involving analysis and

creativity and complex interactions with students.

Just a few years later, in the fall of 1972, I took an undergraduate course on learning at Harvard University, taught by William Baum, that followed the “Keller plan.” The work was divided into 26 units, each requiring some reading, some questions to which answers had to be found and learned (50 to 80 such questions per unit, some of which would require an



essay to really answer properly), and a written and an oral quiz. Students were not allowed to progress to the next unit until they had passed the written and oral quizzes for the preceding unit, and individual instruction with Baum or his graduate teaching assistant was always available. However, due to the large number of units in this 14-week course, and the difficulty of the quizzes, which students often did not pass,

very few students finished the entire sequence and so very few students received an A. Thus using the Keller method does not automatically result in students doing well. The application of such teaching techniques is critical.

Lest anyone think that visions of improving learning by the use of technology are limited to psychologists, 1995 saw the publication of an outstanding work of science fiction by Neal Stephenson, *The Diamond Age*. A central theme in this work is an interactive book, owned by a small girl, that greatly facilitates her learning, development, and upbringing. We cannot yet achieve the degree of device interactivity that Stephenson describes, but we can achieve elements of that interactivity, and Stephenson gives us a vision of the possibilities.

In 1998, Frank Mayadas, then a program director at the Sloan Foundation, gave the keynote address at the City University of New York’s Baruch College’s first annual Teaching and Technology Conference. In this address he pointed out that all forms of college learning have three elements in common: an expert, who oversees the process; information sources; and colleagues, with whom a student learns. All three are important in the learning process, and all three may be instantiated in different ways depending on the modality of instruction. Although current technology cannot by itself design a new course, it can serve well as an information source, and it can assume some of the functions of colleagues. As technology continues to

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develop, the functions that it can serve will increasingly closely resemble those that have traditionally been served by humans.

The more recent past, 2010, saw the publication of *DIY U* by Anya Kamenetz. Consistent with Keller in 1968 and Mayadas in 1998, Kamenetz also would separate the components of the learning process, instead of concentrating them all in a course’s single professor as has been largely the case until now. In her vision of the future, individualized instruction is assumed, with technology playing a significant role, including by taking over those parts of teaching that can be automated.

Kamenetz’s vision is not far away given what is already happening on today’s campuses. As stated in a 2012 report from the Ithaka organization, “Barriers to Adoption of Online Learning Systems in U.S. Higher Education”: “Literally for the first time in centuries, faculty and administrators are questioning their basic approach to educating students. The traditional model of lectures coupled with smaller recitation sections (sometimes characterized as ‘the sage on the stage’) is yielding to a dizzying array of technology-enabled pedagogical innovations.” One primary use of technology is to deliver lecture material

outside of class, while class time is used for discussion and other active interactions involving the instructor and the students. This is known as the flipped classroom, which turns “traditional education on its head.” But recall Keller’s 1968 suggestions about how teachers should be used for “guiding, clarifying, demonstrating, testing, grading,” and that lectures should be “used as little as possible ... and student participation as much as possible.” It seems that the new invention of the flipped classroom is not so new at all.

What encourages these recent statements about the benefits of technology for learning is a worldwide recognition that what is important in higher education is the achievement of specific, agreed-upon learning outcomes. Although this emphasis was present at least from 1912 in the work of learning theorists such as Thorndike, who emphasize the end result — the behavioral goal — in their approach to changing behavior, it has only been in the past few decades that such recognition has become prominent in higher education.

One example is contained within what is known as the Spellings Report (the 2006 report of the commission that was appointed by then-Secretary of Education Margaret Spellings). A

major point of this report was that “[a]ccreditation agencies should make performance outcomes, including completion rates and student learning, the core of their assessment as a priority over inputs or processes.” It is this emphasis on learning outcomes that, in part, enables the use of technology in the learning process. Once the learning outcomes are specified, the process of helping students to achieve them can be programmed, using increasingly sophisticated technology.

Many of the elements of good teaching discussed here — for example, individualized instruction, frequent testing, focus on outcomes, immediate feedback — now have sound laboratory evidence to support their use. We seem to have forgotten their behavioral psychology origins and history, yet it is their effectiveness that is important in the end. Perhaps there are additional lessons to be learned from behavioral scientists, however, in the use of technology to facilitate instruction. We have only to look at casino attendees, particularly the users of slot machines, to see evidence of what Skinner and Keller knew firsthand in the laboratory with rats, that animals (including humans) respond at a high, continuous, persistent rate on variable ratio schedules (situations in which each reward arrives after a variable

number of responses). Using such knowledge, in addition to knowledge from cognitive psychology about how best to structure concepts, can result in online courses that not only make concepts easy to learn and remember but, similar to slot machines, are almost irresistibly attractive.

Keller in 1968 summed up his position on teaching with the following:

Twenty-odd years ago, when white rats were first used as laboratory subjects in the introductory course, a student would sometimes complain about his animal's behavior. The beast couldn't learn, he was asleep, he wasn't hungry, he was sick, and so forth. With a little time and a handful of pellets, we could usually show that this was wrong. All that one needed to do was follow the rules. "The rat," we used to say, "is always right."

My days of teaching are over. But ... I learned one very important thing: the student is always right. He is not asleep, not unmotivated, not sick, and he can learn a great deal if we

provide the right contingencies of reinforcement.

Although we can all agree that college students are certainly not the same as casino attendees or lab rats, we can also all agree that technology, designed and used correctly, can facilitate instruction through personalization as well as through motivation. (The popular appeal of many online role-playing games is one example of that.)

The teaching techniques and tools discussed here have been promoted by behavioral psychologists for the past century.

What lessons can we learn from this? One is that it is possible to facilitate learning using the techniques discussed here, such as personalized instruction, without ever having to use the latest (very expensive) technology. There are times when a relatively cheap programmed textbook will help someone learn, perhaps not as well as the best online programs, but very well.

A related lesson is that it is not the existence of the latest technology or its potential uses that will help us to maximize student learning, but using what we know and have. Faculty must be both aware of the techniques and tools at their disposal, and want to use them.

This requires proper training during graduate school, professional development later on, and appropriate college and university incentive structures (all of which have been too often missing if the repeated rediscovery of these techniques and tools during the past century is any indication).

The sorts of tools that we have needed to help students learn have been around for 100 years, albeit continuously improved. It is our job to — finally — use those tools. ■

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