Interactive Lectures

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What are Interactive Lectures?

A lecture where students can be actively learning and engaged in the material being taught.

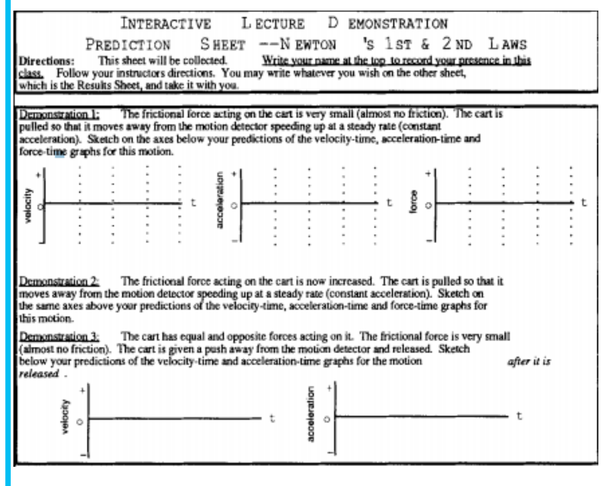
"An interactive lecture is an easy way for instructors to intellectually engage and involve students as active participants in a lecture-based class of any size. Interactive lectures are classes in which the instructor breaks the lecture at least once per class to have students participate in an activity that lets them work directly with the material."

Heather Macdonald, College of William and Mary

Method 1 : Demonstrations

1. The instructor describes the demonstration
2. The students record their individual predictions on a Prediction Sheet. *(Image below on left)*\
3. The students engage in small group discussions with their one or two nearest neighbors.
4. The students record their final predictions on the Prediction Sheet.
5. The instructor carries out the demonstration
6. A few students describe the results and discuss them in the context of the demonstration. Students fill out a Results Sheet, identical to the Prediction Sheet, which they may take with them for further study.
7. The instructor discusses the results and explains key concepts.

David R. Sokoloff and Ronald K. Thornton
Results in bottom left image



INTERACTIVE LECTURE DEMONSTRATION
PREDICTION SHEET --NEWTON 'S 1ST & 2ND LAWS

Directions: This sheet will be collected. Write your name at the top to record your presence in this class. Follow your instructors directions. You may write whatever you wish on the other sheet, which is the Results Sheet, and take it with you.

Demonstration 1: The frictional force acting on the cart is very small (almost no friction). The cart is pulled so that it moves away from the motion detector speeding up at a steady rate (constant acceleration). Sketch on the axes below your predictions of the velocity-time, acceleration-time and force-time graphs for this motion.

velocity acceleration force

Demonstration 2: The frictional force acting on the cart is now increased. The cart is pulled so that it moves away from the motion detector speeding up at a steady rate (constant acceleration). Sketch on the same axes above your predictions of the velocity-time, acceleration-time and force-time graphs for this motion.

Demonstration 3: The cart has equal and opposite forces acting on it. The frictional force is very small (almost no friction). The cart is given a push away from the motion detector and released. Sketch below your predictions of the velocity-time and acceleration-time graphs for the motion *after it is released* .

velocity acceleration

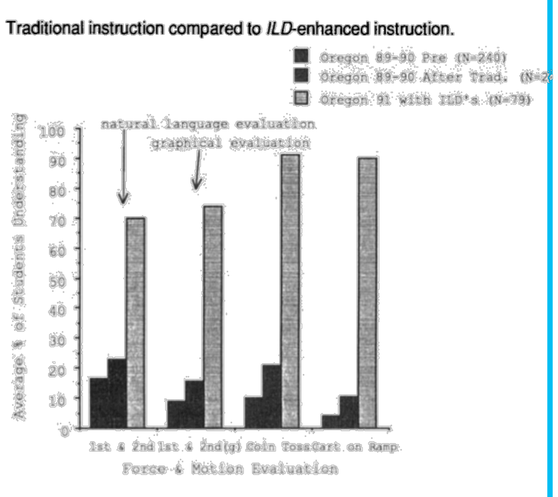


Figure 6. Traditional instruction compared to *ILD*-enhanced instruction.

Method 2: Discussion

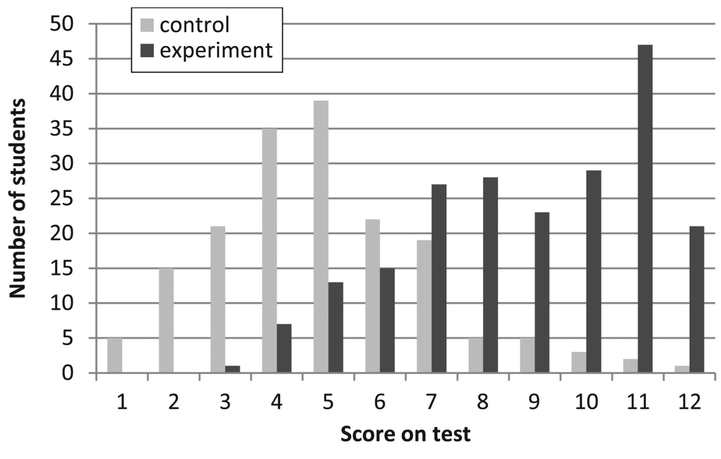
This study was carried out in the second term of the first-year physics sequence taken by all undergraduate engineering students at the University of British Columbia. This calculus-based course covers various standard topics in electricity and magnetism. The course enrollment was 850 students, who were divided among three sections. Each section had 3 hours of lecture per week.

The course included pre-class reading assignments, pre-class reading quizzes, in-class clicker questions with student discussion, small group active learning tasks and targeted in-class feedback

Numeric Results: The average scores were 41 ± 1% in the control section and 74 ± 1% in the experimental section. Students in the experiment did more than twice as well on those in the control section.

Carl Wieman Science Education Initiative and Department of Physics and Astronomy, University of British Columbia, Vancouver, BC, Canada.

Graphical Results



Interactive Lectures aren't perfect

1. If not used properly, content will take longer to get covered
2. Students MUST do the reading. Motivational tactics such as pre-reading quizzes can be used.
3. Not all students participate. Discussion is only useful if the student choice to engage.

Learning Assistants

LAs can be used to help facilitate learning and discussion in interactive lectures. Both methods require groups to work together to solve problems. LAs are taught to encourage this teamwork.

Summary

Interactive Lectures when used properly, help students actively learn the material presented better than a tradition style lecture. Both methods showed conclusive improvements in retention of basic physics concepts.

Professors should consider integrating these method into their current teaching styles.