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Flipped Classrooms: Student Engagement Enhancing Student Success and Satisfaction

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DEDICATION

To my wife Erica: Everything that I have accomplished would not have been possible without

your continued love and support.

To my parents Jon and JoAnn: You have always believed in me and taught me that through hard

work and determination I can achieve anything I set my mind to.

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Abstract

With a growing use of digital technology in homes and at schools, student engagement in academic content can be difficult to achieve. In some cases, students are more engaged with a cell phone than the classroom content. A flipped classroom creates an avenue for educators to utilize the digital format in a purposeful and meaningful approach. By utilizing the flipped learning model, the time students spend in the classroom can be devoted to active learning activities rather than listening to direct instruction through a lecture format. The increase in student engagement due to these active learning activities has shown to increase student success, but not necessarily student satisfaction. This student-centered model of learning can increase student success or achievement due to increased understanding of topics through more autonomous and carefully delivered curriculum. Although the research is not consistent with a connection to flipped classrooms and student satisfaction, the flipped learning model may increase student satisfaction when applied to an appropriate age level and curriculum. While there is still more research to be done, flipped classrooms are clearly an appropriate learning model to increase classroom engagement when applied with careful preparation and implementation.

Keywords: Flipped Classroom, Flipped Learning, Student Engagement, Student Success, Student Satisfaction, Student-centered Learning, Active Learning

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Chapter One: Introduction

From chalkboards and overhead projectors to Smartboards and iPads, the evolution of technology in the classroom has been transforming the way educators approach molding the minds of the youth for decades. One of the most significant differences between today's technology and the previous generations is a greater use of electronics. In 1984, only 8 percent of households in the United States had access to a computer (Ryan et al., 2017). In 2018, 92 percent of households had computer or smart device with internet capabilities (Bureau, 2021). This increase in accessibility of computers opened a window in education that had not always been available. It allowed the ability for teachers to utilize different teaching platforms through computer programs, videos, and content specific demonstrations. If a teacher wanted to attempt the use of these different platforms, a teaching strategy that can be implemented is the flipped classroom.

A flipped classroom (or inverted classroom) can be used to describe a variety of different class structures. In a simplistic model of the flipped classroom, students receive lecture or direct instruction via video or audio at home. The following day in class students will then expand on that content by participating in class activities or labs (Educause, 2012). In this more student-centered model of teaching, the classroom is quite literally "flipped" in the sense that what is traditionally done in the classroom is now done at home, and vice versa. By creating a more student-centered model, the flipped classroom creates a self-learning environment with teacher instructional support that facilitates a level of cognitive and agentic engagement (Muir, 2018). This type of model can also influence student success and satisfaction due to active learning and effective use of class time (Talan & Gulsecen, 2019).

In the contemporary educational setting, educators must lead equitably and inclusively in order to positively impact student development and learning. A flipped classroom provides an avenue for teachers to utilize to make this happen. When utilized correctly, a flipped classroom allows the teacher to meet different academic needs of students simultaneously. Students may show different levels of cognitive engagement within a given lesson, and teachers can fix their attention on the students who do not seem to be making a connection between the content and the in-class activity. Flipped classrooms can be used in a variety of different classrooms, and it allows teachers to expand their horizons on in class activities. This type of learning environment has potential to impact all classes, but more importantly it has potential to impact all students.

Importance of the Topic

The structure of a flipped classroom may be set up different based upon several different factors. A flipped elementary class may have simple active learning objectives, whereas a flipped high school class may have more complex discussions and projects. Additionally, a flipped history class may look different than a flipped science class, with one focusing on discussion and the other focusing on labs, respectively. But what they all share is student engagement in more than just rote memorization, but in activities that give students a real-world aspect. Educators like Hwang (2015) have noted that there is a certain level of importance to engaging students in these types of activities. Teachers would be able to become facilitators of great conversations or group efforts, instead of fighting the constant battle of repetition through direct instruction. There is a paradigm shift taking place in education where the teacher is no longer just there to provide the knowledge, but also to help students to construct knowledge in a world where there is a multitude of diverse learners (Hwang, 2015).

To meet the needs of multiple types of learners, and with the power of the internet, teachers can find and utilize ideas from other teachers. In a world forced into different learning models such as hybrid or distance learning models, teachers have been forced to create content in ways that many would have never expected, and many of these avenues have been through the use of online videos. If posted publicly, this allows teachers to view the content of others and see how another educator might phrase a certain topic, or it may spark a new idea for that teacher. It essentially opens a window for teachers to "step" into other classrooms without having to go far out of their way (Fulton, 2012). This type of peer review can be much more difficult to accomplish in the traditional classroom setting because teachers may not have the option to visit another classroom during a normal school day.

Scope of the Research

The focus of this study is to examine quantitative, qualitative, and mixed methods research centered on flipped classrooms. The studies found in the literature review cover a wide variety of classrooms but share the commonality of the use of flipped learning, or some version of a flipped classroom. The three themes that are discussed in this paper are student engagement, success (or performance), and satisfaction. The primary aspect of the paper is how a flipped classroom correlates to student engagement, student success, and student satisfaction. There will also be a focus on whether there is a direct correlation between student engagement, and success and satisfaction.

Research Question

In light of what is known about pedagogy in the contemporary educational setting, what are the effects a flipped classroom has on student engagement, success, and satisfaction? The answer to the research question is discovered through the analysis of multiple research studies.

While examining the correlation between flipped classrooms and student engagement, it is noted whether student engagement is the factor that helps to increase student success and student satisfaction. These inquiries will help educators to lead in a more inclusive manner while also enhancing student development and learning.

Definition of Terms

Active Learning "is an approach to instruction that involves actively engaging students with the course material through discussions, problem solving, case studies, role plays and other methods" (Active Learning, 2022).

Flipped Learning is a method of learning in which in class activities include more group work and active learning, and direct instruction takes place at home in a video or audio format. The educator is present in class to guide students as they discover concepts on their own, utilizing knowledge from the previous home video or audio lesson (Flipped Learning Network, 2019).

Student Engagement is referred to as a "degree of attention, curiosity, interest, optimism, and passion that students show" while learning at home or within the classroom (The Glossary of Education Reform, 2016).

Student Satisfaction is how a student perceives their own outcomes and experiences within the educational environment and is based on a scale of favorability (Dhaqane & Afrah, 2016).

Student Success is an outcome in which a student has developed "educational attainment, academic achievement, student advancement, or holistic development" (Cuseo, n.d.).

Traditional Classroom is a form of teacher-centered instruction where all or most of the student learning and instruction occurs within the classroom and the two parties can interact face-to-face (Hassan et al., 2014).

Summary

By examining and reviewing research around flipped classrooms, conclusions can be drawn about student engagement, success, and satisfaction within a flipped classroom. According to the research, flipped classrooms can provide student success and satisfaction that is driven by self-paced engagement (Muir, 2018). If structured correctly, this can be accomplished while giving students an opportunity to learn through a real-world lens. In chapter two of this paper, themes will be provided that are derived from a literature review of a multitude of qualitative and quantitative studies that revolve around the flipped classroom model and help to answer the research question. Chapter three will look at implications for the use of this research and applications for the future.

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Chapter Two: Literature Review

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The flipped classroom has been around since 2007 when two teachers from Colorado discovered they could create recordings of their lessons using a Microsoft PowerPoint and a recording software (University of Waterloo, 2015). These two teachers, Bergmann and Sams, would pioneer the beginning of an entirely new approach to teaching by creating the first working model of the flipped classroom. The outcome of their theoretical strategy turned heads of the world and created a new way of approaching teaching by using the flipped classroom. To examine the efficacy of the flipped classroom, this chapter will investigate and review previous literature completed on this topic through a combination of qualitative, quantitative, and mixed methods research approach.

The themes found throughout this chapter are metaphorical to a domino effect, where one cannot fall into place until the first one has. The themes found are student engagement, student success, and student satisfaction. The goal for educators is to have successful and satisfied students, but this cannot take place until the first domino has fallen, which is student engagement. Once students have become actively engaged, then they will find themselves becoming more successful, and success will breed student satisfaction.

The first theme found in the literature is student engagement. This was shown in the research completed by Boevé, Meijer, Bosker, Vugteveen, Hoekstra, and Albers (2017), Caicco (2016), Clark (2015), Entezari and Javdan (2016), and Muir (2018). The approach to measuring student engagement in these studies varied. Some would use a qualitative approach in which students would participate in a post study interview, while others would collect data quantitatively via surveys including Likert scales. For the purpose of comparing flipped classrooms to traditional classrooms, student engagement can be measured via out of class activities or in class activities. There also may be different levels of engagement such as group engagement or individual engagement.

The second theme found throughout the research was done by Say and Yıldırım (2020), McCallum, Schultz, Sellke, & Spartz (2015), Holik, M. (2019), Alsancak Sirakaya, D., & Ozdemir, S. (2018), and AlJaser, A. M. (2017) is student success. Success of students can be measured by using multiple instruments or strategies as shown throughout the studies. Most of the data collected to measure student success is measured through quantitative measurements such as test scores or final grades in certain classes. In most cases, a traditional classroom was used as a control group, if a control existed at all. The experimental group in each case varies as some form of a flipped classroom.

The final common theme found in research on flipped classroom is student satisfaction. Research done by Lawson, Davis, and Son (2019), Talan and Gulsecan (2019), Gross, Marinari, Hoffman, DeSimone, and Burke (2015), Dooley, Frankland, Boller, and Tudor (2018) and Yilmaz (2017) use mostly qualitative data to approach identifying student satisfaction within a flipped classroom. Most of the data collected from this research are based around student opinion and can be difficult to measure quantitatively. Due to the varying nature of one's definition of "satisfaction," the answers received from students in most cases are viewed as a class majority.

The three themes will be explained and broken-down study by study. Within each study, background information of the research will be given such as demographics, the purpose, methodologies, and findings. Limitations to the studies will be discussed as well. The evidence provided throughout the literature review will demonstrate that while student success and satisfaction are what all educators strive for, the first step must be student engagement. Only then can the first domino begin to fall to start this domino effect.

Student Engagement in A Flipped Classroom

The first study examined was completed by Boevé, Meijer, Bosker, Vugteveen, Hoekstra, and Albers (2017). The purpose of this experiment was to study student behavior in a flipped classroom as compared to a traditional classroom (Boevé et al, 2017). Research done in this experiment to study behavior of students used a quantitative approach to comparing a flipped classroom and a traditional classroom of an introductory statistics course. The participants' grade in each class was solely determined by the final, which was 100% of their grade. Participants in the flipped classroom had access to a fifteen-minute preview lecture, and students were required to come with at least one question for 8 out of the 13 classes (Boevé et al, 2017). Once a student

brought a question to class, they were asked to answer it themselves, then try to have their peers answer it, and eventually the lecturer would contribute to the answer (Boevé et al, 2017).

The study data showed this type of student engagement as compared to the traditional classroom increased question response rate. It also decreased the number of hours a student spent studying lecture slides and number of hours spent reading the course book (Boevé et al, 2017). Although in this study, there was no conclusive data in relation to student performance comparing a flipped and traditional classroom, it does show an increase in student engagement within the confines of the classroom.

A similar study done by Clark (2015) shows how a flipped classroom can increase student engagement as well. Student engagement and performance were examined in a flipped classroom setting for a mathematics course to see if there would be an increase in engagement as compared to a traditional classroom. This study was also considered a mixed methods approach because it used both a qualitative and quantitative approach. There were 42 ninth grade participants in the study who were in a flipped classroom for Algebra I for a period of seven weeks (Clark, 2015, p. 98). Although the study used mixed methods, it was mostly centered around being qualitative because of the use of student interviews and a hand selected focus group of ten students. The result of this study revealed that students showed active engagement and learning while collaborating more with peers. Clark (2015) found learning levels were appropriately spread throughout the classroom. One group would work independently on classwork, another would work with the teacher on the Smartboard for additional help, and others would work with peers collaborating and discussing the media content from previous lessons. In the end, students were finding the instruction to be higher quality. The ability for the students to be able to access the content 24/7 and review whenever they liked was a huge

advantage for many students (Clark, 2015, p. 105). The study done by Clark was limited in the

sense that it was only examined over a seven-week period. However, it showed students can

handle a model in which they are being strategic or self-regulated (Muir, 2018).

This idea of self-regulated learning is also shown in the research by Muir (2018), where

four types of engagement (behavioral, emotional, cognitive, and agentic) both within and outside

of the classroom were examined using a flipped classroom (Muir, 2018). In this traditional

flipped classroom, students would watch lecture videos made by the teacher while they were at

home, then return to school and expand on this knowledge in class. This mixed methods

approach consisted of 27 students in a Grade 12 secondary math class in Australia (Muir, 2018).

The quantitative data collection consisted of 42 Likert scale items ranked from 1 to 10 based

around the general use of online resources (Muir, 2018). The qualitative data was derived from

focus interviews from 20 of the 27 students.

Ninety three percent of students stated that they watched the videos from beginning to

end which showed students took ownership of the videos and maintained a sense of autonomy

(Muir, 2018). The qualitative data showed students began to make a connection between this

sense of autonomy and a sense of competence (Muir, 2018). One of the limitations to this study

showed it was not possible to observe the student's interaction with the videos at home, however;

100% of students agreed with the two survey statements: "The tutorials/videos helped me to

understand a concept" and "My teacher wants us to understand the work, not just memorize it"

(Muir, 2018). The key word of "us" in the statement helped to show that all students were made

aware that this methodology was engaging the entire class, not just certain individuals.

Another study focused on student engagement was done at the City University of New

York by Entezari and Javdan (2016). A fall and spring semester course of Anatomy and

Physiology were chosen to be a control and experimental group. In this study, both classrooms utilized the flipped classroom model, but the problem at hand was to compare a flipped classrooms with different levels of student interaction. Both classes had access to lecture notes and videos prior to the week's class, but the control group had minimal discussion in class, whereas the experimental group had group activities that facilitated active learning (Entezari and Javdan, 2016). These activities included but were not limited to one minute paper summaries at the end of class, group work and discussion, and a personal response card at the end of each instruction (Entezari and Javdan, 2016).

Each class was taught by the same professor, and data was collected quantitatively from each class by looking at the scores of three separate exams. Exam scores were slightly better on exams one and two for the active learning group, but there were no significant differences with exam three (Entezari and Javdan, 2016). This data helps to show not only the advantage of a flipped classroom, but how a flipped classroom can be enhanced even more by using active learning strategies. More than just better test scores, Entezari and Javdan (2016) note that there was a substantial improvement in student attitude and confidence.

Beyond looking at student attitudes, a study done by Caicco (2016) investigated the perceptions of a teacher as the educator attempted to engage students using a flipped classroom. By using semi structured interviews, qualitative data was collected from two teachers using flipped classrooms. Both teachers used a type of flipped classroom which has been deemed as a "first generation flip" or a "flipped classroom 1.0" (Caicco, 2016). The nature of this type of flipped classroom is the most simplistic in that students just have videos or PowerPoints to view at home, but no other extensive in class activities are taking place.

The Caicco (2016) study consisted of five different components, where one of them was "Flipped Classroom Advantages" from the viewpoint of these two teachers. The three main advantages these teachers found were increased student interaction, self-paced learning, and meeting students' needs (Caicco, 2016). One teacher stated how there was an ability to connect with students immediately in class and prevent mistakes that would have otherwise not been caught until after collecting homework (Caicco, 2016). The other teacher noted the benefit of students being able to pause, rewind, and rewatch any video they needed (Caicco, 2016). Finally, both teachers stressed how crucial it was being able to meet individual needs of students in the form of one-on-one instruction (Caicco, 2016). The main limitation to this study is the quantity of teachers being interviewed that used flipped classrooms. The study would hold much more weight if there were more than two teachers. However, beyond showing three crucial advantages to a simple flipped classroom, this study also showed that teachers felt the benefits of the flipped classroom, just as much as students did.

These benefits surrounding student engagement are just the beginning of the flipped classroom. Engagement will naturally help students to become more successful. The next section will discuss the next domino to fall in line with the flipped classroom, student success. By examining research data around student success and performance in a flipped class, a better understanding of future implications for it will be achieved.

Student Success in a Flipped Classroom

Once a student has been actively engaged within the content of the classroom, student success is sure to follow. The next theme found throughout the literature about flipped classrooms is student success, or student performance. Say and Yıldırım (2020) conducted a mixed methods approach of both quantitative and qualitative research to determine whether a

flipped classroom influenced student academic achievement. This study consisted of 63 8th grade students (33 girls and 30 boys) who were in the city of Konya in the 2017-2018 school year. The entire study was based in a science class at a state middle school and contained both an experimental group (flipped classroom) and a control group (traditional classroom).

The quantitative data showed the general success of the students in the experimental group was significantly higher than of those in the control group ($p < 0.05$) (Say and Yıldırım, 2020). In this case, the success was measured with an academic achievement test which was multiple choice. Success was also measured qualitatively through student interviews. These interviews showed an increase perception in the subject matter for many students (Say and Yıldırım, 2020). Students also showed an ability for students to be able to self-pace which further increased student success because they had more opportunities to go over topics that were not originally understood (Say and Yıldırım, 2020). The ability for students to self-pace themselves through outside class content is synonymous with the research completed by Caicco (2016). The interviews also revealed some limitations as numerous problems would arise throughout the learning model such as lack of internet at home, slow internet speed, and lack of home computers (Say and Yıldırım, 2020). The implications of this study showed that the flipped classroom can be used to not only increase student achievement, but also student engagement with the teacher, similarly shown by the studies of Clark (2015) and Muir (2018).

Another study reinforced the idea of student success driven by student engagement, which was done by McCallum (2015). In this mostly qualitative research study, a focus group of 60 students were interviewed after participating in a flipped classroom in college level courses. The focus of this study was to see how three themes supported academic success. The three themes of the study were academic involvement, student (peer-to-peer) involvement, and student

faculty involvement (McCallum, 2015). The data suggested the flipped classroom did enhance these themes, and therefore supported student success.

Students stated they felt more prepared for the class ahead of time, and while in class they were more connected to the content (McCallum, 2015). Furthermore, students discussed how much they appreciated the ability to receive immediate feedback with questions they already had prior to showing up to lecture (McCallum, 2015). Students also noted they felt like they built a stronger relationship with their peers and had a more approachable relationship with the faculty members as well (McCallum, 2015). The biggest limitation to this study is the fact that there was no control group, or comparison to a traditional classroom, therefore was deemed exploratory in nature (McCallum, 2015). However, it does offer insight for students recognizing their involvement in the classroom. These students were made self-aware that their academic, peer, and faculty involvement (as compared to previous traditional classrooms they had participated in) had increased and therefore showed a degree of student success (McCullam, 2015). This is further evidence that student engagement in a flipped classroom can have a positive impact on classroom participation and communication, such as in the study done by Clark (2015).

Another example of further research based around student engagement breeding success is the study done by Holik (2019). This action-based research utilized digital formats of technology such as was found in the above research. The main purpose of this study was to determine if success is derived from increased engagement within the classroom. Two culinary arts classes at the secondary level were used where 12 students utilized a flipped classroom with digital access to lecture content at home, and the other 12 listened to lectures in class (Holik, 2019). The main structure for the flipped classroom was a quiz every day at the beginning of

class on content from videos from the night before. This gave the instructor the ability to hold students accountable for watching videos at home and helped to find achievement gaps for individual students (Holik, 2019).

The quantitative aspect of the data focused on using an engagement matrix created by the researcher. The matrix utilized a scale of 1-4, where a 3 is considered "meeting expectations" for engagement (Holik, 2019). Five aspects of engagement were measured: in-class participation, engagement with instructor, peer engagement, student attentiveness, and student preparedness (Holik, 2019). The scores of the flipped versus traditional classroom started off very similar in the beginning of the course and began to diverge over the course of the semester (Holik, 2019). By the end of the 16-week course, the mean score for engagement in the flipped classroom was 2.98, whereas the mean score for the traditional classroom was 2.4 (Holik, 2019).

Seeing as there was a clear increase in the amount of student engagement throughout the course, this was compared to the academic performance of the students. Students in the flipped classroom scored on average 4% higher for a final grade in the course (Holik, 2019). The limitation to utilizing a final grade as a scoring factor was that it did not account for test taking abilities or authenticity of individual lab work. Examining grades on a per activity basis would provide further insight into the engagement influencing the increase in academic achievement. Holik (2019) helped to further establish the relationship between engaging students and the clear effect it has on student success.

The success found in many flipped classrooms are compared to traditional classrooms. However, one study shows how flipped classrooms also compare to other learning environments. In a quasi-experimental test completed by Alsancak Sirakaya & Ozdemir (2018), a student success in a flipped classroom was compared to the success of students in a blended learning

classroom in a Scientific Methods course. A blended learning environment is like a flipped classroom in the sense that some digital resources are used, but they are not the focus of lecture (Blended Learning, 2016). In the blended learning model, internet-based resources are used mostly for in class interactive activities (Blended Learning, 2016).

Alsancak Sirakaya & Ozdemir (2018) had multiple research questions posed when comparing these two learning models, with the primary question being, "Is there a significant difference between the experimental [flipped] and control [blended learning] groups in terms of academic achievement scores?" (Alsancak Sirakaya & Ozdemir, 2018). Classes sizes in the flipped and blended learning model were 32 and 34 respectively. An academic achievement pre-test-post-test format was used to measure student success within each classroom, which consisted of 40 questions. Results found the pre-test showed no significant difference between the achievement of each group, while the post-test showed an average score of 7% higher within the flipped classroom (Alsancak Sirakaya & Ozdemir, 2018).

This data was purely quantitative, and for that reason there were no details on the sample of participants within the groups, which created a small limitation to the study. The study did discuss some of the potential reasons for higher rates of achievement in the classroom. There was an ability for the students to learn theoretical material before class in the flipped model, which may have helped to provide for immediate feedback and stronger relationships between student and teacher (Alsancak Sirakaya & Ozdemir, 2018). This correlation between student and teacher echoes the results of the study done by Caicco (2016). The emphasis of this research shows how flipped learning environments are successful when compared to not only traditional classrooms, but also when compared to other learning environments.

Achievement tests, such as those used by Alsancak Sirakaya & Ozdemir (2018), are often utilized when collecting quantitative data. A study completed by AlJaser (2017) used a similar achievement test when comparing a flipped classroom with a traditional classroom. This study was unique in its limitation because it all participants involved were females (AlJaser, 2017). The students were attending the College of Education, Princess Nourah bint Abdulrahman University in Saudi Arabia, studying the course of Classroom Management. The study looked at the efficacy of flipped classrooms on student achievement by using the achievement test to measure cognitive levels of thinking of 24 random students (AlJaser, 2017).

The scores of the post achievement tests concluded the flipped classroom outperformed the traditional classroom, showing that the flipped classroom had an increase in cognitive levels of thinking (AlJaser, 2017). This aligns with one of Muir's (2018) four levels of engagement, where there was increased cognitive engagement found. Statistically, the study done by AlJaser (2017) aligns with findings by Say and Yıldırım (2020), McCallum (2015), Holik (2019), and Alsancak Sirakaya & Ozdemir (2018).

Each of these studies alone have limitations, with the largest limitation in most cases being some form of the sample size. When critically examining data for a flipped classroom, researchers may find difficulty in analyzing many students. However, when looking for statistical averages, there is an obvious trend in the data that shows flipped classrooms do increase student achievement from a quantitative aspect. The student achievement found in these studies can help to understand why students would enjoy a flipped classroom environment. The next section will look at student satisfaction in multiple facets, as the success of students creates the final domino effect.

Student Satisfaction in a Flipped Classroom

An overarching theme seen in many of these studies is student satisfaction. A study done by Talan & Gulsecen (2019) used quantitative data collection to determine the satisfaction of students in a flipped classroom. A quasi-experimental pre-test/post-test control group design was conducted at a state university in the Fall Semester 2017 in a class called "Computer-I" (Talan & Gulsecen, 2019). An immediate limitation to this study is found in the demographics of the classes. The experiment consisted of 119 participants, 88 who were female and only 31 who were male. The experiment consisted of groups Experiment-I (flipped classroom), Experiment-II (blended learning), and the Control (traditional classroom) (Talan & Gulsecen, 2019). This study determined students were satisfied with the flipped learning model, and students would even recommend that design for other classes (Talan & Gulsecen, 2019). This resonates well with the study done by Say and Yıldırım (2020) because it showed it provided a more relaxed and free learning environment. This more comfortable learning style can provide room for much more complex flipped classrooms, such as those found in the study done by Entezari and Javdan (2016) where an active learning environment was set into place.

Other studies have also taken the approach of a more complex flipped classroom as opposed to a traditional flipped classroom. In the study by Lawson et al. (2019), a different approach is taken for a flipped classroom. This study focused on the difference between a traditional flipped classroom and a Practicing-Connections (PC) flipped classroom (Lawson et al., 2019). The classroom that used PC is one in which concepts were treated like skills that needed to be practiced. These skills needed to be practiced in such a way that connections were made to these concepts by using different mental representations (Lawson et al., 2019, p. 80). These connections needed to be made explicit, students were expected to experience a productive

struggle, and these connections would become more complex over time (Lawson et al., 2019, p. 81). The basis of the PC flipped classroom followed the same guidelines as a traditional flipped classroom. The main difference is instead of simply pushing out content to students outside of class, the PC classroom had students continue to make connections outside of the classroom. This was through the form of well thought out worksheets, or even interactive videos (Lawson et al., 2019).

This quantitative study had 72 participants who were all enrolled in a class called *Inferential Statistics for Psychology*, which was an upper-level statistics course for psychology majors (Lawson et al., 2019, p. 85). This was a quasi-experimental design, where half of the students participated in a traditional classroom and the other half participated in a PC flipped classroom. The goal was to examine the outcome of each class based upon four lab test scores and the final. Students in both classes were given a test at the beginning and at the end which was to measure intelligence and math ability to measure whether there was a growth mindset within each group (Lawson et al., 2019, p. 86).

The results of the five exams showed the PC class performed significantly better in tests 1 and 5, and there was no significant difference in tests 2, 3 and 4. As for the results of the growth mindsets, the PC classroom showed a much more positive trend towards a growth mindset in the categories of intelligence and math ability (Lawson et al., 2019, p. 88). This is just another example of how a flipped classroom can be more than just having students watch videos at home. Students can build a more positive mindset towards learning like shown in this study, or as shown in the active learning shown by Entezari and Javdan (2016).

Talan & Gulsecen (2019) and Lawson et al. (2019) primarily focused on student success or performance, while other studies focused on all three themes found present in this literature.

Gross et al. (2015) used mix methodology to compare flipped and traditional classrooms' student engagement, performance, and perceptions. The focus in this literature was on the student satisfaction variable of the findings, in which Likert scale items measuring from 1-10 were used. (Gross et al., 2015).

Three faculty members at Saint Bonaventure University each taught a flipped and traditional version of their classes to conduct this experiment. Six Likert scale items were given to students at the end of each course on a scale of 1-10 with answers ranging from "Very Satisfied" to "Very Dissatisfied" (Gross et al., 2015). Overall, 88.9 percent of the students completed this survey, and did so before the final exam (Gross et al., 2015). The data showed the flipped classroom had a higher satisfaction rate in all six questions posed to students, with the highest satisfaction of 9.20 on the statement: "Quality of the instructor teaching me" (Gross et al., 2015).

The numerical data represented by three separate teachers helps to conclusively provide evidence that students do enjoy the flipped classroom more than traditional classrooms. However, when satisfaction was compared to student achievement in this study, there were no significant differences in grade point averages between the flipped classroom and those of the traditional classroom (Gross et al., 2015). Even though student performance did not directly correlate with student satisfaction in this study, there was a notable difference in how students perceived the class in terms of enjoyment.

Although data did show student satisfaction, Gross et al. (2015) did note there were notable challenges faced while implementing and utilizing the flipped classroom. Students had a difficult time adapting to the flipped classroom and the expectations that were required to be successful (Gross et al., 2015). It also took a great deal of preparation on the behalf of the

instructor because videos had to be created ahead of time, which could prove to be difficult for less experienced teachers (Gross et al., 2015).

Aside from implementation difficulties, there were a few studies that showed how a flipped classroom does not always yield student satisfaction. Using a similar approach where all three elements of this literature review are found, Dooley et al. (2018) used a flipped classroom in a veterinary pre-clinical science course to measure any significant differences in student engagement, performance, and satisfaction as compared to the traditional classroom. The flipped classroom provided lecture videos a week in advance, along with short learning activities before in class discussions (Dooley et al., 2018). This experiment was investigated in a class called "Foundations of Animal Health" and student satisfaction was measured both qualitatively and quantitatively within the same survey at the end of the course (Dooley et al., 2018). This subject experience survey (SES) contained both Likert scale items and a multitude of open-ended free response questions that would later be transcribed (Dooley et al., 2018). Additionally, some of the undergraduate students from each cohort participated in a focus group interview at the end of the study (Dooley et al., 2018).

This was one of the few studies found in the literature that showed little or no increase in each variable for a flipped classroom. Upon examining surveys on student satisfaction, there were only two Likert scale items that cohorts in the flipped classroom ranked higher than that of the traditional classroom (Dooley et al., 2018). These two items were: "Overall, this subject has been supported by useful learning resources" and "Focusing on my own learning in this subject, I have been in a group committed to learning" (Dooley et al., 2018). All other survey items within the scope of the Likert scale items showed no significant difference in the flipped classroom. The open response questions and student focus groups provided more insight into student

satisfaction. Most of the students either wrote down or verbalized that the flipped classroom

provided for two main benefits: flexibility and self-pacing (Dooley et al., 2018). Students in the

focus group expressed there was an appreciation for not only being able to watch the videos

whenever and wherever they wanted to, but also being able to pace themselves by pausing and

rewinding videos of the lecture content (Dooley et al., 2018). This emphasizes what Caicco

(2016) found on student engagement within the flipped classroom.

In terms of quantitative data, there was no significant differences in student satisfaction.

Possible conclusions drawn from this could be that a flipped classroom may not be a "one-size-

fits-all" solution to education, and certain classes may require some means of in class direct

instruction. The other possibility could be derived from the major limitation found in this study.

In the traditional classroom, only 51 percent of students responded to the survey, and in the

flipped classroom only 44 percent responded to the survey, or a 47 percent average (Dooley et

al., 2018). There were also a couple of limitations noted by students in the focus group. Students

stated the lack of interactions with the lecture gave them a sense of "disengagement" and there

were requests for more feedback from the online activities (Dooley et al., 2018). This showed

how a flipped classroom on the surface may seem like a quick fix, but the instructor must devote

a significant amount of time into the curriculum such as was noted by Gross et al. (2015).

This is not the only study to find flaws with the flipped classroom model. In a study done

by Yilmaz (2017), it showed how e-learning readiness can play a vital role in student motivation

and satisfaction. In a Computing I class, 236 undergraduate students participated in a flipped

classroom in which students were measured based on their E-learning readiness and student

satisfaction (Yilmaz, 2017). The E-learning readiness scale (ELRS) utilized a Likert scale from 1

(completely not true for the student) to 7 (completely true for the student) and contains 6

subdivisions to determine whether a student was prepared enough to utilize electronic learning (Yilmaz, 2017). Using this combined with a satisfaction survey which used a Likert scale of 1 (strongly disagree) to 5 (strongly agree), Yilmaz (2017) was able to determine whether E-learning readiness had a correlation with student satisfaction.

The findings of this study showed a direct relationship between the two surveys conducted. The higher the score students received on the ELRS, the higher the satisfaction and motivation of the student were in the flipped classroom model (Yilmaz, 2017). One of the largest factors that played a role in this relationship was the subdivision of computer self-efficacy found in the ELRS (Yilmaz, 2017). Self-efficacy in this study is "related to how much an individual understands the communicative language and culture exclusive to e-learning environments, and to how good he/she expresses himself/herself in these environments" (Yilmaz, 2017).

The findings of Yilmaz (2017) showed not every student is going to be sufficiently prepared to engage in student learning, due to its high demand for computer literacy and confidence. For this reason, the flipped classroom may naturally be a better fit for students in high school versus grade school (Yilmaz, 2017). It is also important to note teachers should have a full understanding of how much work may be required to implement the flipped classroom model. The findings in this study, although prevalent, could have been made more reliable had there been a control group, and had there been more data collected that was not self-reported via students (Yilmaz, 2017).

Review of the Proposed Problem

Student involvement theory is discussed by McCallum (2015), and it serves as guidance for educators to design more effective learning. The theory recognizes that both student time and energy are limited. As a result, much of the time in the classroom could be used towards

interacting with peers and teachers to create a more engaging experience for the student. Flipped classrooms are an avenue in which this can be achieved. Additionally, with the exponential growth of technology taking place, flipped classrooms can become easier to implement for all students. The ability to utilize a flipped classroom would provide for a more active and student-centered learning environment.

Review of the Importance of the Topic

Student engagement is important in and of itself, but what follows student engagement within a classroom is even more essential. If student success and satisfaction are facilitated by implementing flipped classrooms, students deserve an opportunity to engage in these learning environments. The teacher-centered model of the traditional classroom may hinder or suppress student engagement in its nature. With a great deal of lecture bound to the traditional classroom, there is little time left for either student-teacher or student-student interactions. These types of interactions shown in flipped classrooms allow for the facilitation of student success and satisfaction.

Summary of Findings

Digital technology and accessibility have only been present in the classroom for a couple of decades, hence the use of the flipped classroom has not been around long. However, in a short period of time there has already been numerous studies completed to review the efficacy of this model. Many researchers have found that by utilizing the flipped classroom, both student engagement and student success can increase. This has been shown in multiple formats, and while being compared to multiple types of learning models. There has also been a variety of different versions of the flipped classroom tested in doing so.

As for student satisfaction, there are mixed reviews by scholars on whether flipped classrooms provide for a higher rate of satisfaction. Although some studies show there are direct correlations between flipped classroom and student satisfaction, many means of these measurements are subject to criticism due to the subjective nature of the study. Student satisfaction in its nature may be defined differently or perceived differently by each student and therefore can be difficult to measure.

Conclusion

In conclusion, a flipped classroom can be a great approach for educators to utilize if both faculty and students involved are comfortable enough with it. It may take a great deal of patience from both student and teacher to overcome the learning curve of a flipped classroom, but research shows that student performance can increase with this model. Due to this reason, educators should not view this model as a "quick fix" to any student achievement gaps, but a platform or gateway to a richer learning environment. The flipped classroom does not have to start out as a complex model. It can be something as simple as having students watch short video clips at home and progressing into more active and engaging learning within the classroom.

The next section will focus more on how a flipped classroom can be implemented based upon the research found. The next chapter is also going to discuss how flipped classrooms created in the future can avoid some of the issues that arose within the above research.

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Chapter Three: Discussion and Application

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Insights Gained from the Research

When examining the research found in the literature review, there are a few insights that can be found. There is a clear relationship between flipped classrooms and an increase in student engagement. Another insight is that the flipped classroom also increases student success, or

achievement. Finally, there is data suggesting student satisfaction is higher in a flipped

classroom as opposed to traditional classrooms, but further research may be required. This

section will discuss these three insights and will be linked to the scholarly articles found in the

appendix.

When measuring student engagement within the flipped classroom, it is often compared

to a traditional lecture-based class. Due to the learning environment and structure of the flipped

classroom, many studies found engagement to be much higher in flipped learning styles. It

naturally provides a framework for open communication between students and teachers, and

students with other students (Say and Yıldırım, 2020). With this framework, flipped learning also

provides an opportunity for students to participate in active learning groups rather than sit and

listen to direct instruction (Entezari and Javdan, 2016).

The literature also provides insight as to how a flipped classroom can affect student

success. The quantitative data from the studies above showing an increase in academic

achievement or success cannot be ignored. Not only is there an increase in academic success, but

there is also a correlation between the engagement and success of a student. The success of the

students in the flipped classrooms can also be linked to the availability of content. Many of the

flipped classrooms utilize internet-based videos where students have 24/7 access to them. This

allows for a higher level of flexibility for students because they can practice self-paced learning

(Muir, 2018). When students have the autonomy to complete the content on their own, the

classroom becomes student-centered vs. teacher centered. Students have the accessibility to go

back and look at a concept they did not originally understand and work at their own pace (Say

and Yıldırım, 2020).

The final insight found within the literature is the relationship between the flipped

classrooms and student satisfaction. Data that shows an increase in student satisfaction is present,

but there are also studies that show no difference in student satisfaction whatsoever. Since

students are more engaged and can self-pace, there is a possibility that stress levels of students

may be lower, creating a more enjoyable learning environment. The flipped classroom also

allows for more effective use of class time, which may be considered valuable to some students.

However, another student may find lecture in a traditional classroom to be more valuable. The

bottom line is that student satisfaction can cover a multitude of subcategories. What one student

views a satisfactory, another student may not. The term itself is somewhat subjective and does

not allow for clear and concise conclusions.

The research above, combined with the insights found allows for making the flipped

classroom better for future educators. It allows for is the ability to help understand how to set up

and organize flipped classrooms in the future. Additionally, it helps discover what kind of

experiments could be set up in the future to account for these inconsistencies. The next sections

will discuss both applications and future studies that can be implemented to account for any

limitations.

Application

For a flipped classroom to be utilized properly, the teacher must first and foremost have a

strong grasp on the current curriculum that is being taught. As stated by Gross et al. (2015),

educators must devote a great deal of time to have a successful flipped classroom. The videos

alone will take a certain amount of time to create. Depending on length of the videos and time to

edit and upload them, it could potentially be additional hours outside of a teacher's contract time.

Once videos are created, then the educator must set up in class activities that yield student

interaction. The time and effort set forth by the teacher may seem daunting at first, but once a good system is put into place, future years could be devoted to tweaking and perfecting the learning environment. For this reason, there are three suggested steps that a teacher should take if attempting to integrate a flipped classroom.

The first step is to start simple. A flipped classroom has an ability to be a very complex learning environment. The reason to start simple is because as stated by Gross et al. (2015), students may struggle with adapting to a new type of learning experience. Another limitation may be getting students to buy into this method of teaching. If a student has only been in a traditional classroom while in the education system, then a flipped classroom may not seem appealing, or the student may not be ready for this type of learning. This was shown in the research done by Yilmaz (2017) when measuring student E-learning readiness. For this reason, teachers can start by using simple videos uploaded online as part of an assignment. To start, the videos do not need to be long, and then can gradually become longer. As this gradual increase occurs, eventually students could be watching an entire lecture video at home. This would give educators an opportunity to transition students to utilizing the flipped classroom in its most basic form, watching lecture videos at home. In class routines can stay simple to start, such as work time or the use of a daily check in quiz such as the one used by Holik (2019). This allows students to maintain a sense of comfort while adapting to the flipped classroom.

Once students have been in the routine of the watching videos at home, the second step would be to start implementing more active learning activities. Educators can implement more group work involving projects and in class discussions to drive the emphasis on lecture content from the night before. This is found in the active learning styles in the study done by Entezari

and Javdan (2016). By implementing these types of activities, students will become more engaged to help increase student success, and hopefully student satisfaction.

The final implementation step would be getting to a point within the flipped classroom where students are becoming self-learners. This can be attained through strategies such as completed by Lawson et al. (2019) where a PC flipped classroom was used. Practicing connections flipped classrooms would allow for students to acquire knowledge through a rigorous productive struggle. With teacher guidance, students can learn to self-advocate and gain a sense of autonomy with the curriculum. This final step of implementation would ultimately transition the classroom from being teacher-centered, to student-centered.

Although the flipped classroom model seems great on the surface, there are a few barriers that need to be overcome. As already discussed in the literature review, students buying into the model would take some time. Additionally, the data found suggests that not every flipped classroom yield student satisfaction, despite the resounding evidence for increased student engagement and academic success. To fully comprehend the student satisfaction variable within a flipped classroom, additional research must be completed. The next section will discuss future studies that could provide insight to this dilemma.

Future Studies

As mentioned in the literature review, direct correlations between flipped classrooms and an increase in student engagement and student success do exist. These have been shown through numerous studies done throughout the past decade and qualitative and quantitative data can be linked to evidence for this. Despite this increase in engagement, the data is not reliable enough to conclusively report that increased student engagement in flipped classrooms yield higher student

satisfaction. The above studies discussed can be used to help further explore the possibilities for future studies, and which limitations may exist within them.

Within future studies, the first concept that can be expanded on is the number of students participating in the flipped classrooms. A major limitation present in several the above studies is the population of students. With many of the studies implementing a flipped classroom for only a semester, it does not provide long term results for the flipped classrooms. To research the longevity of a flipped classroom, it could be repeatedly used in the same classroom for several semesters in a row. By doing this, it would also allow the teacher to adapt and make changes to the flipped classroom as the educator learns from past experiences.

Another step to take within future studies for flipped classrooms would be to gather more specific evidence about the population of students involved. With most of the previous studies, the qualitative data collected is self-reporting. The reliability of this data becomes questionable when students have different learning styles. For this reason, one option for a future study would be to categorize students based upon Gardner's multiple intelligences. These intelligences relate to a student's particular ideal learning style. The eight intelligences are: linguistic, logical/mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalist (Marenus, 1970). Students could take a pre-test to determine which intelligence each is best suited for. From there, qualitative data can be collected via surveys to determine student satisfaction. Ideally this would help to narrow down a group of students or learning styles that find the flipped classroom to be more beneficial and satisfactory.

A final future study that could be completed is the comparison of two different flipped classrooms. Only one study in the literature review completed this type of research, which was Entezari and Javdan (2016), whereas most compared to a traditional classroom. There is a lot of

data involving the comparison of a flipped classroom and a traditional classroom, but limited data on comparing two flipped classrooms. As stated above, flipped classrooms can be more than just having students watch videos at home. Studies that compare a traditional flipped classroom to a more advanced flipped classroom would give insight into what exactly creates higher student success. There is a possibility that some students are more successful due to having access to videos at home, while others may be successful because the learning environment is enriching and engaging such as that of more advanced flipped classrooms like the one shown by Lawson et al. (2019). Either way, both quantitative and qualitative data could be collected to discover the efficacy of differentiated types of flipped classrooms.

Conclusion

Throughout the examination of a multitude of flipped classrooms, this learning model exhibits an increase in student and engagement which breeds student success. In most cases, these flipped classrooms were compared to a traditional classroom. When comparing these two learning models, the largest difference is the level of student engagement. In flipped classrooms, while less time is devoted to teacher direct instruction, it allows more time for engaging in class activities. These activities can consist of group discussions, partner work, or projects.

The increased engagement shows an improved success in student academic achievement. Quantitatively, the numbers show an increase in academic achievement in all the above cases. Qualitatively, by having students engage in the material in an authentic way such as dealing with real world problems, it can help to make the educational experience more meaningful. This in turn may help students understand and remember the material more. This ideology of increased success through engagement is found because student engagement was higher in every flipped classroom as compared to its traditional classroom counterpart.

Although student satisfaction was not found to be significantly higher than those of other classrooms in every case, teachers will never know if flipped learning is best practice for a classroom unless it is implemented. Time may be needed to flip a classroom, as it is not something that can happen overnight. The learning curve for students to adapt to this learning style, along with the amount of time devoted by the educator can make this learning model seem challenging and overwhelming. It is also clear that flipped classrooms are not a perfect solution for every given curriculum, or even every student. However, even given these obstacles, a flipped classroom shows an ability to be a steppingstone to more engaging and authentic learning experiences.

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Appendix

Article Tracking Matrix

Articles: Author(s) name and year of publication	Method: Qualitative/ Quantitative/ Meta-Analysis/ Mixed-Methods	Theme 1 (Student Engagement)	Theme 2 (Student Success)	Theme 3 (Student Satisfaction)
AlJaser, A. M. (2017) (PR)	**Quantitative**		X	
Alsancak Sirakaya, D., & Ozdemir, S. (2018) (PR)	**Quantitative**		X	
Boevé, A. J., Meijer, R. R., Bosker, R. J., Vugteveen, J., Hoekstra, R., & Albers, C. J. (2017) (PR)	**Mixed Methods**	X	X	
Caicco, M. (2016) (PR)	**Qualitative**	X		
Clark, K. R. (2015) (PR)	**Mixed Methods**	X	X	
Dooley, L. M., Frankland, S., Boller, E., & Tudor, E. (2018) (PR)	**Mixed Methods**	X	X	X
Entezari, M., & Javdan, M. (2016) (PR)	**Quantitative**	X	X	X
Gross, B., Marinari, M., Hoffman, M., DeSimone, K., & Burke, P. (2015) (PR)	**Mixed Methods**	X	X	X
Holik, M. (2019) (PR)	**Quantitative**		X	X
Lawson, A. P., Davis, C.P., Son, J. Y. (2019) (PR)	**Quantitative**			X
McCallum, S., Schultz, J., Sellke, K., & Spartz, J. (2015) (PR)	**Qualitative**	X	X	
Muir, T. (2018) (PR)	**Mixed Methods**	X		

Say, F. S., & Yildirim, F. S. (2020) (PR)	**Mixed Methods**		X	X
Talan, T., & Gulsecen, S. (2019) (PR)	**Quantitative**			X
Yilmaz, R. (2017) (PR)	**Mixed Methods**			X