Exploring the Effectiveness of Parallel Teaching in a High School Mathematics Classroom

Devon Viola, Stetson University, dviola@stetson.edu

Lou L. Sabina, Stetson University, lsabina@stetson.edu

Amy Smith, Stetson University, asmith92@stetson.edu

The purpose of this study is to explore the effectiveness of the parallel classroom model in comparison to a support facilitation model. Using district-level assessments in geometry, this study assessed student performance when students were taught the same content with the same rigor, where one classroom uses differentiation strategies and small-group instruction to instruct students and the other classroom uses support facilitation. By examining the success of the parallel classroom model, we hope to prove this model to be a viable curricular alternative for the needs of exceptional learners. Specifically, we see parallel classrooms as being more flexible to diverse student needs than traditional classrooms.

Keywords: parallel classroom, exceptional student education, flipped classroom, mathematics instruction

The discipline of special education, referred to in this paper as ESE, (exceptional student education) is focused on providing instructional supports to students based on their varying needs and abilities. Teachers trained in exceptional student education focus on an overwhelming number of exceptionalities, from multi varying exceptionalities to gifted and talented students. With 14 percent of the population receiving services under the Individuals with Disabilities Education Act (NCES, 2022), teachers are expected to differentiate their classroom and learning experiences for students to the best of their abilities to ensure all students can succeed.

Exceptional student educators have examined different models of teaching, including support facilitation, consultation, co-teaching, full inclusion, separate class immersive classrooms, and parallel teaching as modalities to better serve student populations. Parallel teaching is a newer model in P-12 education, originally conceptualized at the collegiate level to support large amounts of students taking general education classes (Ennis, 1986). In this original model, students received instruction from different instructors on two separate ends of the classroom to allow for more individualized instruction and the opportunity for questions and answers to be easily facilitated. When adapted to P-12 education, parallel teaching was a strategy to assist either exceptional student education students or English as Second Language (ESOL) students in learning the same content their general education peers were receiving (Ennis, 1986). The point and purpose of parallel teaching is to ensure student success through using smaller group instruction and differentiation strategies for students without reducing the rigor found in a general education classroom.

This study explored how this model was successfully implemented for 10 students with varying exceptionalities in a high school geometry classroom using differentiation strategies, smaller group classroom settings, and teaching the whole student. This was in comparison to two sections of a high school geometry class with 68 total students, of which 17 students were in a support-facilitation classroom in addition to their neurotypical peers.

Literature Review

Parallel Teaching

Parallel teaching, as defined by Aliakbari and Bazyar (2012), is when, "co-teachers plan a lesson together and then divide the class into two heterogeneous groups. They teach the same material but may use different approaches" (p. 58). Parallel teaching is one of four working style variations to teaching (Watkins & Caffarella, 1999). The other three variations are (1) serial teaching – where one person teaches a class entirely on their own, (2) co-teaching - where two or more teachers share a classroom and its students, and (3) support facilitation – where one teacher solely focuses on content and another teacher focuses on differentiation – usually in an exceptional student education environment. This model has also been proven to build pathways to success for students who would otherwise struggle in a general education or support facilitation classroom (Tracy, 2017).

The two main benefits to parallel teaching include reduction of student to teacher ratio allowing more opportunity for individualized instruction and for teachers to form relationships with students (Bacharach et al., 2008; Villa et al., 2013) or teachers specifically trained to support different populations of students – usually ESE or ESOL (Ploessl et al., 2010; Witcher & Feng, 2010). The focus of preparation was more instructor-centered; with instructors working together to design and develop course components and ensure that students were receiving the

same content. Friend, Reising, and Cook (1993) interpreted parallel teaching as a differentiated education strategy, to allow for either an exceptional student education teacher or English as Second Language teacher to work with a targeted population of students while a subject-area teacher focuses solely on content.

ESE students receive instruction in a separate classroom with the same teacher using strategies designed to help cater their learning strategy to become the most successful in this area of instruction as possible. This requires qualified teachers to teach in a specialized environment. Ljusberg (2011) stated, "the regular school has not always had the ability to search for solutions to problems occurring in the classroom and state that not all teachers have the expertise for teaching all different pupils. Working with children in need of extra support is a conscious choice for them and they state that they want to and can give only these children what they need" (p. 200). A challenge exists in finding, recruiting, and retaining qualified exceptional student education teachers capable of implementing these specific instructional strategies (Ljusberg, 2011).

Currently, a national shortage exists in exceptional student education (Peyton et al., 2021; Reeves et al. 2021; Theobald et al., 2021), causing many districts to fill positions with unqualified teachers or substitutes. One of the challenges in the parallel classroom model is that educators should be dual-certified in exceptional student education and the specific content area in which students are receiving instruction. For example, a teacher must be certified in both mathematics education and exceptional student education to teach within the parallel classroom model. With the national shortage of teachers in general and exceptional student education being an extremely critical area of shortage, districts may not have the personnel to fully implement a parallel classroom model.

Flipped Classroom

Another method of exploring parallel teaching involves the flipped classroom model, which has similarities to the parallel classroom model but may not utilize instructional personnel who are certified in exceptional student education and a specified content area. The goal of the flipped classroom is to increase student engagement and efficacy over learning through active learning strategies while present in the classroom while reserving lecture content and quizzes outside of the traditional classroom structure (Hawks, 2014). Students learn through hands-on engagement and active learning, which has been proven to increase both student performance and student satisfaction (Mandasari & Wahyudin, 2021; Missildine et al., 2013; Murillo-Zamorano et al., 2019). Ryan and Reid (2016) stated, "at its core, the flipped concept involves moving classrooms from teacher to student centered, and instructors from lecturers to facilitators" (p. 13). Instead of spending class time with lectures that are specifically content-driven, students have the opportunity to discuss points of confusion, practice content with the support of teachers present, and think more deeply about complex processes related to content.

The flipped classroom differs from the parallel classroom in concept, as the focus in the flipped classroom model is on content delivery primarily, and relationship building and individualized instruction as a secondary outcome. However, the purpose of both methods is the same, to provide support in a more student-driven setting.

Differentiated Instruction in Relation to Parallel and Flipped Classrooms

Differentiated instruction has long been a proven instructional method to provide individualized support to students (D'Intino & Wang, 2021; Subban, 2006; Tomlinson & McTigue, 2006). Subban (2006) noted that differentiated instruction is, "based on the premise that students learn best when their teachers accommodate the differences in their readiness

levels, interests and learning profiles" (p. 940). Student readiness is influenced by the developmental stage (physical, cognitive, and/or affective) of a student, their interest and attitude toward a particular content area or school in general, their prior knowledge on a topic, and current and past physical or mental health (Davis et al., 2016). Readiness differs from ability in as that ability is perceived as a more permanent idea, whereas readiness changes from topic to topic. Teachers are more likely to be able to address strategies that address student readiness, rather than trying to modify a student's ability.

Sousa and Tomlinson (2018) stated, "Teachers looking for students' readiness needs in specific content rather than focusing on students' ability are working from a growth mindset" (p. 93). This is where differentiated instruction becomes critical in both the parallel and flipped classroom modalities. Teachers must utilize diagnostic pre-assessments to determine a student's point of entry in a topic, to understand student learning, and to guide the teacher in adjusting instruction based on student needs (Taylor, 2015). Ayers (2015) noted, "There is no formula or recipe that works for all learners in all times. There is no set of lesson plans or units that can engage the range of learning styles, approaches, and intelligences that are likely to gather in one classroom" (p. 41). Student readiness leads to student growth, honing student interest leads to student motivation, and teaching to students learning profiles leads to efficiency within the classroom. Differentiated instruction is student-first learning. This can be easily integrated into both parallel classroom and flipped classroom modalities, as well as general education classrooms.

Research Questions

The following two research questions guided this study:

1. How is the parallel classroom different from other inclusion models of instruction?

2. Can the parallel classroom be as effective as other ways of exceptional student education support? If so, how does the performance compare to a more traditional classroom support model such as support facilitation?

Using district-driven assessments from a large county school district in Central Florida, we attempt to provide justification for the parallel classroom as a teaching strategy that should be utilized by school districts to support students with exceptionalities.

Methodology

This research examined test results of students in a parallel classroom setting compared to students in a support facilitation environment. This study utilizes data from three district exams in geometry given to students from August 2021 through October 2021. Students had the same teacher in both the parallel classroom (n = 10) and the support facilitation classroom (n = 17).

In the parallel classroom, students were taught by an ESE teacher independently every day, and in the support facilitation classroom, students were taught by a general education teacher and supported by the same ESE teacher two to three times a week. The parallel classroom allowed the opportunity for students to build close relationships with their teachers.

Exam one was a baseline exam that was taken at the beginning of the school year to determine student readiness. Exams two and three were taken to test content learned in the classroom in geometry. All exams were the same and all content taught was comparable in performance. Exam #1 was a diagnostic exam with 25 questions, 23 of which were multiple choice and two of which were open-ended. Exam #2 was 15 questions, 12 of which were multiple choice and three of which were open-ended. The final exam, Exam #3 consisted of 15 questions, all of which were multiple choice. Basic descriptive statistics, such as mean and range,

were utilized to assess overall student performance in both the parallel classroom and the support facilitation classroom.

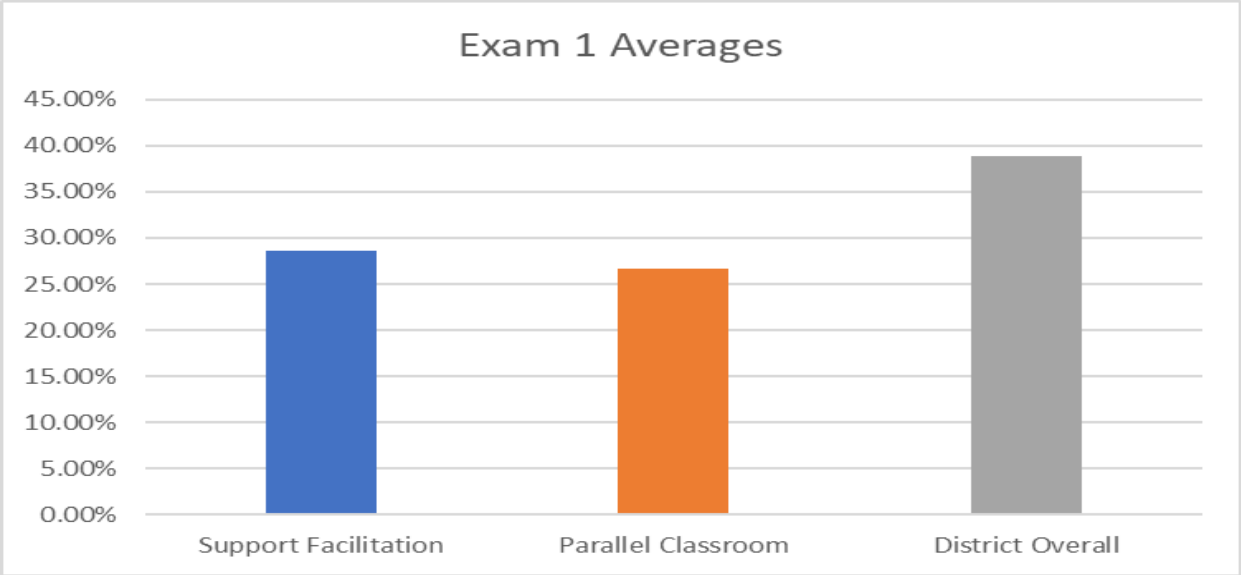
We saw a case study (Stake, 2005; Yin, 1994) as the appropriate methodology for presentation of this research. Case studies utilize a bounded system of data limited to a particular situation or phenomena in research. As this study only examined one classroom at one school, it was limited to one experience (Creswell, 1998). Additionally, case study research is effective in addressing organizational phenomena, and can be used to present qualitative research with quantitative evidence.

Results

Classroom Growth

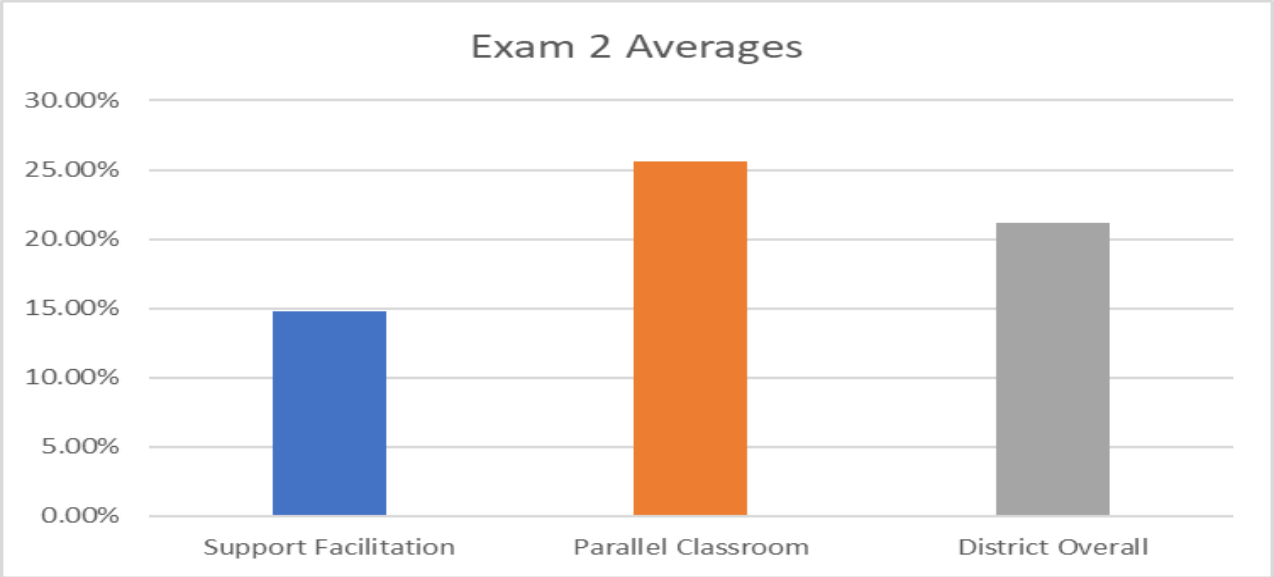
Data presented in this section show performance from the support facilitation classroom (n = 17) and the parallel classroom (n = 10) across three exams. As discussed previously, Exam #1 was a baseline diagnostic exam for upcoming topics during the school year which was conducted in August 2021. The class average in the parallel classroom for Exam #1 was **26.66%** with the range of scores being **46.7%** (highest) to **6.7%** (lowest). The support facilitation classroom seemed to perform better on performance on Exam #1. The classroom average in the support facilitation classroom for Exam #1 was **28.63%** with the range of scores being **53.3%** to **13.3%** (lowest). The overall district average was **38.9%**. It is critical to note that the district average included over 3,500 students, including all grade levels and student placements (general education, ESOL, exceptional student education, honors), who were enrolled in the geometry mathematics course. The initial results seem to indicate that the parallel classroom students performed slightly below the support facilitation students, and well below the district average. ***Table 1*** shows the average scores for Exam 1.

Table 1: *Exam #1 Average Scores*



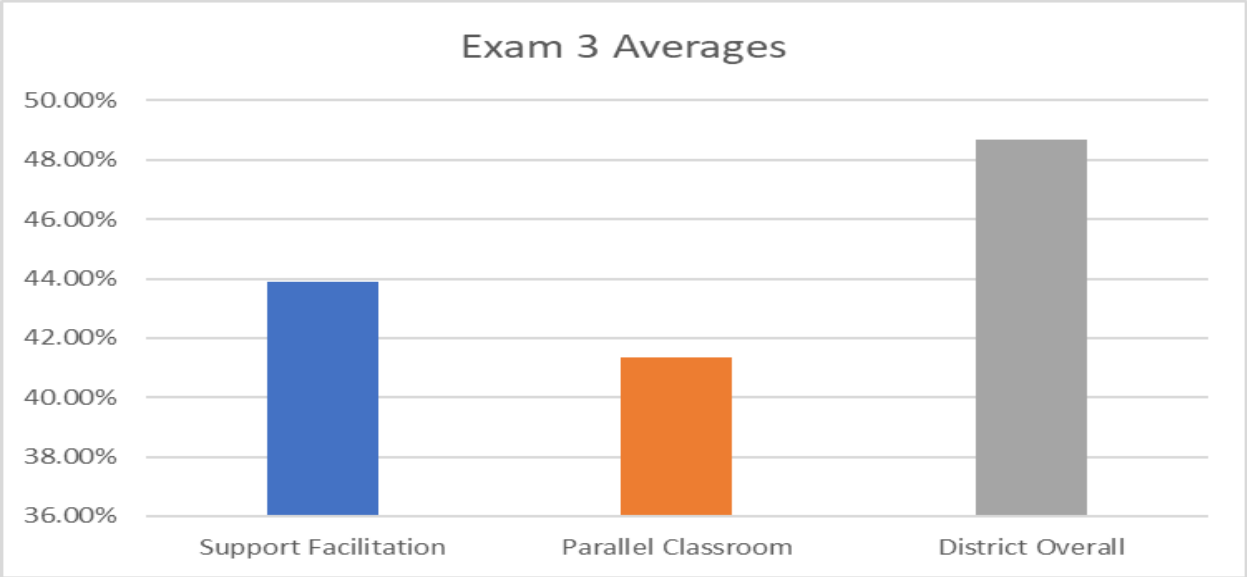
After a month of instruction in the separate classrooms with their respective teaching styles, both classes participated in Exam #2 which was conducted in late September 2021. The parallel classroom seemed to perform better on performance on Exam #2. The classroom average in the parallel classroom for Exam #2 was **25.6%** with the range of scores being **36%** (highest) to **20%** (lowest). The classroom average in the support facilitation classroom for Exam #2 was **14.8%** with the range of scores being **32%** (highest) to **0%** (lowest). The overall district average was **21.2%**. The results for Exam #2 seem to indicate that the parallel classroom students performed well above the support facilitation students, and above the district average. This could suggest that the small class size and the ability of the teacher to form relationships with their students assisted in students making learning gains. ***Table 2*** shows the average scores for Exam 2.

Table 2: *Exam #2 Average Scores*



Finally, after an additional month of instruction in both classes using their respective teaching styles, both classes participated in Exam #3 in October 2021. The parallel classroom seemed to perform similarly on performance on Exam #3. The classroom average in the parallel classroom for Exam #3 was **41.34%** with the range of scores being **53.3%** (highest) to **26.7%** (lowest). The class average in the support facilitation classroom for Exam #3 was **43.9%** with the range of scores being **60%** (highest) to **26.7%** (lowest). The overall district average was **48.7%**. The results for Exam #3 show that the parallel classroom students performed slightly below the support facilitation students, and below the district average. Even though the parallel classroom students did not exceed the performance of the support facilitation students, they still showed learning gains. ***Table 3*** illustrates the average scores for Exam 3.

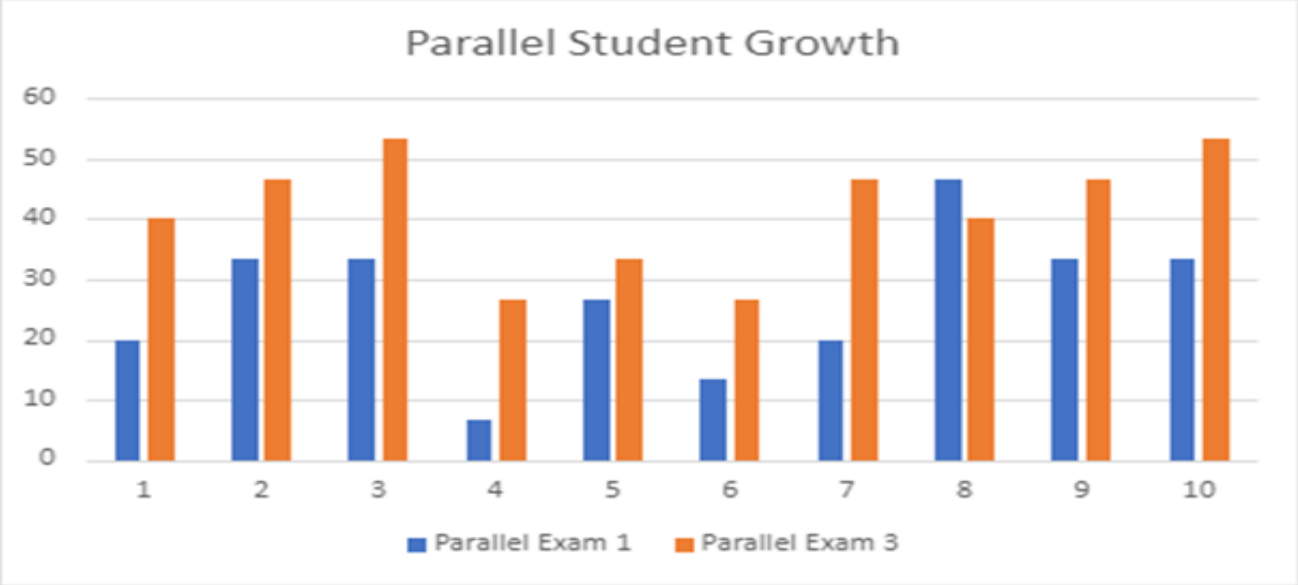
Table 3: *Exam #3 Average Scores*



Student Growth

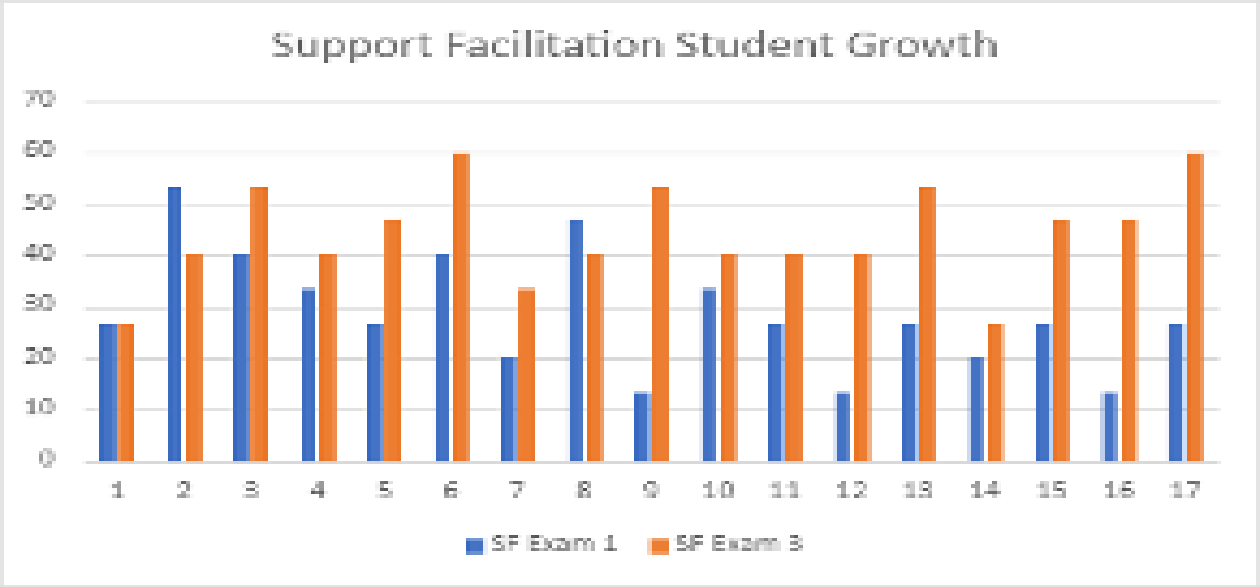
When examining student growth between Exam #1 (August 2021) and Exam #3 (October 2021), the parallel classroom had an average growth of **14.68%**. A deeper dive into student growth when looking at individual student performance revealed that **9** out of **10** students showed learning gains, with student #7 showing the highest overall gain of **26.7%** and student #8 showing the only student decline of **6.7%**. These data are presented in ***Table 4***.

Table 4: *Student Growth Between Exams #1 and #3 in the Parallel Classroom*



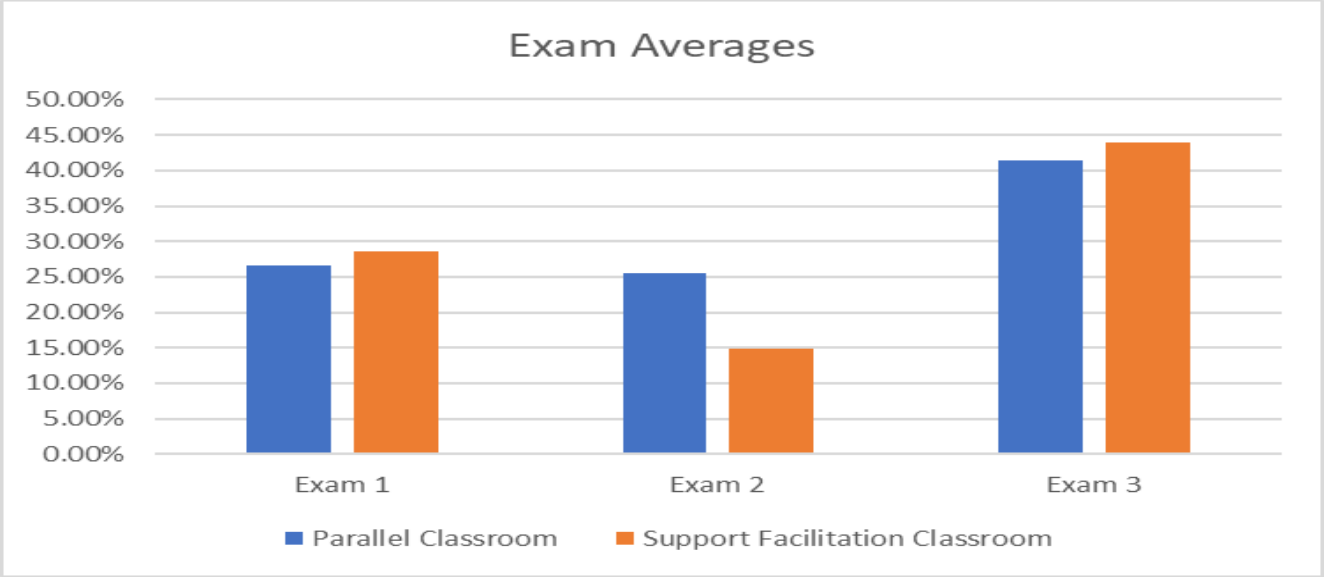
Similar growth was seen in the support facilitation classroom, which is presented in ***Table 5***. The support facilitation students had an average growth of **15.27%** between Exams #1 and #3. In examining individual student performance, **14** out of **17** students showed learning gains, **2** out of **17** students decreased and **1** student scored the same. Student #9 showed the largest gain **(40%)**, while the largest student decline was Student #2 whose score went down **3.3%.**

Table 5: *Student Growth Between Exams #1 and #3 in the Support Facilitation Classroom*



In comparing the overall exam averages, both the support facilitation and the parallel classroom showed growth, with the parallel classroom showing less performance disparity between Exam #1 and Exam #2 than the support facilitation classroom. The parallel classroom student performance only slightly declined from Exam #1 to Exam #2, whereas the support facilitation classroom experienced a much larger disparity. Both the parallel classroom and support facilitation classroom showed growth from Exam #2 to Exam #3. ***Table 6*** shows the averages across each exam.

Table 6: *Exam Averages for Exams #1 through #3 in the Parallel and Support Facilitation Classroom*



Conclusions

Findings over the course of three exams showed that in this case, the parallel classroom was effective in students making similar learning gains to their support facilitation peers. This case offered insight on successes obtained using a parallel teaching model as a form of instruction in a secondary mathematics classroom. While the model requires a commitment of resources such as additional teachers, classroom space, potentially creative scheduling, and training for teachers and support facilitators, this model may offer a new methodology to improve performance for students in need. School administrators should take note of the successes of alternative delivery models such as the parallel classroom as a vehicle for school improvement.

Implications for Classroom Practice

Data provided in this study showed that in this case, the parallel classroom model was just as successful as the support facilitation classroom model in raising test scores on district-driven assessments. In many instances, the district assessments are purposely designed to be

more challenging than the state-mandated assessment (Camara, 2013). This may indicate student performance on state-mandated assessments might also see similar learning gains.

Despite the success of the parallel classroom model in this specific example, it is important to note that to effectively run this model as a school administrator, there must be a continued commitment of resources. This could include additional teachers with experience in both exceptional student education and a subject area, and classroom space for teachers to be able to work with students. As researchers, policymakers, and district-level administrators struggle to find new and innovative ways to approach education as a production function mechanism for standardized test scores (Hanushek, 2020), it is possible that the parallel classroom model offers a strategy that can work for learning gains. Resource commitment and resource allocation are critical for this model's success; and in this case, building-level administrators had committed to the model for the duration of the school year, which resulted in smaller than average class sizes. Many schools may not have either the quality or quantity of teachers or the physical space available to support this model, which might be a barrier for implementation.

Limitations

There were a several limitations with this study. First, the sample size was limited to one teacher in one high school in a large Central Florida School District. The parallel classroom environment was viewed by district and building-level administration as a pilot modality to see if future instruction using this model could be provided. Additionally, the data were limited to only the first three exams of the school year due to shifting populations of students due to student dropout, student transfers, and schedule changes. Data presented from the first three exams utilized all the same students so that appropriate comparisons could be made. Finally, the number

of students in this case study was limited to $n = 27$, which was the number of students in the support facilitation classroom and the parallel classroom combined. With such a small *n*, findings from this case cannot be generalized across a wider population. Despite these limitations, this case may serve as a model for building or district-level administrators to explore if instructional modalities such as parallel teaching might work in their buildings for students with varying exceptionalities.

Future Studies

This case provided a glimpse at how parallel classroom instruction might provide an effective modality for exceptional student education instruction. As the sample size was low and limited to one classroom, future studies could compare larger populations of students within districts where parallel instruction exists. Additionally, this study omitted transfer students who came into the school during the school year and students who were exempt or unable to take all three exams. A future direction for research could include comparing the learning gains of transfer students in a parallel class versus those in the general education or support facilitation classroom. Finally, the modality used in this study was limited to the co-teaching model of parallel teaching in a self-contained parallel classroom. Future studies may also include additional co-teaching modalities such as flipped classroom instruction, or even compared to serial teaching experiences or general education classrooms using similar differentiation strategies.

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