Revolution in teaching

Harvard professor Eric Mazur believes in active learning and preaches a modernization of the traditional format of educating, with pedagogical reformulation and complete change in the format of evaluations

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The application of new teaching techniques can not only improve student learning but also reduce the distance between genders and minorities. This is what Eric Mazur, full professor at Harvard and responsible for the creation of peer instruction in the early 1990s, says. The technique is based on the inversion in the learning process, passing the theoretical content to the student before class and using class time to assist in learning. The method, which works in a similar way to the Inverted Classroom, is also pointed out as one of the strongest trends in education in the coming years.

Mazur is a physics professor at Harvard University and began teaching in the traditional way: exposing the content and then testing the students on what was learned. Despite the positive evaluations he always received, he realized that that format did not meet his expectations and that students only learned, in fact, outside the classroom, when they revisited the notes. "In the traditional method all that really happens is the teacher speaks and the students write down. The students are sitting there writing and there is no time to think about the subject," he reinforces.

Eric Mazur talked to Ensino Superior magazine during his visit to Brazil to present a lecture at the Insper Institute of Teaching and Research. In the conversation, the teacher talked about the creation of peer instruction, how it can help in learning, the need to focus on a pedagogical modification of teaching and how evaluations also need to change for education to move forward.

Higher Education: Can you describe peer instruction?
Eric Mazur: I think of education as a two-stage process: the first is the transfer of information and the second consists of the assimilation of content by students. In the traditional method, all the emphasis is on the first step and the most complicated part, which is to find the meaning, the "model building", is left to the student to do alone. So, what I started doing 24 years ago was to change the emphasis from information delivery to the assimilation process. And instead of putting the teacher in the center as the wise, put him as the instructor. The person who instructs students to help them understand the material. And the way I do this is teaching by questioning: basically asking, giving students the opportunity to think about it, commit to an answer, then discuss with each other - and that's where the term peer comes from - and help each other overcome the reasoning difficulties they may face.

Why is peer instruction better than the traditional method?
I think that in the traditional method all that really happens is the teacher talking and the students writing down. The students are sitting there writing the notes and there is no time to think about the subject. Only later, when you go to your room and read your notes, you reflect on what was passed on to you. So I think the traditional method doesn't give students time to think and with that doesn't give students what they really want. And this is reinforced by the evaluations, which usually force students to memorize the subject in order to reproduce that information. However, in my class you see something very different. You won't see students sitting passively, they are active, they will be doing things, they will be thinking, they will be talking, it will be much more like a real work environment. And due to this process, students have time to think, to clarify things they do not understand immediately and have what I call "a-ha moment", which is that moment when you finally understand something, in the classroom and not outside. So I believe that producing an environment for students to think about in the classroom makes them mentally active and committed and this has shown, through studies, that it increases learning significantly more than the traditional method.

And do the students really arrive in the classroom prepared?
In the traditional method of teaching you should do your homework after class. You have the class that introduces the material and then you do your homework to demonstrate that you understood the content. In my class I put the homework before class, to do the first presentation before and then the most difficult work is not done at home, it is done inside the class. And do all the students do their homework? Well, not always. You know that, you know from when we were the students. But most do, especially if you give a good reason. If it's clear that it will be worth it.

You said that peer instruction can help minimize the learning distance between male and female students. Can you tell me a little more about it?
Yes, it helps. That in physics, I don't know about learning other fields. But in the classes at Harvard when we test female and male students, we can also relate to other minorities, such as black or oriental and Latino students; in fact we test different minors in the classes. But a surprising item we found is that if you take all the female students - and you're talking about 50% of women in our classes at Harvard - the grades on the first day of class, before peer instruction, are significantly below the grades of male students. And in the traditional class both men and women win, but the distance of approximately 10% persists. Women learn and men too, but the distance persists for the next semester. If we use interactive engagement, forcing students to talk to each other, women do better. In part I think that female students tend to do well in a collaborative and competitive environment and also because women tend to do better in a verbal environment than men. The important thing is that men learn more in peer instruction than in the traditional method, but women learn much more.

Do you know what generates this distance?
This is the result of something that happens in high school. Maybe partly because the exact ones are judged as something masculine, maybe because most teachers are men.

Do you believe that the evaluation model will change too?
I really hope it changes. In terms of program and student evaluation standards, we are essentially stuck in the Middle Ages. We tested the thing that is easier to test. I think we really have to realize that our assessments are focused on minor mental skills and that we have to give up some objectivity to promote more creative skills in our students. This is crucial. So I believe that evaluations, including accreditation criteria, need to be reviewed, because, and this is the important part, it will be very difficult to make significant changes in education unting we think about the evaluations.

Even today, in 2014, technique is one of the strongest trends in long-term education according to the NMC Horizon Report. Why do you think it's still long-term?
To be a doctor, you need to pass several accreditation exams. When you are going to be a teacher teaching in a higher education institution, educating the leaders of society, nothing. No training. I don't know, maybe in Brazil there is a certification, but in the United States and in most of the world, nothing. Simply by getting a higher education degree you should supposedly know how to teach. So what do you do? Teach the way you were taught. And to make matters worse, he evaluates his own work. If you think about it, it's almost like a mafia. You control your own world within the discipline. We should arrive at a system in which some teachers focus on the teaching part and others focus on the evaluation part. That would be the only honest way to have a responsibility.

Is technology essential for innovation in education?
I love technology. I'm the first to buy a new gadget, but I'm a big skeptic about technology in education, because most people use technology as a new vehicle promoting old pedagogical methods. And we really need to think about pedagogy and how we can create an environment that induces greater student learning. And technology can be a distraction. In fact, what you really need to do is try to use technology to compose something you couldn't do before. And if you actually measure most of the uses of technology in education using this filter, I think the image that emerges is not very good. So I'm very skeptical, I believe we have to think more about how people learn and how we can maximize this learning and only then should we talk about technology applications. Unfortunately, that's not how most people think.

Do you say that Peer Instruction also improves memorization? Could you explain how?

The brain is connected to store models, not facts. Peer Instruction increases understanding, and this understanding ends up helping to better remember the information.

Do you think the traditional teaching model is still effective?

Effective for what purpose? Maybe just to transfer information. But it doesn't offer many opportunities to think and reflect. Before there were books, the traditional way was the only way to teach. We have evolved for 500 years since the invention of the livos. It's time for us to stop reading books to students during classes!

How do you think Peer Instruction can help higher education in Brazil?

Peer Instruction can help Brazilian students learn reasoning skills. Many students strive only to remember the contents. In this century, information is available everywhere, so remembering is no longer as important as it used to be. We should focus on developing creativity and innovation. And Peer Instruction is the key to developing these skills.

You said that at Harvard, where you teach, teachers have autonomy to teach the way they think is best. And in schools that don't allow this? What can teachers do to improve the way they teach?

They need to actively involve their students.

Do you believe that the Peer Instruction method has any negative points?

If instructors try to use the traditional method and Peer Instruction, it will be difficult. So it is important to find time to use only Peer Instruction. Other than that, I see few negative points in the method.

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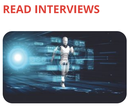

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