Panel on Flipped Classrooms

Jesse M. Heines (Moderator)
Univ. of Massachusetts Lowell
Dept. of Computer Science
Lowell, MA 01854
1-978-934-3634
heines@cs.uml.edu

Jeffrey L. Popyack
Drexel University
Dept. of Computer Science
Philadelphia, PA 19104
1-215-895-1846
jpopyack@cs.drexel.edu

Briana Morrison
Southern Polytechnic State Univ.
School of Comp. & Software Eng.
Marietta, GA 30060
1-678-915-4295
bmorriso@spsu.edu

Kate Lockwood
University of St. Thomas
Computer & Information Sciences
St. Paul, MN 55116
1-651-962-5374
aklockwood@stthomas.edu

Doug Baldwin
SUNY Geneseo
Dept. of Mathematics
Geneseo, NY 14454
1-585-245-5659
baldwin@geneseo.edu

SUMMARY

Flipped classrooms are a new twist on an old idea: homework. The basic formula is simple: do the prep work before coming to class and come to class ready to discuss that work, do an activity to reinforce what you learned, or even take a quiz on the reading or research that was assigned. But as with all approaches to teaching, the reality is never that simple.

This panel will report the experiences of four "flippers" and explore the pros and cons of those experiences. Educators who are considering flipping all or part of their courses will gain insight into how to do so to their—and, more importantly, their students'—advantage, while those who have used this technique may gain new insights into approaches that might help them be more successful if they faced any issues similar to those of the panelists.

1. JEFFREY L. POPYACK

Drexel University

We changed the format and delivery of our freshman computer science curriculum from three 1-hour lectures per week to one 80-minute lecture plus one 2-hour, team-oriented lab, with an individual, out-of-class, pre-lab exercise each week. The results were so dramatic that we have now been doing this for a dozen years, and the same format has been applied to our entry level courses for non-majors, as well.

We originally began by replacing one lecture per week with a lab experience in which students worked individually. This showed modest improvement, but we felt teamwork would improve learning and scale better. Sacrificing a second lecture took a lot of faith, but we worked any material not covered in lecture into a lab exercise. We also added a pre-lab exercise for each lab. These pre-lab exercises were designed to be doable without supervision, take students about an hour, and provide a common experience to prepare them for the lab exercises. In essence, we replaced two-thirds of our lecture time with hands-on, interactive exercises that engage students more in learning than simply listening to a lecture.

The benefits of this approach are as follows:

(a) Students are actually doing something and remain engaged rather than passively sitting in and listening to (some portion of) a lecture.

(b) The pre-lab and lab exercises involve reading, but it is embedded directly in the exercises with links to relevant material. Thus, students have an immediate use for what they are reading.

(c) By grouping students with a variety of skill levels, we are coercing (or at least making more likely) that some peer-learning and near-peer learning will occur as part of the exercises.

As a consequence, our students are doing more work than they ever did while complaining less about the workload. Even when the material is something they already know (which is nearly always the case for somebody), they still have to put their knowledge to work. Some students complain that the lectures aren't valuable, saying they learn much more in the labs. I view this as a positive.

2. BRIANA MORRISON

Southern Polytechnic State University

My conversion to a flipped classroom occurred as a last resort. We have a graduate level transition course in introductory programming that covers approximately 1.5 semesters of our undergraduate programming sequence. This course was originally offered in a traditional, twice-a-week, 90-minute lecture format, with both face-to-face and online cohorts. The face-to-face lectures were recorded and the online students could attend the lectures virtually or watch the recordings on their own.

In the fall of 2012, the course was scheduled as a hybrid course. That is, it would have only one 90-minute meeting per week and the remaining material would be available online. After two weeks of attempting to collapse two lectures into one, I quickly reached the conclusion that a flipped classroom was the only

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scenario that made sense. The course has been offered in this hybrid, flipped format ever since.

The fall 2012 semester was a scramble to find and post enough resources to allow students to understand the material while trying to determine how best to spend the 90 minutes of lecture time. I learned a great deal that semester about what worked—and what didn't—in a flipped classroom. That initial semester experience will be discussed during my presentation, including the lessons learned (the hard way).

Since that initial semester I have improved both the online resources as well as my approach to the classroom time. The next two semesters went fairly well (from both the instructor's and students' points of view), and I believed that I had mastered the technique. However, the spring 2014 course offering ended up being *less* successful for various reasons. My presentation will discuss my thoughts why, after two successful semesters, my flipped classroom failed. I will present student success rates for the classes along with student feedback. I will relay the instructor experience through both the ups and downs in an attempt to share this valuable knowledge with the community.

3. KATE LOCKWOOD

University of St. Thomas

Over the last three years I have taught several courses in the programming sequence at California State University, Monterey Bay (CSUMB), using the flipped classroom. I taught introductory C++ flipped using all self-created materials and introductory Python flipped using all found materials. My presentation will discuss the pros and cons of self-created vs. found materials as well as student reaction to the different types of work assigned.

In addition to flipping my own courses, a colleague and I ran a faculty co-op for four semesters during which we helped other instructors from across CSUMB to flip portions of their courses. Last spring we surveyed all faculty at our institution about their experiences with flipping their classrooms.

I'll briefly present some of the highlights from both the survey and the co-op that address a few of the most prevalent faculty concerns when flipping courses. These include:

- student reaction,
- department support, and
- effort required to convert an existing course.

I'll also draw from the survey data to share techniques that address some of these concerns and that have been successfully employed by either my colleagues or myself.

4. DOUG BALDWIN

State University of New York Geneseo

I made my first foray into flipping a classroom in the spring 2014 semester via an introductory programming course for non-majors. I wanted to find out how thoroughly I could move one-to-many communication of basic concepts out of the face-to-face classroom and how completely I could use face-to-face time to mentor students' hands-on active learning. I therefore became an aggressive flipper: I planned the course around the idea that class time would be used for laboratory-style exercises, I insisted that students take ownership of their initial learning through the readings and videos I assigned, and I adopted a strict policy of only lecturing for short times and in response to questions that students asked or ran into during exercises.

My students understood intellectually what I was doing and why it would be good for them, but they were still very resistant in practice. Many seemed to get very little from the out-of-class readings and videos, and no one asked questions publicly in class. As a result, I hardly ever lectured. Nonetheless, by the end of the semester the class as a whole had learned all they were supposed to.

I met many surprises as a first-time flipper and experienced both the pleasure and the pain that others considering flipping a class should expect. Following are some of my observations.

- Classical three-hours-per-week lecturing is a colossal waste of time—it was humbling yet refreshing to see my students learning what I wanted without it.
- Conversely, hands-on activity is an amazingly effective way to learn—it, and the private questions and research it motivated, is where my students learned my course content.
- Flipping a class needn't be an all-or-nothing decision—I have asked students to do readings outside of class and used class time for a mixture of discussions, exercises, and lecture based on those readings for years, but only after the more aggressive flip do I recognize that as part of a spectrum of flipped instruction.
- The instructor in a flipped class plays a vital role in picking topics, readings, and videos, sequencing those things, planning exercises to reinforce them, and above all mentoring students through them, but students don't see that—mine widely felt, with justification from their perspective, that "we had to learn everything on our own."
- Lack of appreciation of the instructor's role in a flipped class surely extends to the general public—educators may need to explain the benefits and costs of flipped instruction not just to students, but to parents, employers, political leaders, and similar stakeholders.

5. ACKNOWLEDGMENTS

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