

Active Learning and the ‘Partial Flip’ in Microeconomics: Course Redesign to Improve Persistence & Performance

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Introduction & Motivation

In early 2020, in search of a way to better help those students who, every semester, struggled in Intermediate Microeconomics (with calculus), commonly considered the most difficult course in the economics major, I was planning a move to a fully flipped classroom. I had heard many positive reports about the use of flipped classrooms, primarily in math and physics, and thought that might be the best way forward for this analytically challenging course. At the same time, Wellesley College was focusing on a DEI initiative known as ‘inclusive excellence’ and I expected the flipped classroom to help meet the goals of that initiative as well.

A fully flipped classroom requires students to do the equivalent of attending a lecture during non-class time. They either read a textbook chapter, listen to a lecture, or watch a video of the class material. Class meetings are used for active learning; students do group activities or guided exercises designed to apply the material that they read or heard about prior to class. The teaching technique has gained praise in many venues, but it does require considerable self-discipline on the part of students. As I read the literature in preparation for creating my flipped course, I came across a recent study finding that fully flipped classrooms in economics were not as successful as those in math; further, the positive effects of the teaching technique, even in math, were concentrated among male, white, high-achieving students.¹ Then, as the COVID-19 pandemic drove higher education online for spring and then fall of 2020, I also learned more about delivering asynchronous content and felt it important to heed warnings that full-length recorded lectures are too long for sustained viewing; the standard advice was to keep recorded video content to no more than about 10 minutes in length.



In class: instructor lectures, students take notes
Out of class: students do homework to demonstrate understanding



Before class: students watch or listen to recorded lectures
In class: active learning, applications & practice problems



Before class: students watch recorded information, complete a quiz
In class: 70% lecture, 30% group activities applying material
After class: students do shorter assignments to build mastery

The answer to my growing quandary about whether to stick to my plan to convert to a fully flipped classroom eventually came to me. That answer lies in a hybrid technique that I developed and now call the ‘partial flip.’ This teaching system takes advantage of the benefits of delivering some content asynchronously—freeing up time in class for active learning exercises—while maintaining the benefits of a traditional lecture for material that is analytically or conceptually difficult. (See graphic above.) The ‘partial flip’ of the classroom creates a learning environment that is broadly accessible to students of all backgrounds, all learning styles, and all comfort levels with mathematical analysis.

Designing the Partial Flip: Teaching Goals and Challenges

GOALS

- PERSISTENCE: reduce the number of students who withdraw**
- PERFORMANCE - TYPE 1: decrease the number of final grades below C (C-, D, or F)**
- PERFORMANCE - TYPE 2: raise the average grade earned within each section taught**

CHALLENGES

- Maintain content in a course required for major and serving as a prerequisite for other courses.**
- Identify appropriate material to present on video, for viewing prior to class.**
- Create appropriate support materials to accompany video presentations.**
- Hold students accountable for material presented via pre-class videos.**
- Create and provide relevant active-learning exercises for each class period.**
- Provide as much practice in problem-solving skills as possible during the semester.**
- Utilize universal design components of course design.**

Pre-Class Videos: Support Materials and Student Accountability

Videos and Support Materials

In the ‘partial flip’ course design, approximately 20–30% of the original ‘chalk and talk’ lecture material was recorded in (mostly) 5- to 10-minute chunks. Each lecture has one, two, or three videos for students to watch prior to class. Each video is accompanied by a handout that students can use to take notes and to which additional information is added during the video. The annotated (post-recording) handouts are also available to students. A portion of one such annotated video handout is shown at right.

The start-up cost to create videos, handouts, and quizzes (see below) is high but the materials, once produced, can be used for multiple semesters.

Lecture 23 Pre-Class Quiz
(ECON 201 S23 (Skeath))
Due M 5/1/23 9:00am

Watch the pre-class videos first.
This form is automatically collecting emails from all respondents. [Change settings](#)

1. Which one of the statements below is false? *

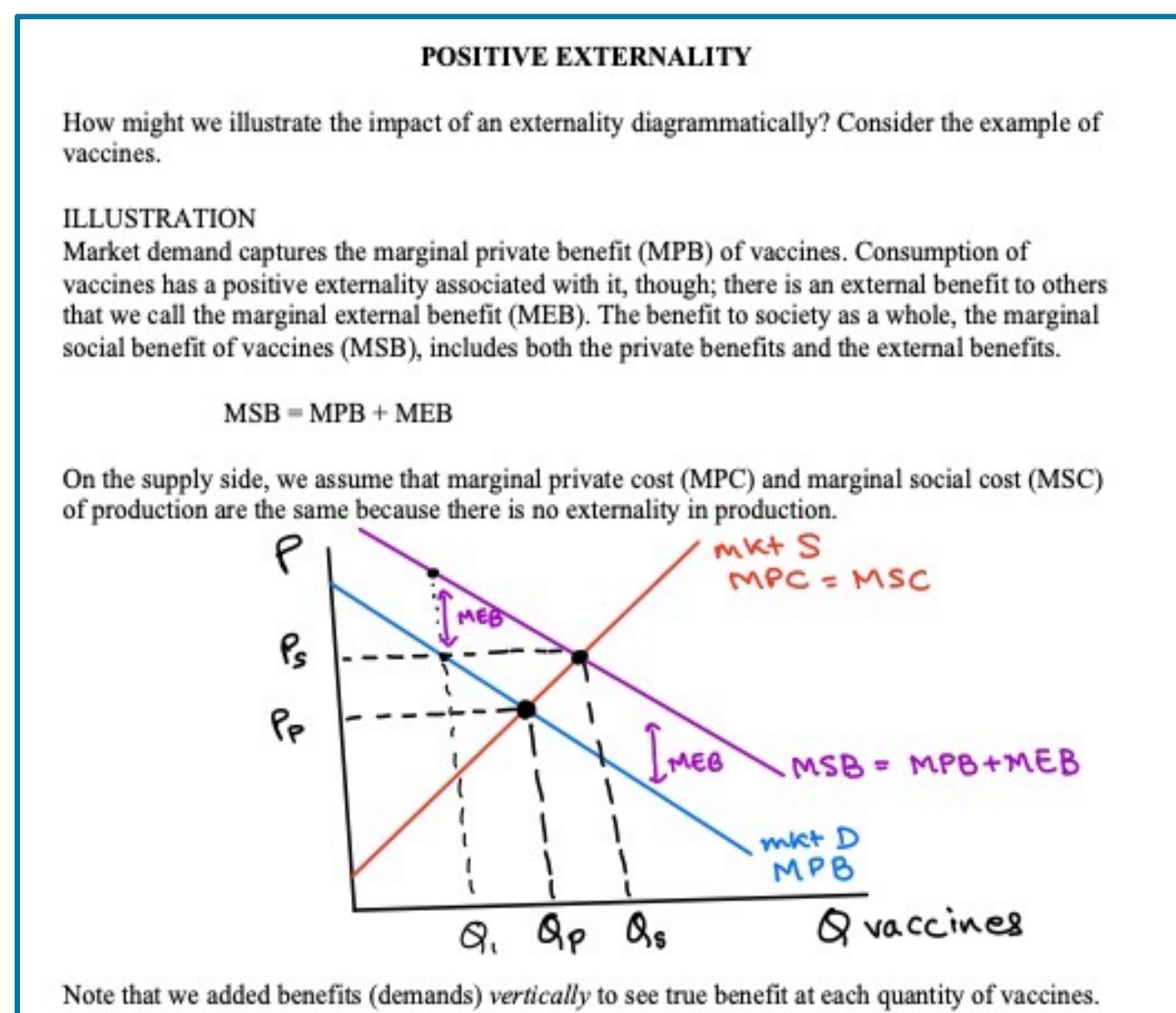
1 point

☐ (a) If you model a negative externality from a particular action as imposing costs on other agents, private costs of the action will be smaller than social costs of the action.

☐ (b) If you model a positive externality from a particular action as reducing costs for other agents, private costs of the action will be smaller than social costs of the action.

☐ (c) If you model a positive externality from a particular action as providing benefits to other agents, then the private benefits of the action will be smaller than the social benefits of the action.

☐ (d) Whenever an externality exists, the private costs or benefits of an action will be different from the social costs or benefits of an action.



Student Accountability: Daily Quizzes

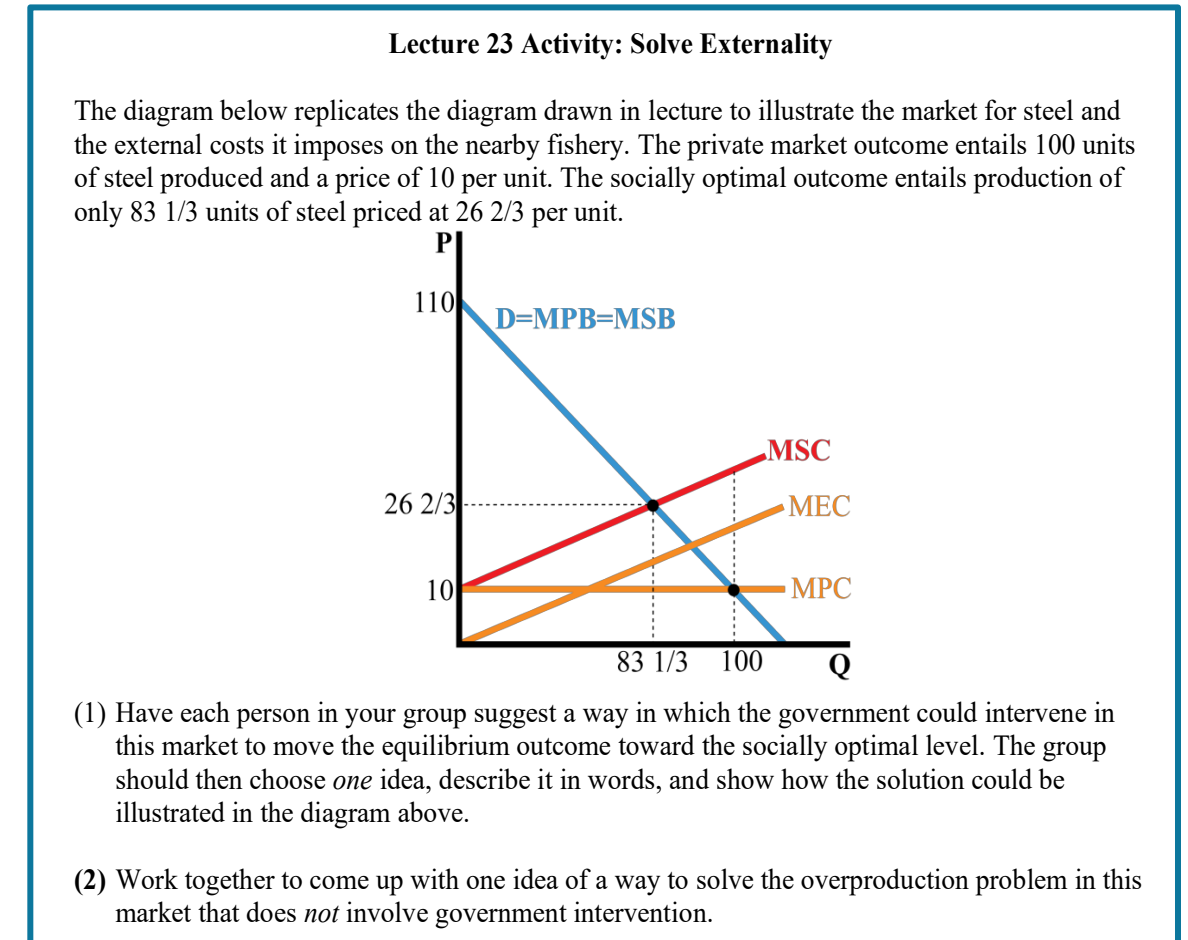
To hold students accountable for the material in the pre-recorded videos, there is a four-question multiple-choice quiz, created in Google Forms, due several hours prior to the start of each lecture meeting. On-time completion of quizzes, not quiz scores, counts toward the final grade (with an allowance for two missed or late quizzes during the semester). Quizzes are graded by Google Forms and include an answer key. Quiz results are reviewed by me prior to class and discussed at the appropriate point in each lecture. Students are given the opportunity to ask questions about the quiz or the videos during class time. A portion of a pre-class quiz is shown at left.

The Student Experience

Students in the ‘partial flip’ version of Intermediate Micro have access to a spreadsheet version of the syllabus (see below) that provides information relevant to each class meeting. There are links to videos, to video handouts, to in-class handouts including active-learning activities (plus answer sheets), to readings, to new, shorter homework assignments and to answer sheets for those (after submission). As part of the universal design approach of the course, blackboards created during class are also posted.

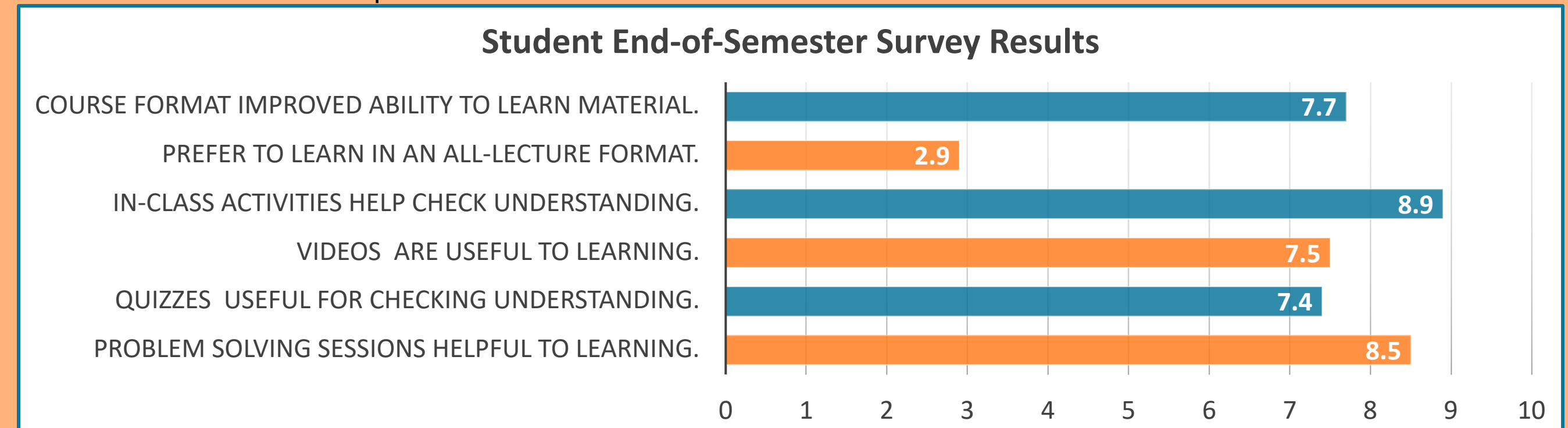
1	Econ 201 Spring 2023 – Lecture & Assignment Schedule				
2	Zoom office hours meeting link				
3	Zoom office hours signup				
4	DATE	TOPIC	DO BEFORE CLASS	IN-CLASS MATERIALS	OTHER MATERIALS
227					
228			Watch Video Part 1 (5 min)	Solving Externalities activity	Annotated Video 1 Handout
229			Use Video Part 1 Handout	Final Exam Review Sheet	Annotated Video 2 Handout
230			Watch Video Part 2 (8 min)		Read ch. 15 (8-13)
231			Use Video Part 2 Handout		Practice Oligopoly Problems
232			Take Quiz		Blackboard
233					
234					
235	W 5/3 (Problems 10)	Problem Solving Session 10		Problem Solving handout	
236	LAST DAY OF CLASS			Problem Solving answer	SUBMIT PAPER!
237					

Prior to each lecture meeting, students watch videos and complete a quiz. During each lecture meeting, 60–70% of the time is lecture on new material, interspersed with review of quiz results, question-and-answer session on the material in the videos, and an active-learning exercise of some sort. An example of a group activity is shown at right. During the third class meeting of each week (previously a ‘study group’ with the course tutor), students participate in ‘problem-solving sessions.’ Students spend the entire period working in assigned groups (different each week) on a packet of practice problems related to the material covered in class (and in videos) over the last week.



STUDENT SURVEY RESULTS

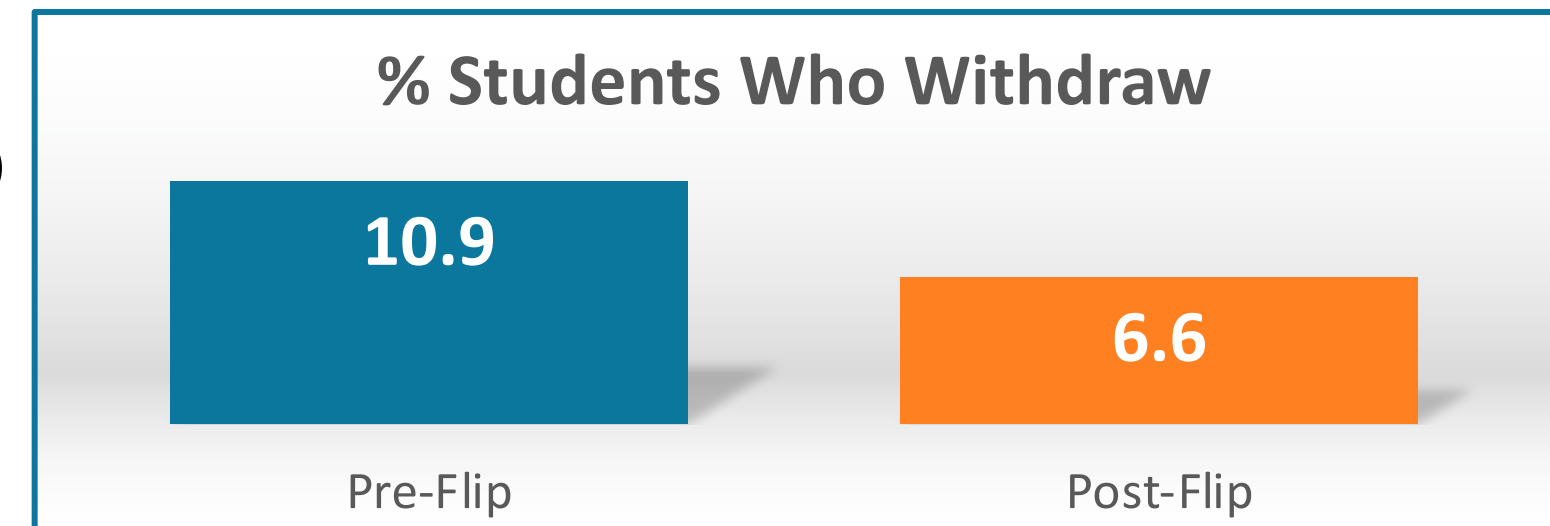
Students in the two most recent ‘partial flip’ sections were asked to rate their experiences in the course on a scale of 1 to 10. (Response rate: 90%.) **Relevant results illustrated below.**



Evidence: Persistence & Performance

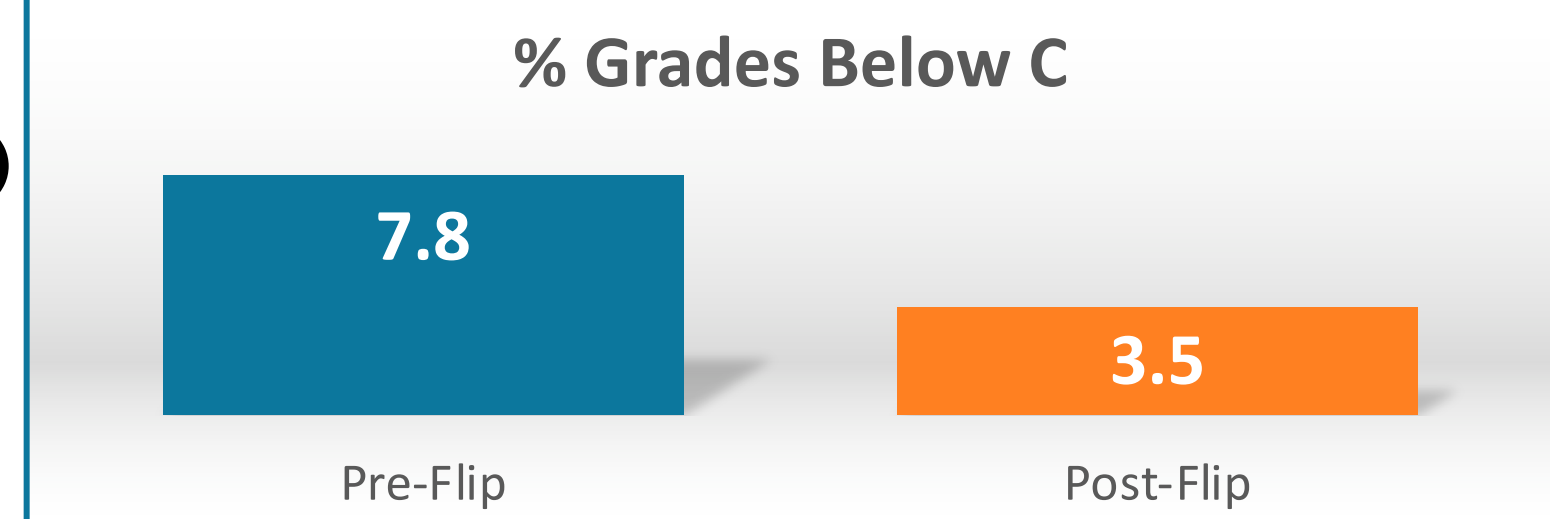
To test the efficacy of the ‘partial flip’ on persistence and performance in my Intermediate Microeconomics course, I use data from a total of 35 sections of the course, 20–25 students per section, taught by me between fall of 2006 and fall of 2023. Of those 35 sections, 29 were taught in standard ‘chalk and talk’ format (fall 2006 through spring 2020); 6 were taught with the ‘partial flip.’ All sections used the same syllabus of topics and virtually identical final exams, although the post-flip exams (both midterms and finals) include additional ‘defend your answer/explanatory questions due to improved abilities in answering such questions across students of all initial skill levels. (In other words, the post-flip exams are probably a little harder than the pre-flip ones were.)

PERSISTENCE (% Who Withdraw)



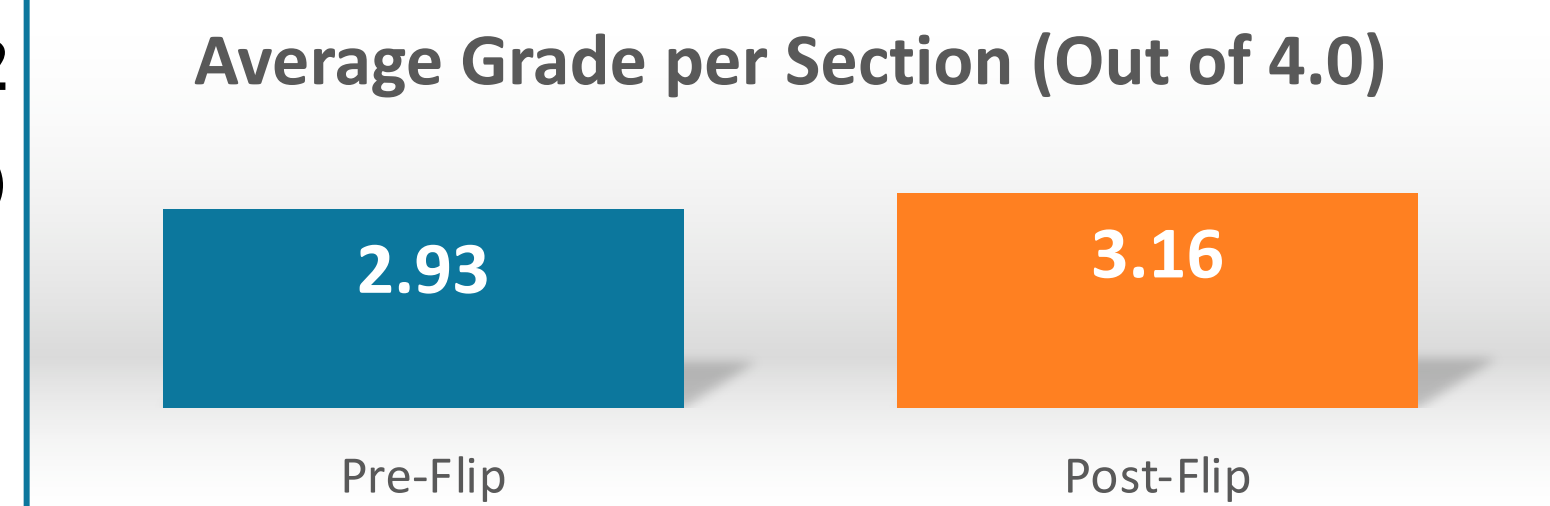
Students in the Post-Flip sections are 4.3 percentage points (39%) less likely to withdraw (or to take a permanent incomplete). (Standard deviation of the Pre-Flip percentage of students who withdraw is 0.059; standard deviation of the Post-Flip sections is 0.055.)

PERFORMANCE – TYPE 1 (Grades Below C)



The percentage of grades below C in the Post-Flip sections fell by 4.3 percentage points (55%). (Standard deviation of the Pre-Flip percentage of grades below C is 0.046; standard deviation of the Post-Flip sections is 0.043.)

PERFORMANCE – TYPE 2 (Average Grade Per Section)



Average grade in the Post-Flip sections increased by 0.23 percentage points (7.8%). (Standard deviation of the Pre-Flip average grade is 0.125; standard deviation of the Post-Flip sections is 0.126. Post-Flip average grade is almost two standard deviations higher than in the Pre-Flip sections.)

Notes & Acknowledgements

ACKNOWLEDGEMENTS

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NOTES

¹Setren, Elizabeth, and Kyle Greenberg, Oliver Moore, and Michael Yankovich. (2020) “Effects of the Flipped Classroom: Evidence from a Randomized Trial.” *Education Finance and Policy* 16(3): 1–54. [DOI: 10.1162/edfp_a_00314]