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FLIPPING THE CLASSROOM ONLINE - IS IT POSSIBLE

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Synopsis:

Flipping the classroom is considered to be a positive active student model of delivery of course material - but can this model also work for online courses? The paper will examine ways in which faculty in every discipline can use the Flipped Classroom model for their online courses.

Flipping the Classroom Online - Is It Possible?

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ABSTRACT

Technology is being used to enhance all types of educational experiences. Several new pedagogical methods have been developed that use technology to assist students in learning. This paper will discuss one of these methods –the flipped classroom. The flipped classroom is not necessarily a new idea, in fact, it developed from such things as hybrid or blended classrooms. But flipping the classroom does have different pedagogical implications for student learning online. The paper will describe the history of the flipped classroom, mechanisms of flipping the classroom for online courses, pros and cons for this method, talk about different student learning styles, and discuss how to get started creating a flipped classroom environment for online learning.

1. INTRODUCTION

The outcome of this paper is to discuss the merits of using a flipped classroom for online courses. As STEAM/STEM educators we need to be aware of how to use technology to enhance student learning and support delivery of classroom material. The concept of a traditional flipped classroom (as described below) combines both in-class and online activities. We need to examine whether or not the flipped classroom will work as well in a totally online environment.

2. THE FLIPPED CLASSROOM

The flipped classroom involves flipping the traditional in-class lecture first and using outside supporting technology second to reinforce the lecture. The flipped classroom assigns web-based content (lecture material) as homework FIRST, making time and space available in the face-to-face classroom for more inquiry-based projects and questions. The Khan Academy actually brought this concept to secondary education beginning in 2004 with a series of videos showing how this methodology can be used. There is still a lot of controversy among educators on the merits of flipping the classroom – particularly at the high school level. However, the merits of this methodology and the more mature student lends itself to better use at the university/college level.

2.1 The History of the Flipped Classroom

Some of the earliest work began with peer instruction in the 1990s done by Eric Mazur at Harvard. Professor Mazur found that by using computer aided instruction he had more time to coach instead of lecture. [10] In 1993, Alison King published the article called “From Sage on the Stage to Guide on the Side”, published in *College Teaching*, Vol. 41, No. 1 (Winter, 1993), pp. 30-35. In 2000, Maureen Lage, Glenn Platt and Michael Treglia published the paper “Inverting the Classroom: A Gateway to Creating an Inclusive Learning Environment”. [8] They talked about creating an inverted classroom in order to accommodate many different student learning styles. In other places in 2000, the University of Wisconsin-Madison began using eTeach software to replace lectures with streaming video presentations (voice with power point). In 2004 Salman Khan began recording videos to help a younger cousin with classwork. The Khan Academy grew from this original concept. There are now over 2400 Khan Academy online video lessons available – and they are free of charge! There have been many articles, workshops and presentations about flipping the classroom made over the last several years.

The method of using technology to actually present lecture material caught on quickly. The prevalence of online technology based knowledge delivery systems helped to support the growth of this model. Adults who have viewed online education videos is also expanding. In 2007 15% of internet users viewed online education videos, while in 2010 30% of internet users have viewed online videos.

3. ONLINE LEARNING STATISTICS

According to the US News and World Report Education the National Center for Education Statistics conducted the first in-depth study of online learners. The government data was released in June as a series of Web tables looking at online learners by state, region, institution and a number of other factors. The National Center for Education Statistics, which is part of the U.S. Department of Education, collected data from institutions eligible for Title IV financial aid. [5]

The study found that about 5.4 million students, or one in four, took at least one distance education course during the fall of 2012. They also found differences in regions of the country. The Plains had 23 percent of students studying exclusively online, the highest percentage, followed by the Southwest, which had 20 percent. But other regions, including New England and what the data referred to as the Mid East, the Great Lakes and the Far West, didn't even have percentages in the double digits.

They also found that:

- Graduate students are more likely than undergraduates to study exclusively online. Of the 2.9 million graduate students in the U.S., 22 percent of them studied exclusively online. Among undergraduates, 11 percent pursued distance education exclusively.
- Of students enrolled exclusively in distance education, 51 percent, or slightly more than half, were reported to be in the same state as their institution.
- Arizona, West Virginia and Iowa had the highest percentage of students enrolled in exclusively online courses, with 48 percent, 40 percent and 39.7 percent of all students respectively. Those states are home to some of the schools with the most online learners, including University of Phoenix, [American Public University System](#) and [Kaplan University](#), respectively.
- In total, 33,563 students located outside of the U.S. were enrolled in exclusively online courses, or 1.3 percent of all students taking solely distance education courses. Those numbers could include Americans abroad or international students.
- Institutions in Kansas drew the largest percentage of undergraduate students located outside of the U.S. studying exclusively online – 35.8 percent – while New York drew the largest percentage of graduate students outside the U.S., at 14.8 percent.
- At tribal colleges, 2.6 percent of students take exclusively distance education courses, while the percentage at historically black colleges and universities is 3.8. [5]

According to EdTech online statistics also show that: [1]

- 64% of full-time faculty at community colleges teach distance education classes; part-time faculty teach 35% [7]
- 72% completion rate for online classes at community colleges, compared to 76% for traditional face-to-face courses [7]
- 18% of undergraduate students are predicted to receive 80% or more of their education through online courses by 2013 [6]
- 23% of students enrolled in at least one online course at the associate's degree level, compared to 17% at the bachelor's degree level [6]
- 61% of the presidents of four-year liberal arts colleges report that their institutions offer classes that are taught exclusively online, compared to 79% of presidents of research universities and 82% of those at community colleges [11]
- 15% of college students who have taken a class online have earned a degree entirely online [11]
- 39% of all adults who have taken a class online say the format's educational value is equal to that of a course taken in a classroom [11]
- 48% of faculty members believe that virtual learning is essential to a 21st-century classroom, compared to 53% of students [14]
- 91% of two-year colleges offer online courses [11]
- 91% of community colleges currently offer online registration for their classes. 40% of institutions reported that they charge students an additional per-credit fee to take distance education classes — the minimum collected was \$2, the maximum was \$80, with a median average of \$22 [1]

These statistics show that students at community colleges, colleges and universities are moving toward online learning as part of their educational experience. Let's look at using the "flipped classroom model" in a wholly on-line environment.

4. FACULTY AND STUDENT RESPONSIBILITY IN THE FLIPPED CLASSROOM

The flipped classroom concept is not as easy as it first appears. The faculty member's role in the classroom drastically changes with the flipped classroom methodology. The faculty member is no longer the "sage on the stage". The faculty must change their focus from being the purveyor of knowledge to students as the receptacle of that knowledge, to a focus as one who is a facilitator to students and allows the students to take responsibility for much of their learning and knowledge attainment. The faculty member becomes a "guide on the side". This requires a change in the faculty member's concept of what it means to "teach". Many faculty have difficulty with this new concept.

One reason the flipped classroom has become popular is the overall performance of students attaining learning outcomes in a course. The traditional classroom is a one-size-fits-all model and has a limited concept of engagement with the students. The faculty member is actually the one taking the responsibility for the students' learning. The flipped classroom model allows for the student to take responsibility for his/her learning. The faculty member can create online experiences that allow for more analysis and synthesis of material. Students can explore additional material in support of the topic being covered. The learning curve for both faculty and students can't be taken for granted with this method. Faculty have to create their lectures and get them posted online – through podcasts, power point with voice, video, etc. They need to have discussions and other interactions that allow

students to interact with each other and the faculty member during the reading of the content material. The online activities need to address expanding the knowledge of the student and giving students an opportunity for more creative and higher-level critical thinking activities.

5. WHAT THE FLIPPED CLASSROOM IS AND IS NOT

It is important to realize that creating a flipped classroom is not just putting lectures on videos. The pieces of the flipped classroom include: [13]

- Creating videos to take the place of face-to-face instruction
- Providing activities for students to work with peers and faculty online to assist in learning
- Creating other learning activities to reinforce learning beyond the videos/lectures
- Allowing the student to take responsibility for much of their learning

Therefore, when examining this model, the flipped classroom allows for:

- Increasing interaction and personalized content time between students and faculty
- Creating an environment where students take responsibility for their own learning
- Blending of direct instruction with constructivist learning
- For students to keep current with their work
- Archiving content for review and study
- Engaged students
- More personalized education for students

The flipped classroom is not:

- Just online videos
- About replacing faculty with videos
- An online course
- A course with no structure
- Students staring at a computer screen
- Students working in isolation

5.1 Why Does This Work?

There is strong research evidence that supports the flipped classroom methodology. In the book, *How People Learn*, John Bransford, Ann Brown and Rodney Cocking report key findings on how people learn. Two of their theories support the flipped classroom method. Bransford, Brown and Cocking state that:

“To develop competence in an area of inquiry, students must: a) have a deep foundation of factual knowledge, b) understand facts and ideas in the context of a conceptual framework, and c) organize knowledge in ways that facilitate retrieval and application” (p. 16). [3]

When students work at home watching videos and taking part in peer and faculty interaction immediately, they can correct misconceptions, and begin to build frameworks for organizing the material themselves. In addition, the authors state that:

“A ‘metacognitive’ approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them” (p. 18).

When the students are able to use higher cognitive functions in the course with the faculty member as their guide, accompanying by the peer and instructor interaction, allows the metacognition to take place in learning.

5.2 What the Flipped Classroom Supports

The flipped classroom supports many positive aspects to support student learning. [2]

1. Provide an opportunity for students to gain exposure in a variety of formats

There are many methods to introduce new concepts/ideas to students – such as textbook readings, power point lectures, lecture videos, podcasts, screen captures, etc. These methods all allow the students to be exposed to the material they are learning.

2. Provide an incentive for students to interact with others and have opportunities to complete additional tasks to enhance learning

By providing some sort of task for the students to complete with their online work, they can also get additional “points” for grades. This also allows for more absorption of the knowledge by providing various methods of completing tasks and allowing students to interact more with others in the course.

3. Provide a mechanism to assess student understanding

All of the pre-class work, including assignments help with assessing how much the student has “understood” of the topic. It allows the student to then come to class with the questions about the material they didn’t understand or comprehend. This allows for immediate feedback if the faculty member uses automatic graded tasks/assignments.

4. Provide in-class activities that focus on high level cognitive activities

As students gain basic knowledge of a topic, then the faculty member can spend more time helping students achieve a deeper learning of the subject matter. This is done by providing additional types of learning activities. These include analysis and synthesis activities. The main point is to have students achieve higher levels of learning and deepen their understanding and increase skills.

6. STUDENT LEARNING STYLES

Another advantage of the online Flipped Classroom is that faculty can address different student learning styles by presenting material in various formats. Originally, there were thought to be three types of learning styles – audio, visual and kinesthetic. Research has now shown that there are many types of learning styles and multiple intelligences. The following are some of the basic types of learning styles and activities for each type: [9]

Verbal-Linguistic

The VL learner has a love affair with words. He will usually excel at writing activities, making speeches and dramatic presentations. Provide this student with the chance to debate topics, to dramatize and role-play themes, to make books and to write stories. Encourage him or her to keep a journal and to research topics of interest.

Logical-Mathematical

This student excels at problem-solving and critical thinking. Present new information to her in the form of puzzles or let him practice his new knowledge by creating logic games with it. Since collecting data is a strong area for this student, allow these students to research topics that provide opportunities for classifying information and making and using manipulatives.

Visual-Spatial

Seeing is believing--or learning--for this student. Graphic organizers like story maps, charts and sketches are invaluable learning tools. Give these individuals the chance to use photography and videography in sharing what he or she has learned; let him or her make three-dimensional models or paint murals to show what they know.

Bodily-Kinesthetic

This student wants to move and touch, so let that be a guide. Hands-on projects are perfect for this learner, including experiments or creating crafts, models and displays. This learner will get the most of your field trips and will excel at creative movement and dance projects. Dramatizations are also great for these students and they do quite well in cooperative learning groups.

Musical

Rhythm and rhyme will be important to the musical learner. Begin by providing the chance to hum softly or listen to music while learning; research shows that all students benefit from baroque music playing in the background, so you can accommodate this learner and his or her peers at the same time. Projects that involve rapping or singing as a means of communicating learning are ideal for this mode of intelligence.

Naturalistic

This is your outdoors loving student and he or she will excel at science activities that involved things like locating the constellations, planting a garden, or identifying animal habitats. Accommodate this students giving activities that might involve outdoor research.

Interpersonal

This student is often a social butterfly. Cooperative learning groups, peer teaching, peer editing and brainstorming are right up this student’s alley. Let this student lead out in online discussions or be in charge of forming clubs and study groups. Use the skills of the interpersonal learner in mediation and in making the rest of the class aware of social issues relevant to your students.

Intrapersonal

This student may seem shy or aloof at times. While you do want to encourage cooperative activities for this learner, allow him or her time to work alone, as well. Provide opportunities to select projects which she or he completes alone, or chances for him or her to study away from others. Encourage the intrapersonal learner to continue with independent reading and to make personal goals for success.

Providing various modes for a particular activity allows students with different learning styles to accomplish the activity using their preferred mode of learning. This takes more time for the faculty member to create in the beginning of creating an online Flipped Classroom course, but the benefits to the students is enormous.

7. HOW TO START AND BENEFITS/CONS OF USING THE FLIPPED CLASSROOM

7.1 Starting the Flipped Classroom

The flipped classroom has gained popularity over the last several years. Each faculty member needs to understand this method and how it affects both teaching and learning. Author Ramsey Musallam in his eduTopia article “Should You Flip Your Classroom” believes in carefully approaching creating a flipped classroom environment. He advocates the following steps: [12]

Step 1 – Identify your current or desired teaching style

Step 2 – Ask yourself this question: Given my style, do I currently use my time to teach any low level, procedural, algorithmic concepts?

Step 3 – If yes, begin by creating opportunities for students to obtain this information within the online environment (primarily through videos)

Step 4 – Include a system that encourages reflection and synthesis of homework-based instruction

We would also add another step - begin looking at creating higher-order learning activities for the online activities based upon the different possible learning styles.

7.2 Benefits of the Flipped Classroom

The flipped classroom allow for benefits for both students and faculty. Some examples are: [4]

- Student-led discussions, tutoring and collaborative learning
- Critical thinking by students
- Problem-based learning
- Collaboration – between student-to-student, and student-to-faculty
- Student ownership of learning
- Student exploration
- Student engagement
- Transformative learning
- Faculty having time to assist students on things they couldn't learning by themselves
- Faculty using technology to assist in teaching/learning
- Faculty having more time to interact with students on one-to-one

7.3 Cons of the Flipped Classroom

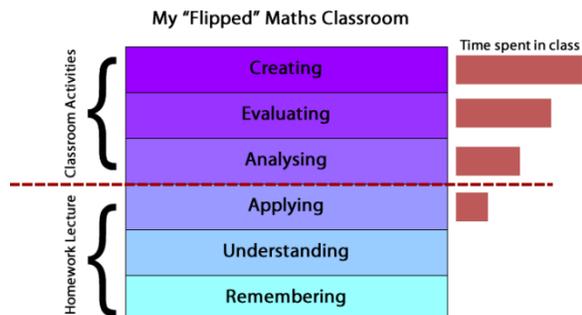
- Additional work on the part of the faculty member to create online videos, other content, learning-style based activities
- Understanding the basics of both teaching styles and learning styles (most faculty aren't aware of these)
- Creating interactive group and individual activities (group projects, chats, etc.)
- Creating several modes of completing one assignment that a student can choose from– i.e., having students choose either to analyze a reading, create a video, create a poster, etc., all based on the same assignment

8. CONCLUSION

The flipped classroom has proven successful in many areas of education. As IT and STEM educators we can embrace the technology and pedagogy for this new method of teaching/learning. This will require a change of attitude for each of us, but the benefits to the students and faculty outweigh the time involved for creating this new learning environment. Understanding how the flipped classroom can benefit students and assist students to achieve the prescribed learning outcomes for the course can be a tremendous benefit to all courses. Online courses can use the flipped classroom model with a little planning and forethought by the faculty member.

The following is an example of one of the author's math courses. It shows how the flipped classroom changes the amount of type of learning that takes place. The traditional classroom activities are moved to the online environment for the completely online

course. Both authors have used the flipped classroom method and believe that it can be used in the online environment successfully.



9. RESOURCES

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