IDEA PAPER #57

# The Flipped Classroom

*Anne M. Braseby • University of Texas, Austin*

**Abstract**

Use of the word "flipped" has become the latest buzzword in the educational world. This paper explores the different uses of the term "flipped," examines the research to date, and discusses how and why teachers are starting to use the new model. It offers suggestions for activities both inside and outside of the classroom to encourage deeper learning and greater conceptual understanding.

A perfect storm of technological advances in the information age, brain research on learning, and the necessity for critical thinking in most career paths have spawned a new epistemological model for teachers in higher education: the "flipped classroom." The concept was inspired by teachers Jonathan Bergman and Aaron Sams who developed "reversed instruction" by offering PowerPoint presentations online for students who had missed class (http://www.flippedlearning.org). The concept has since morphed into a pedagogical tool that "flips" the role of the teacher from "the sage on stage" to "guide on the side" (King, 1993).

For many teachers this is not a new model but a label for a methodology they have used for years. However, the term has become ubiquitous recently in the media, journals, and educational books. If you Google "flipped classroom" there are over 5 million hits, and if you search for "flipped class" on Amazon there are over 180 books associated with the term. Although "flipped classroom" is the latest buzzword, there are many ways to interpret how the flip can be implemented.

## What is the Flipped Classroom?

There is no such thing as THE flipped classroom (Bergman & Sams, 2012). As with any new idea, there are advocates and naysayers writing in blogs, websites, books, and educational journals describing the flipped classroom in many ways, such as delivering instruction via YouTube channels (Walthausen, 2013); replacing the learning paradigm with the instructional paradigm (Wallace, Walker, Braseby, & Sweet, 2014); the "CliffsNotesfication" of college courses (Bogost, 2013); and "setting the stage, not being on it" (Restad, 2013). Differences of opinion (and misconceptions) abound concerning definitions of the flipped classroom.

Educause, an organization of community leaders who focus on knowledge creation to support the transformative role IT plays in higher education, describes the flipped classroom as "a pedagogical model in which the typical lecture and homework elements of a course are reversed." The video lecture is often seen as the key ingredient in the flipped approach (http://www.educause.edu/library/resources/7-things-you-should-know-about-flipped-classrooms). Stephen Neshyba (2013) goes so far as to state that flipping is a "teaching technique that involves abandoning the traditional lecture (or just not relying on it so much) and replacing it with interactive approaches that experiment with technology and require students to gather information outside of class and be prepared to engage the material in class."

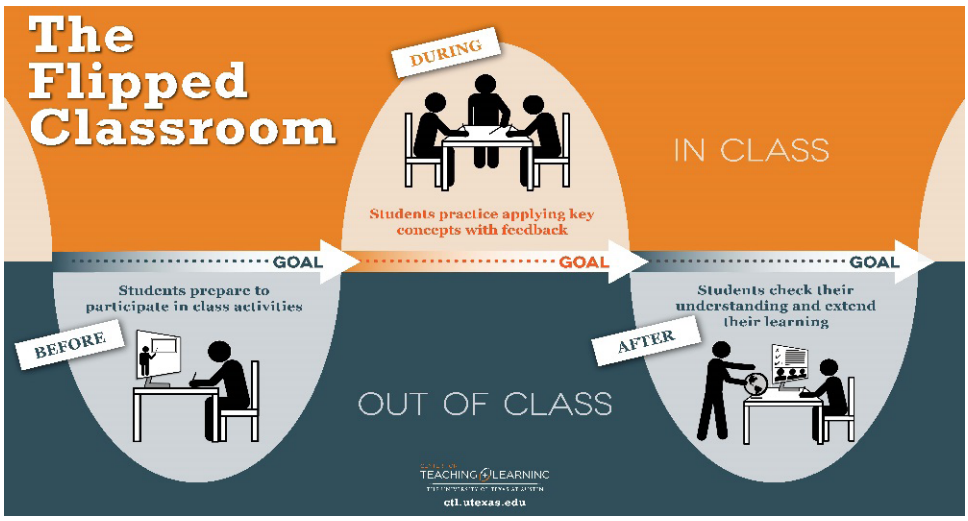
The Center for Teaching and Learning at the University of Texas-Austin has developed a visual of the flipped classroom (see **Figure 1**, following page) that includes acquiring knowledge outside of the classroom, applying key concepts in class, and then checking understanding and extending learning at home (http://ctl.utexas.edu/sites/default/files/flippedgraphic(web1100px)_0.png).

For those who want the elevator speech, Julie Schell succinctly describes "What is a flipped classroom in 60 seconds" (http://blog.peerinstruction.net/2013/04/22/what-is-a-flipped-classroom-in-60-seconds/).

A synthesis of many of the definitions of the flipped class reveals that the basic premise of them all is:

- content acquisition, normally done in a lecture in the classroom, is acquired before class
- time in the classroom is then used for the teacher to work with the students on higher-level cognitive skills.

**Figure 1** • In class and out of class activites.




Members of the Flipped Learning Network (FLN), created by educators including Aaron Sams and Jon Bergmann, have expressed concern about the misconceptions around the term "flipped classroom." The FLN's governing board and key leaders in the network now distinguish between a "Flipped Classroom" and "Flipped Learning" and assert they are not interchangeable. When flipping is simplistically defined as "school work at home and home work at school," it is not necessarily embracing the pedagogical approach originally intended. FLN has established four pillars of F-L-I-P (Flexible learning environment, Learning culture, Intentional content, and Professional educator) along with 11 indicators which members assert teachers must incorporate to be engaging in "flipped learning" (www.flippedlearning.org). The definition itself is not as important as the concept of the flipped classroom and the reason *why* you are engaging in flipped learning in your class.

## Why Flip Your Class?

When one examines the traditional model of higher education teaching styles, the pervading perception is that students sit passively in the classroom (particularly in today's very large theater-seating classes) listening to the professor imparting expert knowledge (Bass, 2012). After the lecture, the students generally work at home, individually grappling with the application of the concepts learned in the classroom. This model tends to rely on students accessing knowledge from the professor and processing that information through assignments with little support from the professor or peers. The lower-order skills are expected when the professor is present, the higher-order ones when the professor is not there to help. Described in this way, the traditional model does not seem the most logical way to prepare our students for the workplace that requires higher-order thinking.

Before the emergence of the technological age, this was the most logical model. Books were expensive and not always readily available, communication outside of the classroom was difficult, and knowledge recall was an important skill for many employers. The flipped model has emerged because (a) the technological revolution challenged the traditional role of the professor as the sagacious purveyor of knowledge, (b) the Internet enabled rapid and easy communication of information, and (c) employers required critical thinkers and collaborative team players in the workforce.

The technological revolution is changing the traditional role of the college professor. Since the time universities were first established, college professors have been considered the content experts who are the access point of knowledge. Now knowledge is being created at a much faster rate and can be accessed by almost anyone at the press of a button. It can be shared with millions of people who can question, affirm, refute, or challenge that knowledge. Today's college students can access an exponentially increasing amount of unobstructed information that in previous centuries was monitored by editors and academics and available only from bookstores, libraries, or the college professor. Not only can information be accessed more readily but also in real time, reducing or eliminating the need for editors and publishers.

This virtually unlimited amount of information changes the role of the college professor in the classroom from knowledge transmitter to knowledge enabler. The college teacher is still the domain expert, but the value of expertise now resides in showing students how to find and evaluate information and how and when to use it appropriately within their discipline. In many ways, instructors' expertise is underutilized if they are *only* the imparter of knowledge.

Considering the relatively short amount of time students are in the classroom, professors bemoan the fact that they do not have enough time to teach students more than content. The flipped classroom is designed for information to be acquired from videoed lectures, premade simulations or presentations, or any other informative media chosen by the professor (the content expert). There are advantages when

the students gather content outside of the classroom. In a traditional lecture, students sit and take notes, trying to capture what the teacher is saying. They can miss significant points and rarely have time to reflect on or understand the links between concepts. Pre-recorded media at home give the students more control over their own learning. They can acquire the relevant information when and where they want, watch it as many times as they want, or even fast forward through it if they feel they know the concept. Students with accommodations and ESOL students especially appreciate the extra viewing time, which enables them to synthesize the information at their own pace. One student who was involved in a flipped class at Southwestern University commented, "I like this because when you're listening to the lecture at home and you don't get something, you can rewind and replay it as many times as you need to" (Mangan, 2013, B18).

There is a relationship between how faculty teach and how students learn. When faculty teach in traditional teacher-centered ways, students tend to adopt surface learning strategies (Hughes & Mighty, 2010). The archetypal professor lecturing at the front of the classroom sets up students to think of information as something that has to be "given" to them from an expert rather than acquired independently. In an interview in the *Harvard Business Review* (Beard, 2014, p. 124), Salman Khan advises students:

> The one meta-level thing is to take agency over your own learning. In the traditional academic model you're passive. You sit in a chair and the teacher tries to project knowledge at you; some of it sticks, some of it doesn't. That's not an effective way to learn. Worse it creates a mindset of 'you need to teach me' so when you are on your own you think 'I can't learn.'

Most would agree that effective teaching requires students to not only acquire knowledge but to also apply it by using higher-order critical thinking skills. In a 2010 study by Hart Research Associates, employers requested more emphasis on effective oral and written skills (89 percent), critical thinking/analytical thinking (81 percent), knowledge skills applied to the real world (79 percent), analyzing/solving complex problems (75 percent), and teamwork skills/ability to collaborate (71 percent). Recent research suggests that these skills are best learned when the teacher and a group of peers are present to help consolidate learning and give feedback, i.e. inside, not outside the classroom (Lee & Smagorinsky, 2000; Chiu, 2004, 2008; Darling-Hammond et. al, 2008; Johnson, Johnson, & Holubec, 2008; Johnson & Johnson, 2009).

If we want real, deeper learning in our classes, we have to give students tools to collect and assess information and experiences to help them become reflective learners and digest the information to produce knowledge. In their acclaimed book, *How Learning Works*, Susan Ambrose and colleagues define learning as a process. "Learning is not something done to students but rather something students themselves do. Learning is a direct result of how students interpret and respond to experiences" (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010, p. 3). The more ways students engage with the information, the stronger the connections in the brain become and the more likely the new learning will become a more permanent memory (Doyle & Zakrajsek, 2013). Based on works of Dewey (1910), Piaget and Inhelder (1969), and Vygotsky (1978), constructivist-learning theories posit that knowledge is not transmitted intact from the professor (or books or videos) to the students' brains. Students construct knowledge by connecting new information to previous knowledge and experiences (Doyle & Zakrajsek, 2013). Giving students experiences that set up connections between concepts and give them retrieval practice is a potent learning strategy (Svinicki, 2014).

For many instructors there is always the intention to get students to discuss, explain, and apply the knowledge they are acquiring. However, face-to-face time is too frequently used to disseminate knowledge that in the last century would have been difficult for students to access in any other way. With the accessibility of Learning Management Systems, YouTube, journals on line, video capture programs, and all the other software and Internet resources, the instructor can now present information (perhaps even more effectively) outside the classroom. Flipping the classroom allows students to be at the center of the process of learning during class time, actively interacting with each other by discussing ideas and applying the information to construct meaning for themselves while the instructor is present to guide the process.

## Does It Work?

The flipped classroom concept is a relatively recent topic for study; therefore, research is still in its very early stages. The flipped classroom does not in itself assure quality learning; however, changing to a flipped methodology increases the likelihood of active learning in the classroom. Active learning increases student achievement (Prince, 2004; Michael, 2006; Freeman et al., 2007; Berry, 2008; Doyle, 2008) and is associated with increased student enjoyment and engagement (Knight & Wood, 2005; Michael, 2006; Freeman et al., 2007).

Research findings are inconclusive as to the effect of the flipped classroom on student learning. One three-year study funded by the National Science Foundation (NSF) (that was still in progress at the time this paper was written in 2014) found few or no gains when comparing traditional classes to the newly designed flipped classes. One of the investigators, Nancy Lape, reported (in USA Today, October 23, 2013) preliminary findings that no statistical difference in student learning had been found in their study. Lape and three other Harvey Mudd College professors studied how the flipped classroom benefits students in their engineering, math, and chemistry classes. They used a variety of measures to investigate students' learning outcomes, metacognitive skills, and attitudes. At the time this paper was written, no results

had been published for the skills and attitudes section of the study.

However, evidence, particularly in the STEM subjects, is emerging to support student learning in higher education flipped classrooms. Pierce and Fox (2012) flipped their renal pharmacotherapy class by using podcasts and inquiry learning during class. They found a statistically significant improvement on the final exam questions. In addition, an instructor flipped one section of a general chemistry class at Purdue University, and students performed better on an American Chemical Society exam than a section taught using traditional approaches (Arnaud, 2013). Some studies have examined other factors than just student achievement. Ferreri and O'Connor (2013) compared pre and post course design data in their pharmacy course. They found students in the flipped classroom were able to solve unfamiliar problems and work well as a team. Furse (2011) found in her flipped electrical engineering course that students could more easily apply appropriate principles than "shop for equations." Other studies have found increases in class attendance, motivation to learn, and student engagement (Grasman, Long, & Schmidt, 2012; McLaughlin et al., 2014; Pierce & Fox, 2012).

Julie Schell illustrates the difficulties in evaluating these early studies in her blog, *Turn to Your Neighbor* (http://blog.peerinstruction.net/2013/11/04/from-flipped-classrooms-to-flipping-with-peer-instruction/). She points out that it is not just the model of the flipped classroom that studies are evaluating but the quality of activities done in class. Student learning in the flipped classroom depends heavily on the quality of the resources presented to the students before class (videos, journal articles, animations, etc.), the quality of the activities in the classroom (case studies, experiments, building products, etc.), and the articulation between the two. With such a complex number of variables, valid research designs are difficult.

## How to Plan for a Successful Flipped Class

For most teachers, designing a flipped classroom means making decisions about which areas of their course are knowledge acquisition and which are knowledge application. Before planning any activities or course material, student-learning outcomes should be clearly articulated and closely examined to determine what the students will best learn individually outside the classroom and what they will best learn in a more collaborative setting inside the classroom. If the learning outcome involves knowledge acquisition by listening, watching, or reading, which are inherently individualistic, then students can accomplish these tasks on their own time and in a setting where they have the ability to move at their own pace. This is best done outside of the classroom. If the activity can be enhanced by guided practice with the opportunity for collaboration with peers and immediate feedback from the teacher, then using class time is more appropriate (Wallace et al., 2014).

### Knowledge Acquisition: Out of Classroom Activities

Although the flipped classroom has become synonymous with recorded online lectures, knowledge acquisition may be acquired through many different media including TED talks, YouTube videos, white board explanations, journals, newspapers, textbooks, movies, the Internet, or any combination of these. The salient point is that students are given materials at the appropriate level that explain the concepts meaningfully.

If instructors want to use online videos, they need to develop skills in capturing lectures online. Watching a lecture online is very different from watching in a classroom. Most experts advise you not to record lectures in the classroom to put online for your flipped class. Each video should be short and cover one of the main ideas of the lesson. Chunk each main idea into a video. If you are succinct and to the point, you will find your lectures online need less time than the same content delivered face to face. Choose software to use (Jing, Camtasia, Screenflow) and practice recording yourself and editing until you are comfortable with the results. (There are many websites that can coach you through best practices; for example, http://www.ehow.com/how_5028849_capture-streaming-videos.html.)

Once you, as the teacher, have accumulated appropriate materials, it is important to make students active participants in their education. Communicate your expectation that students acquire the knowledge they will need for the activity in class. After each chunk (of video or written material), the students should have an activity that requires them to interact with the content. Creating an interaction with the content will help students process the information and support retrieval and memorization, as well as give you, the instructor, some insight to misconceptions or difficult points that you may want to clarify in class. The assessment can be in the form of a multiple-choice quiz. Some software allows you to embed questions; TEDEd allows you to put your own questions into a premade YouTube video (http://ed.ted.com/videos). Other strategies include short answer quizzes and filling in outlines. Studies have found that memory tests between video chunks or pieces of written information enable retrieval practice to enhance memory (Agarwal, Bain, & Chamberlain, 2012; McDaniel, Thomas, Agarwal, McDermott, & Roediger, 2013).

Alternatively, you can use a technique called Just In Time Teaching (JiTT) (Novak, Gavrin, Christian, & Patterson, 1999), which asks students to produce notes or answer questions that are posted online so teachers, before class, identify misconceptions or areas that need more explaining. Often these notes can also help students with an activity in class—for example, drawing a flow chart or concept map, building a 3 X 3 organizer chart, or using a concept or comparison chart. More ideas about using graphic organizers can be found in IDEA Paper No. 51 (Kiewra, 2012).

**Figure 2** • 3 X 3 organizer.

| | | | |
|---|---|---|---|
| Write 3 main points in the lecture/text | | | |
| Write 3 questions I have or muddiest points | | | |
| Write 3 reactions to the content | | | |

**Figure 3** • Organizing/comparison chart.

| Main Ideas | Anti-Poverty Policy 1 | Anti-Poverty Policy 2 | Anti-Poverty Policy 3 |
|---|---|---|---|
| Which population did the policy serve? | | | |
| Reasons for the policy's implementation | | | |
| Political affiliation | | | |
| Date implemented | | | |
| Replaced by which policy? | | | |

Often students are not taught how to read or to watch videos to grasp the most important pieces of information. They will sit and highlight about 50 percent of the text, or write down everything the lecturer is saying and may not remember much of the key information (Kiewra, 1985). Charts like those in Figures 2 and 3 help students to connect ideas by guiding them to the most salient ideas and helping them to organize their learning. They can then be used for an activity in class—for example, students discussing which policy was the most successful and why. Using the charts for an activity in class will help the students to see the usefulness of the exercise. They will then be more likely to participate the next time you ask them to do this. Require the students to post their charts online so you as the teacher can see any misunderstandings before the class starts and address them before the activity. These charts can make students' thinking transparent, which helps you as a teacher to help them become more strategic learners.

Asking students to actually read or watch videos before class may not be totally successful the first time, because some students are often not used to being responsible for knowledge acquisition. Be patient and give students a reason to prepare by having engaging classroom activities that require knowledge to participate intelligently. To reinforce the idea that the students themselves are responsible for acquiring the information before class, it is advisable not to summarize for them the main points of the readings or videos. The success of the flipped class relies on the activities in class being connected to the content that was acquired before class, which has to be used in some way to enrich learning so that students feel productive.

## Knowledge Application: Inside the Classroom

> "The one who does the work does the learning" (Doyle, 2008, p. 63).

By "doing work," Doyle means students have to do the thinking. Students do not spontaneously engage in active learning; they must be given opportunities that require them to do something with the information, interact with it, and manipulate the ideas. Students need to be engaged in rich problem-solving activities that require higher-order thinking skills where they have to articulate their thoughts and make their thinking visible. Essentially, the professor's role is to facilitate students' interactions with the material and with each other by orchestrating the context, providing resources, and posing questions to stimulate students to construct meaning.

"Facilitating student learning," "interacting with the material," "fostering active learning," "constructing meaning," and "requiring higher-order thinking skills" roll off the tongue (or the computer keys) relatively easily, but designing activities that do all these things is difficult and incredibly time consuming. Asking authentic questions should not be that difficult; however, developing activities that scaffold the skills to answer authentic questions can be a barrier to teachers flipping their classroom. There are numerous articles and websites describing methodologies for active learning, such as Team-Based Learning (http://www.teambasedlearning.org/), Problem-Based Learning (http://pblproject.com/), and Inquiry-Based Learning (http://www.inquirybasedlearning.org). In IDEA Papers 53 (2012) and 38 (2002) Barbara

Millis describes the methodologies of some active learning approaches such as Thinking Aloud Pair Problem Sharing, Three Step Interview Value Line, and Send/Pass a Problem. However, it is still daunting for teachers when they first start to develop activities to engage students in constructing their own knowledge through discussions and problem solving.

One idea I have used many times is adapted from Team-Based Learning. I ask students a question that has no obvious correct answer but gives them three or four choices to decide the "most correct" or "greatest impact" or "best location" answer.

**Figure 4** • Example of a higher-order thinking multiple-choice activity with "best" answer.

Many political issues changed the eating habits of the population in 19th century England. Which of these political acts had the greatest impact on food consumption for poor people at this time?

a. The Corn Laws that made wheat very expensive so potatoes became a better option, particularly for poor people.
b. The Game Code that prevented peasants in rural areas from collecting wood from private land to use as fuel to cook their food.
c. A Parliamentary Act that provided meals for needy children in schools.
d. The Ten Hour Act of 1847 that restricted working hours in the factories to a maximum of 10 hours a day, therefore giving mothers and families more time for food preparation and consumption.

When the students discussed this question in groups, they had an incredibly rich dialogue about the reasons *why* the laws were passed, *who* the laws had impacted, and *where* the laws had the most impact. As they were doing their readings and watching the videos, they had taken in the information and organized it in a logical way but had not really thought about it. The discussion in class, listening to others' ideas, hearing questions they had not thought about before, and going back to the material to check on facts led to higher-level critical thinking about the material. After the discussion, the students wrote a paragraph justifying their answers, and most reflected an incredibly deep understanding of the issues in Victorian England.

Using reflective questioning is not about recall of information but a way to get students to delve more deeply into the subtleties and nuances of the content. As teachers, we often become so deeply involved with our subject that we don't think about its value or its use. It's just too obvious. Students are not yet at that expert level, so they often need to justify information and to be taken through the different steps of analyzing and evaluating. The multiple-choice option reinforces the information they have read but also gives them limited options to deliberate upon, which keeps the discussion much more focused than open-ended questions.

This methodology can also be used in case studies which are often used in professional schools such as nursing, social work, and pharmacy.

Some of the disciplines, particularly the sciences, do not lend themselves so easily to the "best answer" type of question. Eric Mazur, a Harvard physics professor, has been working on constructing questions to help students think through concepts rather than "plug and chug" equations. He gives some examples in his YouTube video, *Memorization of understanding: Are we teaching the right thing?* (http://www.youtube.com/watch?v=tn1DLFnbGOo). Mazur gave a conceptual exam question to his physics students and found that many of them could not answer correctly, although they could answer a problem with a similar concept if numerical values were given that required calculations. He now constructs his class around Peer Instruction, which allows for much more discussion leading to conceptual understanding. Some of the conceptual questions may look too easy in the expert's eye, but students often find them perplexing. Take this example:

**Figure 5** • Example of a conceptual multiple-choice activity.

**A × ¾ = B**

Which statement is correct?

1. A is always greater than B
2. B is always greater than A
3. A = B
4. It is impossible to know as there is not enough information.

**Write down why you chose your answer.**

Over 30 percent of a freshman class thought A was greater than B because multiplication always makes numbers bigger. If students considered fractions or negative numbers as a value for A in the equation, their thinking would be transparent in their reasons why they chose option 4. Questions like these can be discussed in class, exposing misconceptions and misunderstandings that can be immediately addressed by the teacher. In fact, many instructors design questions that *will* highlight misconceptions so the students can think aloud around their peers to deconstruct their perceptions.

When students are used to discussing the knowledge they acquire from videos and readings through a structured multiple-choice method, they will be ready to do less structured activities based around inquiry learning or problem-based learning. An example of how a course can be structured around scaffolded inquiry skills is described in Wallace et al. (2014).

## Assessment

When a teacher opts to develop a flipped classroom, it is not only lectures and readings they have to prepare and activities that go with the concepts, but assessments that reflect the learning outcomes stated for the concepts and the course. As Barbi Honeycutt emphasized in a 2013 Online Magna Seminar on the flipped classroom, the right assessment plan not only measures student learning but also reinforces it. Many students can get good grades with only a surface understanding of the concepts because many classroom assessments only evaluate surface learning, particularly recall. If the outcome is to "critically think about . . .," then the instructor should ask, "What are the activities I could assess that would indicate the students had critically thought about the concept?"

One of the most important things I have learned when students work in groups is for them to generate a product. Before asking students to do an activity, sometimes it helps to show them examples of "critically thinking about" or of how a good reflection is constructed. The product at the end of an activity should be evaluated, even if it is a participatory grade. In the Victorian policy question in Figure 3 above, grading was based on the justification of their answer rather than on the "correct" answer. At the end of the exercise, there was a great clamor to know if they had answered correctly rather than if they had given good justifications for their answers. As they did more of these activities, their justifications became more important to them and they started to read and listen to videos more critically. Remember, students tend to concentrate on what is assessed. Assess higher-order thinking, and they will value it more.

## Cautions and Pitfalls

The flipped classroom is not for everyone or for every subject. Often professors want student participation in their lectures, or they feel knowledge acquisition, not application, is a major goal for their course. Some feel much more comfortable with the structure and predictability of the lecture and believe they may be giving up control with group discussions. The flipped classroom initially entails a great deal of work, so many teachers start by flipping one lesson or unit so they do not feel so overwhelmed. It helps if you can work with someone or a group of people who are flipping a similar course so you can share ideas, resources, and successes with a support group.

Contrary to what most innovative teachers like to think, students are not necessarily enamored with the flipped classroom model, particularly when they meet it for the first time. They can feel lost without the structure of a formal lecture; they are used to being passive in class, even checking social media or shopping online. Being active in a classroom is new to them, and often they resent the fact that they have to do the thinking. Some complaints have included that they didn't sign up for a face-to-face class to watch teachers online; the professor should teach us; we are not learning—just talking with our peers; and it's too much work—everything is evaluated. Jen Ebbeler, a classics teacher who has described her tumultuous journey from traditional class to flipped class with her 400-student Roman history class (http://teachingwithoutpants.blogspot.com), explains how she had to improvise her methods and how her students had to become comfortable with her new role.

> As a group, they simply could not see that the class activities were designed specifically how to learn Roman history. They were convinced that they already knew how to learn and that I was an obstacle. In the spring, I made a point of not referring to the class as flipped. I just explained how the class was going to work; what was expected of them; and used the phrase 'active learning.'

Now she is getting much more positive feedback, and students are enjoying the way she teaches.

Clearly explaining the teaching methods and expectations on your syllabus is very important. On the first day of class, involve students in active learning to set the tone for the rest of the semester. Ask them to read the syllabus for homework, and give them a quiz or a discussion question on it the next class. This will help them take responsibility for their own learning from the beginning and set the expectation of being an active participant in the class.

## Conclusion

The implications of the flipped classroom model are for teachers to find the best opportunities for students to achieve higher-order critical thinking skills and to help make learning relevant. Used effectively, the flipped classroom is not a vilification of the lecture or a dumbing down of content, nor is it a free-for-all discussion session. It is a carefully planned experience for students that allows for deeper learning of the content, practice in learning collaboratively, and formative feedback as concepts are being learned. An effective flipped classroom requires much planning, preparation, and willingness to be agile with the content. It is a paradigm shift for both teachers and students. Flipping a class in itself will not make students successful; effective teaching and meaningful learning have to happen to make the class successful. There is no one right way, as Bergman and Sams point out, "every teacher who has chosen to flip does so differently" (2012, p. 12).

*Anne M. Braseby became a Faculty Development Specialist at the Center for Teaching and Learning, University of Texas-Austin, after being an international educator for 25 years. She develops and presents a variety of faculty workshops, consults with departments, and facilitates Faculty Learning Communities across the university campus that provide a rich and rewarding forum for faculty to learn with and from their peers. She has presented workshops on collaborative and Team-Based Learning at numerous universities.*

## References


Agarwal, P. K., Bain, P. M., & Chamberlain, R.W. (2012). The value of applied research: Retrieval practice improves classroom learning and recommendations for a teacher, a principal, and a scientist. *Educational Psychology Review*, 24, 437-448.

Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). *How learning works: Seven research-based principles for smart teaching*. San Francisco, CA: Jossey-Bass.

Arnaud, C.H. (2013). Flipping chemistry classrooms. *Chemical and Engineering News*, 91, 41-43.

Bass, R. (2012). Disrupting ourselves: The problem of learning in higher education. *Educause Review*, 47(2).

Beard, A. (2014). Life's work: Salman Khan interviewed by Alison Beard. *Harvard Business Review*, January-February 19(1/2). Retrieved from http://hbr.org/2014/01/salman-khan/ar/1.

Bergmann, J., Overmyer, J., & Wilie, B. (2013). The flipped class: What it is and what it is not. *The Daily Riff*. Retrieved from http://www.thedailyriff.com/articles/the-flipped-class-conversation-689.php.

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. Washington, DC: International Society for Technology in Education.

Berry, W. (2008). Surviving lecture: A pedagogical alternative. *College Teaching*, 56(3), 149-154.

Bogost, I. (2013, August). The condensed classroom. *The Atlantic*. Retrieved from www.theatlantic.com/technology/print/2013/08/the-condensed-classroom/279013/.

Board of Flipped Learning Network (2014, March 12). What is Flipped Learning? Retrieved from http://fln.schoolwires.net//site/Default.aspx?PageID=92.

Center for Teaching and Learning, University of Texas, Austin. Retrieved from http://ctl.utexas.edu/sites/default/files/flippedgraphic(web1100px)_0.png.

Chiu, M. (2004). Adapting teacher interventions to student needs during cooperative learning: How to improve student problem solving and time on-task. *American Educational Research Journal*, 41(2), 365-399.

Chiu, M. (2008). Flowing toward correct contributions during group problem solving: A statistical discourse analysis. *Journal of Learning Sciences*, 17(3), 415-463.

Darling-Hammond, L., Barron, B., Pearson, P. D., Schoenfeld, A. H., Stage, E. K., Zimmerman, T. D., Cervetti, G. N., & Tilson, J. L. (2008). *Powerful learning: What we know about teaching for understanding*. San Francisco, CA: Jossey-Bass.

Dewey, J. (1910). *How we think*. Boston, MA: D. C. Heath & Co.

Doyle, T. (2008). *Helping students learn in a learner-centered environment: A guide to facilitating learning in higher education*. Sterling, VA: Stylus.

Doyle, T. & Zakrajsek, T. (2013). *The new science of learning: How to learn in harmony with your brain*. Sterling, VA: Stylus.

Ebbeler, J. (2013, August 2). Managing class meetings in the flipped classroom. Retrieved from http://teachingwithoutpants.blogspot.com/.

Educause Learning Initiative. (2012, February 7). Things you should know about flipped classrooms. Retrieved from https://www.educause.edu/library/resources/7-things-you-should-know-about-flipped-classrooms.

Ferreri, S. P. & O'Connor, S. K. (2013). Redesign of a large lecture course into a small-group learning course. *American Journal of Pharmaceutical Education*, 77(1).

Freeman, S., O'Connor, E., Parks, J. W., Cunningham, M., Hurley D., Haak, D., Dirks, C., Wenderoth, M.P. (2007). Prescribed active learning increases performance in introductory biology. *CBE Life Science Education*, 6, 132-139.

Furse, C. (2011). Lecture-free engineering education. Retrieved from http://www.coe.utah.edu/~cfurse/lecturefree%20engineering/teaching%20without%20lecturing.pdf.

Grasman, K., Long, S., & Schmidt, S. M. (2012). Hybrid delivery of engineering economy to large classes. *American Society for Engineering Education*, AC 2012-3147.

Hart Research Associates. (2010). *Raising the bar: Employers' views on college learning in the wake of the economic downturn*. Washington, DC: Hart Research Associates. Retrieved from http://www.aacu.org/leap/documents/2009_EmployerSurvey.pdf.

Honeycutt, B. (2013, August 13). Assessment strategies for the flipped classroom. *Magna Online Seminar*. Retrieved from http://www.magnapubs.com/online-seminars/assessment-strategies-for-the-flipped-classroom-3073-1.html.

Hughes, J., & Mighty, J. (2010). *Taking stock: Research on teaching and learning in higher education*. Queen's Policy Studies Series (135). McGill-Queen's University Press.

Johnson, D. W., Johnson, R., & Holubec, E. (2008). *Cooperation in the classroom* (8th ed.). Edina, MN: Interaction Book Company.

Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher*, 38, 365-379.

Kiewra, K. (1985). Investigating note taking and review: A depth of processing alternative. *Educational Psychologist*, 20, 23-32.

Kiewra, K.A. (2012). IDEA Paper 51: *Using graphic organizers to improve teaching and learning*. Manhattan, KS: The IDEA Center. Retrieved from http://ideaedu.org/sites/default/files/idea_paper_51.pdf.

King, A. (1993). From sage on the stage to guide on the side. *College Teaching*, 41(1), 30-35.

King, A. How to capture streaming videos. Retrieved from http://www.ehow.com/how_5028849_capture-streaming-videos.html.

Knight, J. K., & Wood, W. B. (2005). Teaching more by lecturing less. *CBE Life Science Education*, 4, 298–310.

Lee, C. D., & Smagorinsky, P. (Eds.). (2000). *Vygotskian perspectives on literacy research: Constructing meaning through collaborative inquiry*. New York, NY: Cambridge University Press.

Mangan, K. (2013, October 4). Inside the flipped classroom. Next: Shaking up the status quo. *The Chronicle of Higher Education*, supplement section B.

Mazur, E. (2011, January 7). Memorization or understanding: are we teaching the right thing? Retrieved from http://www.youtube.com/watch?v=tn1DLFnbGOo.

McDaniel, M. A., Thomas, R. C., Agarwal, P. K., McDermott, K. B., & Roediger, H. L. (2013). Quizzing in middle school science: Successful transfer performance on classroom exams. *Applied Cognitive Psychology*, 27, 360-373.

McLaughlin, J. E., Roth, M. T., Glatt, D. M., Gharkholonarehe, N., Davidson, C. A., Griffin, L.M., Esserman, D.A., & Mumper R.J. (2014). The flipped classroom: A course redesign to foster learning and engagement in a health professions school. *Academic Medicine*, 89(2).

Michael, J. (2006). How we learn: Where's the evidence that active learning works? *Advances in Physiological Education*, 30, 159-167.

Millis, B.J. (2002) IDEA Paper No. 38: *Enhancing learning – and more! – Through cooperative learning*. Manhattan, KS: The IDEA Center. Retrieved from http://ideaedu.org/sites/default/files/IDEA_Paper_38.pdf.

Millis, B. J. (2012). IDEA Paper No. 53: *Active learning strategies in face-to-face courses*. Manhattan, KS: The IDEA Center. Retrieved from http://ideaedu.org/sites/default/files/paperidea_53.pdf.

Neshyba, S. (2013, April 4). It's a flipping revolution. *The Chronicle of Higher Education*. Retrieved from http://chronicle.com/article/Its-a-flipping-revolution/138259/.

Novak, G., Gavrin, A., Christian, W., & Patterson, E. (1999). *Just-in-time teaching: Blended active learning with web technology*. Upper Saddle River, NJ: Prentice Hall.

Piaget, J., & Inhelder, B. (1969). *The psychology of the child*. New York, NY: Basic Books, Inc.

Pierce, R., & Fox, J. (2012). Vodcasts and active-learning exercises in a "flipped classroom" model of a renal pharmacotherapy module. *American Journal of Pharmaceutical Education*, 76 (10), Article 196.

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education*, 93(3), 223-231.

Restad, P. (2013, July 22). "I don't like this one bit." Tales from a flipped classroom. *Faculty Focus*, Higher Education Teaching Strategies. Magna Publications.

Schell, J. (2013, April 22). What is a flipped classroom in 60 seconds. Turn to your Neighbor blog. Retrieved from http://blog.peerinstruction.net/2013/04/22/what-is-a-flipped-classroom-in-60-seconds/.

Schell, J. (2013, June 20). Two magical tools to get your students to do and learn from pre-class work in a flipped classroom. Turn to your Neighbor blog. Retrieved from http://blog.peerinstruction.net/2013/06/20/two-magical-tools-to-get-your-students-to-do-and-learn.

Svinicki, M. (2014, January). Evidence-based teaching: Strategies for motivating and helping students learn. Keynote speech at Lilly Conference on Teaching and Learning, Austin, Texas.

TED Ed. Lessons worth sharing. Retrieved from http://ed.ted.com/videos.

*USA Today* (2013, October 22). 'Flipped classrooms' may not have any impact on learning. Reported by Emily Atteberry. Retrieved from http://www.usatoday.com/news/nation/2013/10/22/flipped-classrooms-effectiveness/3148447/.

Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.

Wallace, M. L., Walker, J. D., Braseby, A., & Sweet, M. S. (2014). Now, what happens during class? Using Team-Based Learning to optimize the role of expertise within the flipped classroom. In N. Davidson, C. Major, & L. Michaelsen (Eds.), Small-group learning in higher education: Cooperative, collaborative, problem-based, and team-based learning. *Journal of Excellence in College Teaching*, 25(4).

Walthausen, A. (2013, November 21). Don't give up on the lecture. *The Atlantic*. Retrieved from http://www.theatlantic.com/education/archive/2013/11/dont-give-up-on-the-lecture/281624/.

## Notes

**T:** 800.255.2757
**T:** 785.320.2400

301 South Fourth St., Suite 200
Manhattan, KS 66502-6209
**E:** info@IDEAedu.org
**IDEAedu.org**