

# **The Flipped Classroom Approach**

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**Abstract**

The Flipped Classroom Approach (FCA) is a relatively new but important asset of the teaching world. It can be used for any subject and is becoming a popular means of conveying information. The template of the Flipped Classroom Approach reverses the traditional learning environment where the students learn content on their own and teachers facilitate learning activities in the classroom. The purpose of this paper is to review what the Flipped Classroom Approach is, the uses and applications of it, and to examine how it works as a teaching method. Some personal experience is also given.

## **The Flipped Classroom**

The Flipped Classroom Approach, hereby referred to as the FCA or the FC, has been thought of as a cycle. By this, it means that the students watch a video(s), or read outside material, discuss what they had learned, apply the knowledge during class, and then go watch more videos/read new material containing new content. This continues in a loop, hence the cycle. The FCA combines two elements that are essential in education: lectures and active learning. Students have access to video lectures and/or other material ahead of class time, which frees up more face time between students and teachers for any necessary clarification of material, as well as time for students to work with other students to collaborate on projects, and for applying concepts while getting direct feedback from the instructors. Those who flip their classrooms often view lectures as homework and as an aid to learning. Homework itself is also important because it gives the students time to think about what they just learned, as well as use the homework to review any other material.

The FCA can fit into a broad category of learning called Blended Learning, BL. This is defined as “a formal education program with face to face instruction, in which a student learns at least in part through online delivery of content and instruction, with some element of student control over time, place, path, and/or pace” (Staker & Horn). However, the Flipped Class is different than what is called Distance Education, also known as “E-Learning”. This type of learning requires the student to be at a place of education with a teacher and peers for direct, active feedback and collaboration. Staker and Horn discuss Blended Learning, stating that it is informed by online learning, which they define as “education where content and instruction are delivered primarily over the Internet”. Even though models of learning based on and through the

internet have influenced the content delivery of Blended Learning, and in turn the FC, the main focus of the Flipped Class remains on active learning and not content delivery.

The FC is also different from both Technology Rich Learning, TRL, and Distance Education, DE, which is a type of independent “E-Learning”, in that neither of these types of learning use video lectures and peer collaboration in a classroom like setting. In the Flipped Class, videos and lectures are watched outside of class time which makes a class using the Technology Rich Learning method not included in the definition of a FC. For a class using the TRL method, the educator gives the content of the class in the way of a more tradition style of classroom setting, but with the assistance of technology such as a SMART Blackboard, SMART Board, or with a computer projector (Staker & Horn). The educator has control of the technology in this case, and only uses it to supplement their instruction. Benefits such as collaboration and active learning that are found in a Flipped Class are lost during a class using the Technology Rich Learning method. Basically, what sets apart the FC from a class using the TRL method or the Distance Education method is that the Flipped Class focuses on the active learning, face-to-face style of learning that takes place in a classroom environment (Hamden, et al.).

The definition of the Flipped Class is itself flexible. Sams, one of the founders of the Flipped Class, wrote in his blog that “there is no such thing as THE Flipped Class because the Flip is in the flux” (Sams). He believes that any class can be flipped for certain units or topics, while using a combination of workshops, interactive lectures, and activities in the class. He also believes that over time, and with more research, with the support of educational media in the class, any class that takes an active learning approach will continue to improve. Sams states that there is no one exact way to flip a class. However, the Flipped Classroom Approach’s framework brings the idea that any and all active learning should be done during class, and all passive work,

i.e. homework and reading material, should be done at home. The founder of Peer Instruction (PI), Eric Mazur, states that “in the standard approach to instruction, the active part of learning is left to the student on his or her own, outside of the classroom. If you think about this rationally, you have to Flip that” (Mazur). Simply put, the passive learning should be left for outside of the classroom while the active learning stays inside. Therefore, the definitions of the FC are structured around clearing class time for active learning and helping students in the moment as they are learning (Bergmann & Sams).

The Flipped Class also has a concern involving what is called “generation technology,” students who are growing up around a number of new devices and programs. Educators who plan on using the FCA need to verse themselves in a new kind of literacy called technological literacy. This new culture of learning that involves technology does contain aspects of independent learning, the use of research, critical reading skills, and other traditional values usually seen in academia (Bishop & Verleger). When students learn from the internet, it can be difficult to know how the content that they find is reliable. This is yet another aspect that needs to be on the radar of any educator when assigning projects or other work. However, most students have been able to learn how to check the reliability of their sources considering that the current generation of students uses technology for almost everything and has been using technology all their lives. These efforts are just a way of looking for a new alternative way of learning. Therefore, the Flipped Class is just one stage in an evolution of Blended Learning (Lambert). The FC contributes guidelines and practices for incorporating certain elements of technology and active learning, into a modern curriculum (Hamden et al.). The FC can apply research involving active and passive instructional practices to areas where they can become efficient and useful (Bergmann & Sams).

There are several key people and educators from whom the idea and implementation of the Flipped Classroom Approach has developed including King (1993), Lage, Platt, and Treglia (2000), Strayer (2007), Baker (2000), Tenneson and McGlasson (2006), Mazur (1997), Khan (2012), and Bergmann and Sams (2012). The idea for the FCA came about when in 1993 Alison King published “From Sage on the Stage to Guide on the Side.” In this, she focused on the idea of using class time to help students understand the material that they were assigned to read and know beforehand, as opposed to using the time to teach them whatever they are learning. She called this type of learning “active learning.” This meaning, the students would have access to all the information needed for the following class outside of the classroom. They would be instructed to learn the material and come to class with questions if they had any. The class time would then be devoted to hands on learning instead of learning the material for the first time. Many people over the following years developed further on this idea, whether directly relating it to King’s work or they came about the idea themselves.

In 1997, a Harvard professor named Eric Mazur wrote a book called “Peer Instruction: A User’s Manual” (Mazur) in which he detailed a strategy he aptly named Peer Instruction. This was a type of teaching method where he had students in his class help each other with their learning during their class time. Eventually, he decided to remove his lectures entirely from their class time and recorded his video lectures prior to the class time. Mazur claimed that his classes being computer aided gave him a better time in class to be an advisor to his students in terms of their learnings of his subject, and also reported that his students had higher academic achievements from then on.

In 2000, Lage et al. wrote an article about the Flipped Class, describing as a way to include students in the structure of the class, using their experiences, and giving more time for

personal one to one instruction (Lage et al.). The article is titled “*Inverting the classroom: A gateway to creating an inclusive learning environment.*” Around the same time, Baker presented “*The classroom flip: Using web course management tools to become the guide by the side*” at a conference on teaching and learning in college. His presentation was inspired by King’s work in 1993, noted by the title of his presentation. Her wanted his presentation to assist any educators in their choice process for educational programs and tools they might use to help flip their classrooms. Later in 2004, Khan began recording math video lectures that he used to help his cousins who were struggling in school (Khan). He describes these videos as a “virtual tutor” (Khan), believing them to be a helpful tool for his family as he did not have the time to help them with their schooling in person. Eventually, these videos became the basis for Khan Academy, and some educators choose to use his videos in their classrooms when implementing the FC as these videos are professionally made.

A few years later, Tenneson and McGlasson published “The Classroom Flip”, which described the structure of the Flipped Classroom Approach, explained how using this could enhance any curriculum, and explored several programs for course management. Since 2009, Bergmann and Sams have taught their science classes as flipped classes in their high school. They are considered the founders of the modern flipped class model (Hamden et al.). In 2013 they published a book, “*Flip your classroom: Reach every student in every class every day*” which is considered as a very beneficial resource in teaching the FC by the Flipped Learning Network (Hamden et al.). They find that one of the major strengths of the FCA is that it is flexible. This allows for educators to customize their classes and curriculum, giving them more time to speak with their students about any issues they have with the course. As educators



continue to adopt the Flipped Classroom Approach and help for more classes to adapt to this method, it will continue to evolve.

### **Technology in the High School Class**

Technology has been used in classrooms since the late 1800s and has evolved throughout the years to help benefit the learning environment as needed. The earliest use of technology came in the form of the Magic Lantern in the 1870s which was just a primitive version of the slide projector. Then in spans of 20 years at a time, the next big invention came about with the chalkboard being readily available for use in the 1890s, then the pencil, ballpoint pen, overhead projector, photocopier, handheld calculators, and the Scantron system of testing. Finally, the computer started to become commercially used in everyday households and schools in the tail end of the 1900s. Since then, technology has continued to grow in how it is implemented into the classrooms, and will continue to grow. Because of this, I believe that technology has and always will be one of the greatest resources in the classroom setting.

There are several pros and cons to how technology is implemented in both our everyday lives and in the classroom. Technology can be used to create an environment of learning based around how the current generations live. This can be attributed to the fact that students today are more used to using technology in their homes and during their daily routines that using technology in the classroom could make it easier for them to learn. Technology is used in every field of study and work, so by using it in the classroom it can help set up students to be able to use it in their careers in the future. Collaborations between students becomes easier with technology. If each student has a laptop either with them or provided by the school, and then are put in pairs of two or three to do work during the class time, having multiple screens readily

available to find whatever information is needed becomes a quick task. One student can type up what they find while the other(s) looks up the information. Information is more easily conveyable between the teacher and the students. Instead of verbally explaining how to do a problem, the teacher could easily find a video online that can visually show how a problem is supposed to be done.

However, with the advantages of the use of technology comes the disadvantages. Students are more easily distracted when using technology in the classroom. If a student has a phone and sits in the back or behind other students, they could be paying more attention to that than the teacher. Also, with the use of phones in class, it becomes easier for students to cheat on an assignment or test because they are out of sight of the teacher and have their smartphone on hand. Unfortunately, some students don't have the technological resources that others may have, which makes it harder for them to obtain information for an assignment. Even though most libraries have computers, some students may not have a library card to access these computers and might only ever use a computer during school. Not everything that one finds on the internet is accurate and it is difficult to fact check everything, making it possible that an assignment could have been written entirely with false information.

The reason why technology is so important in our classrooms is because, as stated previously, most students have become accustomed to using a laptop or a smartphone for every little thing in their everyday lives. Not using technology to learn seems to be a burden because why go from having information at the tips of your fingers to having to go to the back of a book in the appendix and hope to find what you are looking for? It would become incredibly difficult for those who are used to technology to have to go and not use it at all. To that extent, watching a video on how to solve a problem can be more beneficial if explain using visuals as opposed to

reading the technical definition and step instructions on how to solve said problem. And, as stated previously as well, every field of work uses technology in some form or another. By having the students learn with technology, they will be better adapted to work with technology in their chosen fields.

The papers I read talks about the usage of a flipped-classroom setting for a mathematics secondary education class. A flipped-classroom teaching approach is the use of technology and learning outside of the classroom in order to facilitate a more open learning environment back in the classroom. This means that the teacher provides the information that the students will learn online and has them read the material and do the work outside of the classroom, that way in the classroom the students can then ask the teacher whatever they want in order to further clarify the material, and also this allows the students to work on more or harder material should they choose to.

The first paper that I read starts out by describing the elements or goals of the flipped classroom approach (FCA). As stated before, the FCA is basically where students learn on their own, with some guidance from the teacher, and then in the classroom the teacher can clarify any information the student wants to know and also give the basics of what is needed to learn. The students are actively encouraged to learn more difficult material should they choose to and then bring that to the class to learn more from the teacher.

Then, the writer goes on to talk about the use of technology in an FCA. Initially, the educational technologies described that should be used include communication and presentation technologies, like an ePortfolio software, and technologies used for representation and processing of mathematical-technical tasks. The writer goes on later to say that in the current era of education, in order to have an appropriate FCA in education, three technologies are needed: 1)

technologies to export direct instruction from the classroom, so technology that can upload material and instructions from the classroom to a mutual website to retrieve the data outside of the classroom, 2) technologies to mathematically deal with real-world problems, so a way to find and solve problems that would relate to a situation one might encounter in their lives as opposed to a nonsensical problem that is only there to attempt to teach a method, and 3) technologies to communicate with each other outside the classroom and present learning products, so another way to upload and retrieve material outside of the class, but also to help solve any problems one might have before going back to the classroom and to relay any relevant information or happenings from the teacher to the student if necessary.

Next, the writer goes to explain what is used, or what they used, to facilitate the three needed technologies. They start with saying that there are videos online that can be accessed by anyone, freely, that help explain and give direct instructions for learning. The example they give is that of Kahn Academy. This is a website that has countless video instructions on solving and learning from math to other sciences to humanities subjects, including pre-algebra to trigonometry, to statistics, to calculus, even differential equations and linear algebra, and then to physics and biology, chemistry, to world history and so on. They go on to write that if the teacher wants to make videos themselves, they could use recording programs such as Jing and Screencast-O-Matic, both of which are free.

To tackle the need of real-world problems, the writer says the use of the program GeoGebra (GeoGebra) is extremely helpful. This is a website as well as an app on the phone, where one could create visual representations of whatever problem they want to solve. It is a free program that can be used for algebra, geometry, statistics and more. It is also possible from this program to upload and share anything created with it.

The writer did not go much into the technology needed to communicate with other because they state, as I have stated before, students in today's world are so accustomed to using technology that they know how to communicate with others and share their work easily.

Next the writer talks about motivating students. They start by writing that a high number of students tend to have strong negative feelings towards learning mathematics. Some students even have a fear of mathematics. One way to go about helping the students to get over this fear or negative emotion is by giving them the more control of what and how they learn and at what speed they learn at. That is part of the main goal of a flipped classroom approach. The use of technology in the FCA has helped to increase the motivation of the students in learning math because the online videos and other digital educational materials have helped to simplify the way others learn subjects, thus making it easier for students to understand math.

In this approach, the writer suggests that teachers should act as moderators towards the students, basically keeping them from getting off topic in the classroom while helping to learn should the need arise. Another way the teachers can help to increase students' motivation is by just being there to help when the students require it, but aside from that to "play a passive to invisible role in the classroom." Basically, be there for the students to answer any questions they have, but don't tell them exactly what they should be learning. Also, the writer suggests that the teachers should not walk around the classroom during this time, as it may intimidate the students and it makes them feel as if they are being constantly evaluated, which would lead to a lack of their confidence.

The writer goes on to explain that a good way to help motivate students learning math is to have them do research on the construction of, and then the technology supported investigation of a Leonardo bridge. The Leonardo Bridge is a concept proposed by Leonardo da Vinci. He

proposed a bridge that could support itself. Originally, he wanted the bridge to span the area of Turkey known as the “Golden Horn”. Unfortunately, this idea was not conceived as possible at the time. A smaller version of the bridge known as the “da Vinci Bridge” was built in Norway in 2001 based off of his earlier design. This is something used in the 9th grade Austrian curriculum. Students are put into groups of 4-5 each and then the process of this research is put into 3 steps.

Step one is the actual research on the bridge. The students are recommended during this step to split their groups more into smaller 2-3 per group. Then they must find the meaning of the term “Leonardo bridge”, what are the features of the bridge, how it works, where such bridges occur, and what they would need to construct a bridge. It is recommended that the groups during this first phase make an e-Portfolio online so they can share with the rest of their group what they find on the information of the bridge, a manual for constructing the bridge, and a resource list needed. A proper technology-enhanced FCA suggests that most of the first step can be done before learning about any part of this project in the classroom, and then when the subject comes up, the students can ask questions to deepen their understanding of what needs to be done.

The second step is the students building their own Leonardo bridge. The requirements for this are the materials the students found that they need, and a big space to build it in, and a decent amount of time to make it.

The final step deals with the mathematical investigation of the bridge. The curriculum in which this takes place suggests that the mathematical processes needed, namely trigonometry, vectors, and functions, are all taught in the same year this goes on.

The point of this project for the students is that by weaving together the problem of the real-world bridge they have to look into and the use of the education in school, as well as the fact

that the students are physically building something can lead to increase in the motivation that students have towards mathematical problems.

The point of this paper was to show that learning from a technology centered FCA has many benefits, as well as some similarities, of learning with a contemporary mathematics education. Because of this, learning from the two together gives the students the opportunity to be their own teachers in the sense that they learn from home and only bring with them questions that need answering. The students are free to learn what they want, and really the only thing in their way is the motivation to do this learning, which can be countered by the hands-on learning of the approach.

### **Literature Review**

Traditional instruction, or passive learning, is defined as an educational approach where learners quietly receive new information from an educator, and they do not interrupt the class except to ask an occasional question (Bonwell & Eison). Bonwell and Eison first discussed the idea of active learning, and have claimed that for students to properly learn, they must do more than listen, they must gain knowledge through activity. They have connected their research on active learning with Bloom's Taxonomy of Learning (Bloom). They agree that for a student to learn to their full potential, they must engage in a higher set of thinking, such as analysis, synthesis, and evaluation. They therefore advise that the traditional method of learning, "sit and get" as they call it, is no longer valid.

Many educators and researchers who have chosen to flip their classrooms believe that active learning is vital to the learning process. However, they believe that there is still a place for direct instruction in the Flipped Classroom Approach, under appropriate circumstances (Bishop

& Verleger). However, there are some concerns about finding a balance between delivering the content in the class and the active engagement in learning aspect. Clearly, there needs to be a method of introducing the new content to the students while still being able to make the majority of the class time be for what's called "student centered learning" (Bergmann & Sams). Content can be introduced through experiential learning, which is a type of hands on learning, or learning through experience. However, for some parts of the higher education system, direct instruction is still recommended when it comes to the more complex concepts.

Berrett, a researcher for the Chronicle of Higher Education, believes that delivery of content should not be a main goal of education. He believes that being able to provide access to content, and being able to help the students learn the content, or unpack it, is a key goal (Berrett). He also believes that any educator should try both direct feedback and questioning methods in their helping students to understand material. Educators have used questioning tactics for a long time in their lectures, which Barrett states "compels students to study the material before class so they can turn up prepared with the basics". Studying material prior to class can help students recall previous knowledge regarding a topic, and help to better prepare them for the discussions in class (Berrett).

Bergmann and Sams found that the interest of the students increased after flipping their class. They surveyed their students and found that before flipping, their students were bored or unfocused, sometimes restless, but then became very engaged following the flip. They stated that because the educators were not "standing there and talking at the kids, many of the classroom management problems evaporated" (Bergmann & Sams). They found that when students actively engaged in class, they were more prone to talking, participating, and expressing themselves. Their energy was able to go from lacking and just being there to actively



participating. Tucker, from EducationNext, also found that the Flipped Class's approach to the active learning helped him with being able to deal with the struggling students' involvement in class. He began to encourage his students to speak out in class as opposed to just sitting there and not talking.

A result of assigning video lectures and other types media learning in a FC can actually result in the classroom becoming more "profoundly human" (Bergmann & Sams). Berrett agrees that because the educators will have more time to build a relationship with students, that the assigning of videos allows for more person to person interaction (Berrett; Bergmann & Sams). Bergmann and Sams feel that "these interactions with the students are some of the richest times we experience in our classrooms" because the Flipped Class allows for active learning, and being able to have more conversations with every student (Bergmann & Sams).

Curtis-Dickenson, in an Edutopia article (Curtis-Dickenson), believes that Project Based Learning, or PBL, is beneficial to the active learning environment because projects can create a greater learning of a topic. She states that "one of the hallmarks of high-quality Project Based Learning is an emphasis on collaboration and shared responsibility". By applying this to the FC, she suggests that the best course design for the PBL includes the student's choice, having a clear made out rubric for success, and being able to coach a team to be successful (Curtis-Dickenson).

Differentiated Instruction, DI, is defined as a method of instruction "to accommodate the different ways that students learn and advocates active planning for student differences in the classroom" (Tomlinson & Allan). Dewey believes that any learner should be an active and critically minded member of society. This furthers the context that the Differentiated Instruction has its importance. Because each learner has their own way of learning and knowledge that they already bring with them, there has to be a space for students to learn in different ways (Dewey).

The Flipped Classroom Approach creates an opportunity for the Differentiated Instruction because the use of class time is mainly for discussion. The educator provides feedback for each class, students can help create the requirements for their own projects to show their knowledge in whatever way they want, and they are able to learn content at their own time, which again recognizes and supports the student's choice and learning preferences.

In addition, Lage et al. had once researched Differentiated Instruction in the Flipped Class to see if flipping a class would be to the benefit of the students. They found that a traditional type of lecture classroom does not meet the needs of the many students. Instead it "appeals to a relatively narrow and homogenous subset of students" (Lage et al.). They found that students with a visual or auditory learning preference and those who prefer learning through experiential instruction do much better in a FC structure (Lage et al.). Generally, they found that "access to technology for self-paced learning creates a more inclusive class environment, where collaboration rather than competition becomes key". They found that an educator has more time with each individual student when utilizing a Flipped Classroom Approach, and that students have the ability to customize the way they learn and show their knowledge, and has a huge positive impact on both the student's motivation and their achievement of outcome goals. Finally, they recommend that educators should not focus on the use of technology or educational media, but that their support of the FC comes from the flexibility of the FCA, and being able to develop relationships with each student.

November and Mull, from November Learning (November and Mull), also recommend the Flipped Classroom Approach as it values DI. They state that the structure of the Flipped Class allows for the educator to tailor the work the students, giving them the best possible potential for learning (November & Mull). They claim that student made videos may possibly

assist those who are having an issue through the peer modeling and PI. They concluded that they have confidence that “the key to motivating and including students is to honor the knowledge they have, challenge them to dig deeper, and not hold back their potential”.

The idea that educational videos can help support the learning process with individual and independent study is advocated by Khan. When Khan began to record his math videos for his younger cousins, he believed that the videos would give them a better handle on their own learning. He hoped that through these videos, they could skip over anything they felt that they had mastered, and use more time to re-watch the parts of the videos that they didn't understand. He has since founded the Khan Academy, and his videos are sometimes used in flipped classes because they are usually professionally made, and they provide clear explanations and advanced content lessons (Sams). However, without constant active practice during the learning process, the content from the videos on Khan Academy do not provide a thorough learning, as in reference with Bloom's taxonomy of learning. Khan himself has said during a TED talk in 2011 that he believes videos will take the place of future educators, however this is not a supported theory from research into active learning theories.

Bergmann and Sams warn that there are wrong reasons to flip a class. One reason was that some educators might just want to flip their class simply for the sake of using technology, meaning that the educator just wants to teach the course via videos. Some educators believe that flipping the class will make their jobs easier by just asking the students to sit and watch the videos. By doing this, they undermine the values and benefits of the FC. Bergmann and Sams state that the core of the Flipped Class Approach is the belief that “pedagogy should always drive technology, not the other way around”. Bennett has also expressed concern that “educators are going to turn these amazing resources into pop and play video lessons just to say they use them.

I'm afraid that the power of videos will be lost by just handing out an accompanying worksheet" (Bennett). This in turn perpetuates passive learning. Bennett also warns that if educators only have the students do the activities on their laptops, then they are not creating communication or a collaborative environment. This will lead to students not being able to develop critical thinking skills or independent learning skills. He has advised that creating an FC where "students watch Khan videos in class while the educator drinks coffee is directly opposed to what the flipped class stands for" (Bennett). Bennett remains concerned that educators might abuse videos as content delivery, and emphasizes the need for educators to focus on project-based learning and PI during class.

## **Challenges**

According to research about the Flipped Classroom Approach, there are three main types of challenges: access to technology and access to time, the professional skills needed to apply this method to a class as well as the skills needed to manage the technology and media aspect, and the approach an educator takes in implementing the FCA in their class, whether it be leaning more towards a traditional instruction based course, or maybe not including the use of media.

The concern over access to personal electronic devices for all students is a generally talked about issue, found in most literature (Hanover Research; Green; Socol; Tucker). Socol, an educator and researcher from Michigan's Integrated Technology Initiative, raised an issue involving those students in poverty having a lack of access to technological devices, whether it was through their school or otherwise, and that those students may not have a quiet place to study, be it at home or elsewhere, even if they did have the access to technology and the videos provided for the class. She made a note that this is seen in some areas of America where the rates

of homeless students in public school systems is high, and that by assigning homework that requires technology is not respectful towards those students with the disadvantages. In a worst case, she believes that the FC is just another version of homework with “videos instead of text”. She believes that even though watching videos may be better than reading books for some of the students, there still remains “no more choice, no more explanation, no more interaction” than in traditional models of instruction. She states that “the parts of education which require the most care, the most individualization, and the most interaction between educator and learner are when content is introduced”.

Regardless of the students’ background, it is still the educator’s responsibility that all of their students have the access and ability to use an electronic device before the beginning of the course (November & Mull). By ignoring the issues involving access to technology, educators are not acting in the best interests of the students. Research suggests that after finding if students do not have the access to devices, educators can preparer an alternative method of information transfer by placing audio or video material on CDs or DVDs, which could then be accessed on the students’ home DVD player. It is important for students to be able to access their work and homework while at home, and not just when the educator is delivering the homework at school, and for the educator to make sure that this is possible before assigning videos or other media for that course. November and Mull state that “schools might work with local libraries and community centers to make access to this material very easy for students. We can agree that it will be quite important for educators and school leaders to understand their communities and think creatively about ways to create equitable environments for learning.”

Socol has questioned the ethics of assigning homework altogether. She believes that homework is not a valuable way to support the delivery of content learned in class, and she also

claims that it takes away from one's family life (Socol). Fulton makes an argument that a student's time is better spent on recreational hobbies or sports when not in school (Fulton). She also states that "too much time and importance are placed on homework. If students do not do their homework, they cannot often catch up". Although it can be quicker for students to catch up on any missing work in the FC, Fulton believes that educational videos are still an annoyance to students. She and Socol believe that school should be the place for school work, and any time outside of school should be used for family, sports, hobbies, or other areas of interest.

Even proprietors of the Flipped Class have concerns about the time needed for educators to create their courses. Stanford University hosts a webpage, "*What are the main things an educator needs to do to teach an online class?*". One part of this webpage describes the putting together of a six week course using the FCA, with Stanford stating that the educator needs to determine the goals of the course, needs to record all lectures used for the six weeks, identify ways students will engage with the content, create the quizzes, which they say should be 1-2 quizzes per 15 minute video, create standardized tests for the content, and design a rubric for grading the projects assigned that the students will have to complete (Stanford University). They state, based off this, that although using the Flipped Class is a good model, it requires just about double the amount of work needed by an educator for a normal classroom style of teaching. Murphy states that the FC is "a pile more work. I've spent several days in the past few weeks restructuring my entire course, recording and editing a bunch of videos, posting them to YouTube, setting up a blog, scheduling the posts, tweaking my presentations, and integrating everything to the BlackBoard LMS". She believes that in the end the Flipped Class is worth the time, but still suggests that educators consider their schedules and the values that the FC holds for their students before deciding to embark on making this commitment. In most cases, it is

found that it is more time consuming to design projects and assessments than it is to merely lecture during the class time (Murphy).

Some say that the time investment will happen every new semester (Friedrich). The belief is that educators should not reuse course material and projects, making content tailored to the new students' needs. One of the main challenges is creating lecture videos and making them different according to the feedback given by the students who have seen the material already. The FC requires a lot of effort, care, and personal energy on the part of the educator. Some educators often underestimate the time needed to take note of students' comments. Generally, Stanford's assessment of the time needed to create a Flipped Class based class is accepted, because educators need to condense their lectures, engage students in class, and design projects which apply coursed content. Some choose to continue using the Flipped Class because they believe it proves one of the best models of instruction for their students.

Although most educators who use the FC say that it is not about using videos, they must still be able to use technology to create educational media. Most educators tend to use professionally made videos, such as those by Khan Academy. However, choosing one's own content in the lecture videos and modifying it for a specific group of students is considered the best practice for a Flipped Class (Friedrich). Some research shows that there is an emphasis on professional development and how to use educational media to record lecture videos (Bergmann & Sam). However, the need of professional development is not needed in only the Flipped Class, but for every educator.

Educators need to change their approach to using technology in regards to the FC. This includes the use of recording videos, creating online forums, and adding quiz generators. Daniels, a specialist in educational technology, has written that "one of the challenges of

traditional professional development is that everyone comes with a different set of experiences and skills”, with this in regards to the classroom. In 2013, she had a workshop that was on teaching educators how to use the Flipped Class. In this workshop, she focused on the point that educators need to know educational programs thoroughly before implementing them into the classroom (Daniels). An example she gave was that if she was working “with a group of educators on how to use Google Docs with their students, and half of them never used Google Docs before, then there are two very different experiences that need to be addressed in the delivery of new information”. One task needed is to teach educators how to use Google Docs, and then teach them how to show students their use. Most times, students will already know how to use programs and media. However, an educator should be prepared to be able to teach students these skills if necessary (Daniels). Daniels also notes that the ability of video setup and recording takes strong technical skill on the part of the educator, and that the use and creation of poor-quality videos are not helpful for communicating content.

Some concerns involving video recordings revolve around the quality of educational videos. Videos might be too long, programs or devices may be too complicated or glitchy to use, and some programs might give off the aura that they are still under development (Bergmann, Overmyer, & Wilie). Educators must become familiar with educational media tools in order to address these concerns. Baker, a communications professor at, gave a presentation on how educators can use online web tools and web course management programs to present instruction online (Baker). He reported on specific technology and implementation strategies that educators could use, acknowledging that he had to spend a lot of time learning how to use the programs he has advocated for.



The FCA takes significant professional development time for most educators as they learn how to use the new media. These skills will be useful in an educator's personal and professional development. McCallum states, however, that the educators should take a slow approach to learning the use of the media over a longer period of time before implementing it into their Flipped Class because it is unreasonable to expect an educator to learn how to use new material in a short one semester period of time (Friedrich).

In 1975, Harvard Professor Eric Mazur became frustrated with his students when they could not grasp his most basic explanation of a physics concept. He asked them to "turn to the person beside you and persuade one another that the answer you arrived at is correct." He has found that even small amount of peer collaboration can lead to greater student engagement and help them with the understanding of more complex topics. He called his method "Peer Instruction". He asked his students to read material and watch videos before coming to his class so they could have more time being able to discuss the content with each other as opposed to listening to him lecture or read from a textbook out loud. He also stated that this could go for any educator in any subject. Mazur has made note that students are oftentimes in a better spot to support each other because educators who are experts in their respective fields can often forget that students can face challenges and obstacles learning material that is looked at as simple by the experts (Lambert).

Finally, the Flipped Class values active learning even though the educators are not standing in front of the class speaking to everyone. Under the FCA, the educator's feedback and support are necessary for students to find success (Bergmann & Sams). Educators should be engaged in creating a different and flexible learning environment, which is taken from the value of their guidance to help change the learning culture of the Flipped Class (Hamden et al.).

### **Personal Encounters with the Flipped Classroom Approach**

I have personally encountered the Flipped Classroom Approach in many of the college courses that I have taken throughout my schooling career. From courses in the Humanities to courses in the Sciences, it seems that more and more professors have adapted the Flipped Class in some way, shape, or form into their classrooms. To me, the most notable of these classes was my New York state EMT course.

The course ran from January of 2019 until mid-April 2019. We were given a roughly 1500-page textbook on the first day of the course. The class met every Tuesday and Thursday night from 6:30-10:00 PM, and on some Saturdays in the morning. For each class, we were expected to have read one or two chapters of the book, depending on the schedule, and come to class with questions, as well as complete the quizzes for each chapter. For each class, a student was chosen randomly to go up and try and teach one of the chapters to the rest of the class. No one knew who was going to be chosen, so we all had to make sure that we read the chapters otherwise we would go through the entire evening in what we came to call “death by slides.” The textbook came with an online site that had an e-book, comprehensive slides, and case studies for each chapter. Each set of comprehensive slides was roughly around 100 slides or more, making it a very boring and daunting class if we ended up having to learn by slides.

I found this to be a more engaging style of learning because it meant that we as the students had to be on top of learning all of the material beforehand and to make sure that we had enough of a grasp on it in order to be able to relay the information to our fellow classmates. While everyone who was in the class did well when they presented the materials, some were better than others. This one woman was called up to run the class through our Anatomy chapter.

She works as a nurse, so luckily, she knew all of this beforehand. She made it engaging and fun because we had a (fake) skeleton in the front of the class to point to for the bones and to where the organs should be, as well as Styrofoam and other plastic fake organs to look at. Some parts she would call by a name she made up for them to help her remember, such as the Foramen Magnum, meaning great hole in Latin, which is the hole at the base of the skull where the spinal cord passes through. She called it the “Brain Drain” because it is the opening at the bottom of the skull and she found it funny to think of it as where everything drains out of the head.

When I was called up to teach the class it was for the chapter on Patient Assessment. This was a long chapter detailing the step by step process we would have to take as EMTs in the field when we would get onto a scene and evaluate our patient. There are five main parts to a patient assessment: Scene size-up, primary assessment, patient history, secondary assessment, and reassessment. Scene size-up consists of scene safety and scene management. All this means is making sure there is nothing on the scene that could pose even more of a danger to the patient or yourself, and to make sure that you have the right amount and the correct type of resources available for that call. Primary assessment is the assessing of the patient’s consciousness, life threats, and the need for any life saving interventions that might need to take place right away. The EMT must check the level of consciousness by talking to the patient and seeing if they respond right away, or if they respond to a painful stimulus like pinching the shoulder, or if they might be unconscious. Then the EMT has to check what is called the ABCs, meaning Airway, Breathing, and Circulation. If the patient talks to you, they are breathing and they have what is known as a patent airway, meaning they have a clear airway. You then have to listen to their lung sounds and check their pulses in their wrists in order to determine circulation. Should the airway be obstructed, or their breathing be impeded in any way, immediate interventions must take

place, such as giving oxygen, suctioning the mouth for any fluid, or clearing the airway of any obstruction.

Next is to take the patient's history. This means asking them what is bothering them that day, called the chief complaint, assessing the mechanism of injury or nature of illness, which is determining if it is a medical or trauma call, and asking them questions which would satisfy two acronyms, SAMPLE and OPQRST. SAMPLE stands for signs and symptoms, allergies, medications, past pertinent history, last oral intake, and events leading up to. In short, finding out what happened and determining any signs from it, if they are allergic to anything, if they are on any medication and if they've been taking it and how it has been affecting them, any recent medical issues that might pertain to the call, the last thing they ingested be it food or drink, and what they were doing before they needed to call for EMS. The last part, events leading up to, leads right into OPQRST which is onset, provocation, quality, radiation, severity, and time. The E of SAMPLE and O of OPQRST basically go hand in hand because once you find out what happened right before the call, you know the onset of it, or when it started. Then the provocation is finding out if anything makes their pain better or worse, i.e. sitting up, laying down, laying on their sides, and so on. Quality is asking them to describe the pain in their own words, radiation is if the pain radiates to any other part of their body and not just being localized to one area, severity is asking on a scale of 1-10 to rate the pain, and time is a bit redundant because it is asking at what time did the pain start, but it could be that it had been ongoing for a few days but the pain became intense enough for the call just that day.

Secondary assessment is the taking of the vital signs, which include blood pressure, pulse, taking note of the color, temperature, and texture of the skin, listening to their lung sounds, checking their respirations, and checking their eyes for dilation/contraction. Blood

pressure is taken with a blood pressure cuff and a stethoscope and you're listening for two things, the systolic pressure which is the first sound you hear when letting the air out of the cuff, and then the diastolic pressure which is when you stop hearing any sound after letting air out of the cuff. Pulse is taken usually on the wrist and you're counting the number of beats you feel over a 60 second period, or a 30 second period and just multiplying by two. The skin is just feeling it and noting the color, temp, and texture; it could be cool, pale and clammy, or warm, dry, and pink. Listening to the lungs requires a stethoscope and just placing it around the area of the lungs and having them breath in. Counting the respirations is the same as the pulse, except you are just counting how many times they breath in the 30 or 60 second period. And then using a pen light, you shine it into their eyes to determine if both react to light.

Finally, reassessment if just retaking the vitals every 5, or 10, or 15 minutes on the way to the hospital, depending on the type of the call. Most common is retaking everything every 5 minutes.

I found there to be a huge different between teaching the class and being a student and listening to the others teach the class. When I would be listening to others, there were times I found it hard to pay attention because they were either not fully confident with their ability to teach, or were just boring teachers. Most of the other students made it engaging, and some even had practical skills along with their lessons, like mine. We got to apply the assessment skills in mock calls to test if we were able to take the concept of what we read and learned and used it in a real-world scenario. I found lessons involving the hands-on skills practice to be more enjoyable than just the lecture lessons.

### **Interview with Prof. McMullen**

I interview Professor Barbara McMullen regarding her usage of the Flipped Classroom throughout her career. She has been teaching for over 20 years, using a mixture of fully online classes and hybrid/flipped classes. She told me that when in regards to her experience as an educator, she has had a predictable experience using the flipped class. Being the Dean of Online Learning at Monroe College allowed her to establish the requirements for both students and faculty.

Later on, she taught at Marist College. Here she found that both students and faculty have successes and failures when it came to using and learning from both online and hybrid format classes. She said “I found that it was important to select students for hybrid and online classes as opposed to permitting students to select these classes in the same way they selected traditional classes.”

She found there to be a line for where students should be academically in order to take online or flipped classes. “I found that students with GPAs below a set standard and who have had previous class failures should not take online and flipped classes. Freshman should also be excluded from courses with these formats. Students who take these classes must have good time management skills and the ability to learn on their own. This is not to imply that students are expected to do all the work of the instructor. However, they are expected to do work that they traditionally expected to be done by the instructor, while they pursue learning in a different way... Students who expect these classes to be easier and less rigorous should not be enrolled.”

When asked about her enjoyment of teaching using a flipped classroom, Prof. McMullen said “I really enjoy teaching alternate formats. Even in a traditional classroom, I add an active

learning component. This is usually some form of lab. For Mathematics for Contemporary Life, I have a series of Excel labs scheduled, which we do together in the computer room. The students both enjoy these sessions and learn the topic being taught more significantly. For example, if I am teaching the students how to calculate descriptive statistics such as mean, median, mode, minimum, maximum, range, variance and standard deviation, I include two Excel labs that explore how they would do these calculations in real life.”

I then asked her about what she perceived as the benefits and limitations involving teaching via a Flipped Class. She told me that “One of the obvious benefits of a flipped classroom is the depth of learning that can take place. Given students who are prepared to learn in this fashion and faculty who do it well, I believe that students gain a more significant understanding to the subject matter. I would use this format for all students and faculty who are prepared for it.” And for the limitations “It is always resources. Our schools are still set up for traditional learning. It took years to get computers, projectors, smart boards, et. al., into the classroom. Finding and scheduling space for an active learning component are challenging. Training faculty is challenging. Ensuring the students enrolled will succeed is challenging. All students should experience alternate formats. They will be asked to deal with them when they leave school, either in their place of employment and for their own advancement. We should be preparing all students to learn on their own in a continuous way. This is a change that is coming but will take time.”

Finally, I asked her about how the Flipped Class has changed her as an educator. Her response was “My primary occupation was not as an educator, as such. I was a Wall Street computer person, who taught continuing education classes on the side. At some point, I moved more into education, finally landing at Marist College in a variety of administrative positions

where I had the opportunity to study learning. I was the Assistant to the President for Technology and also ran three technology centers that offered online and hybrid learning. These were the Center for e-Commerce, the Institute for Data Center Professionals, and the Center for Collaborative and On Demand Computer. These were industry focused centers, where we had total flexibility in delivery design. We experimented with many ideas and I became convinced that deeper learning can be achieved in a hybrid/flipped classroom than in a traditional one. I learned from the experts. I was working in education when Quality Matters was being developed out of MarylandOnline and all sorts of student-centered models were being explored. John Bourne, currently the editor of the International Journal on Innovations in Online Education was my mentor. It was an exciting time for me.”

## **Conclusions**

The Flipped Classroom revolves around the way an instructor mixes the method of content delivery and application of the knowledge acquired. The delivery is normally found in the forms of videos or PowerPoint lectures that the students will engage with at their own leisure, and the checking of the knowledge is usually in the form of labs or quizzes where the instructor is present to direct the students as they apply their new found knowledge.

There are a lot of benefits to the Flipped Classroom. Students can take their time when going to learn the new lecture material. In a traditional class, students have to keep the pace the instructor sets. If they have a hard time understanding a lecture in class, the instructor then has to go back and interrupt the flow of the class to cover something a second, maybe even third time. In contrast, in the Flipped Class, students can go over the material as many times as they need in order to understand it. This gives the students more control over the class itself. The Flipped



Class promotes student-centered learning and collaboration. This encourages students to teach and learn concepts from each other, with their teacher there to provide any guidance necessary. By allowing this, students are able to take ownership of what they learn, because they are partially being counted on to help others understand. And, any student who is absent due to illness, a too long of a commute, or for any other reason, can catch up on the material with their classmates faster and easier with the Flipped Class than with a standard class.

The Flipped Class has brought about constant debates on its effectiveness. Most often, the problems and issues associated with the FC are brought up in the conversations. These problems include the time constraint on the educators when faced with the need to create this class from scratch, the time commitment it would take on the part of the students in order for them to fully understand the material for the class, the need for access to technology on both the part of the educator and the student, the skills needed to use and learn from the technology, and on the educators part, the ability to make sure the material used for the class is accurate for the class itself.

With the problems of the Flipped Class also come the successes. These successes include that the students learn how to study on their own, they learn how to apply the skills they learn through the Flipped Class into other classes, which include being able to work at home, finding resources outside of what is given to them, and being able to help others learn.

Altogether, the Flipped Classroom is an experiment that continues to be used and expanded upon with each implementation of it. Whether it be in high school or college, the educators and students who take part in a flipped classroom come out with knowledge that they did not have before about themselves. The Flipped Classroom will continue to be a vital part of

the education system, and it is my belief that it should be implemented in more schools by more educators because it is a worthwhile tool for education.

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