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February 5, 2012

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

Having this course 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."

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jranelli 4 days ago

hardly a better way to spend a few million, let's hope that the effort is sustained as a kind of permanent inquiry...a quick note: before bashing the lecture (which could use a little time for reflection and revision, granted) consider exploring techniques for "using" it...experience reminds that the discussion sections, usually led by graduate students, can be more than a little helpful...students lucky enough to draw one who is has an instinctive grasp of listening, noting, and application of lectures and the synthesis if these during discussion can come away with a process that serves to bring lectures into a kind of relief that suggests an almost three-dimensional experience of the whole and its parts toward a reassembly that is most useful to the individual...the skill of actors able to grasp the wider meanings and dramatic action of texts from even the most schematic accompaniment of notations concerning the details of "moments," especially the actions of their characters therein, comes close...perhaps the discussion session and the tutoring (and oversight) of discussion section leadership could use some attention.

7 people liked this. [Like](#)



leah_shopkow 4 days ago

This sort of work is being done in many places; it's called the Scholarship of Teaching and Learning. Perhaps it isn't news until Harvard does it?

72 people liked this. [Like](#)



MarjoryMunson 4 days ago in reply to leah_shopkow

Sometimes that is what it takes to get things noticed - it's called politics.

I am adding - and the politics of the media.

4 people liked this. [Like](#)



kspiezio 2 days ago in reply to leah_shopkow

SToL clearly is being pursued at a number of colleges and universities. However, it is not clear whether this is being done systematically as a function of institutional policy. The incentive system in place at most institutions obviously does not privilege -- nor even necessarily reward -- this type of scholarship with the context of tenure and/or promotion decisions. Nor is it clear how many institutions have made a conscientious effort to integrate a pedagogy of engagement into the courses and disciplines that comprise their academic portfolios (such that the cumulative effect of student learning experiences is to support and reinforce one another in regard to the promotion of broader -- institutionally-based - learning outcomes). In principle, this is the promise of a project such as Harvard's although it will entail a rather far-reaching change in the basic molecular structure of higher education (i.e. the class) and the institutional policies that currently serve to promote one particular approach to learning (i.e. seat time) at the expense of others.

5 people liked this. [Like](#)**MarjoryMunson** 4 days ago

One can get a PhD with absolutely NO education pertaining to learning or teaching. We then assume that possession of that degree, signifying at least some knowledge of the content of a discipline, somehow magically qualifies the possessor to teach. It is to be hoped that this project will move forward to incorporating knowledge of pedagogy/andragogy into the knowledge base required for the PhD unless we want to establish TWO PhD tracks - one to teach/one not to teach.

41 people liked this. [Like](#)**111960** 4 days ago in reply to MarjoryMunson

I completely agree with your statement about the erroneous assumption that having a Ph.D. in a discipline means one is prepared or qualified to teach in that discipline. As a student back in Africa, I was fortunate to attend one of the few universities that was specifically built to train high school teachers in the 1960's. The goal was to infuse STEM and liberal arts education at K-12 level to support economic development (does that sound new to anyone?). The curriculum required every student to double major in a discipline (English, business, biology, etc) and education (learning how to teach). When I moved to the US as graduate student, having that background helped me adjust quickly as a graduate teaching assistant assigned to an introductory biology class. Needless to say, the knowledge that I acquired as a double major in botany and education has served me well as a faculty member. Knowing something does not necessarily mean one can teach it.

29 people liked this. [Like](#)**MarjoryMunson** 3 days ago in reply to 111960

I hope we can move toward that ideal in this country. Years ago someone complained to me that the requirements to teach high school in the state of Wisconsin would mean that Albert Einstein could not teach high school physics. They were at first puzzled that I said, "Good!" I went on to explain that although he obviously knew physics, there was no evidence whatever that he knew how to teach that subject at that level. As you said, "Knowing something does not necessarily mean one can teach it." In addition, in the case mentioned here, knowing something very well may make it difficult to find the right level to pass this information on to learners with little or no knowledge of the subject as a base.

16 people liked this. [Like](#)**anahuacbob** 3 days ago in reply to MarjoryMunson

Similarly, too many people that know how to teach don't know the content well enough to make their teaching skills matter.

29 people liked this. [Like](#)**Socratease2** 2 days ago in reply to MarjoryMunson

Damn, going after Einstein. Is that just a less generous way of saying there isn't any evidence he would be a poor teacher at that level.

[Like](#)**MarjoryMunson** 2 days ago in reply to Socratease2

No, it is saying there is no evidence that he would be a good teacher at that level. People who have a very advanced knowledge of a subject may find it difficult to work from a very basic level in attempting to explain it to others.

2 people liked this. [Like](#)**EllenHunt** 1 day ago in reply to MarjoryMunson

Actually, MarjoryMunson, there is considerable evidence he would have been a good teacher at that level. He wrote explanations for lay people without using mathematics of Relativity Theory. I still have one of those old books and I loved it as a kid. Einstein was also well known for wandering around and helping undergrads with their math and physics

homework. He enjoyed it, found it relaxing. He liked that the kids didn't care who he was and wouldn't be obsequious or overly deferential. He liked to hear them say things to each other like, "Who's Einstein? Oh, I dunno. Some prof. He's ok though. Gave me jellybeans." Einstein liked jellybeans, particularly the black ones. Einstein liked to teach, and he liked to teach by socratic method, asking questions and drawing the person through a thought process to see things. Find his layman's book if you can and try reading it. I think you will change your mind.

6 people liked this. [Like](#)



Socratease2 1 day ago in reply to MarjoryMunson

Did Einstein ever teach at a high school? He was at Yale but don't know if he was just doing research or actively teaching at undergraduate level. Anyway, you have a theory but certainly having a high degree of expertise in a field does not preclude you in the least from being an effective teacher. It may be a trend (but certainly no law) in that direction since those people may be doing more research but that is a time problem not an aptitude issue. This is not a zero sum game.

[Like](#)



cwm4c 4 days ago in reply to MarjoryMunson

Most professors have zero education & training in how to teach, how humans learn, or means to effectively convey information, yet most also believe they are good teachers! Actually, most of us are very bad instructors, but being reinforced by those who are also bad through our PhD process, we never realize it. There is a screaming need for professors to have a baseline knowledge prior to occupying a classroom—we should have a minimum standard. Without it, we're left to those smart individuals who seek it on their own.

There is a path to help. In my department of our R1, we ask all candidates during the search process what background/education they have in these areas—if none, we thank them for their time and move on. The quality of our hires has actually increased with this process. Our faculty senate is also considering making it the norm for the entire university. If more schools looked at this, it could drive a requirement—for now, we are changing where we can.

17 people liked this. [Like](#)



profdrsoandso 4 days ago

How nice of Harvard to spend time talking about teaching. Of course, the very things that good teaching requires—sustained interaction with students, for example—are precisely the things that faculty are discouraged from doing if they want tenure.

72 people liked this. [Like](#)



sirach 3 days ago in reply to profdrsoandso

Agreed. Teaching and tenure have never walked hand in hand. Professors expect students to be able to write when they show up - it's someone else's responsibility.

17 people liked this. [Like](#)



MarjoryMunson 3 days ago in reply to sirach

Actually, it WAS someone else's responsibility - but that isn't happening as it should either. Maybe my suggestion of two PhD tracks should be supplemented with two tenure tracks - one teaching - one researching - and make it official that the two are not intended to meet.

25 people liked this. [Like](#)



digiwonk 3 days ago in reply to MarjoryMunson

sirach said that teaching and TENURE don't walk hand in hand; that's not necessarily the same thing as teaching and RESEARCH not walking hand in hand. There's really no reason why someone with interesting ideas (a researcher) can't be a good teacher.

12 people liked this. [Like](#)

**profdrsoandso** 3 days ago in reply to MarjoryMunson

With all due respect, Marjory, I think the idea of two tenure tracks is terrible, as it would only reinforce the idea that teaching and research are distinct, which is the fatal flaw in the current university. They should be intended to meet, or neither makes any sense at all.

16 people liked this. [Like](#)**armedliberal1** 3 days ago in reply to MarjoryMunson

Excellent idea. Some students will want to learn from the best, and will be prepared to learn from those who have the knowledge they need. Some excellent researchers will also be fine teachers. Some excellent teachers will also have a heightened sense of civic duty and will perform service to the profession and the community. Sounds like the traditional method of evaluating people for tenure according to accomplishments in research, teaching and service. It works pretty well until some study finds that all teachers should excel at one thing or the other.

3 people liked this. [Like](#)**ftuer** 1 day ago in reply to MarjoryMunson

I'm not in favor of separation of teaching and research. I build discussion of research and researchers into teaching so students know where the knowledge came from and learn to think critically about what they read.

[Like](#)**vceross** 4 days ago

At the risk of immodesty, I will say that I can run a good lecture/discussion class. However, a couple of years ago, in the midst of a lively discussion, I had an inkling that students didn't really understand what they were talking about, lively as it all was. So I asked them to take out a piece of paper and define the key term we were debating. To my dismay, only one of the entire group was able to come close to defining the term. The next class, I devoted considerable time to a definition of the term. I provided three definitions from different sources, and asked students to form groups and come up with their own definition or choose and justify one of the three. At the end of this class, I asked students to define the term. This time 3 of 29 could do so. I emailed them and told them that the next class there would be a test on the definition. 29 passed. Before this experience, I was anti-test. Now I frequently use little low-stakes mini-quizzes, not so much to keep students on their toes as to help me understand how much, or little, they are learning from all those lively lecture/discussions.

70 people liked this. [Like](#)**sdunkart** 1 day ago in reply to vceross

Vceross, you've just identified one of the strategies in high quality teaching: formative assessment. But not only did you identify the strategy, you used the information to inform your practice - that's the truly vital part. I think the issue that folks in this discussion are citing is that many university instructors have no idea how to do a good job at teaching. You obviously are interested enough in your students' learning to find out what they know. Many instructors forget to do that vital step and just continue charging ahead. We often make the joke as if heard from a professor, "I don't understand why they did so poorly on the exam. I covered the information in class!" As if by just telling them, they would learn. Maybe sometimes they do, but more and more the research is saying they don't.

4 people liked this. [Like](#)**kether1** 4 days ago

Well, my community college - where we already know how to teach - could certainly make use of the \$\$
We could have a gym.

15 people liked this. [Like](#)**jimrettig** 3 days ago

"It's hard to know what it is like for someone else not to know something that you know," Mr. Pinker said.
Well said, Mr. Pinker! In their graduate studies faculty learn how to find, evaluate, analyze, synthesize, and

cite information. (The last is mechanical compared to the other abilities; but sometime is emphasized without connection to the others.) When they become professors teaching undergraduates, how many faculty recall not knowing how to do these things when they were undergraduates? A good question to ask oneself. And a good reason to collaborate with a reference librarian who can help faculty design experiences that help students learn about the complexity of finding, evaluating, analyzing, and synthesizing information. Such experiences can contribute to improved teaching and learning.

10 people liked this. [Like](#)



Socratease2 2 days ago in reply to jimrettig

At least something "that you think you know." I have heard Pinker lecture before, not all that impressive.

[Like](#)



Frank Lowney 3 days ago

Well, we've had Bloom's Taxonomy of Objectives in the Cognitive Domain since 1955. Since then many studies have looked at actual teaching practices and concluded that most of us aim pretty low -- the lowest one or two items in this six level hierarchy. Let's hope this effort and the pressures of competition produce a better result.

5 people liked this. [Like](#)



digiwonk 3 days ago

First, there really is absolutely nothing new in this particular article: I've been reading versions of these "insights" and "new ideas" and "pushes for change" since I started grad school. And I'm older than I look. Many of us have taught according to these principles already for a decade or more.

So, "Science" and "knowledge" about teaching isn't the problem. Let's assume (barring the "learning styles" myth) that effective teaching strategies for different disciplines and different--jargon alert!--learning outcomes have been identified. Assume the problem of "what are some really effective ways to teach?" has been solved.

Why haven't most classrooms changed, then?

[pauses to listen to cricket chorus ...]

It's not a knowledge problem. All the neuroscience in the world ain't gonna help here. There are a multitude of (good, bad, structural, cultural, ideological, practical) reasons why most classes still run as lectures with one big essay or one big exam at the end.

Solve THAT problem, and you might get somewhere.

(I suspect the general institutional disdain for undergraduate teaching and the way that early careers are configured and the contained resources for, for example, capping class enrolments or assigning teaching reliably may play something of a role ...)

34 people liked this. [Like](#)



waratah104 3 days ago in reply to digiwonk

Quite right, well said. Perhaps one way to get around this might be to stagger tenure decisions around periods of focus on Research and then Teaching or vice versa. In other words, faculty explicitly drill down across a period of time on one of the areas and then the other during another period of time. Not perfect, but at least explicitly carves out time for each.

3 people liked this. [Like](#)



armedliberal1 3 days ago in reply to digiwonk

On the nose digiwonk. I too have been hearing these arguments sfor a long time--since I was in junior high, in fact, and I too am older than I look, which is a heckuva lot older than you look. If your reforms were instituted, we might truly jolt education back to life. But I suspect your suggestions are not "counterintuitive" enough to be "exciting" and "innovative," to use words favored by big granting agencies. Nope. Too commonsensical. Better luck next time.

1 person liked this. [Like](#)

**billmassy** 3 days ago

All this is spot on. And it's great that Harvard is taking this initiative -- now if only other places, like Stanford and Yale, would do likewise.

1 person liked this. [Like](#)**MarjoryMunson** 3 days ago

In reply to digiwonk: I agree - but the researcher should also have specific training for teaching before being allowed to do so. Reread the last sentence of the article - teaching is a specific skill, and it needs to begin with understanding what it is like for someone not to know something that you know. That is what education about educating should be.

6 people liked this. [Like](#)**5768** 2 days ago in reply to MarjoryMunson

We have each of us been at the place where we did not understand what we now know. Teacher education is but one means to get back to that experience and is by no means the only means. It has its own set of pitfalls and does not necessarily make one more objective but can bog down in the limitations of learning theories. What may do just as well is better recall of how we ourselves learned.

Rather than drawing on our own individual experiences of education wherein we moved from a position of ignorance to a position of knowing, too many of us operate solely from our current position of knowing and think we can "impart" from our vantagepoint some metacognitive appreciation we enjoy to our students, when in fact the students are yet, for example, at the rudimentary level of the vocabulary, spelling, and syntax of our disciplines, a level we ourselves once found ourselves. We are not where they are and vice versa.

In doing so we forget that we ourselves made the transition by a process involving hard work and sweat equity, by doing the intellectual work that our education required, starting with the rudiments first. That seems to be the most significant and glaring missing variable from the learning/education equation today. Now that we are educated within our disciplines we think that we can save our students from the process as well as save themselves a lot of work by making the process more palatable than anything we ourselves experienced as students, by effectively short-circuiting for our students the very process that made the educator educated. The cutting edge of neuroscience, electronic technologies, and metacognitive strategies aren't required to create someone who knows their field, and they certainly can distract one from what is fundamentally required to master it.

4 people liked this. [Like](#)**MarjoryMunson** 2 days ago in reply to 5768

Which means that we need to understand the root meaning of "educate." It is related to "educere" - to draw out from. It is not related to "cram into." Therefore, it is a process that requires much hard work on both sides of the process.

2 people liked this. [Like](#)**5768** 1 day ago in reply to MarjoryMunson

I don't know what subject you teach, but in a content-intensive science course of standardized course content tracking as a prerequisite into another course, if Johnny can't keep up with the pace of the course, Johnny had better pick up his pace.

"Cramming" is nothing but a red herring in such a context.

[Like](#)**tardigrade** 22 hours ago in reply to MarjoryMunson

Reply to 5768:

"but in a content-intensive science course of standardized course content tracking as a prerequisite into another course"

But are the entire course contents of either course prerequisites to the kind of work the student wants to do / will be doing if/when they graduate? That's the real question.

1 person liked this. [Like](#)**5768** 19 hours ago in reply to MarjoryMunson

Reply to tardigrade:"But are the entire course contents of either course prerequisites to the kind of work the student wants to do / will be doing if/when they graduate? That's the real question."

That's a "real" question? Sounds detached from reality on several fronts.

In this day and age NO one can predict what my many students will be doing in a global economy, particularly since I have multiple majors in any given course whose degree programs require they take the course. As these students find employment in multiple sectors--government, private industry, academe--in a field pervasive within the US economy and that of any developed nation, an "individualized" course that would fit the student like a glove in advance of knowing where that student will find employment sounds to be a fantasy that has nothing to commend it in practice.

[Like](#)**ebitnet** 3 days ago

I see NO VALUE in requiring formal teach instruction for a PhD. I also do not see science and engineering departments in any time soon viewing teaching experience as a requirement for a faculty position. A PhD is a research degree indicating that you have achieved a certain level of scholarship your field of study. A person with a PhD who can figure out how to present his or her research to his or her peers can certainly figure out how to give a good lecture and teach a class. All that is required is some willingness to do a good job, and overall pride in your work. On the other hand, while interviewing faculty candidates, I ask myself "can we put this person in front of an undergraduate classroom with 50 to 450 students?" I can usually figure out how good of a teacher the candidate will be based upon the care put into a research presentation.

I'm a bit old-school on this. I see a real value in having a first-rate scholar present a lecture on a subject in his or her area to students. Lecture should augment and enhance what can be also learned from a good text. A good lecture can be inspirational and impart some of the professor's enthusiasm towards a subject. I also see a huge value in having tutorials. Ultimately, a university experience is about active learning. Tutorials, discussion groups, & recitation sessions are were the "prodding to make meaning" should occur.

22 people liked this. [Like](#)**3rdtyrant** 3 days ago in reply to ebitnet

Old school is a good place to be on this. Why not leave much of the onus on students? Why not require them to adapt, to learn in some adversity? Why not require them to be able to distill from a boring lecture the discipline to learn what must be learned and figure out how to apply it? There is value in all of this. I know it's not ideal to have a boring lecture, but it is an error to then say students cannot learn from one. They just have to buck up and be students.

28 people liked this. [Like](#)**kgodwin** 3 days ago in reply to 3rdtyrant

If the onus is on the student, why are we hiring people to teach classes? The verb itself implies some sort of action on the part of the instructor - not just a "figure it out on your own" attitude as you seem to imply.

7 people liked this. [Like](#)**aeromorrison** 3 days ago in reply to kgodwin

That depends on your philosophy of learning and teaching. That drove the way institutions were designed in the past. Will we continue to mindlessly follow tradition or harness what we know now, and be willing to question what we do? That is a risky proposition, but worthwhile if we care more about learning and teaching than our own comfort and security.

2 people liked this. [Like](#)[Load more comments](#)

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