

THE

ACTIVE

LEARNING
HANDBOOK

Engagement techniques that work

BY PHILIP PREVILLE

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THE PULPIT PROBLEM

Enrico Fermi, the great Italian-born physicist and 1938 Nobel Laureate, was also a captivating lecturer who earned the nickname “The Pope” for his pronouncements at the classroom pulpit. He also offered, from the perspective of his students, one of the most insightful and lasting criticisms of lecturing itself: “Before I came here I was confused about this subject. Having listened to your lecture I am still confused. But on a higher level.”

Decades later, Fermi’s words remain apt: lecturing is not always the best means of transferring knowledge from teacher to pupil. As a lecture progresses into more complex areas, students risk losing their bearings. And once that happens, PowerPoint slides may be of little help.

Today’s lost students, rather than try to find their way back into the material, often find their way into Facebook or Amazon instead. The ubiquity of campus Wi-Fi and laptops provide students with a multitude of opportunities for distraction and disengagement. These technologies have only exacerbated the problem that has been ever-present since long before Fermi’s time: the risk that students, as passive recipients of complex knowledge, will fail to fully comprehend the subject matter.

But these same technologies also represent an opportunity for professors to reach students in ways Fermi never could: a chance to implement new—and technologically enabled—teaching techniques for improved classroom engagement.

TROUBLED TIMES

FOR THE UNIVERSITY LECTURE

Lecturing is the predominant mode of teaching on college campuses, largely because of its perceived efficiency: instructors feel they can cover more material if they do all the talking. But cramming more content into a course syllabus makes it more challenging, especially while making no teaching adjustments to ensure students can meet the challenge. Indeed, recent data shows that students increasingly

find postsecondary education to be a steep uphill climb—and that traditional lecturing is contributing to the problem.

According to the 2016 National Survey of Student Engagement,¹ one in five first-year students had difficulty learning course material and getting help with coursework. The results prompted NSSE director Alexander McCormick to observe that “students don’t necessarily enter college knowing

what it takes to be successful learners...we need to help students crack the code.”

Unfortunately, if students get off to a bad start, they may never reach the finish line. According to

Undergrads in classes with traditional sage-on-stage lectures are 1.5 times more likely to fail than those in classes that use a wider variety of teaching techniques

a 2016 *New York Times* report,² less than half of all students admitted to public universities in America manage to complete their degree. The problem is less pronounced, but nonetheless present, among private schools: of 1,027 private colleges surveyed by the

Washington, D.C. think tank Third Way, 761 reported graduation rates of less than 67 percent.

And the way students are taught has a direct impact upon their outcomes. According to a study from the University of Washington in Seattle,³ undergrads in classes with traditional sage-on-stage lectures are one-and-a-half times more likely to fail than those in classes that use a wider variety of teaching techniques.

In his seminal book, *What's the Use of Lectures?*, former University of Exeter professor Donald Bligh observed, “the idea that lecturers should use the lecture method and no other for 50 minutes on end is absurd; yet it is quite a common practice.” Bligh also remarked on the surprising level of student tolerance for lecturing, given that “the effect of monotonous stimulation”—that is, boredom—“is common knowledge.”

And if monotony lies at the root of the pulpit problem, then the solution is to shake things up and make students more active participants in their education.

THE RISE

OF ACTIVE LEARNING

Twenty-five years ago, two professors from Southeast Missouri State University, historian Charles Bonwell and psychologist James Eison, laid out the first academic case for transforming lecture-based learning into something better. Their 1991 book *Active Learning: Creating Excitement in the Classroom* defined its title concept this way: “In the context of the college classroom, active learning involves students in doing things and thinking about the things they are doing.”

Bonwell and Eison argued that teaching should be less about

imparting information to students and more about developing skills, while also engaging students in higher-order thinking, whether by reading or writing about the task at hand or by discussing it. The central tenet of active learning is that practice matters, and that classroom time is better spent giving students opportunities to work with concepts over and over, in a variety of ways and with opportunities for immediate feedback, so that knowledge can take hold in their own minds. This is as true of the sciences as it is of the humanities: molecular biology

and philosophical inquiry are both best understood through repeated, open and social exploration.

Today, nearly every college in North America has a teaching-and-learning resource center to support faculty as they diversify their

Technology makes it possible for instructors to design and adopt new teaching activities and active learning techniques without having to redesign the classroom.

classroom activities beyond passive lecturing. And universities are now redesigning classroom spaces to promote active learning: instead of theatre-style seating focused on a pulpit, classrooms feature circular tables that encourage small-group discussion, and wall-mounted

flatscreens that students can use to display their work and solicit feedback.

Meanwhile, the same developments that have made lecturing ever more precarious—personal technology—are also serving as a catalyst for the adoption of active learning strategies. Smartphone apps, social media and student engagement platforms such as Top Hat are making the transition to active learning classrooms easier and more efficient. Minute papers, quizzes and muddiest-point exercises (see “What An Active Classroom Looks Like” on the following page) can all be executed and tabulated online. Debate proceedings can be videotaped and posted to course websites. New technologies make it possible for instructors to design and adopt a wide range of new teaching activities and collect real-time data on student performance—without having to redesign the physical classroom itself, which is often an unrealistic goal given the tight budgets imposed on many academic departments.

WHAT AN ACTIVE CLASSROOM LOOKS LIKE

In practice, the term “active learning” encompasses a broad array of tactics and activities, ranging from quick-and-simple interventions to semester-long redesigns of course structure and delivery. While some are better suited to specific disciplines, each one can be adapted for use in any context. Debate, for instance, has its roots in philosophy and politics, but can easily be used to animate discussion in STEM classrooms.

THINK-PAIR-SHARE

Instructors briefly pause their lecture and ask students to pair up and discuss the material that was just presented, and to be prepared to ask questions or share observations with the entire class.

MINUTE PAPERS

During a brief pause, students alone or in pairs are asked to answer a question in writing about the day's teaching. The submitted responses can be used to gauge student comprehension of the material.

QUICK QUIZZES

Administered at the start of class or during a pause, not for a grade, but to assess comprehension, much like minute papers.

MUDDIEST POINT

Students are asked to write down and submit which part of the course material is least understood by them.

DEBATES

Having students defend different viewpoints for the class is a means of structuring class discussion and ensuring that even those in the back rows have the opportunity to speak.

CASE STUDIES

AND PROBLEM SOLVING

Students work in groups, applying knowledge gained from lectures or reading materials to a given situation.

PEER INSTRUCTION

Have students prepare and present course material to the class.

FLIPPED CLASSROOMS

Students watch pre-recorded lectures as homework, then arrive in class prepared to spend the time engaged in any number of the activities described above.

ACADEMIC RESEARCH

ON ACTIVE LEARNING

Academics are often researchers as well as teachers. They leave no aspect of their environment free from observation and experimentation—including themselves and their students—delving into data on what motivates students and the best ways to engage them while tracking metrics such as retention and comprehension.

At this point the empirical data on both topics is voluminous, and the evidence is clear: active learning is good for students, in terms of both outcomes and engagement. One study found that students in active learning classrooms outperform students in lecture

classrooms by six percentage points on the same exams—which can mean the difference between passing and failing.

And, as laid out by Joel Michael of Rush Medical College in Chicago in his 2006 paper “Where’s the evidence that active learning works?”⁴ the research provides instructors with useful principles for the design of active learning activities in the classroom.

Knowledge is created by each of us, not transferred from one person to another.

Instructors can impart what they know, and students can receive it

in an alert and engaged state of mind. But for effective learning to occur, students need to link what they're being taught to what they already know, to correct their misconceptions and to construct new and lasting meaning in their own minds. That process requires discussion and exchange between students and instructors, and among students themselves—activities that are part of any active learning classroom.

Knowing "what" is different from knowing "how."

If students are expected to use the knowledge transferred in a lecture to solve problems, they need opportunities to practice—and they need feedback on their performance. This part of the learning process, typically taken up through homework, is increasingly being done during class time, with students doing problem-solving or case-study exercises and sharing their work with the professor and the class for discussion. It's a great chance to review and go more in-depth with challenging material.

Students learn better when they learn with others, and they learn best by talking.

Whether it's called peer learning, problem-based learning or collaborative learning, the research is emphatic: it works. Even with computer-assisted learning, students learn better when paired. And the more they talk to one another, articulating how they understand certain problems, delving deeper into their own knowledge and self-correcting their misconceptions, the better they learn.

Moreover, the research shows that active learning improves student enthusiasm for learning itself. In a 2012 study,⁵ 372 undergraduate students were provided with either passive or active instruction on information literacy from their campus library. Those who received active instruction were more time-efficient and self-sufficient in their information searches, experienced less anxiety when using library resources and reported improved perceptions of librarians' helpfulness and value.

BEST PRACTICES

FOR ACTIVE LEARNING

The research is clear: active learning techniques improve student engagement and learning outcomes. And they work best when they're used to deliberately target specific objectives. To design an effective active learning program, it helps to assess your experience in lecturing and identify the strengths and weaknesses of your current approach.

- ▶ How is classroom time currently spent? How much time is devoted to each module or concept?
- ▶ Which core concepts do students typically show the greatest amount of difficulty understanding?
- ▶ Where do students struggle most, and where do they succeed?
- ▶ Which aspects of coursework are best conducted in class, and which would best be completed at home?
- ▶ Which active learning techniques would best apply to the challenges of your classroom?
- ▶ What have others tried? Have their efforts been successful?

Perhaps the most crucial question to ask is: what technology can I adopt to facilitate active learning? The tools of active distraction—laptops, tablets and Wi-Fi—can be turned into tools of active learning. Personal

Students don't realize that, as the research shows, active learning will engage them better, help them learn, and provide them with greater satisfaction

technology is a staple of student life, and incorporating it into an active learning platform makes it easier for students to engage. Creating course hashtags or pages on social media such as Twitter and Facebook can facilitate peer-to-peer discussion both inside and

outside the classroom. Classroom engagement platforms can tabulate quiz results in real time to provide feedback on comprehension and student progress, and do the same for minute papers and muddiest-point exercises, while also providing data on student reading habits. Interactive textbooks, with built-in exercises, videos and quizzes that instructors can edit to adapt for their courses, also facilitate active learning activity.

Finally, when implementing any active learning program, be prepared to meet with resistance. Students are just as accustomed as instructors to passive learning, which demands less of them in the classroom. Any program of active learning requires students to be more alert, engaged and active in their education—and often their first reaction to such obligations is to complain. They don't realize that, as the research shows, active learning will engage them better, help them learn and provide them with greater satisfaction. In the early going, the persistence of their instructor will be a crucial factor in active learning's success.

THE ENGAGING PROFESSOR

For nearly two centuries, lecturing has been the mainstay of higher education, the one-size-fits-all pedagogy for any course of learning. During that time the world beyond campus has changed radically, especially in the way technology has changed how we interact with others.

Perhaps it is a comfort to students and faculty that the university classroom has remained constant throughout these years: everyone knows what to expect. But it is increasingly clear that lecturing alone is far from optimal, whether for engaging students or generating strong learning outcomes. If all that's expected of students is to be passive recipients, it should come as no surprise that they remain passive in the face of academic challenge.

Active learning techniques make students participants in their education, raise their grades and their self-esteem, and better impart knowledge and skills. Student engagement is not merely a function of captivating course material or of professorial wit at the pulpit. Engagement is about how students are invited to interact with course material, and smart professors are those who invite them to actively explore new knowledge until they make it their own.

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