

## Narrative Reflection, Fall 2019 Benjamin V. Holt

The Fall 2019 term began my second year at Southwestern, and I am so very glad to be here! The 2018-2019 academic year has helped me to both refine and redefine what I do in the classroom. To begin, I gained more experience in using technology to give students the tools they need to be successful in my courses. I also had two professional firsts: I taught online courses for the first time and I tried a fully-flipped classroom for the first time. Both of these endeavors were successful, and I am grateful that Southwestern has given me the opportunity and space to try them out.

For the beginning of this new academic year, I made an attempt to expand upon these successes with some mixed results. In particular, I decided to venture to the deep end of the flipped-classroom pool by flipping two of my classes: MTH 243 (*Probability & Statistics*) and MTH 251 (*Calculus I: Differential Calculus*). In my MTH 243 course, I felt that things worked out well for the most part, but there were some issues I noticed in my MTH 251 course that have caused me to rethink a flipped model for my calculus students.

In the following I shall elaborate more upon my experiences in each of the courses I taught this term by isolating what went well, what I can do to improve, and what the future holds for implementing those changes.

### What Went Well

**MTH 243:** The videos I had created for my online section of MTH 243 in Spring 2019 had the added bonus of being exceedingly useful for flipping my classroom this term. The freedom to leave the expository heavy lifting to the videos really freed me up to do other kinds of class activities. This term I wanted to emphasize data collection and analyzing our own data.

Over the course of the term we did several activities, the most successful of which was having students collect data on campus. Each student gathered specimens of ivy leaves from around the Tioga building and analyzed the ratios of lengths of the longest middle vein to the shortest vein in each leaf. We used this data repeatedly to make histograms and box plots, as well as to better understand measures of center (mean, median, and mode) and measures of spread (quartiles and standard deviation). Whether the activity involved ivy leaves, the heights of the class members, or the amount of spare change in each class member's pocket, I got a very real sense that analyzing data that we actually collected gave students a more visceral feel of the basic tools of descriptive statistics. This is one of the big successes I had this term. The fruit of the flipped model this term was the time we gained to do these in-class data-collection activities.

**MTH 251:** Due to the success I had in Summer 2019, I decided to flip my calculus classroom as well. Students were required to watch a series of videos that were tailored to the open textbook I am using for the MTH 251, 252, and 253 sequence (Openstax Calculus Volumes 1 and 2).

The time that would have otherwise been devoted to lecture was used to work individually with students. In terms of overall student engagement, I believe the model worked well. Students honed their abilities for acquiring knowledge independently while receiving daily, personalized guidance

from me in the material. Moreover, students were able to get a peer perspective by working with each other and solving problems together. The flipped model has allowed me to implement strategies for guided, in-class practice which is an essential component of my teaching philosophy.

**MTH 81:** This term I had the pleasure of teaching a new cohort of culinary students and they were great! On the whole, they were motivated, had a good attitude, and seemed to do well with the course and its materials. Student participation seemed to increase as well. Students in class engaged with the material and some even had a lot of fun when presenting problems in class.

One explanation for this seems to be that the requirements for the course were simpler. In past sections I assigned hands-on projects related to the material (in addition to the abundance of hands-on work culinary students do in the kitchen). However, in my experience, students found the projects unnecessary and demoralizing. Consequently, I decided to pare down the work load by eliminating the project component of the course. I believe this allowed students to focus more on perfecting the most essential skills of the course, and worry less about long-term deadlines (of which they have plenty in other courses). Also, many culinary students already work in the food-service industry, so time is precious for these students.

As for written work, to help keep their writing skill sharp, I still have students turn in one written "Problem of the Week."

**MTH 60:** I will focus on a single student in the course for whom the present department-wide model worked. This student showed up every day, sought help regularly, and was good at communicating their needs. Helping this student, watching them grow, and seeing them move up to the next rung on the academic ladder was very satisfying. This student serves as a model for how these software-based courses should work.

### **Where To Improve**

**MTH 243:** One of the major difficulties I experienced with the flipped model in this class was that viewership of the videos declined steadily as the term progressed. Another problem a student brought up in my evaluations is that they wanted to get away from a setup that required watching videos. This student wanted a traditional format. To summarize, they said that it felt too much like an online course despite the daily work in class and the individual attention from the instructor.

To compensate for the gradual decrease in viewership, I began to give mini-lectures to be supplemented by the videos if students needed the extra guidance. However, we continued to practice and present homework problems in class by working in groups. This model seemed to work fairly well.

If not brief lectures, one possibility for dealing with students not watching the videos is to create a daily quiz or one given on a randomly chosen day each week. This measure, however, feels punitive. If the methodology works well, I believe we should not have to resort to such heavy-handed, disruptive measures. Moreover, it would take up valuable class time and add a substantial amount of extra work having to create the quizzes (which merely check if they have watched the

video or not).

The ad hoc solution of meeting students half way and providing at least some in-class exposition seemed to be a good compromise, and students at least appeared to appreciate the effort. In fact, this set up is similar in many respects to my first attempts at getting away from lecture as the primary means of students assimilating content, the most basic summary of which is to provide a brief lecture, then get students working on the types of problems they will be doing in homework, and finally, to get them presenting those problems.

**MTH 251:** In a manner similar to my MTH 243 course, the majority of students gradually stopped watching the videos before class.

Although the videos were created for the textbook I am using for the sequence (Open Stax Calculus Volumes 1 and 2), students did not find the videos helpful. One particular reason I can point to for their lack of appeal is that I did not create them. Having watched the videos myself, I can personally attest that they were a good resource for acquiring the most basic skills which were essential to making contributions to the class when presenting solutions. Moreover, I would informally quiz them about points made in the videos, and these points seemed to me to be great places for initiating discussions in class. Despite the individual attention received in class, some students felt left on their own to learn the material themselves. This disconnect feels like a major failing on my part.

At the end of the term, I gave an informal, anonymous survey that sought some basic feedback about how they felt about the videos (helpful, neutral, unhelpful), and what their preference would be for the next term (videos before class or in-class class lectures). The majority of students indicated that they would much prefer the expository portion of the course to be in class and in a lecture format.

**MTH 81:** Now that my materials for this course are more well established and tested, I would like to begin revising them. These efforts will include changing or adding examples. I would like to focus on those students for whom the material is difficult. I would like to use the web-design skills that enable me to create dynamic illustrations of for my other courses to find new ways of visualizing how the ideas of units, unit conversions, yield percents and percentages work in a concrete way.

**MTH 60:** For the Fall 2019 term, MTH 60 was the course in which I had the least success. I tried a couple of things that other instructors said had been somewhat successful. One was giving handouts which would help students stay on track with the course. Speaking somewhat generally, students at this level often have difficulty managing their time well, so this seemed like a good idea. The software did not do a good job in this regard. I also tried a weekly progress report which I went over with each student individually. This report was to help them understand exactly where they stood in the course and what they needed to do in order to maintain satisfactory progress.

In line with the above measures, it seems to me that the main difficulty with the setup of this course is that students have too much freedom to put off the work. Most students at this level are not able to handle the responsibility that comes with the flexibility this course affords. (This is very much in line with the experience I had in my Spring 2019 section of MTH 81.) A common

pattern that I noticed is that students put off doing the work and then realize it is impossible to catch up only after it is too late. Consequently, students give up.

Despite my best efforts to be their advocate and to help and guide students in their efforts to learn, they rarely sought my help. Although I thought that I had made it quite clear that I am there to help, perhaps I did not do enough to demonstrate this. It simply seemed to me that students did not want my help. Moreover, by the fourth week of classes, most students were not showing up to the course. It is my opinion that many thought they would do fine by simply doing the work at home without any guidance in the material or the course structure. They tended to view this course as an online course, which it is not; it requires daily engagement with the material and seeking individual help when needed. It seems that successfully teaching this course requires convincing students of this. This is something that I believe I could have done a better job with.

For the future I need to think more deeply and thoroughly about how to get students into their seats, to do their work, and to learn how to recognize when and where they need to seek help.

### **What Lies Ahead**

**MTH 243:** The next time I teach MTH 243, I will likely not flip the class entirely. I will try the model which is very much in line with what I have done in the past which is to provide brief exposition in class so that we can spend the rest of the time practicing with the instructor available for guidance. Instead of the extra time burden of having to watch a video (in addition to the usual homework), students who need more guidance may consult the video outside of class. (This will also work well for students who had to miss class and want to know what they missed.)

**MTH 251:** For the next course in the calculus sequence, MTH 252, as well as the next time I teach MTH 251, I will likely opt for a more traditional lecture-based model as I hone my ability to work with a flipped classroom model in my other courses. This is due to both popular sentiment, and the new-found belief that video resources are best created by the instructor who is teaching the course.

This is not to say that I will be abandoning the active component which is vital to all of the courses I teach; students will still be working problems and presenting them in class. In a manner similar my MTH 243 class described above, I intend to follow a brief-exposition, immediate-practice model.

As can be said for all levels, calculus being no exception, the time to strike is when the iron is hot. That is to say that the time to practice the material is when it is fresh in students' minds. For this particular group, presenting the material in class would have been a better fit than the videos we used. The next time I teach this course, I will try using videos more as a supplement than an expository staple, and as my lecture notes and slides do become more developed, I would like to create videos to accompany them. Additionally, I would not be opposed to trying a flipped model again. For the moment, however, the time is not right for me to flip the calculus classroom. When I do try the flipped model again for our calculus sequence, I will likely not use videos created by other instructors, even if they are tailored to whatever resource we might be using.

**MTH 60:** As mentioned above, the next time I teach the software-based incarnation of this course, my focus will be on communicating better with students about what it means to be successful and paint a better picture of the successful student. I will double my efforts to be more than clear about course workload, and to be more vigilant in helping them understand fully what is expected of them.

In terms of the more distant future, we have decided to discard the present software-based model in favor of a more traditional, face-to-face model. Personally, I will be glad to return to refining and improving methods that have been largely successful in the past in teaching developmental-level mathematics. These methods involve some in-class exposition, as well as a healthy dose of a built-in active learning component involving peer and instructor interaction.

## **Conclusions**

Flipping the classroom has been overall a good experience. Although the success I had in the Fall 2019 was not as resounding as it was for Summer 2019, I still feel I gained much from the experience. For starters, I now know from firsthand experience some of the pitfalls that can arise in this setting. In particular, I experienced for myself the “video fatigue” that can set in with students.

For the most part, the flipped methodology worked well in my MTH 243 course. On the other hand, although I thought students got more out of actively learning the material, my calculus students were not keen on the flipped model. They felt somewhat abandoned and wanted more lecture-based guidance.

I intend to continue experimenting with flipping the classroom, and after this term I am more inclined to do so with lecture-based components stitched in. I also intend to create videos for all my lectures once all of my materials are complete.

Flipping the classroom has given me a new perspective as I watch students grow in their knowledge of mathematics at all levels. Letting students take helm has enabled me impart a deeper sense of both the utility and beauty of mathematics.