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Harvard Conference Seeks to Jolt University Teaching

By Dan Berrett

Cambridge, Mass.

A growing body of evidence from the classroom, coupled with emerging research in cognitive psychology and neuroscience, is lending insight into how people learn, but teaching on most college campuses has not changed much, several speakers said here at Harvard University at a daylong conference dedicated to teaching and learning.

Too often, faculty members teach according to habits and hunches, said Carl E. Wieman, a Nobel Prize-winning physicist and associate director of the White House Office of Science and Technology Policy, who has extensively studied how to improve science education.

In large part, the problem is that graduate students pursuing their doctorates get little or no training in how students learn. When these graduate students become faculty members, he said, they might think about the content they want students to learn, but not the cognitive capabilities they want them to develop.

"It really requires someone to be doubly expert," Mr. Wieman said. As sometimes happens in some disciplines and departments, a few people develop deeper knowledge of pedagogy. These doubly expert faculty members, he said, can show colleagues how to apply new approaches to teaching the discipline.

Such approaches would demand much more of students and faculty. Students should be made to grapple with the material and receive authentic and explicit practice in thinking like an expert, Mr. Wieman said. Faculty would need to provide timely and specific feedback, and move beyond lectures in which students can sit passively receiving information.

"We assume that telling people things without asking them to actively process them results in learning," Mr. Wieman said.

The conference, which also featured demonstrations of innovative approaches to teaching, was the first event in a new Harvard Initiative for Learning and Teaching, a project supported by a \$40-million grant from two benefactors, Gustave M. and Rita E. Hauser. In addition to the conference, the money will pay for the redesign of classrooms at Harvard and for a grant program that will finance innovative ideas. More than 250 Harvard faculty, staff, and students have submitted letters of interest for projects costing nearly \$10-million. Awardees will be selected in April.

Many colleges routinely hold seminars on teaching and learning. But the fact that Harvard is focusing on the subject—and that many speakers referred worryingly to the growth of online and for-profit providers—suggests a growing concern at even the most elite institutions that the classroom experience is not all it could be.

The Hausers wanted their money to have a broad effect across Harvard's departments and disciplines. They also wanted the university to respond to changes in students. "You can see there will be a fundamental break in how students are learning," Mrs. Hauser said in an interview, "and we thought Harvard should be at the forefront of that."

Confronting Misconceptions

Students are indeed changing, some speakers said. Their level of curiosity has declined over the past two decades, said Clayton M. Christensen, a professor of business administration at the Harvard Business School.

Mr. Christensen also drew an analogy between Harvard and the for-profit world, and General Motors and Toyota, describing how new businesses often enter the bottom of a market and claim untapped customers whom they reach through some new technological advance. Eventually, they move up-market and overtake the dominant player.

Higher education once was immune, he said, until the spread of online learning, which will allow lower-cost providers to extend into the higher reaches of the marketplace. "Higher education," he said, "is vulnerable to disruption."

And, while students are changing, several speakers described conventional teaching approaches as being ineffective.

Take, for example, the lecture, which came up for frequent shellacking throughout the day. It is designed to transfer information, said Eric Mazur, professor of physics at Harvard. But it does not fully accomplish even this limited task.

Lectures set up a dynamic in which students passively receive information that they quickly forget after the test. "They're not confronted with their misconceptions," Mr. Mazur said. "They walk out with a false sense of security."

The traditional lecture also fails at other educational goals: prodding students to make meaning from what they learn, to ask questions, extract knowledge, and apply it in a new context.

And yet, many speakers acknowledged, faculty members harbor their own misconceptions about learning, which still hold sway at Harvard and beyond.

One, said Mahzarin R. Banaji, a professor of psychology at Harvard, is what she called a "myth" about different learning styles, in which it is thought that some students learn best visually, others by hearing, and still others kinesthetically.

"There's no evidence, zero, that teaching methods should be matched up with different learning styles," Ms. Banaji said. "It's intuitively appealing, but not scientifically supported."

Assessing as Learning

Another commonly held notion, that studying is how learning occurs and testing is an afterthought, was upended by Henry L. "Roddy" Roediger III, a professor of psychology at Washington University in St. Louis, who has studied what is known as the "testing effect."

In an experiment, he broke students into three different groups: One studied a list of words eight consecutive times without taking any tests; the second studied the list six times and was tested twice. The last studied the words four times and took four tests. Two days later, they were asked to recall as many words as they could. Those who took four tests recalled words at up to twice the rate of those who only studied.

"Taking a test on something is a very effective way to learn about it," Mr. Roediger said.

But frequent quizzes—which he said should be low-stakes and not "deadly" multiple choice—often hit a wall of disdain among both faculty and students, he noted. "There's a kind of a conspiracy in higher education that professors don't like to give tests," Mr. Roediger said. "We hate grading tests. Students don't like taking them, so we don't give them very much."

But there are other ways to get students to truly learn, other speakers said. Asking students to explain concepts or to teach one another the material they have just learned are also effective.

Writing is often an effective pedagogical tool, too, several speakers said. For his history of psychology course, Mr. Roediger asks his students to send him short essays before each class meets. They respond to the reading. (Others at the conference who use this method said they sometimes ask their students to identify outstanding questions or relevant areas of their reading that have been left unexplored.) Mr. Roediger reads the one-page essays before class and works their thoughts into his comments.

But writing is also more than a means to convey content. It is a core skill that faculty members often hope their students will carry with them after they graduate, said Steven Pinker, a professor of psychology at Harvard who studies language and cognition. But even here, students and faculty often fail.

Students are trained to write in jargon-heavy language that obscures rather than reveals the underlying ideas. Mr. Pinker drew an analogy to teaching, saying that obtuse writing and poor teaching both reflect what he called the "curse of knowledge."

Having this curse means that a writer or professor often assumes knowledge the reader or student does not have. More important, the writer or teacher usually forgets that the reader or student is struggling to learn the material for the first time, which often was long ago for the teacher.

"It's hard to know what it is like for someone else not to know something that you know," Mr. Pinker said. "It's the chief driver of bad writing and, I would argue, bad teaching."