My Experiment with the Flipped Classroom Model

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What is flipping? The flipped classroom?

If you've heard these terms but aren't *exactly* sure what they mean, you're not alone. There are many variations on the theme, but the teaching model for which the term was coined is attributed to two high school chemistry teachers from Colorado, Jonathan Bergmann & Aaron Sams. In 2007, Bergmann and Sams began recording video lectures so that student athletes who missed class because of travel to athletic competitions could receive the course content. Students then asked questions in person or via email about the videos. The students loved the videos—even those that hadn't missed class. In fact, because the videos were publicly posted on YouTube, Bergmann and Sams began hearing from students and teachers from all over the world that the videos were helpful for them in learning and teaching chemistry concepts. Ultimately, they decided to adopt the videos as an initial content delivery method across the board (Bergmann & Sams, 2012).

Another significant player in the flipped movement is the Khan Academy. In 2004, Salman Khan, a hedge fund analyst, began tutoring his cousin on math concepts via video chat. Other relatives sought his help, so he created a YouTube account to distribute his videos. These learning videos gained in popularity and in 2009, Khan began focusing solely on the development of the Khan Academy. Its website at khanacademy.org now houses over 3000 videos, has received over $16.5 million in donor support (Noer, 2012) and Sal Khan has been featured in the popular press, such as on *60 Minutes*.

Other terms that have been used to refer to the flipped classroom model are reverse teaching or the inverted classroom (Bruff, 2012). Also note that video is not a required component; course content can be delivered in a variety of ways.

So is this really a new concept? Many professors use teaching methods that require students to read textbooks ahead of time and then hold a class discussion. Many law schools use the Socratic method of questioning, where students learn the material ahead of time and are required to be able to explain concepts to the rest of the class when called upon. In film studies classes and literature classes, students view the film or read the book before class and come prepared to interpret themes and imagery. Many teachers, professors, and librarians are diligent in combining lecture with active learning exercises to reinforce important concepts instead of simply lecturing to students. The ease of using video has brought "flipping" to the forefront at this time, but good teachers have long used similar methods to achieve the same ends.

The Flipped Classroom Model in Higher Ed

At the Distance Teaching & Learning Conference in Madison, Wisconsin in August 2012, I attended a presentation by Bethany Stone on her experiments with the flipped classroom model. Stone has experimented with flipping two classes: a Genetic Diseases course with 30 enrolled students and a General Biology course with 443 enrolled students. Stone compared students in the previous, "control group" semesters to students in the flipped classroom semester and found that students in the flipped classroom attended class more frequently, scored higher on exams, and most responded positively to the flipped classroom format in a survey.

Professor Stone noted that in the traditional lecture model did have its advantages, such as that the students pick up some course content even while passive, and in the flipped model they may not complete pre-class work and may not come to class ready to work. Overall though, Stone noted several benefits to the instructor with the flipped model, which include more engaged students, increased student-student and faculty-student interaction, and increased feedback on student learning in the classroom. For her, the flipped classroom model led to increased professional satisfaction.

My Experience with Flipping

After hearing about the flipped classroom idea from various sources, I decided to experiment with flipping a one-credit information literacy course section I taught during the fall semester of 2012. To place this in context, IU South Bend's General Education program includes a required one-credit information literacy course called Q110: Introduction to Information Literacy, as part of what are called the Fundamental Literacies. The course is offered either face-to-face or online, and IU South Bend offers over 50 sections of the course a year.

Q110 is a combination of theoretical concepts and practice-based activities, and students learn about information-seeking behavior, search strategies, selection and evaluation of resources; and over the course of a semester, create a research question and compile an annotated bibliography of sources on their topic. I teach both face-to-face and online versions of the course, and often use active learning exercises in the face-to-face classroom to engage the students. The online version of the course uses Libguides to deliver the course content, so online course modules that include text, graphics, and video were readily available. It was relatively easy, then, to decide that I could try having face-to-face students work through the online course modules ahead of class time and then use the in-class time (50 minutes once a week throughout the semester) to participate in activities that would reinforce their learning and allow for more interaction and activity in the classroom.

I started my flipped classroom experiment in week seven of the course - halfway through the semester. The idea has been percolating for a few months, but ways to make it work in my class only became evident to me at midterm. My class had 19 students enrolled at that time. After this initial session, I asked the students if they wanted to continue 'flipping' for the remainder of the semester and they said yes.

During some of the weeks that followed, I had classroom

exercises that we completed during class time, and in other weeks I would ask the students to begin their homework in class so that I was available for them to ask questions about the assignment.

I administered a survey via SurveyMonkey after week ten, or after four weeks of the experiment were completed. I wanted to do it before the course's end, to make sure we were on the right path. The survey consisted of six attitudinal questions and three open-ended response questions that sought input from the students.

Discussion of Results

While there were only eight responses (out of 19 students) and thus the results are not statistically significant, the fall survey information was useful as a formative assessment to help shape the rest of the fall 2012 semester and helped to shape my teaching of the class for the spring semester of 2013. During the spring semester, where I started flipping the course at the beginning of the term, I administered the same survey during week ten, and received 14 responses out of 23 students.

Responses for both semesters (see Figure 1) show that students were generally positive overall about the flipped classroom, believed that it helped them to understand the content, and that the course modules were helpful to them in this context. In terms of learning, the results were a bit more mixed. Students were evenly split on the question of whether or not they learned more from the flipped method as opposed to more traditional in-class lecture and discussion methods only, and there were as many neutral or negative responses as positive responses on whether or not they preferred learning about library research and resources this way or not. One interpretation of this is that students could not easily compare methods in order to answer the question in the spring semester course, but in the fall semester, students had experienced both teaching methods. Another interpretation might be that many students feel that they can learn effectively regardless of the approach, as long as it's well-structured and delivered. So even though the students generally liked flipping, if they have had a generally good experience with the traditional format, they might not say flipping is "easier" (or harder, for that matter) or causes them to learn "more than I would have".

The open-response questions help to explain some of the rankings and some of the confusion that arose during the semester in terms of student preparation and student homework. Most of the confusion relates to what is due when (before class, during class, or homework due the next week), and I continue to work on clarifying that. Many issues listed in the comments related to organizational issues such as turning in coursework via email or in the course management system, and about use of the course management system itself, such as open forums or assignment arrangement. My interpretation of this is that the flipping model itself is not the issue, but details of organization and clarification continue to be an area in which to improve.

What I've Learned

Experimenting is a good quality in a teacher, but perhaps starting mid-way through the fall semester for my first go-round wasn't the best idea. Some of the students anecdotally liked the flipped classroom method, but the survey shows that they were a bit confused. Part of that confusion arose because I would sometimes have them start their homework during class and then some of them forgot to go back and finish it. Also, as Professor Stone noted in her results and as also happened to me, students don't always complete the pre-class work, which can make the in-class follow-up to that work difficult. Additionally, some students noted that they would prefer to receive the course content in class, for various reasons such as being uncomfortable having to first "read about something I really don't know about" and then (seemingly) wait to ask any questions until they come to school to do their classroom 'homework'; some prefer to be first shown "in real life" an instructor-led lecture, which gives an overview of the content with an opportunity for immediate, in-person questions. A student may feel that she is "on my own" when initially working through the "flipped" online learning module, even if a professor is online and available via text or chat. This uncertainty/dislocation may require better framing and preparation for the students on how the process works and/or may improve as students simply get used to the flipped process.

Following the survey in week ten, for the remaining four weeks of the fall semester, I made sure to separate what was in-class work and what was homework (which is now reduced) to add clarity for the students. For the spring 2013 semester, I began the course with a thorough explanation of the flipped classroom model, including clarification on what constituted pre-class work, in-class work and homework, and how that would play out in terms of time on task. In order to ensure that students viewed the course modules ahead of time, I assigned points for materials brought to class or submitted ahead of time, for discussion questions posted in our course management system, and for small quizzes on course content.

As proponents of the flipped classroom model have noted, I found that I enjoyed teaching with this model more than teaching with the traditional lecture/active learning exercise/discussion model. Class is a LOT more fun when more students are actively engaged the whole time. In addition, it has greatly informed my understanding of how students think about research because I can see where students are having trouble with the concepts more easily and immediately.

One downside to the flipped model is that preparation for class is more time-consuming. I have to make pedagogical choices about what is important for pre-class activities, in-class activities and homework, which requires careful thought and planning. In addition, I found that it was sometimes hard for me to handle ~20 students' questions, as a coach, in a 50-minute class period. When the students were actively engaged in their research, I was actively engaged in helping them! These are good problems to have, though, and during the spring semester I included more group work to ease the second problem. The students are correct in that 50 minutes is not long enough, but that is a different and more long-term, structural issue to work on.

(Flipped...Continued on page 10)

(*TechMatters...Continued from page 7*)

A Few Caveats

Of course, as useful as these tools are they do have a few notable limitations of which you should be aware. First, as you might expect, the "text view" functionality of these tools does not work with PDF files. That being said, all three tools do allow saving of PDF files to a reading list, providing links back to the original file when you choose to view that article again.

In addition, these tools also have a tendency to be inconsistent in their ability to accurately distinguish between images that are part of an article's core content, and those that are ancillary. In such cases, they seem to err on the side of removing images so you may need to check closely in cases where you feel that maintaining access to the embedded graphics (such as a chart or table included by the author) are key to understanding the content of an article.

Finally, these tools do not work in a predictable or reliable manner with articles from library databases. In some cases, the database security features seem to block the ability to view saved articles, whereas in other cases they work just fine. Overall, trial and error seems to be the only way to determine the extent to which these latter two categories of articles can be successfully saved and viewed again at a later date.

In Conclusion

Although differing slightly with respect to features and functionality, Pocket, Readability, and Instapaper are all very capable tools for tracking and managing your online reading lists. After using these tools yourself, you may even find that you want to introduce them to your students who can use them when they do their research to save interesting articles that are tangential to their research but that they want to return to at a later date. But more likely, these tools will be used not by students but by voracious readers of all types of popular and professional web material—a description that fits many librarians.

In the end, the choice of which to use will really depend upon personal preference. Luckily, you really can't go wrong since whichever tool you choose you will find yourself successfully saving and tagging in no time at all. At that point, the only problem may be finding time to actually read all of the interesting and intriguing articles that you add to your lists!

(*Flipped...Continued from page 9*)

Conclusion

Even if the flipped classroom model isn't entirely new, it has focused renewed attention on the importance of careful pedagogy and on finding the best ways to improve student learning. Students in this multimedia age are comfortable with using technology to learn on their own. It follows, then, that we can harness technology to make classroom time more engaging and to enhance student learning by being able to focus more on the individual student and their research needs when we are with them in person.

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Figure 1: Survey results for both classes

Flipped Classroom Survey Results
8 responses fall semester/14 responses spring semester

1. The flipped class style makes it easier to understand the course content.

	Agree	Neither Agree nor Disagree	Disagree
Fall semester	62.5% (5)	25.0% (2)	12.5% (1)
Spring semester	42.9% (6)	42.9% (6)	14.3% (2)

2. The flipped approach has helped me learn more than I would have if we had used in-class lecture and discussion methods only.

	Agree	Neither Agree nor Disagree	Disagree
Fall semester	37.5% (3)	25.0% (2)	37.5% (3)
Spring semester	28.6% (4)	42.9% (6)	28.6% (4)

3. The course modules are beneficial in preparing for class.

	Agree	Neither Agree nor Disagree	Disagree
Fall semester	62.5% (5)	37.5% (3)	0.0% (0)
Spring semester	71.4% (10)	7.1% (1)	21.4% (3)

4. The in-class work has helped me to learn the course content.

	Agree	Neither Agree nor Disagree	Disagree
Fall semester	75.0% (6)	12.5% (1)	12.5% (1)
Spring semester	78.6% (11)	14.3% (2)	7.1% (1)

See the entire survey (pdf) at **http://bit.ly/1319FWj**