Summer 2016

Is the Flipped Classroom Pedagogy Effective for All Students?

Stephanie Quarato
Sacred Heart University

Is the Flipped Classroom Pedagogy Effective for All Students?

Stephanie Quarato

Sacred Heart University

Advisor: Michael K. Barbour

Abstract

In my experience as a mathematics teacher, I have learned that mathematics is a subject that is commonly paired with negative feelings. Many individuals lack confidence in their ability to perform mathematics. As a mathematics teacher, I am always looking for different ways to reach the needs of all of my students. The flipped classroom was one initiative that I implemented into my classroom to understand the benefits of learning in this unique way. In a flipped lesson, the students learn the lesson from a textbook or video as the homework, while the practice is completed in the classroom. The purpose of this study was to determine the perspectives of middle school students on the flipped classroom. In addition, because my goal was to reach *all* of my learners, this study also gathered perceptions from teachers, parents, and students who have individualized educational programs (IEPs) or 504 plans on using the flipped classroom method in terms of differentiating instruction. Data was collected through student surveys, a student focus group, teacher interviews, parent interviews, and classroom observations. The data showed that the flipped classroom was beneficial in terms of allowing students to pace themselves when learning, focus more on the lesson and in class activities, have access to the information whenever and wherever they needed to review, and gaining more help and guidance from the teacher.

Table of Contents

Chapter 1 – Introduction

The school bell rings, and all students take their seats to begin the math lesson for the day. The teacher stands at the front of the room by the white board going over how to solve a problem. After the teacher lectures, he provides students with practice problems to complete either individually or with a partner or group. If students have questions, they ask and the teacher will answer. Before the class ends, the teacher assigns homework that aligns with the lesson that was taught that day. The bell rings again to end the period, and students are off to their next class. When the student gets home to work on his math homework, he finds himself having a difficult time completing a problem that he understood in class that same day. When he returns to math class the next day, the teacher has a couple of minutes to spend on reviewing the homework before he moves on to the next topic. Some students understand the content extremely well, while others are still struggling and need more time to practice. This is the story behind a traditional math class. Teachers find themselves struggling to meet the needs of all of their learners. That struggle is part of the reason why two teachers, Jonathan Bergmann and Aaron Sams, revived the notion of a flipped classroom (Bergmann & Sams, 2015).

The flipped classroom is one where the lessons are learned at home (i.e., the 'homework' part), while the practice is completed in the classroom (Bergmann & Sams, 2015; Cox, 2015; Desantis, Van Curen, Putsch, & Metzger, 2015; Houston & Lin, 2012; Lage, Platt, & Treglia, 2000; Mattis, 2014; McCallum, Schultz, Selke, & Spartz, 2015; Parslow, 2012; Siegle, 2014; Strayer, 2012; Talbert, 2014). Students will learn the lesson by either reading pages from the textbook, or watching a video on the lesson that was provided by the teacher. This affords students an opportunity to learn the content at their own pace, and have enough time to take

notes and write down questions that they may want to ask the teacher the next day (Cox, 2015; Houston & Lin, 2012; Russell et al., 2014). The class following the flipped lesson is one where the teacher is able to break students down and provide them with more one-on-one teaching, which has proven to be one of the reasons why the flipped classroom is so effective (Houston & Lin, 2012; Lage et al., 2000; Parslow, 2012; Stanford, Crowe, & Flice, 2010), or an enrichment activity, depending on how well they understood the lesson. The flipped classroom not only gives those who excel more challenges to apply their learning to, but it also provides the teacher with the availability to sit and work with all students to ensure every student reaches mastery before moving on to the next topic.

Statement of the Problem

Bergmann and Sams (2015) defined mastery learning as "a system in which learners must demonstrate understanding, or 'mastery,' of a particular topic before moving through the rest of the course material" (p. 63). Mathematics has a domino effect and if a student does not understand one topic, that student will find himself struggling with much more. For example, if a student does not understand how to add or subtract two numbers, then that student will have a difficult time learning how to solve equations. In mathematics, it is important for students to reach a level of mastery so that they do not fall behind as new topics are taught. Unfortunately in my eighth grade math classes, I have students who have difficulties understanding a topic and don't reach mastery learning before we move on to the next focus area. I invite these students to come for extra help, use manipulatives and technology in my teaching, differentiate instruction, have students work in small groups, and use any other methods that I feel would help increase their overall understanding. However, I always wind up having a group of students who continue to struggle throughout the lessons. The homework that is provided is meant to give students

additional practice on the material so that they can get better at understanding. However, many students give up and choose not to complete their homework because they don't understand how to answer the questions, which is what one study found to be why many students do not complete their math homework (Cox, 2015). In addition, I have many students who have individualized educational programs (IEPs) or 504 plans and struggle with learning in general. These students need a lot of additional help and resources to assist with their understanding of the content. Teachers modify their instruction and provide multiple recourses in order to help these students get the most out of the instruction (Lage et al., 2000).

When my superintendent brought the idea of a flipped classroom to mind, I became interested to learn about whether this would assist my students with their understanding in math. If the students saw that they could perform well in each topic, it could increase their confidence and help them understand the content more quickly so they won't fall behind. This study was necessary in helping me to determine whether or not the students felt that the flipped classroom was beneficial in helping them learn.

Thesis Study

The purpose of this study is to determine perceptions of the flipped classroom model in a middle school setting. This general purpose lends itself to the following research questions:

1) What are middle school student perceptions of the flipped classroom method?
2) What are teachers, parents, and students who have IEPs or 504 plans perceptions of using the flipped classroom method in terms of differentiating instruction?

I decided to use a case study methodology for my research design because the drive behind my study was to determine perspectives about a flipped classroom so that there could be better understanding of the topic (Stake, 1994).

The research was conducted at a public middle school in a shoreline town in Connecticut. The school hosted approximately 450 students from grades six through eight. The research was specifically conducted in an eighth grade mathematics classroom. The classroom was equipped with a *Smart Board*, a student computer that stayed in the classroom at all times, and a laptop cart that contained more than enough *Chrome Books* for every student in one math class to utilize. The participants of the study included four eighth grade mathematics classes comprised of a total of 80 students, two teachers, and four parents. One of the math classes was an algebra class, while the other three classes were pre-algebra classes. The Common Core curriculum for eighth and ninth grade mathematics was followed to teach instruction. The age of the students in the study were between 13 and 15 years old. There were an average of 22 students in each class. The parents had students who were identified as students with IEP's, 504 plans, or placed in response to intervention for mathematics. None of the students, teachers, or parents have experienced a flipped classroom prior to this class.

Summary

Chapter one provided an overview of the flipped classroom, as well as an explanation for the importance of this study. In addition, the chapter offered an introduction to the study including the purpose, research questions, and methodology used to conduct the study. Readers also gained information on the location and participants of the specific study.

In chapter two, I will provide information on the literature that has already been written about the flipped classroom and beyond. Because the flipped lesson can be assigned by allowing students to read the text or watch a video, I discuss the differences between homework from a textbook versus homework from technology. This moves into helping the reader to understand how teachers use technology to differentiate instruction. From there, the review focuses on the

similarities and differences between a flipped classroom and a traditional classroom. Finally, chapter two concludes with studies that have already been completed on the perspectives of students, teachers, and parents on the flipped classroom. The literature will provide a more in-depth understanding on the flipped classroom, as well as how students, teachers, and parents have found it to be beneficial.

Chapter three offers information on the study that was conducted for this research. I will discuss my choice to use a case study methodology for this research study. I will also give more detailed information on the location and participants of the study. Further, this chapter describes why I chose to use surveys, focus groups, interviews, and observations as my data collection method, as well as how these methods were implemented in my study. In addition, chapter three discusses how descriptive statistics were used to analyze quantitative data, while constant comparative was used to analyze qualitative data. Chapter three concludes by giving details about how I used pilot tests, member checks, and triangulation to ensure my results are valid and reliable.

Chapter four will present the results and discussion of this research study. I will discuss what themes were generated from the qualitative and quantitative data collected for each research question. I will also provide additional themes that were discovered across both research questions. Further, I will use the results that I have found from my own study to connect to what has been found in other studies that have been conducted on the perspectives of the flipped classroom.

Chapter five will discuss the conclusions and implications of the study, as well as the limitations from the study. The limitations included the sample size of my data collection, lack of available data, and the measures used to collect the data. In addition, I will discuss two

implications that I suggest for educational practice. These implications include student choices and technological training. Finally, I will provide suggestions for future research on the flipped classroom.

Definition of Terms

Flipped Classroom: Bergmann and Sams (2015) defined the flipped classroom as being when direct instruction is done through reading the lesson or watching a video of the lesson prior to class; then time is used to complete group tasks or for the teacher to work one-on-one with students.

Differentiation: Also referred to as differentiated instruction, this is where teachers use a variety of techniques to teach lessons in order to meet the needs of every learner.

Individualized Educational Program (IEP): An individualized plan or program created for a child who has been diagnosed with a disability to ensure they receive specialized services to aid them in their education.

504 Plan: A plan created for a child who has been diagnosed with a disability to ensure they receive appropriate accommodations that will aid them in their education.

Response to Intervention (RTI): A multi-tiered approach to identify students struggling in a particular subject (i.e., math or reading), and offer services to support them with learning or behavior needs.

Hybrid Model/Blended Learning: Rovai and Jordan (2004), as well as Senn (2008) described the hybrid model to involve students completing some classwork and activities online while still attending classes to have face-to-face interactions.

Chapter 2 – Literature Review

Education is important for all students, and our nation is taking more of an approach to get students to be more college-ready. The Common Core curriculum brought a new set of standards that requires students to begin thinking more critically at a younger age. The problem with shifting to the Common Core is that teachers now have to teach a tougher curriculum that requires students to conceptualize their understanding of new learning; which may be a difficult task for some students if they have not been trained to think this way before. There is very little time in the classroom to allow for students to learn a topic, apply their new learning to a more challenging task, and practice this concept until mastery is attained. In addition, teachers are still battling with students to get their homework completed, which is an integral part of practicing and applying what is taught in the classroom. Teachers and schools are always looking for best teaching practices and models in order to achieve their goal of preparing all students for the future.

The flipped classroom method became an educational trend after two teachers, Jon Bergmann and Aaron Sams, incorporated the practice into their own classrooms (Desantis, Van Curen, Putsch, & Metzger, 2015). The flipped classroom method involves students independently learning the lesson at home, while class time is used for completing activities that align with the instruction. Research has shown that this instructional method has been proven to be effective amongst most students (Cox, 2015; Desantis et al., 2015; Houston & Lin, 2012; Lage, Platt & Treglia, 2000; McCallum, Schultz, Selke & Spartz, 2015; Parslow, 2012; Russel, Malfroy, Gosper & McKenzie, 2014; Strayer, 2012; Talbert, 2014). This method also allows for teachers to differentiate instruction by providing multiple modalities for students to learn, a

practice which has been found to help students perform better in the classroom (Mattis, 2015). Research has also shown that one reason the flipped method is so effective is due to the extra time it allows for one-on-one instruction in the classroom (Houston & Lin, 2012; Lage et al., 2000; Parslow, 2012; Stanford, Crowe, & Flice, 2010). One-on-one attention includes consistent feedback and collaboration between the teacher and student, and this increases academic achievement (Houston & Lin, 2012). Furthermore, students are more motivated to complete homework that is online (Arasingham, Martorell, & McIntire, 2011; Dodson, 2014; Lenz, 2010), which means that more students will complete the homework assignments if assigned from a flipped instruction.

The flipped classroom model itself is not a new approach to learning (Lage et al., 2000). However, it has recently become a popular trend and much of the information attained on this topic was repetitive. This required the review of the literature to expand to other focus points. A comprehensive search of peer-reviewed articles, mainly journal articles, was conducted based on multiple terms beginning with flipped classrooms. Information was obtained from a university database that included *Education Resources Information Center* and *Education and Information Technology Library*. Research was also conducted from *Google Scholar*, *Education Research Complete*, and *Academia.edu*. After reviewing the reference lists of multiple journals, a search was completed on specific authors or journals that were used repetitively throughout the research. Articles chosen ranged in date from 2000 through 2015. Information was first received by researching flipped classrooms and inverted classrooms. Data found were mainly on the perspectives of students, teachers, and parents after a flipped classroom model were implemented. These search terms also provided data on studies that were conducted in undergraduate programs. This expanded the search to focusing on flipped classroom and

elementary school, which did not provide much information. After reviewing some literature and finding that the flipped classroom was a way to differentiate instruction, more search terms were used that included technology and differentiation and education, flipped classrooms and special education, individualized instruction and technology, and special education and technology lessons. The search for these specific terms yielded over 3000 results. After realizing that the flipped classroom was another way to assign a homework assignment, search terms expanded to ones that included homework and technology, technology based homework and student achievement, homework and motivation and technology, homework and student achievement, and homework and technology. Results from searching homework and technology included over 4000 peer reviewed journal articles. Other terms included in the search were reversed learning and hybrid classroom.

This paper focuses on the effectiveness of the flipped classroom approach. The flipped classroom is a way for teachers to differentiate instruction through homework. Students learn the content ahead of a class period from a textbook or video lecture, which is considered the homework. The practice and application of new understanding takes place in the classroom, and this opens up for more independent instruction from the educator. This review begins by explaining how the flipped classroom approach is another type of homework that is assigned. It then goes to discuss how the flipped classroom model is a way to differentiate instruction, including differentiating homework assignments. The review discusses the similarities and differences between flipped classroom instruction and the traditional classroom, which leads to understanding student, teacher, and parent perspectives. Research that has been conducted has not shown whether or not this teaching model is effective for all students, specifically students who have learning disabilities. Further, not much research has been directed towards using this

model in elementary or middle school grades. If a student with a learning disability needs the support and assistance from a paraprofessional or special education teacher in the classroom, can this model be effective for that specific child? This is the question of interest, and one that has not been found through the literature.

Homework From A Textbook Versus Homework From Technology

Homework is a way for teachers to track student progress with content, as well as to give students an opportunity to practice their new learning. Traditionally, homework is assigned to students at the end of a class requiring them to answer questions from a textbook or a worksheet. As all teachers know, some students will come into school without having completed their homework from the previous day. There could be many reasons to explain why there is a lack of homework completion amongst students, but research has shown that some students do not complete homework because they don't understand the content (Cox, 2015; McCallum et al., 2015). According to one study on the flipped classroom, a student stated that, "one of the most discouraging things about doing math homework is that when you get stumped, you kind of want to be like, 'I don't want to do this anymore'" (McCallum et al., 2015, p. 49). Students who spend a good amount of time trying to "figure it out" can easily get exasperated and give up on the homework (Cox, 2015, p. 3107). Textbooks are often difficult to follow, and students may struggle with understanding the content in the book. When a student does not complete his or her homework, that student will fall behind with the content.

Research has found technology to be a positive tool for motivation in terms of homework completion (Arasingham et al., 2011; Dodson, 2014; Lenz, 2010). Two different studies on homework technology have found that students find the web-based homework helpful because the textbook is difficult to understand (Arasingham et al., 2011; Lenz, 2010). The web-based

homework option offers a visual in the form of a video of how a problem is completed (Mattis, 2014). This video gives students another chance to actually see how a problem is being completed, where trying to follow examples from the book could be challenging. However, Lenz (2010) claimed that "searching through the text for an appropriate example is a problem solving task… and may lead to better mathematical understanding of the problem and solution" (p. 243). What if the text does not offer an 'appropriate example' for a student to refer to? It may be more beneficial for student learning if students are able to understand the content first, then they can apply their understanding to problem solving on higher-level tasks in the classroom.

Although the web-based homework model has been successful with promoting motivation in the classroom, there is one common theme that researchers have addressed in order to make this model effective. Students and teachers all need to be trained to use the web-based homework model in order to successfully complete the task (Arasingham et al., 2011; Cranmer, 2006; DeSantis et al., 2015; Dodson, 2014; Houston & Lin, 2012; Lenz, 2010). There may be a software issue while a student is trying to complete a task online (Arasasingham et al., 2011; Dodson, 2014). Not knowing how to address these types of issues may result in the student not being able to finish, or focus on, the assignment. Further, training parents how to use the software can motivate parents to help their children with web-based homework (Cranmer, 2006), as well as eliminate any time that students may spend on software issues. A teacher must also be familiar with what he/she is assigning the students, as well as how it connects to his/her content in the classroom (Arasingham et al., 2011; DeSantis et al., 2015). Research has found that students with negative perceptions about the web-based model struggled with the material because it was presented in a different way than the way their teacher demonstrates the content (DeSantis et al., 2015; Lenz, 2010). Further, because the Internet only offers limited ways to

answer or present a question, the questions on the assessments given may not align with the homework (Arasasingham et al., 2011). Web-based homework is another way to differentiate instruction, and the planning of the implementation is crucial for the models' effectiveness. The next section will discuss how technology could be used to differentiate all instruction, including homework assignments.

Differentiating All Instruction

Classes are comprised of students who have multiple learning styles, and teachers are expected to meet the needs of all students. Lage, Platt, and Treglia (2000) stated that, "classes that use a variety of teaching styles are more likely to increase student performance, diversity, and interest…" (p. 31). Mattis (2015) found that students who were presented with multiple modalities to learn from performed better because they were able to process more information. Teachers have been incorporating technology in their lessons to help differentiate instruction in the classroom by providing multiple modalities including audio and visual demonstrations. Assistive technology (AT) is different multimedia implemented in order to help increase the learning of students, and a study has found that AT can help to motivate students, guide them toward success, and provide more of an independent instruction (Basham, Israel, Graden, Poth, & Winston, 2010). Further, AT can help with students who are gifted and talented, or with students who have learning disabilities.

If available, the use of this technology in the classroom could be very beneficial towards student learning. However, students need to also gain independence in order to be able to continue to use this same model while completing homework assignments (McCallum et al., 2015). Many teachers differentiate their lessons in the classroom in order to reach all learners. They modify instruction and include many resources to help students gain the most out of the

lesson (Lage et al., 2000). Teachers are able to differentiate in the classroom; however, how can they reach all learners through the homework that is assigned so that students do not fall behind in the lesson?

Jonathan Bergmann and Aaron Sams brought more attention to the flipped classroom model in order to help differentiate homework assignments (Siegle, 2014). Bergmann and Sams were high school teachers who implemented the flipped classroom method in order to help students who were absent from class, as well as students who were struggling with content from the homework. The flipped classroom is a model in which the content is taught through watching a video or reading the textbook, which students complete at home, and the traditional 'homework' is completed in class (Bergmann & Sams, 2015; Cox, 2015; DeSantis et al., 2015; Houston & Lin, 2012; Lage et al., 2000; Mattis, 2014; McCallum et al., 2015; Parslow, 2012; Siegle, 2014; Strayer, 2012; Talbert, 2014). As stated before, individuals learn better through a combination of modalities such as audio and visual representations (Mattis, 2015), and a flipped classroom allows for students to learn content by listening and watching a video, or reading a textbook, as many times as needed.

"The flipped lesson paradigm invites teachers to use technology to plan differentiated instruction that is tuned to the needs of individual learners" (DeSantis et al., 2015, p. 41). Teachers who use the flipped classroom model are able to differentiate their lesson by allowing students to work at their own pace (Cox, 2015; Houston & Lin, 2012; Russell et al., 2014). Students who are struggling with the content have the option to pause the video, as well as re-watch the video when needed (McCallum et al., 2015), or they have the option to reread the textbook when necessary. This type of model also allows students who are grasping the content rather quickly to 'speed through' the material they have already mastered (Siegle, 2014).

Through this model, the teacher is allowing students to use the audiovisual to their advantage because they are able to watch the video until they have understood the content, which means they will reach mastery of the content before moving on to the next topic (Parslow, 2012). The research that has been conducted on the flipped classroom model for this review has mainly focused on undergraduate students, and there is not much inquiry on the effectiveness of this model and elementary aged or middle school students (Houston & Lin, 2012; McCallum et al., 2015; Rovai & Jordan, 2004; Senn, 2008; Sullivan & Freishtat, 2013; Strayer, 2012; Talbert, 2015; Wasserman, Norris, & Carr, 2013). However, a study conducted on teacher candidates' perspectives on the flipped classroom found that half of the candidates believed that the practicability of the flipped classroom is becoming a "rising belief" (Filiz, Kurt, & Orhan, 2015, p. 2314). Teacher candidates in the study found the flipped classroom impractical for younger students for reasons that included the age of the children, and the inability to guide technology without help. The idea behind this research was ideal; however, the teacher candidates answered about practicability based on watching a video and conducting research. The individuals did not actually teach using this particular method.

In the classroom, the teacher creates activities for students to apply their understanding of the content from the video or the textbook to solve more challenging problems. Because the teacher is not spending time lecturing, the teacher is able to spend more one-on-one time with each student (Houston & Lin, 2012; Lage et al., 2000). This allows for more "personalized attention" during the class activity (Parslow, 2012, p. 337). The teacher can spend time re-teaching students who did not fully understand the content from the video or the textbook; or the teacher can assign a more stimulating task to students who need the extra challenge. This one-on-one time also allows teachers to get to know who their students are, as well as what the strengths

and weaknesses are of each student (Stanford, Crowe, & Flice, 2010). The flipped classroom model allows teachers to "tailor curricula" to meet the needs of all students (p. 7).

Using a flipped classroom model to differentiate instruction can help all students, including students who have learning disabilities and students who are gifted and talented (DeSantis et al., 2015; Lage et al., 2000). However, there are students who rely on teachers to help them stay focused in the classroom (Basham et al., 2010; Strayer, 2012). There are not many studies that have been presented on the flipped classroom that mention having a sample size of students with learning disabilities. When a teacher assigns a 'flipped' assignment to students, that teacher expects students to learn the lesson before attending class. The video is available, but students can also learn from the textbook, if that is the preferred way of learning. The flipped classroom gives students the opportunity to learn in a way that best meets their own individual needs (Lage et al., 2000). The video lessons may help some students, but others may still prefer to learn from the textbook rather than follow a video; or students may use both resources to increase understanding. The one-on-one time in the classroom will only be beneficial to student learning if the student came in prepared with questions about what the lesson entailed. However, students with learning disabilities may have even more difficulty focusing on the lesson if it is being learned at home; which means that student will not come prepared with questions.

Much of the research on the flipped classroom today includes the use of technology to create videos in which students could learn the lesson (Cox, 2015; Houston & Lin, 2012; Lage et al., 2000; McCallum et al., 2015; Parslow, 2012; Russel et al., 2014; Strayer, 2012; Talbert, 2014). Gulek and Demirtas (2005) found that engagement and achievement in the classroom increased when students were given the opportunity to work on a laptop. However, while the

study did not have a large sample size of students in special education, it was noted that these students could benefit from the visual representations of using a laptop. Furthermore, another study on the flipped classroom found that, "visual-verbal learners were more easily distracted when viewing lectures, and visual learners spent more time than others watching the video lectures" (McCallum et al., 2015, p. 44). The flipped model also allows teachers to assign students pages from the textbook to learn prior to a class activity. There does not seem to be a great deal of reliable research that can substantiate whether this method is effective for students with learning disabilities. If the learning is being completed at home, is the student receiving the same support from his/her parents; and if not, is this model beneficial to that student? Basham, Israel, Graden, Poth, and Winston (2010) stated that, "effective differentiation involves more than providing instruction in different formats. In differentiation and Universal Design for Learning, there are common learning goals, but also flexibility in the learning process" (p. 49). If a teacher provides a flipped lesson for homework, how can that teacher provide the flexibility for a student with a learning disability to learn the same content? The next section will discuss the differences between the traditional classroom and the flipped classroom, focusing on how each benefit student learning.

The Flipped Classroom Versus The Traditional Classroom

American educational psychologist Benjamin Bloom claimed, "an average student who receives one-on-one attention is enabled by constant feedback and corrective process, and can jump to the 98th percentile of the student population in academic achievement" (Houson & Lin, 2012, p. 1177). Salman Khan, an advocate for the flipped classroom, stated that, "teachers in a traditional classroom spend five percent of their time actually working with students, while spending the other 95 percent lecturing, creating lectures or grading" (p. 1177). The goal for any

teacher, administrator, and school district is to ensure that all students are receiving the best education possible; but how can teachers get to a point where students are receiving one-on-one attention to maximize achievement? The purpose of a flipped classroom is to encourage students to learn lessons at home so that they can gain more of that one-on-one attention during school hours, which is one of the benefits of a flipped classroom (Lage et al., 2000; McCallum et al., 2015; Parslow, 2012; Strayer, 2012). But the research is limited regarding students in elementary and middle school, as well as students who have learning disabilities.

Multiple studies have been conducted to determine the effectiveness of a flipped classroom versus a traditional classroom (Dodson, 2014; Lage et al., 2000; Mattis, 2015; McCallum et al., 2015; Wasserman et al., 2013; Talbert, 2015). Research has shown that there is no significant difference in terms of learning the content from a flipped classroom versus a traditional classroom (Dodson, 2014; Lage et al., 2000; Wasserman et al., 2013). This information was based on obtaining student and teacher perspectives. The flipped classroom allow for students to spend more time in class "deepening and extending their knowledge" on tasks they work on with peers (Talbert, 2015, p. 366). According to Talbert, the type of tasks that students struggled the most with were the tasks that students were usually assigned to complete independently for homework; but the flipped model allows students to receive the help and support from peers and teachers to complete and understand these tasks (McCallum et al., 2015). With the increasing attention on the Common Core curriculum, which encourages conceptual understanding and application of skills to more challenging tasks, spending more time focusing on these tasks in the classroom may be beneficial to student learning. There are still students, however, who need to be guided by the teacher (Basham et al., 2010; Strayer, 2012). Further, the tasks need to be challenging, yet attainable by students in order for this concept to work properly.

If the task is still too difficult, the student will give up in the classroom just as he/she would give up at home completing the homework. If the activity is too easy, the student will not be receiving the full benefits of the in-class activity (Talbert, 2014).

A hybrid classroom model is very similar to flipped classroom instruction. The hybrid model, also known as blended learning instruction, encompasses students completing some of the classwork and activities online while still attending classes to have face-to-face interactions (Rovai & Jordan, 2004; Senn, 2008). Research has shown the hybrid classroom to be an effective teaching approach because it allows for students to have flexibility in their learning from the online portion (Rovai & Jordan, 2004; Senn, 2008; Sullivan & Freishtat, 2013). Students benefit from online discussion boards while learning because they are able to make more connections with the topic (Sullivan & Freishtat, 2013). In some instances, it forces students to broaden their learning by conducting extra research on a topic in order to understand better before replying to a discussion thread. In the classroom, students would not have time to look for other answers if they were not understanding in order to reply to a student comment. Encouraging students to respond to discussion threads online somewhat forces them to broaden their knowledge of a topic. If the student does not understand the material, this model gives the student more opportunity to learn.

The face-to-face time in a hybrid classroom is also a crucial part to student learning (Rovai & Jordan, 2004; Senn, 2008; Sullivan & Freishtat, 2013). This time allows for students to apply their understanding of their new learning to more rigorous tasks. Furthermore, face-to-face time encourages group work and collaboration, which is "a core principle to the success of learner-centered education" (Sullivan & Freishtat, 2013, p. 15). In order for the hybrid classroom model to work effectively, students need to have self-motivation. The student needs to complete

his/her part the learning in order to be a part of the collaborative process. Research on the hybrid classroom model mainly focuses on college-level students, and more specifically, on how this model can help students who travel far distances for classes (Rovai & Jordan, 2004; Senn, 2008). The research has been done in order to find an approach to shift focus from delivery of instruction to learning in more student-centered environments (Rovai & Jordan, 2004; Senn, 2008; Sullivan & Freishtat, 2013). One of the reasons that curriculum is changing at the elementary, middle, and high school level is to prepare students for college. The hybrid classroom model has been found to be successful at a college level, unless the student was not prepared enough to use the online forums. If the goal is to get students college-ready, then perhaps younger-aged schools should consider using some of these new learning models. If implemented correctly, it may help with college-preparedness, as well as increase student understanding and learning. The next section will discuss different perspectives on the flipped classroom model from students, teachers, and parents, which may give a direction on whether or not these new models would be beneficial to student learning in the younger grades.

Perspectives On The Flipped Classroom

The flipped classroom has gained positive attention from teachers and students who have implemented this new style of learning. Students have claimed that having access to all of the information on the computer allows them to work at their own pace (Cox, 2015; Russell et al., 2014). Having the material introduced through a video allows for students to pause or rewind the video, as well as to revisit the material when preparing for an examination (Houston & Lin, 2012; McCallum et al., 2015; Senn, 2008). The availability of the information is a benefit to student learning; however, there is little to no mention in the research about students who do not have Internet access at home. Students still have the opportunity to use the textbook in order to

learn the lesson prior to the class activity; but the textbook may be too difficult for the student(s) to learn from (Lenz, 2010), and the learner will be missing out on the in-depth explanation from the teacher. Furthermore, research does not indicate whether the availability of information is useful to students who have difficulties focusing in school. As stated before, much of the research completed on the flipped classrooms has been done at a college-level age where students are independent learners. Would all students benefit from the flipped classroom if a teacher were to use this model in his/her eighth grade mathematics class where there are multiple students with individualized educational programs (IEP's) or 504 plans? If students are not completing this task at home, they may not completely benefit from the flipped classroom.

The in-class activities are said to be effective to all student learning when they are meaningful and challenging. Talbert (2014) stated, "the main effectiveness of the inverted classroom is found in its use of class time to engage students in meaningful sense-making activities on difficult content" (p. 365). This specific learning activity encourages collaboration amongst peers while working on a project-based or problem-based activity after viewing the video or reading the textbook. Collaboration has helped student understanding of topics due to the ability to learn from the different perspectives from peers (Lage et al., 2000; McCallum et al., 2015). Research has shown that students are more willing to work in small-group settings in an inverted classroom because they learn best from their peers (McCallum et al., 2015; Strayer, 2012). Not only can students learn from different perspectives of their peers, but this type of collaboration can also help with understanding the content that was learned from the video or textbook. A student who may have understood the content entirely would be able to re-teach the material to a student who may have struggled with certain parts of the lesson.

In a technology-based flipped classroom, the lecture is done through a video online, which allows for the entire class time to be spent on group work and collaboration. This extra time also allows for the teacher to be available to answer more questions and give feedback to students (Siegle, 2014). Students have reported that, with the availability of the teacher, they believe they were able to engage more in a conversation with the teacher, which helped the teacher to know whether a student was falling behind or keeping up with the content (McCallum et al., 2015). However, other students have stated the importance of having more of a structured lesson with a teacher who was "making them care" (Strayer, 2012, p. 188). The feeling of the students about the role of the teacher depends on how the student learns best. Some students are self-motivated and able to learn by interacting with peers; but others need to be driven by the teacher.

Although most student perspectives on the flipped classroom were positive, there was a common negative opinion about this particular model. Some students noted the difficulty of being able to keep up with the work independently (McCallum et al., 2015; Rovai & Jordan, 2004). This often led to students procrastinating, causing them to fall behind their peers in the learning process (Cox, 2015). A flipped classroom model requires students to have self-discipline with completing assignments before a class, which many students often struggle with in the classroom. The flipped classroom has been found to be beneficial in motivating students to learn (Houston & Lin, 2012; Lage et al., 2000), but there are students who require a lot of guidance and support from the teacher. Further, there are many students who are not always driven by an assignment; and this model may not be ideal for students who struggle with working independently.

Educators implementing the flipped classroom model also had positive experiences with this new way of learning. Teachers noticed an increase in motivation in an inverted classroom due to increased student accountability for their learning (Houston & Lin, 2012; Lage et al., 2000). The research that cites this teacher observation states that students who use technology for learning are more motivated in learning, engaged in the activity, and produce higher quality work (Gulek & Demirtas, 2005). Giving students the opportunity to take ownership of their learning allows them to work at their own pace, which can help increase student understanding. The inverted classroom freed up more time for one-on-one conferencing with students, which teachers perceived as being very beneficial to student learning (Houston & Lin, 2012; Lage et al., 2000). This extra time allows for teachers to answer more questions that students have about the content, as well as gives teachers the opportunity to further assess student understanding. As valuable as the one-on-one time is to have with the students, it is still important for the teacher to lecture students in the classroom. This type of teaching helps students to become, or stay familiar with the teaching style of the teacher, which would help students to better understand the content if learning from a video lecture (DeSantis et al., 2015; Lenz, 2010). Furthermore, it is crucial for teachers to continue to model instruction for the students even after a flipped classroom assignment is given. Many students, including students with learning disabilities, need modeling in the classroom in order to gain understanding of the concept being taught.

Parents of students using technology for homework mostly had a positive perspective on this learning resource. In her study, Cranmer (2006) stated, “a key factor in the mediation of homework within the home is the involvement of parents” (p. 303). Incorporating technology into lessons, specifically for homework purposes, allows parents to participate more in their child’s learning (Portier, Peterson, Capitao-Tavares, & Rambaran, 2013). Studies showed that

some parents needed to assist their children with the homework on the Internet (Cranmer, 2006; Portier et al., 2013). This assistance provides time for the parent to have a discussion with their child regarding what they are learning in school, as well as to see how their child does with the content they are studying.

The parents are able to become more actively involved in their child's education. The only problem, however, comes when a parent is unsure of how to navigate the technology. There are some parents who do not understand how to use technology, and they may not have an older child to assist another sibling with the homework assignment (Cranmer, 2006). For this reason, it has been suggested that parents become trained on how to use the technology before there is an assignment given to the students to complete (Portier et al., 2013). Students will benefit more from their web-based homework assignment with the help from their parents; and so it is important that parents are experienced in using the technology (Cranmer, 2006). What happens if a parent or parents do not have the knowledge of using technology and their child is struggling? There was no mention in the research regarding this disadvantage. There also needs to be further research regarding parents who are not actively involved in their child's learning due to apathy or their own lack of academic skills. There are also a large segment of parents who are not home at night due to work obligations or furthering their own educational pursuits. Collaboration amongst the parent and the teacher is imperative to student learning (Portier et al., 2013). Much of the research conducted discussed parents assisting students with the technology portion of the assignment, but mentioned nothing about helping their child[ren] to stay focused while learning the lesson (Cranmer, 2006; Portier et al., 2013).

Summary

The flipped classroom is a teaching method that was introduced many years ago, but Johnathan Bergman and Aaron Sams popularized the teaching style. They added on video lectures for students to watch to help with student understanding on a topic. The flipped method requires the students to learn the lesson for homework through a textbook or video lecture prior to attending class to complete a problem-based or project-based activity. Students are motivated to learn and complete homework through web-based instruction, and the use of video lectures has been found to be beneficial to student performance. One issue with textbook assignments is students often find themselves struggling to understand the textbook, which leads to frustration while completing homework assignments. However, students have a choice in how they will learn the content in the flipped lesson, using a video lecture, the textbook, or both. Teachers are differentiating instruction by providing these different modalities for students to learn from, which has been found to increase student performance. Through the use of a flipped classroom model, teachers are able to spend more time with each student individually in order to help increase understanding on the content. This particular model also provides more of an individualized instruction for student learning, as the teacher is able to provide other resources for all students, including students who are gifted and talented and students with learning disabilities.

By examining the difference between the flipped classroom and the traditional classroom, there is no distinction in learning the content between the two. However, the flipped model opens up more time in the classroom for students to deepen their understanding of the content, as well as allows for more one-on-one instruction from the teacher. Some students struggle, however, with this model of learning because of the self-discipline that is required to learn the content

prior to attending the class activity. A hybrid classroom, much like a flipped classroom, is a combination of online learning and face-to-face instruction. This model has been proven to be effective in a college leveled course. The hybrid model gives more of an understanding as to why it is crucial for teachers to continue to have a part in the classroom if the teacher is providing online instruction.

The flipped classroom model has had mostly positive impacts on students, teachers, and parents. Students are more motivated to learn through the flipped classroom as it encourages collaboration amongst peers. Students appreciate learning from one another, and this type of collaboration increases student understanding. The students also find the extra time with the teacher beneficial. The flipped classroom model also permits students the opportunity to work at a pace that is more suitable for their learning needs. Negative perceptions on the flipped classroom model included the struggle of self-motivation and self-discipline with learning the content ahead of time. Parents who had positive perspectives of the flipped classroom model shared the idea of being a more active participant in their child's education.

A flipped classroom seems as if it would benefit all students because of the ability to learn the lesson in advance. Providing a video lecture for students to learn from is beneficial for students who need more of an explanation than what the textbook can offer. Further, the online lecture makes lesson available at all times, where textbooks or notes may be difficult to follow unless a student prefers to learn with the textbook. The flipped classroom model can also help increase student critical thinking skills with the problem-based instruction that is taking place in the classroom.

The research that has been completed on the flipped classroom model mainly focuses on students who are undergraduates or graduate students in college. If education is shifting its focus

more towards getting students college-ready, then how can we make this shift happen for students in younger grades who are not yet independent and self-motivated? Further, many students have learning disabilities and need individualized attention and instruction in the classroom in order to succeed. What studies have failed to find was whether or not students who have learning disabilities could benefit from a flipped classroom if assistance is needed from a teacher in order to stay focused. Can this type of learning be successful for those students? These ideas lead to my proposed action research. Does the flipped classroom model increase student motivation and rigor in the classroom with middle school students? Also, is the flipped classroom model more effective with helping students who have IEP or 504 Plans to understand the content? These are questions that have not been answered by the research conducted for this review and require more focus and attention.

Chapter 3 – Methodology

The purpose of this thesis is to determine perceptions of the flipped classroom model in a middle school setting. This general purpose lends itself to the following research questions:

1) What are middle school student perceptions of the flipped classroom method?
2) What are teachers, parents, and students who have individualized education programs (IEPs) or 504 plans perceptions of using the flipped classroom method in terms of differentiating instruction?

The drive behind this study was to determine perspectives about flipped classrooms so that there could be a better understanding of the topic. Stake (1994) identified an intrinsic case study as one in which the researcher wants to have better understanding of a case. Therefore, a case study was conducted in order to gather data on my research questions.

A case study is completed when a researcher wants to gain a better understanding of the case or cases being studied. Merriam (1998) said, "a case might also be selected because it is intrinsically interesting; a researcher could study it to achieve as full an understanding of the phenomenon as possible" (p. 28). A case study is used to address a descriptive or explanatory research question. In other words, research questions used in a case study are usually aimed towards answering 'how' or 'why' questions (Yin, 2004). This methodology was chosen for my study because I wanted to add more knowledge and clarity to an already familiar topic. I was also able to determine how or why a flipped classroom was beneficial to students in an eighth grade classroom.

Merriam (1998), Stake (1994), and Yin (1994) all explained that there were multiple and single case studies. All three scholars stated that multiple case studies focused on gathering data

from many different groups and analyzing the data to find comparisons. Because my focus was on a specific group of students, I conducted a single case study. A single case study, as described by Yin (1994), allowed the researcher to distinguish between the case and the context. In my case study, the sixth through eighth grade middle school in which I am employed was the context of my study, and my case was my eighth grade mathematics classes, as well as the teachers that worked with these specific students. My goal was not to compare the perspectives of the teachers and the students; my goal was to gather perspectives from all individuals who were involved in a flipped classroom to increase understanding.

The Case

The research was conducted at a public middle school located in a shoreline town in the state of Connecticut. The school hosted approximately 450 students in grades six through eight. The classroom in which the research was conducted in was an eighth grade mathematics classroom. The classroom had a *Smart Board*, a student computer that stayed in the classroom at all times, and a laptop cart that contained thirty *Chrome Books*. The laptop cart was the only one in the eighth grade, and all eighth grade teachers had to share the cart by signing up on a *Google Sheet*. The *Chrome Book* cart contained enough laptops for each student to use their own, as well as had extra laptops if one was not functional. The school, and classroom, was also equipped with wifi Internet access.

The participants in the study included four eighth grade mathematics classes and the four teachers of each of these classes. One of the math classes was an advanced algebra class. Students were placed in this class because they met a list of requirements that consisted of previous academic grades and standardized test scores. The other three classes were pre-algebra classes. Students in the three pre-algebra classes were randomly placed based on their

independent schedules. Two of the three pre-algebra classes were co-taught mathematics classes, which means there was a regular education teacher and a special education teacher in the class at all times. The Common Core curriculum for eighth and ninth grade mathematics was used to teach the instruction. The age of the students in the study were between 13 and 15 years old. The average class size of the four classes in the study was 22 students. The teachers in the study included a one-on-one aide, a special education teacher, the eighth grade mathematics teacher, and a math response to intervention specialist. With the exception of the eighth grade mathematics teacher, none of the participants have experienced a flipped classroom before.

Data Collection Methods

The purpose of this study was to gather perceptions from middle school students and teachers about the flipped classroom method. Because the goal was to gain insight from the participants in the study, it was important to collect data in a way that allows the participants to verbally express their opinions. Further, this study also focused on whether or not a flipped classroom model is beneficial to students who have IEPs or 504 plans. Therefore, some observations were conducted in order to collect data. The data collection methods that were utilized for this study can be found in Table 3.1.

Table 3.1

Research Question and Methods Used to Collect Data

Research Question	Methods
1. What are middle school student perceptions of the flipped classroom method?	a. Surveys b. Focus groups
2. What are (a) teachers, (b) parents, and (c) students who have IEP's or 504 plans	a. Surveys b. Interviews

perceptions of using the flipped classroom method in terms of differentiating instruction?	c. Observations

The next section will discuss each of these methods in detail, as well as include how each method was operationalized in the study.

Surveys

Quantitative data was collected through a survey that was completed by the students. Surveys are a good method to use when gathering data from a larger group of people (Creswell, 2011; Stevens, Lawrenz, & Sharp, 1993). Creswell (2011) stated that surveys collect attitudinal measures in order to determine the attitudes and beliefs people have towards an educational topic. Surveys can be open-ended, which allows the participants to elaborate more on their opinions, or close-ended, which keep the boundaries of answering each question strict (Stevens et al., 1993). Surveys that are close-ended can include multiple choice options, scalar questions, or checklists (Mertens, 2010). Because a survey is being used to determine the perceptions of middle school students on a flipped classroom, a close-ended survey was utilized.

Before beginning the survey, a consent form was sent home for each student and their parent/guardian to sign giving permission and agreeing to take the survey (see Appendix A for a copy of this consent form). A survey was administrated to four different eighth grade math classes on the same team during their 42-minute mathematics class (see Appendix B for a copy of this survey). In every class, the teacher (i.e., researcher) was available to assist in any technology issues. Students used *Chrome Books* to access the survey online. A web-based program called *SurveyMonkey* was used in order to administer the survey to each student. In order to easily access the questionnaire, the link to the survey was sent to the student's school e-

mail accounts. Students were able to spend as much time as they needed during the 42-minute period to answer the survey questions. Any student who did not finish the survey during that time period was brought back to the classroom during the enrichment period (i.e., study hall) at the end of that school day. Students who were absent from school were given a pass to come to the classroom during an enrichment period to take the survey.

Focus Groups

Qualitative data was collected through multiple measures, one of which was focus groups. Stevens et al. (1993) noted that focus groups are useful when gathering perceptions about the outcomes and impacts a project had on individuals. Further, using focus groups allows participants to share their feelings on a particular topic (Gibbs, 1997). Creswell (2011) stated that these groups are most beneficial when there is interaction between the interviewees. Much understanding can be gained about a topic from listening to the interaction and discussion between the group members (Mertens, 2010). Focus groups consist of a small group of individuals who have something in common in terms of the evaluation (Stevens et al., 1993).

The focus group in this study was comprised of six students from the population of eighth grade students. The six students were chosen based on an initial survey given to the students at the beginning of their eighth grade school year on their feelings of mathematics. Two students expressed their dislike for the subject, as it was one that has always been difficult for them; two students noted how math was very easy for them; and two students said it was easy or hard depending on the topic. Four of the six students expressed their lack of confidence in their ability to do math at some point in middle school. These six students were able to give more insight on the same topic that the survey covered in order to gain understanding on the benefits of the flipped classroom. The students were given a list of questions that were going to be covered

during the focus group (see Appendix C for a copy of these questions). The discussion took place during one 42-minute class period in the mathematics classroom. The only individuals in the classroom at the time of the discussion were the six students and the facilitator (i.e., researcher). The researcher asked a question, and the students were given time to answer each question. Students were encouraged to build off of each other's responses based on their own personal feelings of the question that was asked. If the researcher felt she wanted more information, she used probing questions to build off the topic. The researcher documented information from the focus group, as well as recorded the discussion to revisit the conversation when transcribing and analyzing data.

Interviews

Another measure of qualitative data that was used in this study was interviews. Creswell (2011) stated that interviews allow for participants to answer open-ended questions in order to give detailed information about a topic. Many researchers use a semi-structured approach when interviewing (Mertens, 2010). This method allows for the researcher to ask the interviewee questions and probe based on responses. Interviews can be conducted face-to-face, over the telephone, or through the Internet (Creswell, 2011). Stevens et al. (1993) stated that interviews were helpful when trying to determine what a program looked like and felt like to other stakeholders, as well as to understand the thoughts of the stakeholders. In order to understand the perceptions and feelings that teachers and parents had on the benefits of the flipped classroom in terms of differentiating instruction, interviews were conducted.

Two teachers and four parents were interviewed for this study (see Appendix D for a copy of the interview protocol). The two teachers were approached and asked if they would mind giving up some time after school to answer questions on the flipped classroom. One teacher was

a special education teacher who co-taught with the researcher. This special education teacher has also been the special education teacher of the students with IEPs for the past three years. The other teacher was a one-on-one aide with a student who has an IEP, and has been the aide of this specific student for the past three years. E-mails were sent home to parents with students who have an IEP or a 504 plan. The e-mail explained the purpose of the survey, and asked for volunteers to be a part of the interview. The parents that were chosen each had a child with an IEP or a 504 plan. These four parents agreed to complete the interview as they have been working closely with their child at home to help improve their child's understanding in math. Each interview with the teachers was conducted separately after school. The facilitator would ask each question, and probed further when more information was wanted or needed. The interviews were recorded and the facilitator wrote down responses that were given. The parent interview was administered through e-mail as it was the easiest way to allow for parents to participate at the leisure of their own time. The facilitator emailed the list of questions to each parent through a *Google Doc*. Each parent was asked to respond to each open-ended question to the best of their ability. While reviewing the responses, the facilitator made note on which questions she wanted more elaboration. The facilitator then emailed the parents back again to gain further information from a specific question or questions. This process was repeated until the facilitator gained all of the information that she wanted/needed, or until the parent did not have anything further to respond.

Observations

The final method used to collect qualitative data was through observations. Creswell (2011) noted that observations provide opportunity for a researcher to collect data in order to study behaviors. Further, observations are used to answer a 'how' or 'what' type question

(Cohen & Crabtree, 2006a). There are multiple observational roles that an observer takes on depending on the nature of his/her study. Creswell (2011) stated that a participant observer is one who takes parts in the activities in order to gain understanding on the action being observed, while a nonparticipant observer does not take part in the activities, but rather documents what he/she views. An observer can watch and listen to the behaviors and interactions of the participants during program activities, as well as how and what the participant contributes to the program activity (Mertens, 2010). During an observation, the observer collects data through field notes and drawings in order to record notes for data analysis. Observations were conducted in order to gain a better understanding on whether or not a flipped classroom is beneficial in terms of differentiating instruction.

The observations were completed during mathematics classes before and after a flipped classroom was assigned. The math class that was observed included 22 students. In that class, five students have IEPs, and four students have 504 plans. The students who have IEPs and 504 plans were the focus of these observations. The observer took on a changing observer role, participating in some activities that the students completed, while watching other activities without partaking (Creswell, 2011). Field notes were used to collect data during each observation. When the students were assigned to groups to complete an activity, the observer would walk around and sit with each group for one to two minutes at a time. While sitting in each group, the observer focused on the active involvement of each student, the eye contact each student had with his/her peers, and the answers that each student were sharing with their group members. At times, the observer would take part in some activities, asking questions to each student and documenting the responses given. The observer would also use this as a way to see how the student (a) was listening to the question, and (b) would respond to the question. This

was done before a flipped lesson was assigned, as well as after a flipped lesson was assigned. The observer focused on the behaviors and contributions of the students in order to determine whether or not the flipped classroom lesson increased motivation and student engagement, as well as helped student understanding of a topic.

Data Analysis Methods

Both quantitative and qualitative data were collected and analyzed in order to understand the perspectives of students, parents, and teachers on the flipped classroom.

Quantitative Data

Descriptive statistics was used to analyze quantitative data from the study. Descriptive statistics are used to help summarize the data collected (Creswell, 2011; Mertens, 2010). The mean, median, and mode are some methods that were used to analyze the data. Creswell (2011) stated that researchers report the mean, median, and mode from their study. The mean is the summary of a set of numbers in terms of significance, the median is the number in the middle of the data, and the mode is the number that appears the most. Together, these methods help to explain the characteristics of the sample collected (Mertens, 2010).

Students completed a survey from *SurveyMonkey* on their perspectives of the flipped classroom. Responses from that student survey that used a Likert scale were collected and organized. According to Salkind (2013), *Microsoft (MS) Excel* has a descriptive statistics tool that calculates the different measures. Therefore, *MS Excel* was used to organize the data, as well as to calculate the mean, median, and mode of each question. Charts and graphs were created to present a visual representation of the data, as well as to show the percentage of students who gave a certain response for specific questions. These questions included student focus during the video lessons, their engagement in class activities after completing a flipped lesson, and whether

or not the flipped lesson helped improve their confusion when solving mathematical problems. The data was analyzed to determine whether or not the flipped classroom was beneficial in helping to improve their overall understanding in math by having the tools available to review the material. Further, the researcher was able to determine whether or not the students felt they learned best from a traditional classroom or from a flipped classroom.

Qualitative Data

The constant comparative method was used to analyze qualitative data from the study. Glaser and Strauss (1967) stated that this method has four stages. The first stage requires the researcher to code each occurrence into different categories, or into existing categories. In the second stage of this method, categories and their properties are analyzed and integrated. The third stage happens when the themes and categories begin to 'delimit' the theory. Finally, the fourth stage occurs when the theory is written based on analyzing all of the data. In other words, the researcher is constantly comparing the data to see if new themes and trends appear across the data (Creswell, 2011). Once there are no more themes that are evident, the research is completed.

Qualitative data were collected from transcriptions from a focus group discussion, as well as from interviews with teachers, parents, and students. In addition, field-notes were recorded and analyzed from classroom observations. Ruona (2005) noted that basic word processing software was beneficial in "managing, organizing, and manipulating data for rigorous, effective data analysis" (p. 250). For this study, *MS Word* was used to organize and analyze the data. Ruona offered four steps to help analyze qualitative data, and those were used for this particular study. First, the data were prepared by collecting transcripts from interviews and field-notes from observations. A table was created in order to prepare for a later step in this process. While preparing the data, I began becoming familiar with the data; which is Ruona's second stage in

analyzing qualitative data. Any piece of the data that was relevant was documented on the table that was created from step one. The next stage included coding the data. This was completed in order to develop themes and descriptions (Glaser & Strauss, 1967). Once themes were identified, codes were assigned to those topics. Each of the three steps was completed for the interviews, as well as for the observations. All of the data was reviewed and analyzed further in order to make meaning of the data.

Reliability and Validity

When research is complete on a specific question or questions, it is important for the researcher to provide indicators that show the information is "trustworthy and believable" (Mertens, 2010, p. 379). Reliability and validity are how individuals judge the quality of the data that is collected in a study. Researchers test the reliability of a study to show consistent measure that proves the data is trustworthy. The validity of a study is tested in order to determine whether or not the research is credible. Creswell (2011) stated, "scores need to be stable and consistent first before they can be meaningful" (p. 159). Therefore, the reliability and validity of the study are tested prior to documenting the outcome of the study. In this study, pilot tests, member checking, and triangulation were measures used to ensure the study was reliable and valid.

A survey on the perceptions of students on the flipped classroom was the instrument used to gather data on the perceptions of eighth grade students on a flipped classroom. The researcher created the questions in order to gain a better understanding of her students with this type of learning method. Questions were produced based on the purpose of the study, as well as the literature read about the topic. Because the researcher generated the questions, a pilot test was conducted to check the reliability and validity of the study prior to conducting the survey. Creswell (2011) stated that a pilot test requires the researcher to administer the test on a small

group of people in order to make necessary changes based on feedback. According to Schade (2015), pilot testing was beneficial for allowing the researcher to test the tasks on the survey so the questions were not misleading or confusing, as well as to determine if there was enough time to respond to the questions. Further, Schade also stated that pilot testing was useful to ensure there would be enough data that could be used in the study. Five eighth grade students were chosen to pilot test the survey. Each student was given a copy of the survey and asked to respond to the survey and make notes about the process and questions. After the responses were collected, the comments and responses were read in order to look for unanswered or unexpected answers, as well as any misinterpretations. Based on the information gathered, the survey was modified and given to the same five students again. The same process was used to pilot test the interview questions. Instead of using students to pilot test the interview questions, two parents and one teacher were chosen to pilot test the interview questions. The teacher was another eighth grade math teacher who is beginning to implement the flipped classroom into her own teaching. The two parents were of students who were a part of the survey population. Once the pilot test results showed clear and understandable responses, the survey and interviews were administered to the sample.

A focus group was led in order to gain further insight on the perspectives students have on flipped classrooms. Further, interviews were conducted to obtain feelings from parents and teachers on the flipped classroom. Once the questions were pilot tested (as described above), and the focus group and interviews were completed, the researcher used member checking to check the validity of the study. Member checking is a way to allow members who were a part of the study to check the accuracy of the data collected (Creswell, 2011). This is a way to ensure that the interpretation of the researcher is consistent with what the participants were saying (Carlson,

2010). Not only are member checks beneficial for the interviewees to be able to change incorrect responses they gave or challenge an interpretation from the interviewer, but it also provides another opportunity to make additional comments (Cohen & Crabtree, 2006b). After each interview (including the focus group), the transcripts were provided to each interviewee to review. Individuals were able to make changes necessary on the transcripts in order to add more comments, or challenge what the transcriber wrote. Once the transcripts were approved, themes and categories were generated from the data. These were given back to each interviewee in order to complete one more member check. At this point, each individual was able to challenge the interpretation of the researcher, or make additional comments towards the themes or categories generated.

Triangulation is another way that the reliability and validity of this study were tested. Mertens (2010) stated that, "triangulation involves checking information that has been collected from different sources or methods for consistency of evidence across sources of data" (p. 258). Further, Mertens also stated that triangulation was used in order to "support the strength of interpretations and conclusions in qualitative research" (p. 429). Triangulation helps the researcher to find the same themes or have the same interpretations from multiple different methods (Yin, 2012). This study collected data from surveys, interviews, and observations in order to gather common themes to help validate the study.

Subjectivity Statement

As a seventh year middle school math teacher, I have taught many students who had/have varying abilities in mathematics. Some of my students are talented and gifted and need to be constantly challenged in order to maintain engagement. Many of my students are average learners, and their understanding varies based on the topic of the lesson, as well as how the

lesson is being taught. A growing number of my students struggle in mathematics, and some type of learning disability hinders them from understanding much of the topics that are being taught. When I was a student, I was somewhere in between the 'average' student and the 'struggling' student in mathematics. As a high school and college student, I was always looking for alternative ways to learn a topic in mathematics. Whether it was asking a friend, or searching for an alternative resource such as a textbook or the Internet, I always found myself looking for more ways to teach myself the same topic. None of my teachers ever used the flipped classroom. As a matter of fact, the first time that I had heard of such a thing was at the interview with the Superintendent for the job that I currently hold. The minute he explained the flipped classroom to me, I became immediately intrigued.

I have been implementing the flipped classroom for slightly over a year now. In my opinion, the flipped classroom is extremely beneficial in a mathematics class. Many students understand the topic and can do well on the practice problems in the classroom. However, when students go home to practice independently that is when they find themselves struggling. In using the flipped classroom, students are able to do the learning at home and the practicing in the classroom; which, in my opinion, is much easier. If they are learning the content at home, they are able to write questions down and bring them to the classroom for a discussion. Then, they are able to practice the skill in the classroom, which allows them to utilize the teacher and their peers for additional clarification and help. Students have parents at home to gain assistance from while working on homework. However, as students get older and take harder math classes, many adults find themselves unable to help their child[ren] because it has been so long since they have learned and practiced that skill.

The school that I currently work in is in a middle class economy. The school district is well equipped with the technology needed in order to implement a flipped classroom with video lessons. Only a small number of my students (i.e., about one or two) do not own a computer at home; but are able to utilize the technology in the classroom if they are learning from the video lesson. Further, every student has a textbook that they are able to keep at home, as well as access online. I have worked in lower socioeconomic neighborhoods where the school district was not as fortunate and lacked many different resources in terms of technology and textbooks.

Summary

This study gathered data on the perceptions of students, teachers, and parents on the flipped classroom in a single case study design. The participants of the study included eighth grade students learning from the flipped classroom, a special education teacher, a one-on-one aide, and four parents of students with IEPs or 504 plans. The study was completed in an eighth grade classroom in Clinton, Connecticut.

In order to collect data, multiple methods were utilized. Close-ended surveys were administered to the eighth grade students, and a focus group was conducted with six of those eighth grade students to gain a more in-depth perspective. Interviews were completed using a semi-structured approach with the two teachers, as well as with four different parents of students learning from the flipped classroom. Finally, observations were completed in a classroom in order to observe the behaviors and interactions of students who have IEPs or 504 plans. The observer took on the role of a changing-observer, participating in some of the activities, while watching and listening to others, in order to collect data. Descriptive statistics was used to analyze the quantitative data from the survey results, while constant comparative was used to analyze the qualitative data from the interviews and observations. To ensure the reliability and

validity of the study, the researcher pilot tested the survey and interview questions prior to administering them. The researcher also used member checking and triangulation to guarantee the validity and reliability.

Chapter 4 – Results and Discussion

The idea behind this thesis was to gather perceptions of the flipped classroom in a middle school setting. It was important to gather the thoughts and opinions of all individuals involved – parents, students, and teachers – in order to determine if the flipped classroom benefitted all students, including students with learning disabilities. These ideas directed the study to the following research questions:

1) What are middle school student perceptions of the flipped classroom method?
2) What are teachers, parents, and students who have individualized education programs (IEPs) or 504 plans perceptions of using the flipped classroom method in terms of differentiating instruction?

The results of the study were reflected of survey results from eighth grade students, interviews completed by parents and teachers, a focus group of six eighth grade students, and observations in the mathematics classroom. Quantitative data was analyzed through a survey that was completed by eighth grade mathematics students. Qualitative data was examined based on observations and information shared by the interviewees. Each research question provided many common themes that were evident throughout an analysis of all of the data collected.

Research Question 1: What are middle school student perceptions of the flipped classroom method?

The intended purpose of the flipped classroom is to help students who are absent to stay caught-up on their work, and to also provide additional support to students who struggle in their classes (Bergmann & Sams, 2015). Students learn the lesson from the textbook or a video prior to attending class. In class, students apply their understanding of what they learned from the

homework lesson to complete an activity. This provides teachers an opportunity to spend more time working with students who may have difficulties with the lesson. Many of these notions were evident throughout the research study. Students from the study had many positive perspectives to share regarding the flipped classroom.

Pacing

The student survey provided participants with a Likert scale to determine the average responses of each question. The survey data showed many positive responses in terms of learning the lesson at ones own pace in the flipped classroom. Out of all of the responses, 93.2% of students said they agreed or strongly agreed that they liked how they were able to pace themselves while watching the video lessons (see Figure 4.1). In addition, the open-ended survey question that reads, "What did you like most about the flipped classroom," showed 51% of the participants mentioning something about the opportunity to learn at their own pace. Students made comments about being able to go back and rewind the video lesson if they did not understand something, and many had also mentioned the ability to take better notes from the lesson because they were able to pause the video and write things down.

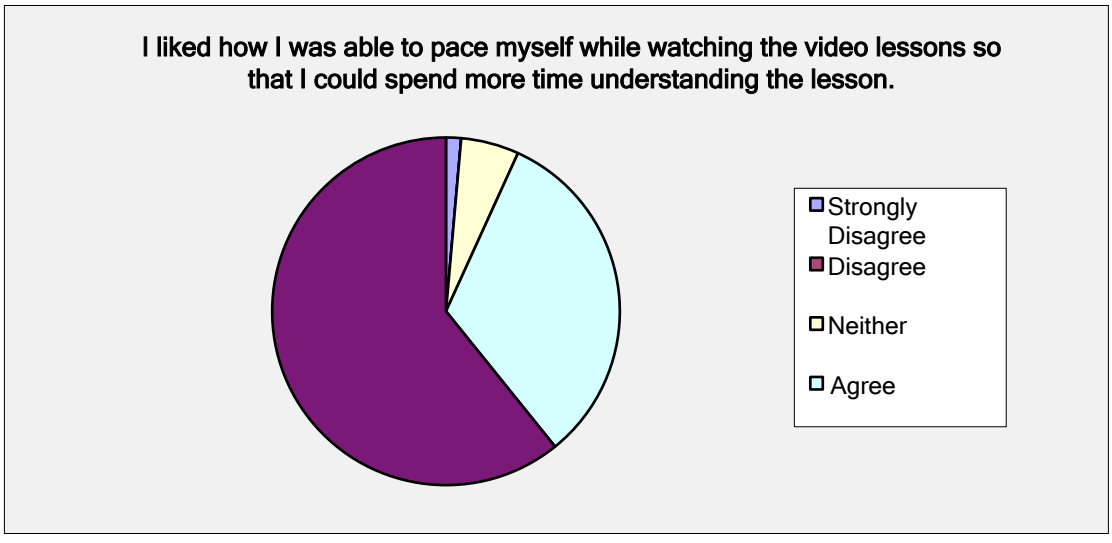


Figure 4.1. I liked how I was able to pace myself while watching the video lessons.

The majority of students noted that the flipped classroom aided them with their ability to learn the lesson by allowing them to work as fast or as slow as they needed or wanted to learn the topic.

The focus group also had many positive responses about the ability to work at their own pace while learning through the flipped lesson. The focus group consisted of students whose math abilities varied. The group included students who performed extremely well in math and were also in an advanced class, students who were average learners in math, and students who struggled. Some of the learners mentioned how they enjoyed the opportunity to learn more than one lesson at a given time and move on with their learning based on how fast they understood. For example, one student noted how, when learning about solving systems of linear equations by graphing, she was able to fast forward through the first half of the video because she already understood how to graph equations to find one solution. This was supported by another student, who indicated that sometimes he would spend that time learning two of the video lessons and working on making connections between the topics before practicing in class. The students in the focus group also noted how they would skip through sections in the book or on the video if they understood that topic already, and spent time focusing on topics they found more difficult. When learning about how to find the volume of composite solids, one student claimed that he was able to skip through the part where the video reviewed the formulas because he already knew how to use the formulas with one shape.

The students in the focus group also noted the benefit of taking better notes from the video lessons. A student mentioned how she "can stop the video and re-watch it to take notes, where in class I might get it but we have to wait for everyone else, so I can't move at my own pace in the classroom." In addition, many students in the focus group noted the inability to take

effective notes in class because things are always moving "so quickly," and there was never enough time to learn the material and take good notes. This was noted by a student who said, "sometimes, after a lecture, I cannot understand the notes that I took because they are all sloppy. I am not able to get everything on them from the class because we are moving so fast and by the time I copy something down, you move the slide or erase the board." In addition, two students mentioned how they liked the ability to pause the video and draw images, or used different colored pencils to color-code their notes, as they are more visual learners.

The results of my study coincided with the results of these other studies on the perspective of students on the flipped classroom, in that the flipped classroom has been found to be an effective way to differentiate instruction because it allows students to work at their own pace (Cox, 2015; Houston & Lin, 2012; Russel, Malfroy, Gosper, & McKenzie, 2014). For example, students in this study felt they were able to slow down and re-learn information when they did not understand, or move on more quickly when they grasped the concept. Similarly, the research found that students felt they were able to work at their own pace when having access to information on the computer (Cox, 2015; Russel et al., 2014). Studies also found the flipped classroom to be effective because it allowed students who were struggling the opportunity to pause or re-watch the video when needed (McCallum, Schultz, Selke, & Spartz, 2015), or students who understood could move through the material they had already mastered (Siegle, 2014). This was consistent with this study, where many students also mentioned the fact that they were able to take better notes with having the opportunity to pause and rewind the video, which also helped them to understand the lesson. This final point was also specifically discovered in another study where teacher observations found that students who used technology for learning produced higher quality notes and work (Gulek & Demirtas, 2005).

Availability

Another theme that was found often through analyzing the data was the availability of the lessons. Responses were overall positive in terms of the availability of the flipped lessons, specifically having the lessons through a video format. In a survey question that asked students to choose what they enjoyed about the flipped lesson, 83.8% of the students chose "the availability and access to the video lessons." This was one of the top three responses to that specific survey question (see Table 4.1). Two of the students who chose "other" stated that they liked having the videos up for the whole year so they could review for the midterm and final examinations. In addition, when analyzing the data to the open-ended question about what students liked most about the flipped classroom, 55% of the students mentioned something about having the videos available to them whenever, and wherever they needed them. On the open-ended survey question, a few students noted how they liked the "permanent access" they had to the video lessons, providing them the opportunity to go back and re-watch the videos to prepare for a quiz, chapter test, or final examination. In a survey question that asked students whether they review the video to study for an assessment, 61.7% of the students agreed or strongly agreed to this question. This also shows that students take advantage of the permanent access of the video lesson.

Table 4.1

A Survey on the Perceptions of Students on the Flipped Classroom: Which (if any) did you enjoy about the flipped classroom (you may pick more than one):

Answer Options	Response Percent	Response Count
The availability and access to the video lessons	83.8%	62

Being able to pause and rewind the video when I was confused or missed something important	94.6%	70
The collaboration and discussions in class (as a whole class or group)	29.7%	22
The amount of time the teacher had to review a topic	51.4%	38
The amount of time we had to practice the skill learned through the flipped lesson	59.5%	44
Working on the class activities after learning the lesson	47.3%	35
Being able to pace myself while learning the lessons	78.4%	58
Other (please specify)	13.5%	10
	answered question	74
	skipped question	0

Students in the focus group also mentioned the pros of having the video lesson available to them at their leisure. One student mentioned that something good about the flipped [video] lessons is having the opportunity to "go back and watch it at any time before a quiz or a test." In addition, another student had commented about many students have cellular phones or tablets that allow them to access the video lessons on *YouTube* "right at their fingertips." Four students specifically mentioned that they were, at that time, going back to review all of the videos from the topics covered the second half of the year "in order to begin preparing for the final examination." The availability of the video lesson not only benefitted the students at the time of their learning, but it was valuable to them throughout their year in the class.

Other than the availability of the lesson being a positive, students also noted the benefit of having the availability of the teacher during class times. In a question that asked students if

they believed that the teacher had more time to answer questions about the topic after a flipped lesson than in a traditional lecture, 85.1% of the students agreed or strongly agreed. Figure 4.1 show that 51.4% of students enjoyed the flipped classroom because of the amount of time the teacher had to review a topic. Students in the focus group mentioned how it was helpful to have the teacher available to sit with a student or a group of students to further explain the lesson if students were still confused after learning from the flipped lesson. Some learners stated that they found the time I spent with them in a small group re-teaching the Pythagorean theorem incredibly helpful. One student said that she "felt more confident and ready to participate in the group activity because she was able to learn the lesson from the video and from the teacher in person." In addition, students also agreed that sometimes the class period itself was too short to teach the lesson and allow students to ask questions about the lesson, and so having the extra time for the teacher to explain further was "extremely helpful." For example, a few of the students mentioned how they were really struggling with the discovery lesson on solving systems of linear equations by elimination. They were trying to ask questions, but ran out of time in class. When learning the lesson from the video that evening, students understood the topic a little better, but were even more knowledgeable the class that followed the video lesson because I had "practically the entire class to answer questions and review the topic." I was able to sit and meet with all of my students one-on-one to answer questions throughout the entire class period. The flipped lesson gave me the opportunity to ensure all of my students understood the topic before moving on to a new lesson.

The results from my study in terms of lesson and teacher availability aligned with the results from studies that had been conducted on the perspectives of the flipped classroom. Jonathan Bergmann and Aaron Sams (2015) restored the flipped classroom partly to help

students who were absent to stay current with their education. However, the availability of the information from the flipped lesson had been found to benefit all students, not just those who were absent from classes (Houston & Lin, 2012; McCallum et al., 2015; Senn, 2008). Students from my study have expressed the benefit of having the videos available to them to prepare for future assessments. In addition, research found that the flipped lesson also opened the time a teacher has to work with students during class, which helped improve student understanding and achievement (Houston & Lin, 2012; Lage et al., 2000; McCallum et al., 2015; Parslow, 2012; Stanford, Crowe, & Flice, 2010). Students from my study also shared the positives of having the teacher available to answer more questions or re-teach a topic to help improve student understanding. Not only have my students expressed the value of having the videos available whenever and wherever they need them, but they also enjoyed the opportunity to spend more one-on-one time, or small group time, with me in the classroom.

Ability to Focus

Through analyzing the data, it was evident that students had positive opinions on the ability to stay focused through the video lesson. Students felt that they were able to focus more on the video lesson than they were learning from the textbook. Based on the survey results, 89% of students always watched the videos rather than used the textbook to learn the lesson. In addition, 85.1% of students agreed or strongly agreed that the video lessons provided more information on the topic than the textbook provided (see Figure 4.2).

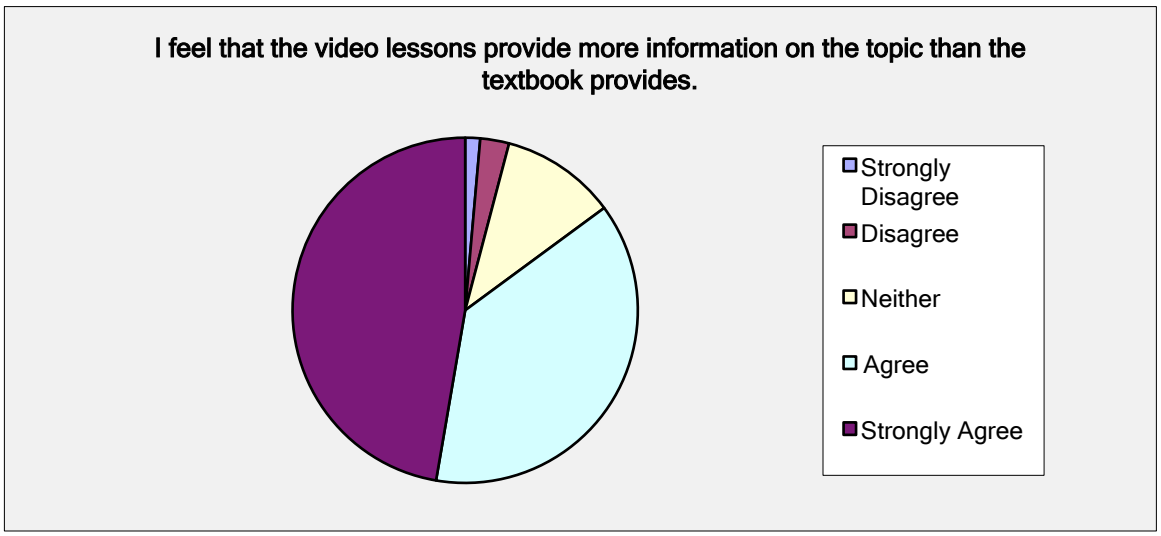


Figure 4.2. I feel that the video lessons provide more information than the textbook.

As shown in Figure 4.2, the majority of students felt that the video lessons provided more information than the textbook itself. There were very few students who disagreed that the videos were not more helpful.

Students in the focus group also mentioned the ability to stay more focused when learning the lesson from the video than from the textbook. One student claimed that "the textbook stinks because it doesn't explain the problem, it just shows the steps." Another student agreed and said, "sometimes sitting down and reading a textbook is awful," and others built off of that statement saying, "just the thought of it does not intrigue you" or "it's difficult to follow, and it's easier to understand a person than a textbook." These students also noted that the video lesson goes "more in-depth than the textbook," because the video lesson explained things thoroughly, where the textbook just showed the steps needed to answer a question. Only one student in the focus group claimed that she liked reading along with the textbook because "the problems are similar," but other students stated that the textbook made them frustrated because it was difficult to follow.

Students also noted their ability to stay more focused on the flipped lesson because there were fewer distractions while they were learning the lesson itself. An open-ended survey question that asked what students like most about the flipped classroom show 34% of students commenting on being less distracted by their peers since they were learning the lesson at home or during a free class period. Students made comments in the survey such as how they liked "not being distracted or slowed down by peers." In addition, students also noted that they were able to focus more on the lesson through the video than when the teacher was teaching through a lecture. Only 9.5% of students agreed or strongly agreed with finding it difficult to stay focused to videos because of other Internet disruptions such as checking email or social media sites. The focus group also had a conversation regarding classroom distractions. One student stated that he liked the video lessons because, "it's like a mini classroom lesson at your house. Then you don't have to get distracted by everyone else around you." Another student stated that, "we are able to get through more and stay focused with the lesson because you don't have to take the time to stop the lesson and repeat information for students who were not paying attention in the first place." This student shared an example of a class that we had just completed that day. I did not assign a flipped lesson for that specific topic because, in my opinion, it was a quick and simple topic. She mentioned that she had two more questions to ask, but was unable to ask them because a group of three students who were not paying attention to the lesson asked me to repeat what I had said. Because I had to spend time repeating what more than half the class already knew, this took away time from students who had questions that built off the lesson. Many students also noted how, because of their ability to do well in math class, students would ask them questions in the middle of the lesson. For example, a student who performs extremely well in math sits in class with a couple of students who struggle. He claimed that, often times during lessons, students

would ask him questions because they were too nervous to ask out loud in front of the entire class. Students asking him for help during the lesson were extremely distracting to the student while trying to complete his own work, and the flipped lesson eliminated these additional disruptions. It also meant that this student had the ability to stay focused on his own work, worrying less about having to stop his concentration in order to assist a peer.

Studies found that technology is a motivational tool in terms of getting students to complete homework assignments (Arasingham, Martorell, & McIntire, 2011; Dodson, 2014; Lenz, 2010). In addition, studies showed that students benefitted from web-based homework because the textbook was difficult to understand (Arasingham et al., 2011; Lenz, 2010). My study, too, has shown that students preferred to learn from a video rather than a textbook because the video provided students with more explanations on how to complete a mathematical problem. My study indicated that the flipped video lessons also eliminated distractions in the classroom. Research has found that students learn best from their peers through small groups and collaboration (McCallum et al., 2015; Strayer, 2012). However, the collaboration is only effective if students successfully learn the lesson material, which is the purpose of the flipped lesson (Bergmann & Sams, 2015).

Research Question 2: What are teachers, parents, and students who have IEPs or 504 plans perceptions of using the flipped classroom method in terms of differentiating instruction?

The flipped classroom can be used to differentiate instruction in order to meet the needs of all students, including gifted and talented students and students with learning disabilities (DeSantis, Van Curen, Putsch, & Metzger, 2015; Lage, Platt, & Treglia, 2000). There are, however, students who need an adult to help them stay focused during the lesson or activities being completed in the classroom (Basham, Israel, Graden, Poth, & Winston, 2010). The

literature review completed for this study has not found much information on the specific perceptions of students who have IEPs or 504 plans. Through parent and teacher interviews, student surveys and observations, my study has found much about the perspectives of these students on the flipped classroom.

Multiple Avenues for Learning

In a classroom, there are talented and gifted students, average student learners, students with 504 plans, and students with IEPs. The data analysis showed that the flipped classroom provided multiple avenues for learning in order to reach the needs of all learners. My observations of students who were completing a flipped assignment showed that students chose a method that best suit their individual needs. There were nine students who were the focus of the observation, and six of them learned from the video lesson. Out of those six students, five of them were seen pausing the video many times throughout the lesson to take notes on their pre-made notes page (see Appendix E for a copy of these pre-made notes). The other three students who did not watch the video chose to either follow the textbook or read through the *Microsoft (MS) PowerPoint* presentation that was handed to them (see Appendix F for a copy of the *MS PowerPoint* presentation that was handed to these students). These students were engaged in the learning, and all of them were able to successfully complete the discussion questions that followed the lesson. The parents of these students who completed the interview also had positive things to say about using the flipped classroom as a way to differentiate instruction. One parent noted that the flipped classroom was, “very beneficial considering [her] difficulties with learning.” Another parent had the following to say regarding the flipped classroom as a way to differentiate instruction:

> I think the flipped classroom model reaches all learners because it has the teacher speaking in the videos for those students who can learn through listening, it shows the work with the equations/graphs/figures for visual learners, and the note taking component helps those who learn through writing. The option to pause and rewind is also helpful for any student who is confused or needs the lesson to slow down.

The co-teacher in the classroom also agreed that she believed the flipped classroom allowed her students to work comfortably with something that they are confident in learning from. For example, the three students who decided not to watch the video lessons could not focus from a video because there were other parts of the technology that distracted them from learning – such as website games. Although they did not utilize the video lesson, they were still able to learn the topic in a way that was best for their learning style and with the least distractions.

Research found that students performed better in the classroom when they were provided with multiple modalities to learn from (Mattis, 2015). Research also showed that student performance and interest heightens when students were presented information in a variety of ways (Lage et al., 2000). In my study, students were given different options to learn the same material, which allowed for them to choose the method that motivated their learning. My study showed that students benefitted from learning the lesson in a way they were most motivated to learn.

Ability to Focus

My data showed that students were able to stay more focused while learning the lesson, as well as when participating in the class activities. In the survey, students responded that they learned from the flipped classroom because they could go at their own pace and pay more attention to the lesson. Many of these students expressed their appreciation to the fact that they

were able to focus on their work because they were not concerned about how much the other students had accomplished. One student specifically noted that he did not feel anxious and pressured to have to "pretend to be done with the work," so no one thought he was taking too long. The parent interview data also showed a positive outcome in their child's ability to stay focused when learning form the flipped classroom. All four parents made a comment about their child's ability to pause the video when they needed a break, as well as to "take really good notes" while learning. One parent noted how her daughter takes very thorough notes, which help her to prepare for assessments. Her child is able to write down "side notes" in her own words, which helps her daughter to understand better when reviewing for a quiz or a test.

When discussing the ability to take a break, the teachers in the interview agreed that many of their students sometimes needed that "mental break," and having the flipped lesson allowed them to take that break without missing instruction. My observations, as well as the interview with the teachers, showed that one student had a very difficult time staying focused during lectures when he did not understand from the start. He would become very overwhelmed to the point where he would lose hope and give up listening altogether. The teachers explained that the flipped video lesson allowed him to pause the video when he was becoming aggravated, walk away from the lesson to take a break, and jump back in when he was ready. They stated that they saw a greater improvement in his confidence because he was able to spend more time focusing and learning the lesson.

The observations in the classroom also showed that students were able to stay more focused while learning the flipped lesson, as well as participating in a group activity. While lecturing, I noticed that all of the students had difficulties staying focused on the entire lesson. Two of the nine students were looking out the window and not taking any notes, and another

student was playing with her pencil. None of them were able to maintain focus for the entire lecture. When I assigned a flipped lesson, my observations were entirely different. Eight of the nine students were paying close attention to the video and taking notes. Only one student had a difficult time staying focused, and the teacher in the room needed to sit next to him while he watched the video. He often needed cues to ensure he was on task. During the class activity following the lecture, two of the nine students were actively participating in the group discussion; the other seven students were either listening to the conversations, or distracted by the noise outside of the window. In addition, all students were able to stay focused during the small group discussion that was a re-teach to the flipped lesson. Students were engaged in the conversation, while listening to others when they were unsure of their understanding.

My research showed that when students were provided with more time to learn a lesson, they were able to focus more and learn the topic enough to understand. One of the benefits of the flipped classroom is that it provides more time for a teacher to review a topic (Bergmann & Sams, 2015). This time could be used for students to complete more challenging projects or activities, have collaborative discussions about the topic, or re-learning a topic. It provides the teacher the opportunity to give more individualized attention during the class period (Parslow, 2012). Inclusion classrooms allow for students with special needs to learn in a regular education setting; however, these students still benefit most from small group instruction (Basham et al., 2010).

Higher Level of Engagement

The data from my study has shown that students with IEPs or 504 plans had a higher level of engagement when learning from a flipped classroom. Parents and teachers all mentioned the pros of allowing the students to learn from the computer, as it is something of interest to

them. One parent said that her child "likes videos and electronics, so this captured his attention." In addition, the teacher said that many of the students would much rather play video games than read a book, and so the video lessons kept students engaged in the learning process. Results from the student survey also showed that students were more interested in learning the topic because they were able to do so on their computer or tablet. One student said, "I like to play games on the computer all the time, so I like this learning. I like being able to listen to the textbook audio online, and then learn it from the videos." The technology used for a flipped lesson was a motivational tool for students. Parents believed their children were engaged in the lesson because they enjoyed using the technology.

My observations in the classroom also showed that students were more engaged in the class activities that followed a flipped lesson in comparison to class activities that followed a lecture. One student did not change much in terms of engagement in the activity. He appeared as if he were not listening, but then would chime in and comment on something a student was saying. Another student, the same student who needed a teacher to cue him when watching the video, still had difficulty participating in the class activity no matter how he learned the lesson. Three of the four parents commented that they feel that the video lessons give their child the extra support, and it jump-started their learning the lesson. For example, one parent noted that his child was:

> usually behind because when [his] son doesn't understand one topic, he usually doesn't understand it in enough time before moving on to the next lesson. The flipped lesson allows [his] son to understand the lesson from the start, so he is not delayed but ahead of his learning.

Further, another parent stated that her son is "also able to understand a topic from the start, so he is ahead rather than falling behind." In addition, the parents had mentioned comments regarding the confidence of their child increasing because they are able to learn the lesson ahead of time, as well as repeat it when necessary. Perhaps students were observed as more engaged in the activity following the flipped lesson because they had higher confidence in their ability to perform the activity.

By implementing the flipped classroom, teachers can integrate technology to differentiate instruction (DeSantis et al., 2015). Technology had been found to be a motivational factor in student engagement and achievement (Gulek & Demirtas, 2005). My study coincided with the results of these studies. From the survey, many students noted their enthusiasm in learning from the computer. In addition, the observation showed that students appeared more engaged in their learning because they were learning in a way that motivated them.

Additional Results

There were common themes that were generated across both research question findings. These themes were positive suggestions for the future implementation of the flipped classroom. They were analyzed from survey results, interviews, and the focus group discussion. From all of the data that was collected for both research questions, the following information was gathered regarding ways to improve the flipped classroom.

Educating the Purpose

Data collected from the parent and teacher interview, as well as the student surveys, showed that individuals believe there should be more practice problems included on the videos to ensure student understanding. However, the purpose of the flipped lessons is to have students focus on learning the content, and not to get frustrated with completing homework questions

(Cox, 2015; McCallum et al., 2015). In addition, three of the four parents, as well as six of the students, were not aware that they could pause the videos in order to slow down and take notes. Research has shown that in order to help students to successfully complete the assignment, they need to be properly trained to use the tools (Arasingham et al., 2011; Cranmer, 2006; DeSantis et al., 2015; Dodson, 2014; Houston & Lin, 2012; Lenz, 2010).

Prior to implementing the flipped lesson, it is crucial to educate students, parents, and teachers on the purpose of the flipped classroom, as well as how to use the technology that is needed to complete the task. Perspectives from parents from a study showed that when they were unable to navigate through the technology, their student(s) had difficulty completing the task (Cranmer, 2006). Therefore, students should be trained how to use the technology, as well as the purpose of the assignment; and parents, too, should be educated on the same information (Portier, Peterson, Capitao-Tavares, & Rambaran, 2013).

Provide Other Teaching Styles

From the focus group, one student suggested providing a link (or links) to multiple videos or websites that presented the same content in a different way from a different individual. The focus group discussion led to students believing some children cannot adapt to my teaching style, and may need to see the lesson presented a different way. In addition, an open-ended question from the student survey that asked students to provide suggestions towards the flipped classroom showed that other students recommended providing multiple videos of different ways to solve the problems.

Research showed that the flipped classroom was not beneficial when students were presented with a video lesson being taught by an individual whose teaching style they were not familiar with (McCallum et al., 2015). However, it may be a good idea to include a ‘choice

board,' where students choose how they would like to learn the lesson so it best meets their individual needs (Bergmann & Sams, 2015). In addition, students can be educated more on how to use the technology to help them choose a video that best meets their needs (Portier et al., 2013). Students may need to be navigated through this process at the beginning, but as they become familiar with how to achieve this task, then students can apply it in other classes.

Summary

The overall outcome of my research showed that middle school students had positive perspectives in terms of the flipped classroom. The data from the study showed that students appreciated the opportunity to work at a pace that was suitable for their learning needs. Students who mastered their understanding quickly were able to move on to more challenging tasks, while children who were struggling were able to work at a slower pace until they reached mastery. Students enjoyed having the availability of the lesson in order to review it when necessary. In addition, pupils appreciated the extra time that the teacher had to work with learners one-on-one, as well as to re-teach the topic. Students expressed their ability to focus more on the video lessons because they were easier to follow and understand than the textbook. Their focus also improved in the classroom.

The flipped classroom benefitted students with IEPs and 504 plans. It provided multiple avenues for students to learn the topics, which assisted student learning. Students were engaged because they were working with technology, which was a resource that motivated their learning. These children were also able to focus more on their own work because they were not anxious about competing with their peers with understanding. Students were able to take their time when learning the lesson, which also allowed them to pause the video and take detailed and helpful notes.

All students benefited from the extra time that the teacher had to review concepts with students who were struggling with the material. Further, all students benefitted from the ability to learn the topic at their own pace and without having to worry about what their peers were working on. Students, parents, and teachers did provide suggestions in terms of future implementation of the flipped classroom. All believed that there should be another practice problem for students to complete following the lesson in order for the teacher to truly know if mastery was met on the topic. In addition, the data showed that it would be helpful to teach students, parents, and teachers how to use the technology prior to implementing the flipped classroom. These were positive suggestions that were meant to help the researcher improve the flipped classroom.

Chapter 5 – Conclusions and Implications

The purpose of this study was to determine the perspectives of all students, as well as teachers and parents, on the flipped classroom. My eighth grade math students were struggling with understanding the content. We would move on to the next lesson when students were still trying to figure out the previous one. I was also finding it challenging to help my students with individualized educational programs (IEPs) and 504 plans reach mastery on time. Students would become overwhelmed with the work to the point they would stop completing the practice homework, causing them to fall further behind. I was determined to find out whether the flipped classroom would benefit student understanding. As I completed the literature review to broaden my understanding on the flipped classroom, it became clear that much of the research that was conducted was done at the college level. In addition, my research did not lead me to learning any information on whether or not the flipped classroom benefitted students with learning disabilities. Because of this, my research questions were developed around the perspectives of all eighth grade math students on the flipped classroom, as well as the perspectives of students with IEPs and 504 plans and their parents and teachers. In order to gain noble understanding on these perspectives, data was collected and analyzed through interviews, surveys, and observations.

I collected data to gain perspectives on the flipped classroom from eighth grade students, more specifically from students with IEPs and 504 plans, as well as from teachers and parents. My data overlapped with the literature review research that I found. Students felt that they were able to pace themselves with their learning, which was a positive perspective that came up often through the research that had already been conducted. In addition, students enjoyed learning from the video lesson because of the explanations it provided. The textbook was found to be

frustrating and difficult to follow, and research from my literature review found that students who tried to learn from the textbook often became discouraged with their learning. Students were more motivated to learn from the video lesson because using technology was something that was engaging to them. The research from my literature review also showed that technology is a motivational tool for student learning. Although my literature review discussed the benefits of students learning the video lesson from a teaching style they are most comfortable with, my data showed that students believed providing additional videos with different teaching styles might benefit some students. Overall, the perspectives from both of my research questions came out to be positive. Students enjoyed learning from the flipped classroom, and everyone believed that it was beneficial for all students learning.

Limitations

Three limitations affected the research study on the perspectives of middle school students on the flipped classroom. The sample size, being the first limitation, was not ideal for this study. There were 74 students that completed the student survey, and six that were included in the focus group. In addition, four parents participated in the interview, and only two teachers presented perspectives. Although the number of students who took the survey aligned with other research on this topic, I believe the data may have offered different insight had there have been more surveys completed. I also believe it would have been better to gain specific perspectives from more students in a focus group. Even though the data from the survey provided much information, the focus group discussion offered rich information.

The next limitation that affected this research study was the lack of available data. As previously stated, I only included one focus group in my study in order to gain perspectives of students on the flipped classroom. I believe I could have received a lot more viewpoints on the

flipped classroom if I included more focus groups. The limited time prevented me from being able to include more focus groups. In addition, this study would have benefited from more parent and teacher opinions on the flipped classroom. I reached out to a total of thirteen parents, but only four were available to participate in an interview. In addition, only two teachers (excluding myself) had exposure to the flipped classroom, which limited my ability to gain more teacher perspectives.

The final limitation that affected this study was the measures used to collect the data. Although other studies guided my thinking, I created my own survey, interview, and focus group questions and prompts. After analyzing the data, there were more questions that I believe could have enhanced my results. I would have liked to hear more about whether or not time was a factor in students' perspectives on the flipped classroom. Some said watching the videos took a longer time, while others took shorter. I question whether this had anything to do with whether it benefitted student learning or not. In addition, I would have liked to gain understanding on whether or not students found it difficult to keep up with the lessons. Learning from a flipped classroom requires independent motivation. From my experience as an educator, students in eighth grade are still learning how to manage their time in order to complete their studies.

Implications for Practice

It is important to understand that implementing a flipped classroom takes time and patience from an educator and the learners. An educator needs to create lessons, write a script for the video, and record the lesson before posting it on the Internet. In addition, the educator needs to determine how students will be assessed for understanding on that specific lesson, and create activities that allow students to apply their new learning to something that is more challenging. The students need to learn the lesson, take notes, and come to class prepared to apply their new

understanding to real world applications. In my personal opinion, the time it takes to implement a flipped classroom is completely worth it as it enhances student learning. Other than understanding the time it will take, there are two major implications for teachers who wish to implement the flipped classroom – student choices and technological training.

The data that was collected for this research showed that students wanted more choices in terms of learning the lesson. It is important to understand that students are provided with multiple modalities in a flipped classroom through learning from the textbook, a video lesson, or pre-made notes. However, students and parents have suggested providing more video options for students who may need the video, but may need to learn it from a different teaching style. One way to provide more video options is by emailing or posting links on a website for students to access. In addition, teachers can provide links at the bottom of a notes page, or write it on a board in the time span the lesson is being taught. Perhaps a teacher may want to show his students how to access other videos that show up on the 'up next' section on *YouTube*, as these usually align to the topic being learned; or teachers can show students how to search for educational videos on *Google.* This guides me to the next implication, which requires teachers to train students, parents, and other teachers how to use the technology.

It is the twenty-first century and, although technology has become more popular, one should never assume how literate others are with using this tool. My data collection, as well as review of the literature, noted the importance of training individuals to use the technology in order to gain the full benefits of the resource. If implementing the flipped classroom using video lessons, teachers need to spend time teaching students, parents, and teachers how to use the technology. Teachers should teach students how to access, pause, and re-visit the videos. It may be helpful for a teacher to model the learning. For example, a teacher may wish to set up a

'mock' video and create notes that go along with this video. In the classroom, the teacher can model exactly how a student should use the feature in order to gain the full benefits from the video lesson. In addition, it may be beneficial for a teacher to provide this same 'mock' video and notes page, as well as a directions sheet, to the parents and teachers of students who will be learning from a flipped video lesson. This way, the parents and teachers will know how to help their student if they are having difficulties while learning, which will prevent students from becoming discouraged when learning.

Suggestions for Future Research

Although the idea of a flipped classroom is not new, I have not found many studies that have been completed on the flipped classroom. In addition, my review of the literature has helped me to understand the perspectives of college-aged students on the flipped classroom, but I am still unclear about the perspectives of students who are in middle school. I believe that more studies need to focus on this age group. In addition, I believe it would be wise for a future researcher to focus on whether a student of this age is responsible enough to learn from a flipped classroom. Because the flipped classroom requires a student to learn a lesson prior to attending class, the student has a higher responsibility of completing the assignment than if the student were assigned problems to complete from a textbook or worksheet.

My literature review had also not been successful with obtaining knowledge on whether or not the flipped classroom benefits students with learning disabilities. Because the flipped classroom is a way to provide differentiated instruction, I believe it is important to conduct more research on how students with learning disabilities benefit from this learning. It would be helpful to learn how students with learning disabilities are able to manage learning a lesson by themselves if they have difficulties staying focused while learning from a lecture in the

classroom. If used appropriately, the flipped classroom can really help students to gain confidence and not fall behind in mathematics. However, it is still unclear how beneficial it is for students who have those difficulties learning independently. The one-on-one time with the teacher is beneficial, but understanding how students with learning disabilities can receive a good initial understanding from the flipped classroom might help to improve the understanding of all students.

References

Arasasingham, R. D., Martorell, I., & McIntire, T. M. (2011). Online homework and student achievement in a large enrollment introductory science course. *Journal of College Science Teaching*, *40*(6), 70–79.

Basham, J. D., Israel, M., Graden, J., Poth, R., & Winston, M. (2010). A comprehensive approach to RtI: Embedding universal design for learning and technology. *Learning Disability Quarterly*, *33*(4), 243–255.

Bergmann, J. & Sams, A. (2015). *The flipped learning series: Flipped learning for math instruction*. Eugene, OR: International Society for Technology in Education.

Carlson, J. A. (2010). Avoiding traps in member checking. *The Qualitative Report*, *15*(5), 1102–1113.

Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research, 53*(4), 445–459.

Cox, S. (2015). Flipping for technology integration. In D. Slykhuis & G. Marks (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2015* (pp. 3106-3114). Chesapeake, VA: Association for the Advancement of Computing in Education.

Cranmer, S. (2006). Children and young people's use of the Internet for homework. *Learning, Media and Technology*, *31*(3), 301–315.

Creswell, J. W. (2011). *Educational research: Planning, conducting and evaluating quantitative and qualitative research.* Boston, MA: Pearson Education, Inc.

Cohen, D. & Crabtree, B. (2006a). Observations. In *Qualitative research guidelines project.* Somerset, NJ: Robert Wood Johnston Foundation. Retrieved from http://www.qualres.org/HomeObse-3594.html

Cohen, D. & Crabtree, B. (2006b). Member Checks. In *Qualitative research guidelines project*. Somerset, NJ: Robert Wood Johnston Foundation. Retrieved from http://www.qualres.org/HomeMemb-3696.html

Desantis, J., Metzger, J., Putsch, J., & Van Curen, R. (2015). Do students learn more from a flip? An exploration of the efficacy of flipped and traditional lessons. *Journal of Interactive Learning Research*, *26*(1), 39–63.

Dodson, J. R. (2014). The impact of online homework on class productivity. *Science Education International*, *25*(4), 354–371.

Filiz, O., Kurt, A. A. & Orhan, D. (2015). Views of teacher candidates on practicability of flipped classroom model in public schools. In D. Slykhuis & G. Marks (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2015* (p. 2313–2315). Chesapeake, VA: Association for the Advancement of Computing in Education.

Gibbs, A. (1997). Focus groups. *Social Research Update, 19*. Retrieved from http://sru.soc.surrey.ac.uk/SRU19.html

Glaser, B. G. & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Piscataway, NJ: AldineTransaction.

Gulek, J. C., & Demirtas, H. (2005). Learning with technology: The impact of laptop use on student achievement. *ERS Spectrum*, *23*(4), 4–20.

Houston, M., & Lin, L. (2012). Humanizing the classroom by flipping the homework versus lecture equation. In P. Resta (Ed.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2012* (pp. 1177-1182). Chesapeake, VA: Association for the Advancement of Computing in Education.

Lage, M. J., Platt, G. J., & Treglia, M. (2000). Inverting the classroom: A gateway to creating an inclusive learning environment. *Journal of Economic Education, 31*(1), 30–43.

Lenz, L. (2010). The effect of a web-based homework system on student outcomes in a first-year mathematics course. *Journal of Computers in Mathematics and Science Teaching*, *29*(3), 233–246.

Mattis, K. (2015). Flipped classroom versus traditional textbook instruction: Assessing accuracy and mental effort at different levels of mathematical complexity. *Technology, Knowledge and Learning, 20*(2), 231–248.

McCallum, S., Schultz, J., Selke, K., & Spartz, J. (2015). An examination of the flipped classroom approach on college student academic involvement. *International Journal of Teaching and Learning in Higher Education*, *27*(1), 45–55.

Mertens, D. M. (2010). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods.* Thousand Oaks, CA: SAGE Publications, Inc.

Parslow, G. R. (2012). Commentary: The Khan Academy and the day-night flipped classroom. *Biochemistry and Molecular Biology Education*, *40*(5), 337–338.

Portier, C. A., Peterson, S. S., Capitao-Tavares, Z., & Rambaran, K. (2013). Parent perceptions and recommendations about homework involving wikis and blogs. *Middle School Journal (J3)*, *44*(5), 6–14.

Rovai, A., & Jordan, H. (2004). Blended learning and sense of community: A comparative analysis with traditional and fully online graduate courses. *The International Review of Research in Open and Distance Learning, 5*(2), 1–13.

Ruona, W. E. (2005). Analyzing qualitative data. In R. A. Swanson & E. F. Holdton III (Eds.), *Research in organizations: Foundations and methods of inquiry* (pp. 233–263). San Francisco, CA: Berrett-Koehler Publishers, Inc.

Russell, C., Malfroy, J., Gosper, M., & McKenzie, J. (2014). Using research to inform learning technology practice and policy: A qualitative analysis of student perspectives. *Australasian Journal of Educational Technology, 30*(1), 1–15.

Salkind, N. J. (2013). *Excel statistics: A quick quide* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Schade, A. (2015). *Pilot testing: Getting it right (before) the first time.* Fremont, CA: Nielsen Norman Group. Retrieved from https://www.nngroup.com/articles/pilot-testing/

Senn, G. J. (2008). Comparison of face-to-face and hybrid delivery of a course that requires technology skills development. *Journal of Information Technology Education*, *7*(1), 267–283.

Siegle, D. (2014). Technology: Differentiating instruction by flipping the classroom. *Gifted Child Today*, *37*(1), 51–55.

Stanford, P., Crowe, M. W., & Flice, H. (2010). Differentiating with technology. *TEACHING Exceptional Children Plus*, *6*(4), 2–9.

Stevens, F., Lawrenz, F. & Sharp, L. (1993). *User-friendly handbook for project evaluation*. Washington, DC: National Science Foundation. Retrieved from http://files.eric.ed.gov/fulltext/ED366511.pdf

Strayer, J. F. (2012). How learning in an inverted classroom influences cooperation, innovation and task orientation. *Learning Environments Research*, *15*(2), 171–193.

Sullivan, T. M., & Freishtat, R. (2013). Extending learning beyond the classroom: Graduate student experiences of online discussions in a hybrid course. *Journal of Continuing Higher Education, 61*(1), 12–22.

Talbert, R. (2014). Inverting the linear algebra classroom. *Primus*, *24*(5), 361–374.

Wasserman, N. H., Norris, S., & Carr, T. (2013). Comparing a "flipped" instructional model in an undergraduate calculus III course. In *Conference on Research in Undergraduate Mathematics Education, Denver, CO*. Retrieved from http://pzacad.pitzer.edu/~dbachman/RUME_XVI_Linked_Schedule/rume16_submission_10.pdf

Yin, R. K. (2011). *Applications of case study research*. Thousand Oaks, CA: SAGE Publications, Inc.

Yin, R. K. (1994). *Case study research: Design and methods.* Thousand Oaks, CA: SAGE Publications, Inc.

Appendix A

Parental/Guardian Consent Form
Survey on the Perspectives of Students on the Flipped Classroom

You are being asked to allow your child to participate in a research study titled "Is the Flipped Classroom Pedagogy Effective for All Students?" The letter on the reverse side of this form provides you with information about this study and the researcher, Stephanie Quarato, can be reached at [email address] to answer all of your questions. Please read the information below and ask any questions you might have before deciding whether or not your child may take part.

- Students will be asked to take a brief survey on *SurveyMoneky*® which will ask questions to determine their perspectives on the flipped classroom. The survey will be completely anonymous.
- The survey will be conducted at the beginning of all Math Classes on Monday, April 11, 2016, and will take no longer than five minutes to complete.
- The survey will use a Likert Scale (students will choose responses from 1 to 5); and the average response will be found of each question.
- The responses will be used in my thesis paper in order to provide more information on the perspectives of the flipped classroom; however, no names of any students will be used.

Your participation is entirely voluntary. If your child participates, you can get information about the project by contacting me at the above email address. Please fill out the form below and have your child return it to me no later than Wednesday, April 6, 2016. Thank you very much for your time!

Name of Child:_____

_____ My child may participate in the survey on the perspectives of students on the flipped classroom in class on Monday, April 11th. If my child is late, he/she may complete the survey at the beginning of their math enrichment period.

_____ I do not wish for my child to participate in the survey on the perspectives of students on the flipped classroom at any time.

Parent/Guardian Name: _____

Parent/Guardian Signature: _____

Student Signature: _____

Appendix B

A Survey on the Perceptions of Students on the Flipped Classroom

1) I feel more engaged in the flipped classroom versus a traditional classroom.

2) I like watching the lesson on videos rather than listening to the lesson through a class period.

3) When assigned a flipped lesson, I usually watch the videos rather than use the textbook to learn the lesson.

4) I find it difficult to stay focused to the videos because of other Internet disruptions (such as checking email or social media sites).

5) While watching the video lesson, I pause or rewind the video when I need to write notes or review a part that I was not sure about.

6) I find it more helpful than the textbook to be able to go back and re-watch the videos when I need to review for a quiz or a test.

7) If I did not have a computer or the Internet available to me, the teacher made sure I still learned the lesson by providing notes ahead of time or allowing me to review the video prior to class.

8) I liked how I was able to pace myself while watching the video lessons so that I could spend more time understanding the lesson.

9) I believe that the flipped lesson allowed for our class to have extra time to practice topics.

10) I participated more in the activities following a flipped lesson than I did in activities completed after a traditional lecture.

11) The flipped classroom allows students to spend more time collaborating and having discussions about the topic with each other in the classroom.

12) The activities that we completed in the classroom following a flipped lesson were beneficial with improving my understanding of the topic.

13) The teacher had more time to answer questions about the topic after a flipped lesson than she did in a traditional lecture.

14) I would rather learn through a traditional lecture than learn from the flipped classroom.

15) The video lessons helped prepare me for the class activities.

16) I feel that the video lessons provide more information on the topic than the textbook provides.

17) I often re-watch the video lessons before taking a quiz or a test.

18) It was difficult for me to find a computer or Internet access to watch the video lessons.

19) I feel like the flipped classroom helped to improve my understanding in math (from watching the videos, having them available all of the time, to the class activities that followed the lesson).

20) When I complete a regular homework assignment (solving problems after learning a lesson in class), I sometimes get confused working on the problems by myself.

21) When I complete a flipped homework assignment, I don't get as confused when working on the practice problems by myself.

22) The flipped lesson gave me more confidence to complete other homework assignments that practiced the same skill.

23) Which (if any) did you enjoy about the flipped classroom (you may pick more than one):
____ The availability and access to the video lessons
____ Being able to pause and rewind the video when I was confused or missed something important
____ The collaboration and discussions in class (as a whole class or group)
____ The amount of time the teacher had to review a topic
____ The amount of time we had to practice the skill learned through the flipped lesson
____ Working on the class activities after learning the lesson
____ Being able to pace myself while learning the lessons

24) What did you like most about the flipped classroom?

25) If you could provide any suggestions towards improving the flipped classroom, what would it (they) be and why?

Appendix C

Focus Group Discussion Questions on the Perceptions of the Flipped Classroom by Students

1. During the flipped lesson, did you read the textbook, watch the video, or both? Which did you find the most helpful/least helpful and why?

2. Think about both a flipped classroom lesson and a traditional lecture lesson. What are the pros and cons about each of them? Are the lessons any different? Does the structure of each lesson benefit you in any way? How?

3. How many of you feel you are less stressed completing practice problems for homework when you learn from the flipped lesson? What (if anything) makes you stressed when working on traditional worksheet/textbook homework? What (if anything) makes you stressed when completing a flipped lesson?

4. What do you think are advantages of a flipped classroom? Disadvantages? Why?

5. Are there any improvements that you believe can be made towards a flipped classroom? If so, what do you think they are?

6. Is there anything else that you would like to add regarding the flipped classroom?

Appendix D

An Interview on the Perceptions of the Flipped Classroom by Teachers and Parents

1. Have you ever experienced a flipped classroom before? What is your understanding of the flipped classroom?

2. Do you feel that the flipped classroom helped your child learn? What part of the flipped classroom do you believe helped the (your) student(s) the most (being able to review the lessons; being able to learn at a specific pace, etc.)?

3. How long did your student spend watching the video lessons or reading the textbook for a flipped assignment? Does it take them longer or shorter to complete practice problems from a worksheet or textbook?

4. Some students express frustrations when completing math problems for homework. They say that they understand the work when they are in class, but get really confused when trying to complete the work by themselves. Have you noticed your student still experiencing frustrations with completing homework assignments with having the flipped lessons available to them?

5. Do you believe that the flipped classroom model is a good way to reach all learners? Why or why not?

6. Did you find the flipped method to be beneficial to you when your student(s) needed help with understanding the topic? Do you think having the flipped lesson available allowed you to spend more time working with your child on his/her homework? Explain how.

7. Is there anything else that you would like to add about the flipped classroom (ways to improve; ways it was beneficial; etc.)?

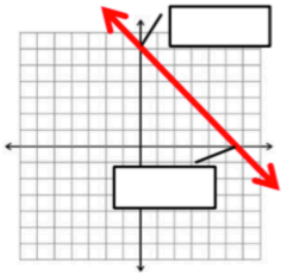
Appendix E

Pre-made notes handed to the students with individual education plans (IEPs) or 504 plans that were used while watching the video lesson or reading the textbook

Name:_____ **4.4 Notes on Slope-Intercept Form**

Vocabulary

- The _____ of a line is where the line crosses the _____.
- The _____ of a line is where the line crosses the _____.



- A _____ is an equation that makes a straight line when it is graphed.
- _____ is a linear equation that is written in the form:

$$y = mx + b$$

Identifying Slope and Y-Intercept

What is the slope and the y-intercept in the linear equation: $y = 2x - 8$

Slope (m) = _____ Y-intercept (b) = _____

Writing an Equation

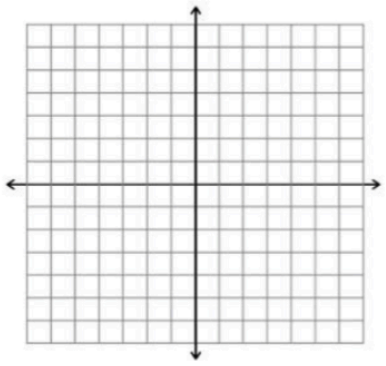
Write an equation given the following information: Slope is -4 and the y-intercept is 12.

Graphing Linear Equations (without using a table of values!)

Graph the equation: $y = -3x + 4$

STEPS:

1. Plot the y-intercept
   ($y = mx + \mathbf{b}$ think about "b" as the *beginning*! That's where you'll plot your first point!)
2. From the y-intercept, use your slope to plot more points
   (In this problem, our slope is -3, So, we can go down 3 and right 1, or up 3 and left 1)
3. Connect your points! Don't forget an arrow at the end of your lines!



Appendix F

MS PowerPoint presentation that was used in the video lesson. Copies of this presentation were given to students with IEPs and 504 plans to follow along to or use for their main learning source.