Recommended screencasts on how to study:

https://youtu.be/MMHih0RSi3s
https://youtu.be/Uebdd3ewMxg
https://youtu.be/8lTpt2izYxo

Things you like:
- challenging homework good
- clicker questions
- group work in class
- whiteboards
- very hands on
- good conceptual understanding of the material
- screencasts
- knowledgeable instructor
- class time is the best... good for short attention span
  and never feels like 2 hours
- BOLD center

Suggestions for change:
- homework too challenging
- assign less homework
- assign more homework
- textbook has too much material and drawn out derivations
- sometimes assumptions being made aren't clear
- some notes would be good
- would like to see more example problems
- midterm problems were harder than class
- lecture more
- less weight on exams
- work problems in class like the homework
- more interesting examples
- talk about more real-world concepts (Hindenburg problem was great!)
- show abbreviated proofs in class

To improve your own performance:
- spend more time on each homework
- spend more time reading book
- write brief notes in class about things I didn't understand
- review posted notes immediately after class
- ask more questions
- spend more time studying on the weekend
- spend more time in the BOLD center

Comments / Questions:
- pretty sweet class
- you're convincing me to become an engineer
- office hours have been very useful
- will the class be curved?
- you're cool
- I need more time in my life!
Laurentius de Voltolina

# Students use of class time assignments fairness accessibility learning experience

Painted nearly 700 years ago

Laurentius de Voltolina
Farewell, Lecture?

Eric Mazur

Discussions of education are generally predicated on the assumption that we know what education is. I hope to convince you otherwise by recounting some of my own experiences. When I started teaching introductory physics to undergraduates at Harvard University, I never asked myself how I would educate my students. I did what my teachers had done—lecture. I thought that was how one learns. Look around anywhere in the world and you’ll find lecture halls filled with students and, at the front, an instructor. This approach to education has not changed since before the Renaissance and the birth of scientific inquiry. Early in my career I received the first hints that something was wrong with teaching in this manner, but I had ignored it. Sometimes it’s hard to face reality.

When I started teaching, I prepared lecture notes and then taught from them. Because my lectures deviated from the textbook, I provided students with copies of these lecture notes. The infuriating result was that on my motion, which states that the force of object A on object B in an interaction between two objects is equal in magnitude to the force of B on A—it sometimes is known as “action is reaction.” One day, when the course had progressed to more complicated material, I decided to test my students’ understanding of this concept not by doing traditional problems, but by asking them a set of basic conceptual questions (1, 2). One of the questions, for example, requires students to compare the forces that a heavy truck and a light car exert on one another when they collide. I expected that the students would have no trouble tackling such questions, but much to my surprise, hardly a minute after the test began, one student asked, “How should I answer these questions? According to what you taught me or according to the way I usually think about these things?” To my dismay, students had great difficulty with the conceptual questions. That was when it began to dawn on me that something was amiss.

American RadioWorks

DON’T LECTURE ME

The Problem with Lecturing

BY EMILY MANFORD

Back in the late 1970s a colleague came to David Hestenes with a problem.

The two of them were physics professors at Arizona State University. Hestenes was teaching mostly graduate students, but his colleague was teaching introductory physics, and the students in his classes were not doing well. Semester after semester, the class average on his exams never got above about 40 percent.

“And I noted that the reason for that was that his examination questions were mostly qualitative, requiring understanding of the concepts,” says

"The introductory classes only seem to be really working for about 10 percent of the students. These are the 10 percent who would learn it even without the instructor."

-David Hestenes

http://www.environment.harvard.edu/docs/faculty_pubs/mazur_sciencemag.pdf

http://www.slate.com/articles/life/education/2014/03/powerpoint_in_higher_education_is_ruining_teaching.html