

Teaching Flipped Physics 2100

Cal. State LA

Dept. of Physics and Astronomy, and College of Natural
and Social Sciences

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Expectations

After attending the flipped workshop, I had a set of expectations on what would happen teaching a flipped course.

- ▶ Learning curve for instructor who hadn't taught flipped classes
- ▶ Much preparation required for curricular materials
- ▶ Students would not be adjusted to the new method
- ▶ Success in students achieving learning outcomes not guaranteed
- ▶ Confounded with the transition to semesters, the transition to flipped would be even more difficult

Experience

So here were my experiences:

- ▶ Learning curve was not so steep
- ▶ Expectation of high level of preparation was reality, especially if developing your own material
- ▶ Students adjusted after several weeks, especially to the videos. The emphasis on quizzes assured students would comply with keeping up with the course
- ▶ Based on comparing data with the previous Physics 211 courses I taught, the midterm averages were higher
- ▶ With semesters, there is more time to give exams and short quizzes throughout the course of the term than in quarters

Videos

- ▶ Videos are truly essential to the process. If you don't have a video prepared, the students haven't been properly introduced.
- ▶ Videos were placed on YouTube (channel <https://www.youtube.com/channel/UC04jePqkIT28c2vRnxsEkKw>) to ensure compatibility with the wide variety of devices and media players. Unfortunately, the native Moodle player was not very helpful in this regard.
- ▶ Captions are necessary, but require a bit of effort.
- ▶ When quizzes on the videos were introduced, the number of views and the watch time went up.
- ▶ number of views: 1295 (11/9/2016)
- ▶ average view duration: 3-4 minutes

Physics 2100
Cal. State LA
Video #7 : Momentum, Impulse, and Collisions







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In-class assignments

- ▶ We used a workbook to introduce the conceptual points of each new topic
 - ▶ College Physics, A Strategic Approach, 3rd edition
 - ▶ These exercises fall in the academic range between the activities and the types of problems assigned as homework
 - ▶ We used worksheets to introduce problem solving for each topic (chapter)
 - ▶ Most problems independently developed
 - ▶ Some problems adapted from problems in the course text
 - ▶ The solutions were posted online on Moodle

Topics Actually Covered and the Course Proposal

There was a rearrangement of the material covered from a 3-quarter sequence to a 2-semester sequence.

- ▶ The course proposal for 2100 was to cover Mechanics and Thermodynamics
- ▶ Many in the department chose to focus only on Mechanics
- ▶ With the flipped model, it was possible to cover the material more rapidly, and hence cover Thermodynamics as well.

Short Quizzes and Exams

- ▶ Short quizzes on the videos at an intro level are easy for the students, nearly 80% average.
- ▶ Exams (long quizzes) which take place every 3 weeks are challenging for the students, but help in the long run with preparation for the midterm and final.

Unofficial Performance Comparison of Flipped vs Non-Flipped

- ▶ Attendance fluctuated from 65% to 95% throughout the semester.
- ▶ The midterm in Physics 2100 was roughly comparable in coverage of material and difficulty to the final in Physics 211.
- ▶ The final average in 211: 60%
- ▶ The midterm average in 2100: 72%

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