Flipping & Clicking in the Classroom: Pros & Cons, Applications & Limitations
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Introduction: Experiential Learning

Experiential education is a teaching philosophy in which educators engage with learners in focused activities aimed at increasing knowledge, enhancing understanding, and promoting higher-order thinking skills.

Experiential learning encourages learners to think more as opposed to being spoon-fed information, requiring the embrace of learning as an interactive experience in which much of the responsibility of acquiring knowledge falls on the student engaging in the process: it changes the role of the teacher to being a facilitator of learning as opposed to the provider of information.

Students learn best during social exchanges that allow active interaction with their peers and teachers in activities through which they can continuously assess their knowledge base and understanding of concepts.

How do we produce an interesting and engaging learning experience for our students through which we lecture less while teaching more?

In the 1990s, Harvard University Physics Professor Eric Mazur introduced the experiential “peer instruction” method

- Class begins with posing a question based on previously learned material.

- Students are allowed to reflect on the question, discuss their thinking process with each other, and commit to an answer.

- The instructor presents and reviews student responses with the class, providing explanations as to which answers are correct and incorrect (and why!) before presenting the next concept to the class by way of a short lecture.

- The question → peer-instruction → answer → discussion → lecture” sequence is repeated.

Flipping the Classroom and Experiential Learning

In a “flipped classroom”, the introductory concepts of a given topic are presented to the students before coming to class by using some technological application or tool, most commonly a narrated video presentation that the students must watch and study in advance.

The pre-lecture videos should present the minimum material necessary for effective active engagement in an interactive session amongst students and with the instructor.

This allows the classroom to be transformed into a question and answer “workshop” aimed at expanding beyond the basics and promoting a deeper understanding of the material being studied.

The flipped classroom constitutes a role change for instructors, who give up their front-of-the-class position in favor of a more collaborative and cooperative contribution to the teaching process.

There is a simultaneous change in the role of students from being passive participants in an education process where instruction is served to them to one of having a greater responsibility for their own learning.

The pedagogical basis for the flipped classroom is the use of constant feedback during interactive classroom activities as a method of self-assessment and reinforcement that leads to a deeper understanding of concepts.

The goals are to increase the level of learning during classroom time, enhance motivation, encourage preparation for class, and promote attendance and participation.

The flipped classroom permits more hands-on time with the instructor guiding the students, allowing instructors to assist the students while they are in the process of actively developing new ideas, assimilating information, and applying higher-order thinking skills.

Clickers and Experiential Learning

The use of personal response systems (PRSs, a.k.a. ‘clickers’) in the classroom, flipped or not, promotes a proactive experiential learning process rather than passive instruction by actively engaging students, permitting frequent assessment, and providing immediate visual feedback:

- Instructors can gauge the class’ level of understanding and instantly tailor lectures to fulfill any identified deficiencies

- Students also realize their actual level of understanding once the answers are discussed, allowing for misconceptions to be clarified immediately

- It’s a “win-win” situation for both students and instructors!

Students self-admitted that by making clickers mandatory and part of their final grade led to

- Increased attendance to class and attentiveness
- Increased preparedness
  - more reading
  - more homework
- Increased socialization with peers

Self-Paced Testing: Applications of Clickers

The best method of assessing thorough knowledge and understanding of concepts is via questions that elicit explicit answers in written or oral form, which is a major challenge in large classes where hand-grading exams is time-prohibitive.

Single answer multiple-choice questions are not optimal for evaluating critical and higher-order thinking skills and can ultimately promote guessing and cheating.

The disadvantages of multiple choice exams can be partially circumvented by using clickers for ‘self-paced testing’, where questions of varied types can be asked, including those that stimulate higher-order thinking while minimizing guessing.