Teaching Students in Heterogeneous and Homogeneous Algebra II Classes: Teacher’s Perspectives and Student Performance

By

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ABSTRACT

The controversial debate between detracking and tracking classes has been a topic of discussion from many years. Although many researchers believe the homogenized classroom makeup to be best, researchers not in favor of tracking claim the impact of academic segregation is a serious demonstration of inequality in education (Boaler, 2006; Batruch et al., 2019; Domina et al., 2019; Hallinan, 1994; Lotan et al., 1992; Rubin, 2006). Although educational equality is a vital component of detracking/tracking, the focus here is on academic outcomes.

The goal of the current study was to understand the experience secondary mathematic teachers underwent when a class was changed from tracked to detracked. In addition, this study’s aim was to understand the effective supports needed by teachers to successfully teach heterogeneous classes that were once homogeneous. Furthermore, I compared the experiences teachers had when teaching heterogeneous and homogeneous classes.

To accomplish this, I conducted semi-structured interviews and qualitatively analyzed the transition from tracking to detracking math classes, changes in teacher experience between teaching heterogeneous and homogeneous classes, and if supports received or not received affected teachers’ ability to teach heterogeneous classes. Additionally, I completed a linear regression to see if class organization (i.e., tracked, detracked) and/or geometry ability (i.e., above average, average, below average) could predict student performance in Algebra II classes.

Results indicated that Algebra II teachers felt their voices were not heard and were given no chance to share their input when decisions were made by administration. The teachers recognized the significant differences and felt more at ease when teaching homogeneous classes than heterogeneous classes. Results also indicated that the teachers understood the need for collaboration and support as they transitioned to teach heterogeneous classrooms.
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analysis of student performance within these heterogeneous and homogeneous classrooms provided evidence that with below average students, there was a practical significance for this group with a near 9.3-point final grade advantage for the tracked class organization.
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CHAPTER I

Introduction and Problem Statement

For several decades, the practice of tracking and detracking in public schools has been a topic of intense debate (Batruch, Autin, Bataillard, & Butera, 2019; Domina, McEachin, Hanselman, Agarwal, Hwang, & Lewis, 2019; Giersch, 2018; Hallinan, 1994; Hyland, 2006; Rubin, 2006). The term *tracking* refers to the practice of assigning students to instructional groups based on ability whereas *detracking* refers to grouping students heterogeneously to ensure that all students have access to high-quality curriculum and resources (Hallinan, 1994; Rubin, 2006). Traditionally, schools have homogenized students by assigning them to groups based on ability at young ages during their elementary levels and now, by tracking at the secondary level (Francis, Taylor, & Tereshchenko, 2019; Lotan, Swanson, & LeTendre, 1992). Researchers who are not in favor of tracking claim the impact of academic segregation is a serious exhibition of inequality in education (Boaler, 2006; Batruch et al., 2019; Domina et al., 2019; Hallinan, 1994; Lotan et al., 1992; Rubin, 2006). However, many teachers are in favor of grouping students by ability, as they believe it may narrow the range to teach more effectively (Boaler, 2006).

While the particulars of detracking vary considerably from school to school, there are many commonalities in the ways detracking has been successful in secondary schools (Hallinan, 1994; Oakes & Lipton, 1992). Historically, Oakes (1992) has pointed out that student success has been associated with the enriched curriculum they are exposed to as well as the individualized learning that teachers provide to meet various student levels. By implementing an enhanced curriculum where educators do not assume that all children in heterogeneous classes have knowledge of the same things, teachers act as directors who encourage student learning through multiple instructional techniques and strategies, such as cooperative learning, complex...
instruction, and peer and cross-age tutoring (Ascher, 1992). Today, teachers are encouraged to create activities to build social relationships among students, such as intentionally scrambling groups for academic activities, and managing activities that call upon different types of knowledge and skills (Rubin & Noguera, 2004). Hence, detracking has the potential to help students redefine their sense academic self-efficacy based on the widened opportunities presented to them (Rubin & Noguera, 2004).

However, moving from a tracked system to a detracked system (i.e., detracking reform) is a challenging shift for any school to endure. A major challenge is the design and implementation of instructional accommodations and adaptations. Teachers of newly detracked classrooms have difficulty adapting their lessons and instructional practices to address the needs of various student levels. In a qualitative study conducted by Yonezawa and Jones (2006), students reported that their teachers, “regardless of track level, needed to increase demands so more students could master essential material” (p. 21). Due to the scarcity of foundational knowledge, skill, understanding, and experience that is needed to provide equity of access to high quality learning for a broad range of learners, educators fall short, which is why the shift could be such an overwhelming task (Ascher, 1992; Tomlinson, 2015). Regardless of the difficulty, detracking is still boosted as a reform that is needed especially as it can benefit students with different levels of ability (Hallinan, 1994; Liou, Leigh, Rotheram-Fuller, & Cutler, 2019).

Throughout the years, Mulberry High School (MBHS) has been designated as a National School of Excellence and has been ranked as the number one high school in New Jersey. Not only does it offer a wide range of courses, varying in different levels, such as academic, honors, and advanced placement, but it even gives students the opportunity to gain college credit. Specifically, in the department of mathematics at MBHS, there are 18 courses ranging from
Algebra I through Calculus III. Within the department, MBHS had always offered three different levels for Algebra II. The placement of students in these Algebra II courses is based on the final grade they achieve in Geometry, the prerequisite course for Algebra II, during the previous school year. In the academic year of 2013-2014, the first level of Algebra II was titled Intermediate Algebra II, a course solely for students who normally scored poor/satisfactory (letter grades D to C) in Geometry the previous year. The second level, Algebra II Academic, was for students who scored satisfactory/good (letter grades C to B) in Geometry, and Algebra II Honors was for students who scored good/excellent (letter grades B to A) in Geometry. A brief pictorial depiction of the 2014 mathematics course movement of Geometry and Algebra II is given below (See Figure 1).

**Figure 1. Mathematic Course Movement of Geometry and Algebra II Before 2014**

Since the Intermediate Algebra II course progressed at a slower pace, the teachers who taught this class were unable to teach all topics the Algebra II curriculum required students to learn. In 2014, the Partnership for Assessment of Readiness for College and Careers (PARCC), which is a statewide test given to students, mandated that all topics from the Algebra II curriculum be tested. The topics that Algebra II covered were aligned with the New Jersey
Standards tested by the PARCC. In order to take the exam and be fully prepared to score proficiently, all students at MBHS were required to learn a full curriculum of Algebra II. From the PARCC exam’s inception, there has been a significant amount of pressure placed on teachers by administrators to increase student performance on this exam. Therefore, to address the pressure and the requirement to pass Algebra II to graduate high school, the Mulberry Board of Education engaged in a detracking reform. This reform eliminated the Intermediate Algebra II course entirely, forcing students who were best suited for this course to now be placed in Algebra II Academic. A diagram of the Mulberry Board of Education’s Detracking Reform is given below (See Figure 2).

**Figure 2. Mulberry Board of Education Detracking Reform from 2014 to 2018**

Detracking continued for four years at MBHS. Although several researchers (Ascher, 1992; Boaler, 2006; Hallinan, 1994; Lotan et al., 1992; Oakes, 1992; Oakes & Lipton, 1992; Rubin, 2006; Rubin & Noguera, 2004; Tomlinson, 2015) have found evidence that the implementation of detracking in various schools has proven to be successful at secondary schools, the Algebra II teachers at MBHS were unhappy with the change and reported detrimental effects of the detracking. Although the hope was for increased academic
achievement on the PARCC, the detracked Algebra II courses negatively affected students’ scores. Specifically when comparing the 2014 (with tracked) and 2018 (detracked) academic grades and PARCC scores, the percentage of students who met/exceeded expectations on the Algebra II PARCC in 2014 was 46% whereas in 2018, that same percentage was only 26% (NJDOE, 2014, 2017a). Furthermore, the course failure rate of Algebra II increased 35% between 2014 and 2018 when detracking continued.

**Pilot Study**

To gather more information about Algebra II teacher perceptions of detracking, I surveyed ten Algebra II teachers through a Google Form at the end of the 2018 academic school year when they were still teaching detracked classes as a pilot study for the current study. The survey (See Appendix A) consisted of questions such as “What were some of the difficulties you faced while teaching this heterogeneous class?” followed by questions like “From the difficulties you stated, what type of supports did you receive to help you overcome these hardships?”. Data from the survey indicated that approximately 70% of teachers strongly agreed that they were not provided with any resources or training accommodations to effectively teach the newly mixed ability Algebra II course. In addition, 80% of teachers strongly disagreed that they were familiar with the best teaching strategies needed to meet the needs of a set of diverse learners. Common words that appeared from responses to open-ended questions that asked about teaching experience in the heterogeneous classes were “frustration, stress, overwhelmed, dissatisfied, and discouraged.” In addition, within the past five years, Algebra II teachers have openly shared their frustration and struggles with the detracking model with many individuals including myself.

Based on the findings of the survey and the information provided by the Algebra II teachers, preliminary data suggests that the Algebra II math teachers of MBHS had insufficient
knowledge of best practices to teach various learners. At the same time, these teachers were not supported with helpful professional development and resources causing them to have an overall feeling of low morale in their educational environment. These findings provided evidence of problems that stemmed directly from the implementation of the detracking model at MBHS.

The level of dissatisfaction could be described as an “uproar.” In response to this frustration, the Algebra II teachers formed a committee in the Spring of 2019 and proposed a plan to add an additional level of Algebra between the Academic Algebra II and Honors Algebra II course. This proposed plan would move the courses back to a tracked model. At various board meetings, math teachers of MBHS provided student’s academic data to give concrete evidence to show the decrease in mathematical student performance from 2014 to 2018. This was one of the teachers’ strongest justifications as to why the detracking model was not a good fit for the students of MBHS. After much deliberation and at least four board of education meetings with teachers, parents and administrators throughout the school year, the proposal to add an additional level of Algebra II was passed. By providing workshops to help teachers structure and collaborate on the curriculum of the new course level, three levels of Algebra II returned in September 2019. The revised pictorial depiction of the 2019 mathematics course movement of Geometry and Algebra II is given below (See Figure 3).
This situation at MBHS provides the unique opportunity to look through a teacher lens to understand the complexities of teaching heterogeneous classes and identify factors identified by teachers that impeded student progress is vitally important to understand why detracking, considered best practice by many, failed at MBHS. As such, one of the purposes of this comparative mixed methods study was to determine the difference in teacher experience between these two models. The preliminary evidence found from the pilot study indicated an overall negative experience with teaching heterogeneous classes. To avoid this from happening again and diminish the low morale teachers of MBHS encountered and to increase teachers’ positive experiences, we must understand what teachers faced to inform practice. Another purpose of this study was to evaluate the implementation of supports and how it could or could not affect a math teacher’s ability to teach heterogeneous classes. Based on teachers’ negative responses from the pilot survey, it is also important to understand the similarities and/or differences teachers faced when teaching both heterogeneous and homogeneous classes as it will also inform teacher practice. Additionally, student performance data should be studied to see if class organization
(tracked, detracked) and/or geometry ability (above average, average, below average) can predict student performance in Algebra II classes.

The following research questions guide the study design:

1. How did teachers experience the change from tracking to detracking Algebra II?
2. What supports did teachers report were needed to effectively deliver instruction in heterogeneous math classes?
3. What were teacher’s comparative experiences when teaching in homogeneous and heterogeneous classes?
4. Did class organization (i.e., tracked, detracked) and/or geometry ability (i.e., above average, average, below average) predict student performance in Algebra II?
CHAPTER II

Literature Review

I will begin this review of literature by exploring the literature on the merits and demerits related to the key aspects of the on-going tracking debate in education. Next, the literature on Algebra II student performance in tracked and detracked classes will be discussed. Additionally, the literature on teacher voice and input in decision making will be covered. Furthermore, the literature on how the implementation of supports affects math teacher’s ability to teach heterogeneous classes will also be discussed. Lastly, the research examined will cover math teachers’ comparative experiences when teaching in homogeneous and heterogeneous classes.

Tracking and Detracking Debate

According to Hyland (2006), the tracking-detracking debate is centered around two broad issues, educational equality, and students’ academic outcomes. Although educational equality is a vital component of detracking/tracking, the focus here is on academic outcomes. I selected this focus in order to maintain a narrow focus and conduct a rigorous study exploring depth and wealth of teacher experiences and student outcomes. Those who contend that tracking is detrimental to student’s wellbeing argue that biased assessments used for placement and poor prior instruction account for the placement of students in tracks rather than student ability (Hyland, 2006). Assessments of academic ability have historically been used to place students into different tracks or ability-grouped classes.

In addition, the quality of teacher instruction has been another factor that has been proposed to account for the placement of students into different tracks. Fundamentally, a teacher’s inequitable practices are related to ability-grouping which has been a common response to differences in student aptitudes and achievements. Nearly all secondary schools have placed
their least qualified teachers with low-track classes and their most qualified teachers with high-tracked classes (Mayer, LeChasseur, & Donaldson, 2018; Oakes, 1990). In such cases, the difference in opportunities limit instruction for all students. If the quality of teacher instruction is poor, marginalized students tend to score lower on achievement tests, assigning them the title of being low-ability students (Oakes, 1990).

**Algebra II Student Performance in Tracked & Detracked Classrooms**

Over the past 30 years, American high schools have taken a broad effort to enroll fewer students in low-track courses by requiring students to take more challenging ones, which has been particularly noticeable in mathematics (Domina, Hanselman, Hwang, & McEachin, 2016). Specifically, the Mathematics Advisory panel referred to Algebra as the “gatekeeper” to advanced courses and college-readiness (Nomi, 2012; Rickles, 2013). In fact, Nomi (2012) stated that many more schools required Algebra for all students in high school than in the past. However, research has not yet considered the potential difficulties of universalizing Algebra in terms of organizing instruction effectively to meet the needs of all students who enter high school with diverse academic skills while providing a rigorous curriculum for all students (Allensworth, Nomi, Montgomery, & Lee, 2009). Therefore, it is important to investigate and examine student performance in Algebra in both tracked and detracked classrooms to have a better understanding of which classroom setting results in better student performance outcomes.

Focusing on students’ academic outcomes, specifically in the subject of mathematics, numerous studies have found that mixed-ability classes, also known as heterogeneous classes, have greatly increased the achievement of all students (Burris & Welner, 2005; Boaler, 2006). Burris, Heubert, and Levin (2006) have found that the performance of high-achieving students remained the same, contrary to teachers who believe that an “influx of low achievers will lead to
reduced student achievement, especially in the case of the most talented students” (p. 108). High achieving students did not learn less when they studied in heterogeneous classes. These students’ performance was significantly higher than their performance in homogeneous classes (Burris et al., 2006). Furthermore, in two research studies conducted by Boaler (2006), she discovered that schools that used mixed-ability approaches resulted in higher overall achievement as well as more equitable outcomes. Not only were students’ scores higher academically, but students in these heterogeneous classes learned to treat each other with respect regardless of social class, gender, race, and attainment levels (Boaler, 2006).

Some researchers have found that students perform better in tracked Algebra II courses than detracked Algebra II courses (Domina et al., 2016; Loveless, 2009; Nomi, 2012; Reed, 2008; Trautwein, Lüdtke, Marsh, Köller, & Baumert, 2006). Loveless (2009) raised two valid questions when he discussed how Massachusetts Middle Schools abolished the lower-level tracks and courses. He asked, “With changes in policies, did school organizations think they could magically transform struggling learners into middling or high-achieving ones? And were they oblivious to the effects that such altercations might have on youngsters who were already high-performing?” (p. 1). These questions are important to consider as detracked courses seem to result in more students failing and students who need improvement than tracked courses, specifically in mathematics (Loveless, 2009; Nomi, 2012; Reed, 2008). In the study conducted by Loveless (2009), it was found that there has been a decline in the number of failing math students linked to tracking in schools. Statistically, Nomi (2012) found that in a tracked Algebra classroom, overall math scores were higher by 2.04 points. Additionally, researchers have found that motivation is a factor that affects student performance. It was found that students in a
tracked classroom are more motivated to do well than in a detracked classroom (Reed, 2008; Trautwein, 2006).

Although researchers, such as Cortes and Goodman (2014) and Weller (2017), argue that tracking prohibits lower-level students from meaningful peer-to-peer collaborative learning, Loveless (2009) and Nomi (2012) have found that in detracked classrooms of Algebra, the higher-level students’ skills decline as the rigor of the courses drop to accommodate classroom of mixed abilities. In a detracked classroom, many students retain less material, therefore the teacher has to spend more time on reviewing the “basics” before moving on to more challenging material. In such classes, higher-level students are found to be bored and disaffected in classes with lower skill peers while simultaneously, the lower-level students are struggling to keep up with the curriculum (Loveless, 2009; Nomi, 2012; Reed, 2008). Teachers have no choice but to lessen the rigor of the course and cut certain topics in detracked Algebra classes just to ensure that a wide variety of students can follow along and be successful (Reed, 2008). Simply put, “More tracks, more high-performing kids and fewer failures. Fewer tracks, fewer high-performing kids, and more failures” (Loveless, 2009, p. 2).

Despite the research indicating the ineffectiveness of low-track classes and tracking, it still exists and thrives in many secondary schools across the country (Burris & Welner, 2005; Giersch, 2018; Oakes et al., 2000). However, recently, local educators and policy makers have begun questioning their own local practices and many school districts are moving towards alternatives (Oakes & Lipton, 1992; Rubin, 2006). Several researchers, such as Rubin (2006), have argued that “Heterogeneity is the norm rather than the exception in school classrooms” (p. 12). It is important for schools to realize that one size does not fit all when teaching students as students vary in several ways. (Dixon, Yssel, McConnell, & Hardin, 2014). For these reasons,
many school districts have attempted various detracking reforms. Detracking reforms are built
against the idea that higher achievement follows from a more rigorous curriculum and that
lower-track classes result in lower student achievement (Burris & Welner, 2005). Some schools
have taken strong strides towards reform by eliminating ability grouping entirely from their
district and other schools have taken milder strides, such as allowing access to high-track classes
for students formerly in lower tracks (Datnow, & Park, 2018; Rubin, 2006). By dismantling
tracking and providing a high curriculum for all students, schools are stepping forward to close
the achievement gap of student learning that tracking has created (Burris & Welner, 2005).

**Teacher Voice and Input on Decision-Making**

For this study, there are many areas that have emerged that need exploration in the area
of teacher experiences. To begin, the first topic to pay close attention to is teacher voice and
input with decision-making. I review the research that provides findings on how teachers
experience change in their educational setting. Traditionally, school matters that pertain outside
of a teacher’s classroom, such as policy planning and decision-making have not been within the
teacher realm and decisions have been made by administrators (Lin, 2014). For several decades,
teachers have passively accepted decisions made by administrators and have been obliged to
implement policies and practices which have not been developed with teacher input or
experience (Gozali, Thrush, Soto-Pena, Whang, & Luschei, 2017; Lin, 2014). Researchers such
as Gozali et al. (2017), Lin (2014), and Pennington (2013) found that teachers are far removed
from decision making that impacts the happenings in their own classrooms. Gozali et al. (2017)
contend that it is irresponsible for the most actively engaged individuals (teachers) in the
transmission of knowledge to be the least recognized in decisions. Conversely, Pennington
(2013) found that since teacher input and voices are not always positive and can differ from an
administrator’s viewpoint, “fewer problems can arise by omitting teachers from decision-making” (p. 1). Throughout the years, teachers have only had opportunities to make decisions regarding classroom instruction, teaching techniques, and student grading and have always had less of a role with decisions that are schoolwide and beyond the classroom (Ingersoll, Sirinides, & Dougherty, 2018).

**Benefits of Teacher Input.** Nonetheless, in recent studies, many researchers have shared that a teacher’s professional knowledge has the greatest influence on many aspects of school which have positive benefits affecting school improvement (Gozali et al., 2017; Ingersoll et al. 2018; Lin, 2014; Pennington, 2013). Specifically, teachers are known as the experts in the classroom, as they know their population of students the best. They have unique knowledge about their classroom which is the “key to successful policy formation and implementation” (Gozali et al., 2017, p. 34). As an active participant in decision-making, with authentic knowledge of student needs within the classroom, teachers positively restructure schools far better than any administrator (Lin, 2014). With years of experience, teachers have a wide array of perspectives on educational policy and practice along with a more “grounded view” of restructuring than any policymaker (Gozali et al., 2017, p. 34).

Furthermore, Ingersoll et al.’s (2018) study has found that schools with the highest teacher involvement in decision-making have ranked substantially higher in both mathematics and language arts opposed to schools who have had the lowest teacher involvement in decision-making. When teachers have the chance to share their input and recognize that it is a vision on school improvement that aligns with administrator’s views, a positive stride in student achievement occurs (Ingersoll et al., 2018). Lin (2014) also found that there is a strong positive correlation between teacher input and student achievement scores.
Another benefit of teacher input and voice on decision-making is the positive impact it can have on certain policies that are being implemented. Researchers, such as Lin (2014) and Gozali et al. (2017), have found that when teachers have an actual say in decision-making, they are more likely be better implementers on policies because they have an increased sense of ownership and feel responsible for the outcomes. Also, when administrators accept teacher input and let teachers share their voice on certain policies, they have an increase in motivation to implement changes especially since their thoughts and opinions were considered (Lin, 2014). Teachers who are given the chance to swap roles from being passive practitioners to active practitioners who have input in decision-making have an increase in school commitment. This phenomenon is explained by DuFour (2007) who shared that when teachers have “buyin,” they are more committed to a decision if they were engaged in the process that led to that decision (p. 38). Without teacher buyin, DuFour (2007) shared that resentful compliance is generated which ultimately sabotages any policy or initiative that was being discussed.

Additionally, when teachers are given the opportunity to have input and share their voice in decision-making initiatives, there is a positive increase in their self-efficacy (Ingersoll et al., 2018; Lin, 2014; Liu, Bellibaş, & Gumus, 2021; Siuty, Leko, & Knackstedt, 2018). In particular, Liu et al. (2021) used the term “distributed leadership” to describe when schools engage in allowing teachers to take part in shared decision-making (p. 434). In this quantitative study, Liu et al. (2021) found that distributed leadership had a direct positive effect on teacher self-efficacy due to the collaboration and supportive feeling teachers felt when they got together to give input in shared decision-making efforts. As a result, this type of leadership has helped teachers have an increase in their job satisfaction as well as their confidence in their instructional decisions (Liu et al., 2021; Siuty et al., 2018).
For many years, a hierarchal model has been adopted when it comes to educational decision-making (Ingersoll et al., 2017; Lin, 2014; DuFour, 2007). Simply put, leaders often make mistakes when they say, “I have looked at the data and research, and I know what needs to be done” (DuFour, 2007, p. 38). Administrators with this mindset appear to be wrong. Research findings suggest that teachers have had to deal with top-down mandates where they are forced to embrace a new model for years (DuFour, 2007). Top-down can be defined as having a lack of democratic input in policy creating and implementation (Pazey, Cole, & Spikes, 2017). In educational settings, the administrators are characterized as top-down leaders who want to implement new initiatives and in such situations, teachers have no choice but to follow these mandates with no input (DuFour, 2007). Recently, Gozali et al. 2017 reported that teachers have become increasingly suspicious and resistant towards reforms “made by those in the level of bureaucracy” (p. 34). To foster improvement that is sustainable and successful, there must be a widespread consensus for a concept or initiative before proceeding (DuFour, 2007; Lin, 2014; Pazey et al., 2017). Lin (2014) used the term “decentralization” to explain that by lessening administrative authority, teachers can be empowered to give their input and voice into decision-making opportunities for school-based change (p. 52).

Teacher input and voice in decision making has become a crucial part of the educational system. Teachers are not just teaching academic subjects. Their input and voice on certain matters are needed to make decisions regarding school culture, climate, and ethos of their schools (Ingersoll et al., 2018). It is important to change the imbalance of teacher role versus administrative role and give teachers the opportunity to share their opinions on school-based changes since they are ultimately the ones who directly affect student achievement (Ingersoll et al., 2018; Lin, 2014).
Supports Needed in Heterogeneous Classes

Another area that has emerged that will be explored in this study are the supports teachers believe they need to effectively deliver instruction in heterogeneous math classes. Several researchers have claimed that teachers are ill-equipped to meet the needs of all learners in heterogeneous classes (Bradshaw & Mundia, 2006; El-Haj & Rubin, 2009). With detracking, El-Haj and Rubin (2009) found that “most teachers support the inclusive and equity-minded goals but struggle with seemingly intractable tensions and dilemmas as they work to implement these reforms” (p. 436). When teachers attempt to enrich their instructional practices to accommodate their detracked math classes, they need extensive support and follow-up, especially during the detracking implementation process (Lotan et al., 1992; Schenke, Ruzek, Lam, Karabenick & Eccles, 2017). Schenke et al. (2017) hypothesized that one of teachers’ most serious concerns is being able to provide opportunities for all students in a heterogeneous classroom. Heterogeneous classrooms are complex and as such require complex instruction. If teachers are not given appropriate support, it can cause unequal participation in the classroom which results back in the inequality of learning which is what districts are initially trying to prevent through detracking (Lotan et al., 1992).

Complex Instruction. One of the most common and effective instructional approaches to help support teachers to successfully teach heterogeneous classes when courses have been detracked is through complex instruction (CI). Rather than dominating the classroom, teachers act as directors of learning through routines of complex instruction (Ascher, 1992). As Staples (2008) states, “Complex systems thrive on diversity—it is the grist for the mill” (p. 369). This approach includes various practices that math teachers have used to reduce student status differences, both social and academic, and to maximize student interaction in heterogeneous
classes (Boaler, 2006; Cohen, Lotan, Scarliss, & Arellano, 1999; Horn, 2006). Staples (2008) highlights that in CI, the teacher’s role is like a gate opener who encourages all students to interact in groups and determines constraints when necessary at the individual or group level. From classroom observations, interviews with students, and analysis of promoting equity, researchers have found that one of the many practices that falls under complex instruction is multidimensional classrooms (Boaler, 2006; Horn, 2006; Lotan, 2003; Rubin, 2006; Staples, 2008). One specific practice in multidimensional classrooms is having group-worthy problems.

**Addressing Student Needs in Heterogeneous Classes.** Teacher knowledge of several strategies increases the probability of success for students with differing mathematical abilities. Specifically, using group-worthy problems and differentiated instruction. As such, professional development in each strategy might be needed.

Although teachers cannot prescribe collaborative interaction, they can organize the classroom structure to promote and encourage opportunities for collaboration amongst students (Staples, 2008). Teachers can create group-worthy problems to get students motivated to work in heterogeneous classes. It is an effective way to provide multiple entry points into content material for heterogeneous learners (El-Haj & Rubin, 2009). As a teacher, he/she “must judiciously use his/her position to enable productive conversations and find a delicate balance between creating structure and opening space for students to collaborate” (Staples, 2008, p. 352). These types of problems have four distinct properties which include: (a) showing important mathematical concepts, (b) completing tasks that draw on collective resources of a student group, (c) allowing for multiple presentations, and (d) using several possible ways to achieve the same solution (Boaler, 2006; Horn, 2006; Lotan, 2003, Staples, 2008). Group-worthy problems
facilitate group work, allowing more students to contribute which as a result, helps students feel more valued with their mathematical skills (Boaler, 2006).

Group-worthy problems require students to have positive interdependence as well as individual accountability, which is another factor that falls under multidimensional classrooms (Boaler, 2006; Cohen et al., 1999; Lotan, 2003). Even though interdependence is vital for group-worthy tasks to be successful, teachers have a responsibility to make sure that each individual student has mastered the concepts that have been taught. Therefore, teachers can ask each student for a written report after each group activity to ensure that all students have learned the topic at hand (Cohen et al., 1999; Lotan, 2003). Boaler (2006) goes one step further, providing another way to address individual accountability. For example, a teacher asks each student from the group a question after a group activity. If the student is not able to answer the question, the teacher leaves the group and during the intervening time, “it is the group’s responsibility to help the student learn the mathematics he or she needed to answer the question” (Boaler, 2006, p. 43).

It is unfortunate that many teachers are unaware of complex instruction. Due to the unfamiliarity of this, teachers need training or professional development that aims to educate them on this type of instruction.

Differentiated instruction is the ideal method to employ in heterogeneous classes as it offers different paths to understanding based on a student’s ability and interests (Dixon et al., 2014). Tomlinson (2003) made a powerful statement on the importance of differentiation, “differentiation can liberate students from stereotypical expectations” (p. 9). Providing professional development on differentiation can be an effective support for all teachers. El-Haj and Rubin (2009) emphasized that, in detracked settings, teachers are advised to differentiate their instruction, so each student could learn in the way that is best for him/her. Like group-
worthy problems, to accommodate for each students’ need, teachers are strongly advised to use their classroom, curriculum, and pedagogies to allow students to have multiple entry points on a specific content. This helps students learn and express what they know (El-Haj & Rubin, 2009).

In addition to complex instruction and differentiation, researchers have found that teacher-to-teacher collaboration can serve as another support to help teachers successfully teach heterogeneous classrooms (Bondie, Dahnke, & Zusho, 2019; de Jong, Meirink, & Admiraal, 2019; Hartwig & Schwabe, 2018; Quintero, 2017; Reeves, Pun, & Chung, 2017; Vangrieken, Dochy, Raes, & Kyndt, 2015). It has been found that 75% of a teacher’s day is spent communicating with colleagues and through this interaction, valuable resources such as advice and support are exchanged (Quintero, 2017). It is vital to recognize that teacher collaboration can consist of many different types of activities and interactions and is not just limited to teachers working together in a school setting. For instance, Hartwig and Schwabe (2018) gave a good order of activities that could take place within teacher collaboration. First, teachers can prepare material together or share strategies of effective instruction. Then, teachers can practice different teaching strategies in their heterogeneous classrooms, come back together and reflect on their experiences and if necessary, adjust their instructional strategies to better fit their individual classes. Additionally, collaboration allows teachers to learn instructional techniques from each other and receive feedback which could result in improved teaching (Bondie et al., 2019; Quintero, 2017; Reeves et al., 2017). In a study conducted by Bondie et al. (2019), it was found that when classes were changed to “one-size-fits-all,” (heterogeneous) teachers reported having increased tasks in specific areas (p. 347). One of the increased tasks included collaborative interactions with other teachers. Specifically, researchers have found that teacher collaboration on differentiation resulted in positive attitudes toward differentiated instruction. With more
positivity towards differentiation, teachers in heterogeneous classrooms could have more effective instruction if they feel more optimistic about differentiation (Bondie et al., 2019; Hartwig & Schwabe, 2018).

Many researchers have reported that student performance greatly increased as a result of increased teacher collaboration (Banerjee, Stearns, Moller, & Mickelson, 2017; Bondie et al., 2019; Hartwig & Schwabe, 2018; Reeves et al., 2017; Vangrieken et al., 2015). In a study conducted by Reeves et al. (2017), it was found that collaboration among teachers during planning had a significant positive effect on students’ math achievements. To be exact, when there was a “one-unit increase in teacher collaboration during planning, students’ math achievement was increased by 5.91 points” (Reeves et al., 2017, p. 232). Similarly, Hartwig and Schwabe (2018) found that teacher collaboration, specifically on differentiation in heterogeneous classrooms, had a significant positive influence on student performance. This outcome stressed the importance of “positive and constructive social relations at the workplace” (Hartwig & Schwabe, 2017, p. 114). Interestingly, Banerjee et al. (2017) found a strong relationship between a teacher’s environment and student achievement. In particular, if a teacher’s work environment consists of “cultures of collegiality and collaboration,” this can help a teacher resolve issues, promote learning of new teaching tools which can ultimately enhance their instruction which results in improvements in student performance (p. 210).

Furthermore, teacher collaboration can also help alleviate stress that comes with the task of teaching heterogeneous classrooms (Datnow, 2018; de Jong et al., 2019; Hartwig & Schwabe, 2018; Reeves et al., 2017). Reeves et al. (2017) has found that teacher collaboration helped lessen the burden of teacher workload. This was found to be a huge support that helped teachers focus more on their instruction and practice than having to stress over everyday lessons and
material. Similarly, Datnow (2018) has found that a collaborative teacher environment created a strong professional community where teachers reported leaning on each other to overcome the stress and frustration they faced with school reforms which demanded their time and shift in teaching. Equally, de Jong et al. (2019) found that teacher collaboration made teachers feel as though they had a joint responsibility, especially when teaching heterogeneous classrooms. Having this “joint responsibility became the norm of interactions in their professional collaboration” (de Jong et al., 2019, p. 10). However, de Jong et al. (2019) came to the realization that not all schools are pro teacher collaboration. In his study, he found that some schools share different norms where they have more of a closed community where teachers are not willing to share material or ideas with one another. This factors are important to consider as they affect a school’s environmental climate and how teachers interact with one another.

**Professional Development.** All of these practices require teacher knowledge. Unfortunately, researchers have found that classroom teachers are not provided with the assistance they need, specifically in relation to complex instruction, differentiated instruction, and collaboration (Avramidis & Norwich, 2002; Datnow, 2018; de Jong et al., 2019; Dixon et al., 2014; Stanovich & Jordan, 1998; Van Reusen et al., 2001). Professional development on complex instruction, differentiation, and collaboration has been found to be the key to success, where teachers are given ample opportunities to practice and learn the expectations and components needed to be successful in heterogeneous classrooms (Avramidis & Norwich, 2002; Datnow, 2018; de Jong et al., 2019; Dixon et al., 2014; Stanovich & Jordan, 1998; Van Reusen et al., 2001). Rubin (2006) stressed that without professional development on teaching mixed-ability students, teachers tend to revert to instructional practices that were used in tracked settings. Research studies have found that when teachers are given professional development
training opportunities, teachers’ belief of differentiation increases positively, and teachers experience a positive change toward diverse learners in their classrooms (Avramidis & Norwich, 2002; Dixon et al., 2014). With professional development on how to successfully teach heterogeneous classrooms, teachers become more flexible with adjusting their teaching approach, develop a higher teaching efficacy, which as a result, helps teachers reduce their feeling of being unprepared to teach all students (Avramidis & Norwich, 2002; Dixon et al., 2014; Stanovich & Jordan, 1998; Van Reusen et al., 2001).

Some supports needed to successfully teach heterogeneous math classrooms have been identified by previous research. However, in the case of MBHS, it was not clear whether teachers needed a voice in the decision making, additional support, or both. Furthermore, providing a voice to those teachers will inform future reform at MBHS. As such, the importance of analyzing the supports that secondary teachers need to be able to effectively teach heterogeneous classrooms is crucial. Teachers are “under a great deal of scrutiny and pressure from state and local government to meet the expectations of heterogeneous classrooms” (Van et al., 2001, p. 8). Being able to provide teachers with effective supports that they can utilize is vital, especially if they are directly being affected by the detracking movement in their educational setting. Feeling prepared and having knowledge of the best instructional practices for detracked classes is one way for teachers to acclimate to the shift. It can also help teachers have a more positive experience which can positively affect the education a student receives. Having active support will help teachers expand their knowledge and broaden one’s thinking about the capacities of their students which in turn, can better provide them with concrete teaching in heterogeneous settings (Rubin, 2006).
Comparison of Teacher Experience with Homogeneous and Heterogeneous Classes

In addition to the discussing the supports teachers need to effectively deliver instruction in heterogeneous math classes, it is just as imperative to explore the experiences of math teacher’s when teaching heterogeneous and homogeneous classes. Specifically, the events at MBHS provide the unique opportunity for a comparison of teacher experience within these two different types of classes that can provide insight on many of the similarities and differences that teachers face in their educational environments.

Teachers report negative experiences when teaching in heterogeneous settings (Hallam & Ireson, 2005; Mason and Burns, 1995; Ruthven, 1987). With a wide range of levels in heterogeneous classes, it is expected that teachers will prepare more individualized material for students of various levels. In a qualitative study conducted by Mason and Burns (1995), it was found that 74% of teachers felt extremely overwhelmed as they spent twice the time planning for new differentiated lessons. One teacher said:

They put too many students in a heterogeneous class. It requires a horrendous amount of preparation by the teacher, and I think that probably an additional planning amount of time would be very profitable. It’s a horrendous amount of preparation time. You’re busy every minute. And you must be ready for every minute. (p. 41)

Along with more time needed to prepare for a heterogeneous classes, Mason and Burns (1995) and Hallam and Ireson (2005) emphasized the additional attention needed for classroom management. Research indicated that teachers in heterogeneous classes have found themselves spending instructional time having to manage disruptive behavior; whereas there is a general agreement that classroom management is much easier in homogeneous class settings (Hallam & Ireson, 2005; Mason and Burns, 1995). The combination of extra time needed to prepare lessons
and excessive class time spent on classroom management leave teachers feeling inadequate with their instruction. Teachers are left disappointed and frustrated when they have worked hard to create individualized material but are unable to have enough time to teach during class due to constant disruptive behaviors (Hallam & Ireson, 2005; Mason and Burns, 1995).

In addition to lack of training in methods of teaching heterogeneous classes, teachers often have preconceived notions of students' abilities (Garcia, 1984; Hallam & Ireson, 2005; Ruthven, 1987). Before teachers are assigned to teach a heterogeneous class, many teachers are already stepping into a class with stereotypical expectations and perceptions of student ability (Hallam & Ireson, 2005). Unfortunately, having these perceptions produces inappropriate patterns of differential treatment in the classroom and perceived negative experiences for both teachers and students. In a qualitative study with mathematics teachers, Ruthven (1987) found a strong tendency of teacher interactions to be directly related with a student’s ability. For instance, teachers are more likely to interact and help students with higher abilities as opposed to those with lower abilities. The stereotypes and perceptions that teachers hold impact their experience in the classroom, as they are restricting themselves from being open to a wider range of learners. As a result, teacher experience is negatively influenced as their preconceived notions of how students perform is ingrained in themselves long before stepping foot into a mixed-ability class.

On the contrary, research also indicates that teachers preconceived notions about student’s ability in tracking situations influence more positive experiences. In a study conducted by Dar (1985), he found that since teachers are under pressure for academic achievement, they strongly believe ability grouping will guarantee academic trajectories. As a result of this, teachers have a diminished liability for student failure which ultimately gives them more of a
positive experience and outlook on these types of homogeneous classes. In addition, Linchevski and Kutscher (1998) stated that teachers are more likely to use and be more positive about ability grouping as students in the class easily adapt to class content, pace, and teaching methods. Specifically, in mathematics, the subject is "graded," "linear," "structured," "serial," and "cumulative," making it difficult for teachers to work with groups of students with different levels of knowledge and ability in one classroom (Linchevski & Kutscher, 1998, p. 533). Thus, as a result, they have a positive mindset going into teaching homogeneous classrooms.

This preconception also influences teachers’ relationships with students, which in turn impacts their experiences and self-efficacy for teaching heterogeneous populations. Sparks and Pole (2019) explained that teachers bring their own bias, which is why they have been hesitant to change their interaction with diverse students, causing them to have negative experiences in these classes. According to Rubin and Noguera (2004), for a functioning detracked class to flourish, teachers need to build a social relationship with students they do not know. Gustiani (2019) goes further and explained that in such classrooms, students must feel safe and “welcomed to contribute their opinion where they feel they are respected regardless of their proficiency” (p. 304). However, regrettably, in detracked classrooms, teachers are more likely to only establish positive relationships with high-track students, alienating low-track students (Oakes, 1992).

One of the reasons teachers have alienated low-track students is because they are unable to change their views that all students are equal and deserving of the same education. Jilk (2016) reports that educators have a hard time shifting their focus from student’s academic deficits to students’ strengths. Teachers are typically immersed in students’ outcomes which are mainly students’ shortcomings. It is a teacher’s nature to focus on identifying learners’ mistakes and
understandings, but this can only be justified if teachers use students’ misunderstandings to improve their practice to help students progress (Jilk, 2016). Ross et al. (1997) shared that math teachers especially have a hard time with detracking as they believe that their subject is unchanging and sequential. They tend to have a fixed mindset with their views of students as well as their subject content. The figure below (See Figure 4) is a brief comparison that highlights the main differences teachers face between teaching heterogeneous and homogeneous classrooms.

**Figure 4. Features Between Teaching Heterogeneous vs. Homogeneous Classes**

<table>
<thead>
<tr>
<th>Heterogeneous Classes (Detracked)</th>
<th>Homogeneous Classes (Tracked)</th>
</tr>
</thead>
<tbody>
<tr>
<td>More planning time needed</td>
<td>Less planning time needed</td>
</tr>
<tr>
<td>More attention with classroom management</td>
<td>Less attention with classroom management</td>
</tr>
<tr>
<td>Less effective teaching as an outcome</td>
<td>More effective teaching as an outcome</td>
</tr>
<tr>
<td>Negative preconceived notions of student ability</td>
<td>Positive preconceived notions of student ability</td>
</tr>
</tbody>
</table>

**Theoretical Framework: Teacher Self-Efficacy**

From the review of the complex literature on tracking and detracking of Algebra II, teacher self-efficacy emerges as the theoretical framework for this study in relation to the experiences of teachers at MBHS during the school reform. Self-efficacy is the belief in one's ability to succeed in achieving an outcome or reaching a goal. The expectations one has
determines how much effort he or she will expend and how long he or she will persist in the face of obstacles and aversive experiences. It is a plain and simple concept that Bandura (1977) explains that the stronger one’s self-efficacy, the more active the efforts. This same concept follows teachers’ teaching self-efficacy. A teachers’ teaching self-efficacy is related to the amount of effort teachers invest in teaching, the goals they set, their persistence when things do not go smoothly and their resilience in the face of setbacks (Bandura, 1977; Tschannen-Moran & Hoy, 2007).

The relationship between self-efficacy and teaching heterogeneous groups of students appears to be circular. First, research had indicated that when teachers have not had positive experiences teaching heterogeneous classes, their self-efficacy in relation to teaching heterogeneous mathematics classes is decreased. Second, low teaching efficacy might, at least partially, explain the negativity teachers experience when teaching in heterogeneous classes (Ben-Ari, Krole, & Har-Even, 2003). In a quantitative study conducted by Shachar and Shmuelevitz (1997) to measure the effects of teachers’ sense of efficacy to teach heterogeneous classes, they found that teacher efficacy is subject to change based on a teacher’s experience.

From a diminished teaching efficacy, a teacher’s experience is easily influenced and because efficacy is low, a teacher’s practice in heterogeneous classes might be hindered. This hindrance negatively impacts a teacher’s ability to provide individualized instruction to meet the needs of all learners, resulting in poor student academic performance. This catalyst can be described as a domino effect, where one action stimulates the next to occur. This is unfortunate because researchers have found that a teacher’s low efficacy to teach heterogeneous classes is a catalyst that affects student achievement levels (Hallam & Ireson, 2005; Mason & Burns, 1995; Ruthven, 1987; Shachar & Shmuelevitz, 1997).
On the other hand, research has found that teachers who have a high level of teaching efficacy tend to be more open to new ideas which could be very beneficial for students in a heterogeneous class (Hoy & Spero, 1997; Shachar & Shmuelevitz, 1997). Similarly, Goddard and Kim (2018) and Banerjee et al. (2017) have found that teachers with high efficacy are more likely to try challenging instructional approaches that require taking risks in their classroom. For example, if a teacher has a higher level of efficacy, he or she is more willing to try new teaching strategies or in other words, “experiment with new methods to better meet the needs of their students” (Hoy & Spero, 1997, p. 345). In a recent survey of teachers in junior high schools, 60% of teachers with a high level of teaching efficacy shared that they are more resilient to setbacks in the classroom and are more willing to take the time to help struggling students who make numerous errors (Shachar & Shmuelevitz, 1997). Not only can self-efficacy have direct influence on choice of activities and settings, but, through expectations of eventual success, it can help determine how much effort one wants to expend (Bandura, 1977). Connecting this to teacher self-efficacy, if teachers have successful experiences with teaching in heterogeneous classes, teachers will be more willing to try new teaching methods which can improve their craft and ultimately better meet the needs of all learners.

Summary

Connecting back to the purpose of this research study, although much is known about strategies that are helpful in heterogeneous classes, many theoretical and conceptual gaps pervade the research. For example, although the literature mentions the challenges teachers experience when teaching a wide range of learners (heterogeneous), most of the literature does not focus on secondary math educators. In addition, a majority of studies, researchers only administered a survey to teachers who teach homogeneous secondary classes. Without gathering
data on teachers who teach heterogeneous classes, this becomes a one-sided survey. It also fails to gather a fair and valid amount of data on teachers who have taught homogeneous as well as heterogeneous classes. As such, my purpose in the current study was to help bring out the voices of teachers and the supports they believe have been effective to address the complexities of teaching detracked math courses. In addition, I will explore the impact on student Algebra scores in both tracked and detracked classes to add to the literature in relation to the impact on student achievement.

Specifically, I will answer the following research questions:

1. How did teachers experience the change from tracking to detracking Algebra II?
2. What supports did teachers report were needed to effectively deliver instruction in heterogeneous math classes?
3. What were teacher’s comparative experiences when teaching in homogeneous and heterogeneous classes?
4. Did class organization (i.e., tracked, detracked) and/or geometry ability (i.e., above average, average, below average) predict student performance in Algebra II?

Personally, these gaps in the literature drive my interest and determination to find real evidence that provides the answer to my research questions. I conducted this study because there is not enough literature on math teacher’s experiences of changing their teaching from a tracked to detracked class of Algebra II. In addition, there is also not enough research on teachers’ experiences when teaching heterogeneous classes and how the implementation of supports affects math teacher’s perceived ability to teach heterogeneous classes. Specifically, this study aims to compare Mulberry High School’s secondary teachers experiences after classes were
detracked to their experience once classes were tracked again. The outcomes from both situations (detracked and tracked) at MBHS will be studied to see if there is a difference with respect to teacher experience, teacher self-efficacy, supports provided, and student performance. Furthermore, student performance grades can significantly differ based on tracked and detracked classes (Domina et al., 2016; Loveless, 2009; Nomi, 2012; Reed, 2008; Trautwein, Lüdtke, Marsh, Köller, & Baumert, 2006). This study aims to see if class organization (tracked, detracked) and/or geometry ability (above average, average, below average) can predict student performance in Algebra II.
CHAPTER III

Methodology

This mixed methods study aimed to explore the experiences of secondary math teachers when Algebra II changed from being a tracked course to a detracked course in (year) at MBHS. I examined the teacher perceptions of what were needed to effectively deliver instruction in heterogeneous classrooms along with their comparative experiences between teaching homogeneous and heterogeneous Algebra II courses. Finally, I compared the average final Algebra II student grades across three groups of students (below average, average, above average) in heterogeneous and homogeneous classes.

This study was a mixed methods comparative case study. Comparative case studies involve collecting and analyzing data from several cases (Merriam & Tisdell, 2016). This method includes analysis and synthesis of the similarities, differences, and patterns across two cases that shared a common focus or goal. It ultimately produced knowledge that was easier to generalize about underlying questions – how and where, and if possible, why it carries on as it does (Merriam & Tisdell, 2016). Johnson, Onwuegbuzie, and Turner (2007) define mixed methods research as the “type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration” (p. 123). A mixed methods approach was appropriate for this study as it allowed for the adoption of multiple perspectives in examining a complex problem and also allowed the use of multiple sources of evidence for the purpose of verification (Johnson et al., 2007). Specifically, quantitative research highlights trends across
data sets or study groups, but not the motivation behind observed behaviors. To fill in these knowledge gaps, I utilized qualitative methodology (Goertzen, 2017).

The qualitative elements of this study examined how teachers experienced the change from tracking to detracking an Algebra II course in their school setting and pinpointing the supports they reported were needed to help them successfully teach heterogeneous classrooms. In addition, the qualitative elements of this study also examined Algebra II teachers’ comparative experiences when teaching in homogeneous and heterogeneous classes. Through in-depth interviews, I looked for insider personal experiences, such as how teachers reacted to the sudden change of teaching heterogeneous classrooms that were once homogeneous. Furthermore, these interviews provided insight on the vast differences in experiences teachers faced during the span of two years when comparing their teaching involvement in heterogeneous and homogeneous classrooms. According to Merriam and Tisdell (2016), qualitative research’s purpose is to “achieve an understanding of how people make sense out of their lives, delineate the process of meaning-making, and describe how people interpret what they experience” (p. 15). Therefore, these in-depth interviews were one of the most effective ways of gathering this type of information and answering research questions 1, 2, and 3. (Merriam & Tisdell, 2016).

The quantitative elements of this study compared the average final Algebra II grades between three groups of students (above average, average, below average) in heterogeneous and homogeneous classes. Using the data collected, a multiple linear regression was conducted to determine if class organization (tracked, detracked) and/or geometry ability (above average, average, below average) can predict student performance in Algebra II. The multiple linear regression provided the basis for comparison of qualitative interview findings to quantitative data obtained through the District Chairperson of Mathematics at MBHS.
Study Site

The Mulberry Public School (MPS) District is a pre-K to 12 suburban district in central New Jersey containing eight elementary schools, one junior high school, and one high school. The Mulberry High School includes students from grade 10 through 12. Each school year, approximately 2100 students are enrolled in MBHS (New Jersey Department of Education; NJDOE, 2017b). The student demographics are 55.6% White, 31.7% Asian, 7.5% Hispanic or Latin, 4.7% Black, 0.4% two or more races, and 0.1% American Indian (NJDOE, 2017a). The district consists of approximately 831 teachers of which 687 are female and 144 are male (NJDOE, 2017c). Although most students within the Mulberry school district are diverse, 92.7% of the teaching staff is Caucasian whereas only 3% and 2.8% are Hispanic and Asian, respectively (NJDOE, 2017c).

MBHS was the site for this study due to the frequent changes of detracking and tracking mathematic courses, specifically Algebra II. In addition, there were many teacher who have been working at this school district for over 15+ years who have first-hand experience in the impact the detracking model has made in the school environment. These Algebra II teachers were able to provide insight and comparisons when they discussed their experiences teaching heterogeneous and homogeneous classrooms.

Sample

My sample was representative of the population. The chosen sample of participants met the following criteria I had devised to participate in this study. The first criterion was that a teacher in my sample had to be currently teaching at MBHS. The second criterion was that a teacher must have taught Algebra II before and after the detracking model was put in place. Although the years a teacher taught Algebra II did not need to be consecutive, the teacher must
have had experience with both the tracked and detracked levels. The reason I had created these criteria was to ensure that my participants had at least four to five years of teaching experience in the school where my study was being conducted and had sufficient experience to provide a comparison of teaching both tracked and detracked levels of Algebra II. Therefore, it was imperative that they had taught both types of courses. Furthermore, since my focus was on Algebra II classes, it was crucial that only the Algebra II teachers were part of this study.

The Algebra II teachers at MBHS were chosen through a convenience sampling approach (Gall, Gall & Borg, 2015). In total, I anticipated interviewing ten Algebra II math teachers. To gather my sample, a recruitment letter was first emailed to all tenured Algebra II teachers at MBHS who met the criteria above inviting them to participate in the current study.

A total of eight teachers responded to the recruitment letter and participated in this study. Two Algebra II teachers declined the invitation. All the teachers were teaching Algebra II at MBHS during the current study. Of the eight participants, seven of the teachers were general education teachers and one of the teachers was a special education math teacher. The table below provides information on the years of experience of each teacher as well as their identification. General education teachers are labeled as GE and special education teachers are labeled as SE.

Table 1. Teacher’s Years of Experience and Identification

<table>
<thead>
<tr>
<th></th>
<th>Lisa</th>
<th>Robert</th>
<th>Taylor</th>
<th>Megan</th>
<th>Daniella</th>
<th>Emy</th>
<th>Christine</th>
<th>Joanna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years</td>
<td>15</td>
<td>24</td>
<td>11</td>
<td>16</td>
<td>5</td>
<td>16</td>
<td>29</td>
<td>12</td>
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<tr>
<td>Identification</td>
<td>GE</td>
<td>GE</td>
<td>GE</td>
<td>GE</td>
<td>GE</td>
<td>GE</td>
<td>GE</td>
<td>SE</td>
</tr>
</tbody>
</table>

Note: GE = General education; SE = Special education; Years = Number of years taught at MBHS.
Since each of the MBHS Algebra II teachers who were part of this study had at least four or more years of experience in this current district, it was a sufficient representation of individuals for the study. The experiences and perceptions I heard from these individuals provided a basis for understanding how these teachers experienced the detracking to tracking shift in a course they once taught, the supports they believed they needed to successfully teach heterogeneous classrooms and the similarities or differences they encountered in their heterogeneous and homogeneous classes.

**Procedure/Data Collection**

For this comparative case study, I collected qualitative and quantitative data. With qualitative research, I conducted interviews to get a true taste of the topic of research. A major realization that I made from interviews is that many events/emotions/actions were observed, such as feelings, thoughts, and intentions (Patton, 2002). Interviews created a door into the participants’ minds and thoughts, allowing for a deeper understanding of their experiences. As the purpose of this study was to explore teacher’s feelings and perceptions, I conducted semi-structured face to face interviews virtually.

**Interviews.** The interview was designed to help glean a thorough understanding of how Algebra II math teachers experienced the shift from tracking to detracking Algebra II as well as how they experienced teaching heterogeneous and homogeneous classes. Additionally, the interviews were designed to help understand teachers’ knowledge they had about teaching various learners, the supports that affected their teaching ability in such classes, how they felt in detracked educational settings and how their experience changed once classes were tracked once again (See Appendix B). All interviews took place over Rutgers Zoom virtually. Each interview lasted 30 to 45 minutes. Overall, the interview protocol (See Appendix B) included open-ended
questions. Questions were open-ended to “minimize the imposition of predetermined responses” (Patton, 2002, p. 353). In addition, open-ended questions allowed participants to answer the questions in whichever direction they saw fit and used any range of words they wanted to use to express what they wanted to share (Patton, 2002).

The main topics the interview protocol focused on were the transition from tracking to detracking math courses, Algebra II math teacher’s experiences of teaching heterogeneous classrooms, changes in instructional practices, how supports received or not receive have affected their ability to teach heterogeneous classes, and student achievement scores. For example, I asked the Algebra II teachers how students were previously assigned to math courses before the detracking change. I also questioned how teachers changed their instructional practices to meet the needs of all their learners to gain a better understanding of how much knowledge each teacher had regarding best practices for heterogeneous classes. Questions asking if teachers had encountered specific challenges throughout this detracking movement were also asked. Lastly, teachers were asked about supports they had received or would have liked to have received that they believed would impact their ability to teach heterogeneous classes. To ensure confidentiality, specific actions took place. First, when interviews were transcribed, each participant’s actual name was replaced with a pseudonym name. In addition, all recordings, transcriptions, and data collected were kept in a password-protected electronic folder on a password-protected computer.

**Student Performance Data.** I elected to conduct multiple linear regression analyses with Algebra II grades, which provides a clear illustration of student performance that can be easily compared in detracked heterogeneous classroom versus tracked homogeneous classrooms. Although the validity of academic grades has been questioned by some, the social validity with
school districts, teachers, and parents is high (Strain, Barton, & Dunlap, 2012). The grades students earn determine whether the student is allowed to take the next course in the sequence of math courses and ultimately is used to determine if the student met graduation requirements.

For the regression analyses, I completed two steps. First, based on data provided by the MBHS staff, students were grouped into one of three groups (below average, average, or above average) based on their final Geometry grade, the year before they were to take Algebra II. A final grade in Geometry that was from 80 and above was considered above average. A final grade in Geometry that spanned from 70 to 79 was considered average and a final grade 69 and below was considered below average. The class organization (detracked or tracked) and the geometry ability of each student (above average, average, below average) were used to give predictions of students’ Algebra II final grades. I elected this method of grouping because this is how students at MBHS were placed in Algebra II tracked classes.

Second, I collected deidentified data from the Mathematics Department Chairperson at MBHS that included Algebra II students’ marking period one, marking period two, and midterm grades that spanned from 2017 to 2020. The students’ names were removed and only their identification number was used to ensure confidentiality. Additionally, the math teachers who taught each student was also removed to eliminate bias as well as to ensure confidentiality. A total of 234 students’ Algebra II final grades were collected, some from the 2018-2019 school year (detracked) and the others from the 2019-2020 school year (tracked). Prior to this collection, each students’ final grade in Geometry was collected and from their final grade in the course, each student was categorized as either above average, average, or below average.

In addition to the collection of the qualitative and quantitative data listed above, I collected artifacts from the teacher participants, that included Algebra II teachers’ letter to
administration requesting a meeting and a page full of Algebra II teacher’s notes on specific topics they wanted to address with administration. These were relevant to the research questions of the present study and were used as a third data point for triangulation (Merriam & Tisdell, 2016). Documents and artifacts were scanned and saved digitally.

**Qualitative Data Analysis**

To answer research question one and analyze how teachers experienced the change from tracking to detracking Algebra II, I used three recommendations of analysis following the recommendations of Hays and Singh (2012). First, after each interview, I wrote memos on my perceptions, thoughts, and feeling during the interview to capture the initial impression of the conversation. I also highlighted some parts of the conversation that stood out to me. These memos were written after all eight interviews were transcribed. This analyzation was strictly done by hand and was mainly performed as an initial first read of the interview data that was collected. Second, I transcribed the face-to-face interview recordings of the eight participants by hand. Third, transcription data was analyzed in Dedoose (Salmona, Lieber, & Kaczynski, 2019). Dedoose is a cross-platform application for analyzing qualitative and mixed methods research with text, photos, audio, videos, spreadsheet data and more (Salmona, Lieber, & Kaczynski, 2019). My goal was to code the data for thematic analysis. Within Dedoose, as I read through each interview transcription once more, I began deductive coding by grouping data in categories based on similarities and differences as they related back to the research questions. For example, through this process, I noticed that many of my participants used similar adjectives or characteristics to describe their experiences before and after the detracking model was put in place. This was opportune as it allowed me to group evidence and label ideas which helped give
me insight to create broader views which is a core component of qualitative data analysis (Creswell & Creswell, 2018).

Within the first round of analysis, all the data was coded. A key feature of Dedoose is within each code, parts of each interview that are tagged with a particular code are pulled together in a list. I used these codes to create larger categories. Specifically, I looked for similar codes and placed them all into one larger category. Through this process, I looked for common and unique responses among participants. From analyzing these larger categories, I was able to organize the data into themes, connections, concepts and interpret inductive codes. This same process was repeated to answer the second and third research question as the answers were within each transcribed interview.

Quantitative Data Analysis

To answer the fourth research question, which asks if class organization (tracked, detracked) and/or geometry ability (above average, average, below average) predict student performance in Algebra II, a multiple linear regression analysis was conducted using JMP (Goos & Meintrup, 2016). When statistically significant results were found, I explored the individual predictors with t-tests.

The data that for these analyses consisted of 234 student’s final Algebra II grades along with each student’s class organization (detracked or tracked) and each student’s geometry ability (below average, average, above average). The 234 final grades that were collected came from the year school year 2018-2019 and 2019-2020, when Algebra II classes were detracked and tracked, respectively. The dependent variable in this multiple linear regression is the predicted student Algebra II final grade which is based on a students’ particular class organization and geometry ability.
Table 2. Number of Students in Each Group

<table>
<thead>
<tr>
<th>Geometry Ability</th>
<th>Class Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Detracked</td>
</tr>
<tr>
<td>Above Average</td>
<td>73</td>
</tr>
<tr>
<td>Average</td>
<td>16</td>
</tr>
<tr>
<td>Below Average</td>
<td>48</td>
</tr>
</tbody>
</table>

Note: N = 234

Ethics

For the best interest of my participants, I made every effort to respect the rights of all participants in this study and address concerns of consent. I emphasized the voluntary nature of each participant’s participation and clearly explained that purpose of the study. I repeated this message verbally immediately before each interview. I informed participants of all data collection procedures and recordings and notified them of their option to skip questions. I also informed participants on how I planned to report the data I collected, and I made transcription and findings available to participants for their review. Participants were given a chance to let me know if they would have liked me to exclude any part of their transcription in my findings. Although anonymity is not completely possible for interviews, I protected the privacy of participants by assigning pseudonym names. All ethical considerations required by the university’s Institutional Review Board were implemented.

Researcher’s Role

My personal experience as a mathematics teacher at MBHS helped shape my perspective on this study. Although I acted as an instrument of data collection, it is important that I was aware of my own biases and was careful that I did not allow my personal experiences cloud my judgement or analyzation of data. As the role of the researcher, I considered myself an insider as
I have worked with many of my participants for the past seven years. I know many of my participants from both a personal level and in order to be a good researcher, those are factors that I could not incorporate into my data collection as it should be strictly factual and objective. Furthermore, part of my role as a researcher is the ability to ask good probing questions during the interviews, listen intently on responses, think, and then ask more probing questions to get deeper levels of conversation. Overall, I strived to seek responses that built a picture from my participants’ responses that can help open my eyes to various themes or even theories of what my research study wanted to find.

**Reliability and Validity**

I conducted three methods of validation for the thematic analysis. The first method of validation was member checking. Each participant was given a hard copy of their transcriptions. Participants were asked to provide their feedback regarding the transcribed interviews. This helped ensure the accuracy of their ideas was captured. No participants requested that any information be changed. Second, if at any moment, a participant began to feel uncomfortable with any part of the study, they were given the opportunity to revoke their consent and their transcription would be deleted permanently. Third, since I am the sole researcher, I checked transcriptions against the audio recordings and had a fellow researcher who is not employed by the district to cross-check my transcriptions for accuracy and coding reliability. The next method of validation was the use of peer review. I consulted will some of my fellow doctoral students and my professors over the course of research and asked for feedback on my data analysis.
Consistency of Teacher Placement

It is important to be aware of the consistency of teacher placement in this study. Every year, many school districts change teachers’ schedules where they are asked to teach different mathematical courses from year to year. However, in my setting, our Department Chairperson has not changed the courses that we taught from year to year which has been a huge benefit for my colleagues. Our Department Chairperson has given the Algebra II teachers an opportunity to master their craft for the past three to four years. As a result, this has helped the Algebra II teachers answer the interview questions that asked them to make a comparison between different aspects of the 2018-2019 school year versus the 2019-2020 school year.
CHAPTER IV

Findings

In this mixed methods study, I investigated the reported experiences shared by teachers when tracked Algebra II classes changed to detracked Algebra II classes. In addition, I examined the reported supports MBHS’ Algebra II teachers needed to effectively deliver instruction in a heterogeneous math classroom and the teacher’s comparative experiences when teaching in heterogeneous versus homogeneous math classes. In this study, I also examined if class organization (tracked, detracked) and/or geometry ability (above average, average, below average) can predict student performance in Algebra II. The data was collected through semi-structured interviews, student’s Algebra II grades from 2017 to 2020, and teacher notes from meetings with administrators.

Findings from data analyses in relation to the research questions that guided this study are described in this chapter. An analysis of teacher responses provided an in-depth understanding of reported teacher reactions to the tracking change, supports and experiences teachers had teaching heterogeneous classes versus homogeneous classrooms. The analysis also gave an in-depth understanding of student performance differences in three subsets of students (i.e., below average, average, above average) across two academic years, one with students tracked heterogeneously and the other with students tracked homogeneously. The results from the qualitative analyses included seven themes that emerged from interviews as well as the artifacts I collected from the teachers interviewed. The results from the quantitative analysis included the student performance data (i.e., final grader per each year) that I collected from the mathematic supervisor of MBHS. The first theme includes background knowledge that emerged from participant discussion of how the detracked model came into action, which addresses the first
research question. This information sets the stage for the additional themes that address the second and third qualitative research questions. Lastly, I will complete my findings by discussing the quantitative findings that addresses the fourth research question.

**Qualitative Data Findings**

**The Removal of Intermediate Algebra**

During the interviews, several of the Algebra II teachers brought up their experience and shared their views on to the news that Intermediate Algebra would be discontinued. According to the interviewees, this automatically meant that students who were once in this course would now be placed into a heterogeneous classroom. To answer this question, a theme focusing on dissatisfied changes emerged from the teachers’ interview responses.

**Research Question 1**

One major theme emerged from the data to answer the first research question: *How did teachers experience the change from tracking to detracking Algebra II?*

**Theme 1: Unsatisfactory Changes.** Based on what the Algebra II teachers reported, the sudden detracking of Algebra II courses blindsided the Algebra II teachers, leaving them feeling that the school administration had no respect for their expertise and input. For example, Christine stated that she and her colleagues were completely “confused” and “outraged” that administration took the step to detrack the Algebra II courses without giving any indication that this was something they considered at the time. Lisa said, “It was working, the Algebra II system was working. Why change something when it’s working well?” Collectively, Lisa, Megan, Christine, and Robert expressed that they did not agree with the administration’s motive behind detracking Algebra II when they felt that the current model that was put in place was already effectively working for students and themselves as educators.
**Respect for Teacher Expertise and Input.** Participants indicated that, as a department, during the initial discussion of removing the Intermediate Algebra II course, the Algebra II teachers felt that the administration did not respect their expertise and input of what they believed was best for all students. According to Megan, a majority of the Algebra II teachers at the time were against the change. The teachers reported feeling disrespected and unhappy that this new model of classes would not benefit all the different levels of students. Joanna shared:

> We were unhappy that we were just told that the change was in the best interest of the students, but nothing was ever given to us as proof. We felt they were making a huge mistake.

In addition, the Algebra II teacher reported that to meet the needs of all student levels, they would have to do extra work, resulting in an increase of teacher stress. Of the eight participants, each Algebra II reported never having enough “time” for the extra work they were now required to do. Lisa stated, “New lessons for the courses, assessments, differentiated worksheets… we always ran out of time during team planning. It was tense.” Taylor felt like she was “running a marathon” and no matter what she did or tried in the classroom, she felt like it just did not work. The participants reported that the way the news circulated through the math department really upset the Algebra II teachers at the time. Christine, a teacher who has been working in the district for 29 years, explains how the teachers were informed:

> We were told – yeah, we were told – we were not consulted and then when we found out about the plan, we vehemently said “wait a minute, this has to be looked at better, I’m not sure this is going to work”. Not only were we not consulted, but our concerns were completely ignored.

Several of the Algebra II teachers shared how the change was an administrative directive.
with no prior discussion or consultation. Megan, a teacher with 18 years of experience in the district, expressed her view with how administration “pretended” to give teachers input:

It felt like it was just a question that needed to be asked to us out of courtesy but in actuality, administration had already made their decision and teachers obviously had no input.

Joanna goes one step further and reports that the teachers were given false information from administration. She said, “I remember them saying that all the other subjects have two levels, and we can’t have three levels which was a lie because at that time, I knew science was doing three different tracks.” Lisa also mentioned how the Algebra II teachers “were just told it was happening” and even though many of them tried to push back, it was not heard or considered. Christine passionately explained her discontent with how administration neglected the teacher’s opinion on the matter:

I honestly would have liked the administration to have listened to us – you know, we are the experts who were teaching these kids over the years. We are the experts – listen to what we are saying when we’re telling you this is not going to work. Do not just say – “oh but the research supports this.” The research is one thing and theoretics are one thing but in practice, unfortunately, it’s not ideal and the students don’t always “rise” to what we would like to happen.

From the administration’s failed acknowledgement of teacher expertise and knowledge of students, Algebra II teachers have shared that they have felt extremely stressed and challenged to effectively deliver instruction in their heterogeneous Algebra II classes.

The motive behind why administration decided to remove the Intermediate Algebra course and only have two different tracks was another factor that made teachers feel that their
expertise and input was neglected. Lisa’s recollection of what administration told her focused on the Partnership for Assessment of Readiness for College and Careers (PARCC) exam:

They told us the reasoning for it…. they were really concerned when they looked at PARCC scores - that kids in a lower track just were not scoring well on the PARCC.

They felt like since they are all taking the same assessment, we needed to prepare them in the same way – that was their reasoning to remove the Intermediate Algebra level.

Robert also gave an explanation as to how administration justified their reasoning:

It was believed by some of the administration that our kids would be better off having two levels of Algebra II so they removed the lowest level, and the belief was that the kids who were in the lower level would rise to the challenge and be able to handle the regular Algebra II given better role models and better caliber students in the class.

Christine also spoke about the idealistic views that administration had that drove their motive to detrack the Algebra II classes:

What was presented to us was that ideally, the kids are all working together, they thought that the lower performing kids would be pulled up if they worked with the role models.

They also thought that the higher ability kids, you know pre-tracking – would benefit from the extra explanations and the teaching of their classmates and their peers and would gain a better understanding. In an ideal situation, theoretically, this sounds wonderful, but the problem is that theoretical unfortunately does not always roll out into practical and from what I experienced, that is really not what happened!
Research Question 2

Three major themes emerged from the data to answer the second research question: What supports did teachers report were needed to effectively deliver instruction in heterogeneous math classes?

Theme 1: Support and Guidance from Administration. The Algebra II teachers who participated in the study generally felt that they did not have enough support and guidance from administration to effectively deliver instruction in their heterogeneous math classrooms. In particular, administrative support and professional development were the two factors that teachers frequently mentioned they needed to effectively teach their heterogeneous classes.

Lack of Administrative Support. Specifically, administrative support was something that several of the Algebra II teachers shared they needed but did not receive. They shared their frustrations with being unable to reach the needs of all students and desperately wanted some type of training or assistance from administration especially since they were the ones who implemented these types of classes in the first place. Several of the Algebra II teachers defined administrative support as just checking in to see how teachers were doing with the change and asking if there was anything they could do to help make the transition easier. Christine, who was extremely vocal during the interview, expressed “Our leadership was not helpful at all. Our administration was not helpful at all. They were not effective in terms of when we requested things.” Taylor shared her views and shared an example of what she would have appreciated:

I would have liked more administrative support and resources and maybe going into other schools where they have a mixed (heterogeneous) level and seeing how they do it – I mean, that would be the best way we could learn how to teach these classes.
The Algebra II teachers were aware that a similar model was effectively working in the junior high school. Likewise, Lisa shared a similar example of what she wanted:

I don't know how that model would have worked but at least to tell us and show us an idea, I would have liked to be able to do that - just to see different ways because junior high strategies were effective for those kids.

Unrelated Professional Development. In addition to the lack of administrative support, the Algebra II teachers reported that the professional development that was provided was ineffective and unrelated to mathematics. Several teachers claimed that they would have liked to have received more subject related professional development and training. Joanna, the special education math teacher, expressed her wish:

I wish we had more training on different practices or the current teaching pedagogies that are out there. I don’t think we were prepped as teachers to prepare for all these different levels and differentiation.

Although she experienced the transition as being tough, she praised her colleagues for being hardworking teachers, which is why she believed the classrooms were successful without the help of administration. Joanna emphasized that “there is not a lot that’s done to help us teachers with our teacher practice” when talking about administration. Furthermore, many teachers have shared that the new district initiative of technology along with trying to teach heterogeneous classes had been overwhelming and complex. With new Lenovo laptops and the rollout of a new online platform called Canvas, teachers have been yearning for some type of training or professional development session dedicated to helping them get their feet wet with the new teaching expectations in the classroom. Emy, a teacher who was worked in both the junior high school and high school, shared her view:
We did have a couple of professional days – but they weren’t exactly math related. Administration wanted us to use the big ideas textbook to support this lower level of Algebra II, but we didn’t have enough time to truly learn it and incorporate it especially on top of Canvas and the new laptop and new curriculum. We were so overwhelmed. Robert believed that there could have been more training and admitted that training is a “hard thing” because teachers have certain expectations when it comes to having dedicated professional development days built into their full school year schedule. He goes on to share that he knew teachers were eager to take part in useful training to help improve their instruction but unfortunately, he saw that they were often left unsatisfied and frustrated rather than appeased. Similarly, Joanna shared that administration offered training where they said, “here’s how to do this tech and here’s how to do that tech” but in actuality, teachers were really not being trained to do things correctly with the technology.

**Theme 2: Teacher Collaboration.** Teacher collaboration was the second theme that emerged from the eight interviews that were conducted. Teachers reported that they had to look elsewhere in order to gain the support they needed to effectively teach heterogeneous classrooms because administration did not have much to offer. Specifically, the participants reported that team planning on lessons and differentiation strategies were important factors that provided the support they needed to be successful with their practice in heterogeneous classrooms. In addition, teacher unity was another support they reported that helped them advocate for what they believed would positively improve the detracking model, which as a result they believed would benefit the students greatly in the Algebra II classes.

**Team Planning.** In the mathematics department at MBHS, the teacher schedules were strategically arranged to allow for teachers who taught the same subject to have prep periods
together. These periods were daily and 42 minutes in length. During this time, teachers sat in a classroom and collaborated together while planning lessons, assessments, and activities that they could use in their respective classrooms. Almost all the Algebra II teachers felt that team planning was the crucial support they needed and ultimately, their saving grace in this situation. Several of the Algebra II teachers used team planning in a multitude of ways. Christine explained her use of the time with her colleagues:

> We were there together every day so the majority of the time was planning and trying to figure out how on earth are we going to not lower expectations so much in order to keep these kids at the bottom – when I say in the bottom, truly they were the kids who couldn’t grasp what we were doing in this new detracked model.

Christine even admitted that the entire 42 minutes was not solely just used for planning lessons and assessments, she explained that sometimes when she was together with her colleagues, they shared time “commiserating and venting” about their frustrations of teaching the heterogeneous classes. In addition to planning lessons and assessments, the Algebra II teachers shared different teaching strategies amongst each other which they found useful in these classes. Taylor shared her experience:

> As colleagues, we are all trying to help each other out. I think the biggest thing that we did during the detracking year was trying to think about how we’re going to teach something and that is something we haven’t done in a long time which is so important – you know, how do you teach a certain concept? We all have different ways and which way do we feel… like it’s really going to be helpful and just knowing other people’s ways of teaching. I think being able to discuss with our colleagues the specifics of the curriculum were very helpful.
Emy shared her view on team planning:

I think team planning is very helpful. We are expected to team plan once a week but because our schedules are arranged where we all had the same period off, we pretty much met daily, so we were able to take a lot of time to discuss and help each other.

Simple remarks during the interview such as, “team planning is a great support” from teachers like Joanna really showed how much teachers relied on this support in a time of need.

**Differentiation Strategies.** Participants reported that another aspect of teaching a heterogeneous classroom is to have the ability to effectively differentiate in the same classroom. This was something that several Algebra II teachers mentioned they struggled with. However, together with collaboration, many of the Algebra II teachers reported putting their efforts together and developing some ways of differentiating in the classroom. A common teaching activity that stimulated differentiation was a levels activity that most of the Algebra II teachers spoke of when asked about differentiation during the interview. Daniella, a teacher who was an expert at this activity, gave an insightful description of what the levels activity was:

The levels activity is a differentiated activity. The levels activity is where typically, students are in groups and the groups are more homogeneous. Together, students work their way through different levels of problems, and they need to check their work and make sure that they and everyone in their group got everything right or at least understood their mistakes to move on to the next level, which is supposed to be a more difficult level.

She shared a second example of how she differentiated in her classroom:

I also did an activity where it was differentiated by topic. I gave students a pre-assessment and then I said, okay well if you were confused on problem number four, pick
up the green sheet now, meet with all the green people – so that was another way that I
differentiated instead of by level – I think it was really helpful.

Although Daniella was one of the only non-tenured Algebra II teachers in the math department at
the time, she had been successful with these activities and took the liberty to help educate her
fellow colleagues on how to implement these types of activities. Lisa, who initially never had
any experience using these types of activities was open to new teaching practices which she
shared in her interview:

You know, I started learning, um some strategies that were brought from some of the
teachers that taught Algebra II like the levels activity because I was dealing with a group
where two-thirds of them were highly distractible and the other third were disaffected.

Christine also shared that since she did not have a lot of experience with working with such a
mixed range of students and had no prior involvement with differentiating, she felt she was able
to lean on her colleagues during the first year of the new detracked model. She shared her
experience with differentiation:

We definitely had to differentiate. I don’t know if I did the best job just because of the
sheer overwhelming nature of having so many different levels in one room. I did that a
little, but I didn’t do it formally very often. It was hard for me – I had another demanding
course to teach and because other people were better with that, I kind of leaned on them.

You know, I relied on our team the first year – we had a couple more teachers who were
apt to put a lot of time into creating physical lessons that were differentiated.

**Theme 3: Teacher Unity.** Another support that the Algebra II teachers reported were
needed was teacher unity. However, according to the teachers, this was for a different reason
which stemmed from the struggles and lack of support received when teaching heterogeneous
classes. For as long as they could, the Algebra II teachers shared that they tried their best efforts to meet the needs of all the students in the heterogeneous classroom. However, even with teacher collaboration, teachers reported feeling unsatisfied with the instruction they were providing and reported that students’ performance were not improving. Teachers reported that the low morale that took over the math department especially in the Algebra II classes drove the Algebra II teachers to come together and form a committee. They reported that this committee, headed by the tenured Algebra II teachers, finally took a stance they felt was long overdue but necessary to help improve the structure of the Algebra II courses. Christine, who was one of the Algebra II teachers who first joined the committee explained that the main reason for this committee was to make a positive difference for all students taking Algebra II. She expressed her excitement for the committee formation and further explained that “the goal of the committee was to propose a new Algebra II course that would fall in between Algebra II Academic and Algebra II Honors.” From years past, the Algebra II teachers reported that the tracked math classes were highly successful from their experience and they wanted to move the Algebra II courses back into a tracked model. Daniella, an Algebra II teacher who was advised not to be part of the committee since she was non-tenured at the time, reported hearing that “teachers were given a lot of control to develop a model and that it was definitely teachers in the department that pushed for the new model.” Christine, who played a big role in the committee, gave an overview of how the committee began:

We (Algebra II teachers) thought we would get together and really talk about how we can bring our concerns to the administration and we met as a department - tenured teachers only – we informed the non-tenured that they didn’t have to join the committee if they
didn’t want to. Us teachers basically had a consensus that this was just not in the best interest of the students to keep Algebra II as a detracked class.

Several of the Algebra II teachers shared that they met together and wrote a letter (See Appendix C) inviting administration and members from MPS’ central office (Superintendent, Assistant Superintendent, Mathematics Curriculum Director) to attend a department meeting to discuss the teachers’ hardships as well as formulating a possible change in the Algebra II courses. Almost all of the Algebra II teachers who I interviewed were a part of the committee and many of them shared that as a department, they walked into the meeting extremely prepared. The Algebra II teachers shared that they gathered student performance data, notes on the negative characteristics they observed happening in their classes, the “water downed” curriculum, the disadvantage these classes gave to the higher-level ability students, the way students in their classes would not be prepared for their future math classes and some teachers even shared that they “would not want their own children taking these detracked Algebra II classes.” The notes from this meeting were detailed, organized, and powerful to make a good case as to why the detracking model needs to change as soon as possible (See Appendix D). The notes the teachers compiled had a list of the key bullet points each teacher was responsible for presenting at the department meeting they scheduled. The notes indicated that teachers were ready to justify their claims that they knew the detracked Algebra II classes was a true disservice to students. Some of the comments on the notes were: “Huge disparity/gaps in levels in classes, teacher stress, teacher strengths and preferences are not taken into account, teachers are constantly hitting brick wall everyday – not getting through to students as much as we would like, lack of family time/having a life outside of schoolwork.” Emy, who was another teacher in the committee shared her experience at the
They definitely heard us out and the teachers planned a lot beforehand – like each teacher prepared one part of the reasons why we needed the new level to have three levels instead of the two. I think because we were organized and everyone had a lot to say and were very passionate about it, the three administrators did really seem to hear us out at the time, and they were taking notes and they got back to us and just said that they would consider and think about it.

Eventually, with enough conversations and meetings with administrators, the Algebra II committee was ready to present at a district board meeting that included them on the board meeting agenda. Participants reported that several of the Algebra II teachers came together and gave a formal presentation with the same extensive notes they had during their department meetings. Christine shared the outcome of this board meeting:

They eventually heard us, and I guess we made enough noise so how could they ignore us? They listened and they finally reinstated the extra level and they said it sounded like a no-brainer which baffled me because we have been telling them this for at least a few years now, we know it was a no-brainer!

Not only did the new level called Algebra II Accelerated get developed, but Joanna shared that “everybody finally had a sigh of relief about it and everybody felt like they were finally valued as teachers” because their opinions were heard and that is what they felt always needed to happen from the very beginning.
Research Question 3

Three major themes emerged from the data to answer the third research question: *What were teacher’s comparative experiences when teaching in homogeneous and heterogeneous classes?*

**Theme 1: Variability in Course Characteristics.** Overall, when participants compared their experiences when teaching in homogeneous and heterogeneous classes, they reported that there was a vast difference between course rigor, curriculum, pacing, and assessment modifications.

**Rigor.** One of the key characteristics that was mentioned frequently in the interviews was the difference in course rigor between the homogeneous and heterogeneous classes. Before the detracking model, several of the Algebra II teachers felt that the Intermediate Algebra course was academically effective and had a fair difficulty level that the lower-level students were able to manage. Joanna, who once taught Intermediate Algebra when she was a general math teacher, said, “To me, the Intermediate Algebra class worked, the class was able to really slow down the pace of instruction so students in this track were successful.” However, when the detracked model came into existence, the rigor of the Algebra II Academic course had to be lowered to meet the needs of all students now that the lower-level students were in the same classroom as the higher-level students. Seven out of the eight Algebra II teachers I interviewed used the phrase “rise to the challenge/occasion.” The Algebra II teachers reported that this exact phrase was used by administration to justify their reasoning as to why they thought the detracked model would be effective. Joanna makes a humorous comment when she explained her thoughts on students rising to the challenge:
During the first two weeks of school – that was when I realized that none of the lower-level kids would rise to the challenge. Yup, they didn’t rise. We were like a flat bread, like a pita but I wanted us to be a nice round roll!

In actuality, the Algebra II teachers felt that the opposite happened. Christine talked about the perceived disadvantage that participants reported negatively affected the higher-level students during the detracked model:

Lower-level kids did not rise to the difficulty of the course and it ended up pulling the higher-level kids down so the opposite happened. In our instruction, we couldn’t leave more than 50% of the kids behind so we had to you know, change our expectations – slow down and lower the rigor which was terrible.

Teachers reported that even with a weakened rigor, the lower-level kids were still struggling and as Robert stated, “The higher-level kids who could have handled a lot more difficulty did not have the opportunity to be given that chance.” In addition, words like “dumbing down” were also used by several of the Algebra II teachers who were very passionate about the fact that the course that was once up to par with an appropriate difficulty no longer existed. Taylor apologized for using informal words to describe the rigor but admits that she had “no other way of describing it, but you really had to lower your expectations in order for students to be successful.” Comparably, Megan felt the stress of trying to meet the needs of all the learners in one classroom. She complained, “I couldn’t teach slow enough to reach the lowest student, but I also couldn’t go fast enough to reach the highest student.” Additionally, the Algebra II teachers reported that there were many times when students who had difficulty in the honors track would choose to move down to Algebra II Academic if they felt they were struggling with the harder
type of problems. Daniella, who taught the Algebra II honors track explained how she felt badly for the higher-level students:

You know, when it was just Algebra II Honors and Algebra II Academic (detracked class) - it was such a disservice for some students. If a kid who was a semi-honors kid went down into the regular Algebra II level, he or she would be discouraged because it’s too easy and honors was too difficult. There was such a discrepancy between the high and the low level, there was no middle ground. It was really not good for the kids.

Similarly, Megan also viewed that students who dropped down into the Academic level from the Honors level were “frustrated and regretted dropping down” into such an easy and boring course.

However now, according to the Algebra II teachers who are teaching the new course during tracking, which is the added course of Algebra II Accelerated that is in between Algebra II Honors and Algebra II Academic, believe it is an appropriate level for the tracked students with respect to rigor. Megan, who teaches the Algebra II Accelerated course shared that the course rigor had strengthened and reverted back to the true Algebra II level it should have been from the beginning. Daniella, who has a lot of experience with students who want to drop the honors course due to difficulty, reported being happy to know that students could take Algebra II Accelerated because it was the middle level that finally existed:

Now that there’s a middle ground, I feel like students are more comfortable to go down a level – it’s a more homogeneous level of students in the classroom. I think tracking this year (2019-2020) has definitely helped the students who couldn’t handle the difficulty in the honors class because now they have a class better suited for them.

Robert was overjoyed with excitement when he spoke about the Algebra II Accelerated course (during tracking) during the interview. He shared that he was especially happy to tell
students in the honors track that “Hey! We have this new class that’s a better level for you and I feel that you will be successful and still be challenged while learning at the same time.” He felt satisfied to advise students to take Algebra II Accelerated which would ultimately be a better fit for certain students struggling in honors. When the committee of teachers spoke about this course, Christine mentioned that she wanted a course where the rigor can really be tailored to the level which was much more unanimous in uniform. Specifically, she felt that the “kids who need to be challenged more are being challenged and the students who need a slower rhythm have the opportunity to move slower in the respective tracks.”

Focusing on rigor specifically, all eight of the Algebra II teachers reported that the new Algebra II Accelerated was a track that would meet the needs of the middle half of the students who were more mathematically advanced than the regular Algebra II Academic but not suited for Algebra II honors.

**Curriculum and Pacing.** Another characteristic reported from the experiences of the Algebra II teachers when comparing homogeneous and heterogeneous classes was the difference in curriculum and pacing. Before the development of Algebra II Accelerated, the two tracks of Algebra II Academic and Algebra II Honors met the New Jersey Common Core Standards and covered all the topics required for students on the PARCC exam. When I asked the Algebra II teachers about pacing, Christine was not afraid to admit that one of the major problems with the Algebra II course was that although the full curriculum was taught, the pacing was too fast for the lower-level students. Since the lower-level students were not able to keep up with the pace, she explained that the topics from the required curriculum were not being learned well by all the students in the heterogeneous classroom. Lisa remembers teaching topics in a way that was “less conceptual” because if she did not do this, her lower-level students would end up extremely
confused. According to her and a few other Algebra II teachers, the lower-level students gravitated towards just memorizing steps procedurally rather than conceptually understanding the reasoning behind the math.

When asked about curriculum and pacing, Megan, who has had experience teaching both Algebra II Academic and Algebra II Accelerated shared that there was a considerable difference with the curriculum and pacing between the two courses. She said, “It felt like these two courses, like completely different classes even though the content was so similar!” She explained that the curriculum and pacing change significantly improved to benefit all students in the classroom. Many of the Algebra II teachers reported that they expected the curriculum to change when the Algebra II Accelerated course was first developed. Robert and Lisa both mentioned that there were “voluntary summer workshops” that were put in place to help the Algebra II teachers design the curriculum to fit the new course. Christine, who is an active member of the mathematics department at MBHS, was part of the voluntary summer workshop where teachers wrote the new curriculum:

I was in the summer workshop and I know that the curriculum for Algebra II Accelerated – the pacing changed to a faster pace and we added topics that were not in the regular Algebra II Academic curriculum. But the curriculum did not change for the lower level.

Robert explained that the new curriculum was starting with the basic Algebra II Academic curriculum but “modifying it so that it was somewhere in between the accelerated and the honors levels.” Megan, a teacher who taught the new Algebra II Accelerated course, explained how certain topics that had not been covered in Algebra II were now being covered because the students could be challenged a little bit more. She was particularly excited while teaching this course because she liked having the opportunity to go over “challenging problems like real world
application word problems.” After teaching so many years of the regular Algebra II Academic course, she shared more on why she was excited to teach the new course:

In Algebra II Accelerated, the students seemed to be catching on to things much quicker. I could see the heads nod in class where they were following along, and it was such a pleasure! I kind of considered my accelerated class as an Algebra II Honors “light.”

Many of the Algebra II teachers shared that the pacing was very different during the tracked year versus the detracked year. Six of the eight participants shared that they kept record of pacing for the three levels once the new course was developed just by conversing with the teachers who taught the new tracked Algebra II class. According to Christine specifically, she shared that it was “common knowledge” to the Algebra II teachers that the honors course was typically always a chapter ahead of the accelerated course and the accelerated course was always a chapter ahead of the regular academic course. Although the full curriculum was taught in all three tracks, Emy explained that the Algebra II Academic course had the slowest pace and did not really dive deep into difficult problems and “kept topics at a more basic level which is why the lower-level students ended up being more successful.”

Surprisingly, out of all the participants, Robert was the only Algebra II teacher to discuss the parents and how they felt now that the curriculum and pacing was different. He reported having conversations with parents during parent-teacher conferences where parents reported being more appreciative that their child was finally in a math class in which they would be more successful. Additionally, many parents admitted that they were upset that these courses were not available or developed sooner for their children.

**Assessment Modifications.** The Algebra II teachers reported feeling that the assessments and certain modifications were drastically different when comparing their experience of teaching
homogeneous and heterogeneous classes. Before the new tracked Algebra II Accelerated course was developed, teachers reported that the assessments given in the two tracks of Algebra II were extremely dissimilar.

Many of the Algebra II teachers who taught the detracked Algebra II Academic course had a difficult experience trying to determine how many questions to put on an assessment as well as the level of the questions. Emy shared her struggle with designing appropriate assessments:

Timing for students was a struggle. If we had a test or quiz, it was very difficult to know which questions to put or what question level to choose (easy, medium, hard) because you would have some of these students who would finish in ten minutes and you would have other students who would not finish and needed extra time after school.

To accommodate the lower-level students during the detracked year, several of the Algebra II teachers shared their assessment modifications which helped some of the students be successful. Emy shared that her modifications were “anything from giving a hint or using smaller numbers.” She explained that the reason she felt comfortable doing this was to help the lower-level students boost their self-esteem since some of them were truly working very hard and she wanted them to see positive results. Joanna mentioned “little successes” which is what drove her to modify certain assessments for her lower-level students:

I tried to make things small and short but very specific with content. It was really important for the students to at least attempt the problems – to be able to go through it. When the lower-level students felt those little successes, it helped motivate them, so it was very reasonable to modify. I did make sure to keep it at a level where they
understood while still giving the content and delivering good math curriculum, but it was something the kids could attain.

Taylor shared how she was honest with her students because she wanted them to know that modifying assessments was not a norm that students should expect but more of a kind gesture that she was doing to help them:

I did tell them I was modifying because I wanted them to know that this is not normal, but I did it to help them learn. I honestly only modified for the two lowest performing kids who were like failing. They were very low so I would keep the concept, but I would make it a little bit of an easier question. Also, I would separate the pages out so that they would do one page at a time and not be overwhelmed. Yeah, it was brutal.

Christine shared that her biggest modification was allowing her lower-level students to have extra time to finish an assessment. She shared her specific modifications:

By myself, I definitely modified assessments. I did have a couple of kids who I felt just did not belong in my class so I would modify for them by taking off a couple of questions. The biggest modification was extra time if a kid truly needed it and was really trying, I would give them it to those and almost everybody really because I didn’t think it was fair if I didn’t give it to everyone in the class.

Similarly, Robert shared that he would modify his assessments by giving a more medium level of a problem as opposed to a hard level problem. He explained that he gave modified assessments mainly because he thought it would “benefit them more in the long run” and admitted that “those are kids that traditionally would have been in a lower-level Algebra II class.”

With the tracked Algebra II Accelerated course, the modifications teachers had to make on assessments lessened tremendously. Megan, who taught the Algebra II Accelerated course
shared that since her level was the appropriate level for Algebra II, the math supervisor advised her that there should be absolutely no modifications. She explained what she did:

I was told that unless the student had an IEP or 504 Plan that said they received modified assessments, I did not modify assessments. I honestly did not need to modify assessments during the new tracked year since all the students were properly placed in the course.

With the new tracked Algebra II courses, Emy shared that there were hardly any modifying even in the regular Algebra II Academic course since the “classes were already geared toward a lower-level group of students.” She felt that it was unnecessary to give an extremely modified assessment, She also felt that things were more level in terms of timing and the types of questions given on the assessments. With student performance, Lisa was one of the few teachers who gave a rough breakdown of students’ grades with the new tracked model of the Algebra II class:

What was great was that with the new Algebra II Accelerated course, my regular Algebra II Academic class had more of the majority getting B’s and maybe C’s, with not many students failing. I think this helped with pacing kids.

**Theme 2: Comfort of Students.** Several of the Algebra II teachers shared that once the new Algebra II Accelerated course was added (tracked), they noticed a shift in students’ comfort level in the classroom. Before the additional course, when students were in detracked classes, many Algebra II teachers reported that the lower-level students were shy, nervous, and embarrassed to ask questions in their detracked Algebra II course. Lisa shared her experience:

When we were untracked, the kids were almost like a deer in the headlights… especially your lower-level kids.. they just wouldn't say “boo.” I kind of felt like they were quiet because they didn't want to draw attention to themselves.
Also, Lisa shared that she knew some of her students felt like “wow, I’m the dumb kid in the class” based on how they did not want to participate or interact with higher-level students. Taylor shared that in her regular Algebra II Academic class, she “couldn’t get the lower-level students to speak” in the classroom because they knew they were in the “low class” and they did not feel comfortable asking questions or saying something incorrectly in front of the “smarter kids.” Taylor explicitly shared how she felt on a day-to-day basis in her detracked Algebra II Academic class:

I felt like I was losing my high kids because they were so bored and they were done with the lesson in five minutes and then I was constantly re-teaching the low kids and they were feeling like they couldn’t get their head above water and so many times at the end of the period, I would think to myself “what just happened in the last 40 minutes?!” It was terrible.

However, the Algebra II teachers made more positive remarks about tracking with respect to the comfort of students. Taylor shared some personal notes that she received from her lower-level students who were in her regular Algebra II Academic class during the tracked year. Students wrote comments like, “I finally feel like I can do well in math” and “thank you for helping me, I couldn’t have passed without your help.” Daniella felt that the students were more manageable which was a benefit for the students as well as the teachers. She shared that in the specific tracks:

Teachers were more able to provide help to the majority of students, so students were less neglected like they were in the past. I feel like now kids understand better and are being challenged and supported more so they are overall more comfortable.

Emy shared that she felt that all around, the students were more comfortable in the classroom, “not just with their math abilities but just emotionally and mentally.” Similarly, like Daniella,
Emy agreed that teachers had a better experience with the tracks because they were able to focus on teaching the concepts and less on having to differentiate.

Another aspect in the three tracks that positively impacted student’s comfort was cooperative learning groups. Groupwork was mentioned often by five of the Algebra II teachers. Christine shared her viewpoint:

Groupwork was much more effective this past year because of the different tracks – the kids were able to discuss and some kids I think who maybe didn’t speak much last year were more comfortable. It was much better than before because all the kids were around the same level in the classroom.

Joanna also shared her experience with groupwork when classes were tracked:

The lower-level students were able to mix in with some of the other kids, even the ones with attitude and personalities. They got along in a way that was comfortable for all of them whereas I think last year (detracked year), they were at different math levels and the personalities and the motivations were so different. Last year, it felt like certain students felt uncomfortable in the classroom because they weren’t good at math.

Taylor had a certain way of organizing her students in groups during tracking. She shared that she tried to pair students with others who they were good acquaintance with within the classroom to ensure an interaction that was “smooth” rather than “awkward.” Several of the Algebra II teachers said that discussing math problems and working through solutions is something that lower-level students did not have much experience with during the detracked year. However, in the three tracks, students were in the right placement where, as Lisa said, “they let their guard down” and were overall more relaxed. Robert, specifically, said that “students are just in love with the fact that they were as smart as everyone else in the class,” which is why they were more
willing to pay attention and put in the effort to be successful. With the three tracks, Robert shared an observation that he noticed about student comfort:

In the regular Algebra II Academic class, when there were only two levels (detracked), the lower-level student might have been the weakest kid in the class and now in the three tracks, they’re one of the stronger ones since they are all currently at the same ability levels. They were more motivated and comfortable.

**Theme 3: Positive Teacher Outcomes.** Changes in teacher outcomes, specifically the Algebra teachers' teaching self-efficacy and instructional practices were two elements that changed from the experience’s teachers reported while teaching heterogeneous to homogeneous classes.

**Teachers’ Teaching Self-Efficacy.** The Algebra II teacher’s responses about their experience during the interview indicated that their teaching self-efficacy was low when teaching detracked classes. A majority of the Algebra II teachers shared that they felt the stress and difficulty of teaching a class with a wide range of student abilities when classes were detracked. They shared that it discouraged them and made them question their effectiveness in the classroom. Christine, Taylor, Emy, and Joanna all gave responses where they shared that they felt that their abilities to handle tasks, obligations and challenges were negatively affected based on their experiences in their detracked classrooms. Even before stepping foot in the classroom during the year the classes were detracked, Megan shared her concerns:

With the heterogeneous grouping, I was very stressed because I already heard that the ability of the students was very low. I already had that negative mindset going into it.
Christine shared her views and simply put, called it a “nightmare” that she could not wake up from. She questioned how anyone could ever feel effective with different levels who need all different things in one classroom:

I often felt like I was not doing a good job because I did not feel like I was serving any of those populations well. I felt like I served the lower end much better than the others, but my goal is to reach everybody.

Joanna felt exactly the way Christine did and shared that she had a lack of confidence in her teaching ability:

I just felt like I was always doing someone a disservice like there was no way to get to everybody – there was no way to make those struggling kids feel like they had any shot because the stronger kids would have these conversations and make these awesome connections which you obviously grasp onto and you go with it because these are the conversations that come up and you want to hear but then this other one-third of the students were like “what are you even talking about? I still don’t know how to add, how did they get ten steps ahead and apply it to new concepts?”

Robert tried to give his students the “rah-rah” which he explained were motivational pep talks to his struggling lower-level students. However, even with these pep talks, deep down he admitted that he still felt extremely ineffective as a teacher.

With the addition of the Algebra II Accelerated course, which was tracked, the Algebra II teachers reported that their teaching self-efficacy improved. Several of the Algebra II teachers shared that they felt more effective during the past year in their tracked classes than previous years in their detracked classes. Many of the Algebra II teachers believed it was due to the
placement of students in each respective track of Algebra II. Emy shared how effective she felt after the new tracking model:

I was able to take a little more ownership of my class and have a little more of a voice with the curriculum so that impacted how effective I was. I felt the majority of the kids were at the same level and so I knew I wasn’t trying to consider all these three different or four different type of learners but more that they were all one and so that made planning easier. Once I knew that they’d be successful or confident at one concept, I was able to build off of that and then I felt like the class as a whole was able to move forward together and I wasn’t losing as many students as I did the year before.

Taylor also shared her experience on how effective she felt with the new tracking model:

I feel like having the three levels are important. I know the biggest worry was that having the low level – all the kids would not rise to the occasion, but I mean I do think that we’re trying our best to make it as effective as possible and I saw better results, so to me, it felt right, and I finally felt like I was a good teacher again.

Megan shared that after so long, she was finally able to have fun in her Algebra II Accelerated class, which made her feel like an effective and influential teacher. She told me that she was able to get to know her students at a personal level, something she was unable to do with her lower-level students in her previous detracked classrooms. Her students in the Algebra II Accelerated class had the “right amount of motivation and fun personalities” that she enjoyed in the classroom. She didn’t feel like she was “wasting class time” when she asked how everyone’s weekend was or if she let some of her students share how they celebrated their birthday over the weekend. She had time to teach and form relationships with her students which she shared was the most rewarding experience of this new Algebra II Accelerated course.
Instructional Practices. The Algebra II teachers felt that their instructional practices were different when comparing their experience of teaching detracked versus tracked classes. Although the Algebra II teachers shared that they spent the same amount of time planning for the courses every year, the first year the courses were detracked was heavily concentrated on trying to deliver instruction in a way that the lower-level students would understand. Joanna explained the Algebra II teachers’ experience during this time:

We were like jumping through hoop after hoop trying to just do whatever the students needed. It just took more effort when all the kids were lumped together in that same Algebra II Academic class to get where we needed to be, so it was more tedious to get them all there.

Christine shared that she felt forced to change her instructional practice and teach her lesson with direct instruction as opposed to class activities during the detracked year. She shared that “even if we wanted to do a class activity, it was hard because of the disparate levels in the same classroom.” Megan shared what the district wanted the teachers to do:

They wanted us to use three different worksheets for three different groups of students in the detracked classroom. To me, that was just a whole lot of work – especially when you’re creating your own materials and you want to make sure you have good things that cover the curriculum.

Lisa and Taylor spoke about flexibility. With such a wide range of students in one classroom, they both shared that they became more flexible with deadlines for assignments and the amount of work they gave, specifically for the lower-level students. Taylor shared her change in class expectations:
I think I became a lot more flexible knowing my population. If a kid needed to hand in something late and they were normally not a motivated kid, if they’re willing to come forward and say “I can do this, I can do that” - I was much more flexible with it. I did let some kids retake exit cards and stuff like that because again, if there was motivation and they were like “I think I get it” – I gave them a new one and they did it again, so I definitely became more flexible.

Emy shared that she did more with scaffolding which she defined as breaking lessons into chunks in her detracked classes:

I think I did a lot with that when I taught lessons and introduced topics. I always like to either bring up previous concepts or start with something – basically like starting off with something the kids already know and then building off of that.

According to the Algebra II teachers, many of these instructional practices that they had to adapt to during the detracked year are currently still being used in their classes, particularly in the regular Algebra II Academic track.

**Quantitative Data Findings**

**Research Question 4**

*Did class organization (i.e., tracked, detracked) and/or geometry ability (i.e., above average, average, below average) predict student performance in Algebra II?*

**Student Performance Data**

Results of the linear regression indicated that class organization and geometry ability were statistically significant predictors \( F(5, 228) = 28.1416, p < .0001 \), \( R^2 = 0.38 \), of final Algebra II grades. The linear regression was conducted using the equation in Figure 5 (See below). Results of post-hoc t-tests that examined the individual predictors indicated that final
scores were statistically significantly higher for the tracked than detracked groups \((t = -2.62, p = .0095; \text{See Table 5})\). During the 2018-2019 school year when the Algebra II classes were
detracked, the students’ mean final grade was a 76.03 with a standard deviation of 13.88 (See Table 3). However, during the 2019-2020 school year when the Algebra II classes were tracked
with the addition of the new Algebra II Accelerated course, the students’ mean final grade was
81.01 with a standard deviation of 11.95.

Additionally, final scores were statistically significantly higher for the above average \((t = 7.38, p < .0001)\) and below average groups when compared to detracked groups \((t = -7.95, p < .0001)\). During the 2018-2019 school year when the Algebra II classes were tracked, the means
for the above average group (85.56, 11.20) were higher than in the detracked year (83.67, 8.19; See Table 4). During the 2018-2019 school year when the Algebra II classes were tracked, the
means for the below average group (73.15, 10.65) were higher than in the detracked year (63.81, 12.19).

<table>
<thead>
<tr>
<th>Class organization</th>
<th>(N)</th>
<th>(M)</th>
<th>(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detracked</td>
<td>137</td>
<td>76.0292</td>
<td>13.8824</td>
</tr>
<tr>
<td>Tracked</td>
<td>97</td>
<td>81.0103</td>
<td>11.9474</td>
</tr>
<tr>
<td>Geometry Ability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above Average</td>
<td>127</td>
<td>84.4724</td>
<td>9.5866</td>
</tr>
<tr>
<td>Average</td>
<td>30</td>
<td>78.6000</td>
<td>11.9528</td>
</tr>
<tr>
<td>Below Average</td>
<td>77</td>
<td>67.3766</td>
<td>12.3438</td>
</tr>
</tbody>
</table>

*Note: MD = mean, SD = standard deviation, total \(N = 234\)*
### Table 4. Interaction mean and standard deviations of Algebra II final grades

<table>
<thead>
<tr>
<th>Measure</th>
<th>2018-2019 Detracked</th>
<th>2019-2020 Tracked</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Above Average</td>
<td>83.6712</td>
<td>8.1871</td>
</tr>
<tr>
<td>Average</td>
<td>77.8125</td>
<td>13.9486</td>
</tr>
<tr>
<td>Below Average</td>
<td>63.8125</td>
<td>12.1929</td>
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</table>

*Note: MD = mean, SD = standard deviation, total N = 234*

### Table 5. Expanded Estimates and Test of Significance of the Model Parameters

<table>
<thead>
<tr>
<th>Effect</th>
<th>Estimate</th>
<th>SE</th>
<th>95% CI</th>
<th>$t$</th>
<th>$p$</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$LL$</td>
<td>$UL$</td>
<td></td>
</tr>
<tr>
<td>GC [Above Average]</td>
<td>7.3421</td>
<td>0.9952</td>
<td>5.3813</td>
<td>9.3030</td>
<td>7.38</td>
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<tr>
<td>GC [Average]</td>
<td>1.3850</td>
<td>1.3930</td>
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<td>4.1296</td>
<td>0.99</td>
</tr>
<tr>
<td>GC [Below Average]</td>
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<td>1.0982</td>
<td>-10.8910</td>
<td>-6.5632</td>
<td>-7.95</td>
</tr>
<tr>
<td>CO [D]</td>
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<td>-3.8086</td>
<td>-0.5364</td>
<td>-2.62</td>
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<td>CO [T]</td>
<td>2.1725</td>
<td>0.8303</td>
<td>0.5364</td>
<td>3.8086</td>
<td>2.62</td>
</tr>
<tr>
<td>CO[D]*GC[Above Average]</td>
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<td>-0.7305</td>
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<td>1.24</td>
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<tr>
<td>CO[D]*GC[Average]</td>
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<td>1.3930</td>
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<td>4.0734</td>
<td>0.95</td>
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<tr>
<td>CO[T]*GC[Above Average]</td>
<td>-1.2304</td>
<td>0.9952</td>
<td>-3.1912</td>
<td>0.7305</td>
<td>-1.24</td>
</tr>
<tr>
<td>CO[T]*GC[Average]</td>
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<td>1.3920</td>
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<td>1.4159</td>
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<tr>
<td>CO[T]*GC[Below Average]</td>
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<td>1.0982</td>
<td>0.3952</td>
<td>4.7231</td>
<td>2.33</td>
</tr>
</tbody>
</table>

*Note: SE = Standard error, CI = confidence interval, LL = lower limit, UL = upper limit, GC = geometry ability classification, CO = class organization, D = detracked, T = tracked, N = 234*
Figure 5. Prediction Expression

\[
\begin{align*}
77.271275084 \\
+ \text{Match}(\text{CO (Class Organization)}) \\
\quad \left\{ \begin{array}{l}
D \Rightarrow -2.172530791 \\
T \Rightarrow 2.1725307913 \\
\text{else} \Rightarrow .
\end{array} \right.
\end{align*}
\]

\[
+ \text{Match}(\text{GC (Geo Ability Classification)}) \\
\quad \left\{ \begin{array}{l}
\text{ABOVE AVERAGE} \Rightarrow 7.3421191326 \\
\text{AVERAGE} \Rightarrow 1.3849749165 \\
\text{BELOW AVERAGE} \Rightarrow -8.727094049 \\
\text{else} \Rightarrow .
\end{array} \right.
\]

\[
+ \text{Match}(\text{GC (Geo Ability Classification)}) \\
\quad \left\{ \begin{array}{l}
\text{ABOVE AVERAGE} \Rightarrow \text{Match}(\text{CO (Class Organization)}) \\
\quad \left\{ \begin{array}{l}
D \Rightarrow 1.2303694519 \\
T \Rightarrow -1.230369452 \\
\text{else} \Rightarrow .
\end{array} \right.
\end{array} \right.
\]

\[
+ \text{Match}(\text{GC (Geo Ability Classification)}) \\
\quad \left\{ \begin{array}{l}
\text{AVERAGE} \Rightarrow \text{Match}(\text{CO (Class Organization)}) \\
\quad \left\{ \begin{array}{l}
D \Rightarrow 1.3287807913 \\
T \Rightarrow -1.328780791 \\
\text{else} \Rightarrow .
\end{array} \right.
\end{array} \right.
\]

\[
+ \text{Match}(\text{GC (Geo Ability Classification)}) \\
\quad \left\{ \begin{array}{l}
\text{BELOW AVERAGE} \Rightarrow \text{Match}(\text{CO (Class Organization)}) \\
\quad \left\{ \begin{array}{l}
D \Rightarrow -2.559150243 \\
T \Rightarrow 2.5591502432 \\
\text{else} \Rightarrow .
\end{array} \right.
\end{array} \right.
\]

Note: CO = class organization, D = detracked, T = tracked, GC = geometry ability classification
CHAPTER V

Discussion

The current study was conducted to explore the experiences of Algebra II teachers during tracking and detracking of an Algebra II course across two academic years. Algebra II teachers reported their comparative experiences when teaching heterogeneous and homogeneous classes and supports needed to teach students in a heterogeneous classroom. Furthermore, I evaluated the difference in final Algebra II student grades between below average, average, and above groups of students in heterogeneous and homogeneous classrooms.

Qualitative data from interviews and artifacts, such as teachers’ notes from Board of Education meetings were analyzed to answer the first three research questions. Quantitative data (i.e., student final grades in detracked and tracked Algebra II classes) were analyzed to answer the fourth research question. A linear regression was conducted to determine if class organization and geometry ability classification predicted student grades. This chapter is a discussion of the findings within the context of prior research and the theoretical framework (i.e., Teacher Self-Efficacy) that guided this study. Implications for policy, practice, and future research are discussed, followed by this study’s limitations.

Summary of Findings

Overall findings indicated that Algebra II teachers were unhappy when the decision was made to detrack Algebra II classes by administration without consideration of teacher expertise or teacher provided input. Additionally, the Algebra II teachers were upset that they did not receive support or guidance from administration and failed to receive effective professional development related to their subject area which hindered their ability to efficiently deliver instruction in heterogeneous classrooms. However, with teacher collaboration, a dedicated time
slot of teacher planning together and shared instructional practices, the Algebra II teachers were more equipped to teach mixed ability learners in the classroom to the best of their ability. Nonetheless, they were not comfortable throughout the process and continually felt overwhelmed.

The vast differences in course characteristics between the detracked and tracked Algebra II course affected the teachers’ teaching self-efficacy. They were much more comfortable and felt capable in the tracked Algebra II class setting. Contrary to previous research on tracking, the findings here have clearly made it evident that tracking was the ideal way to structure Algebra II courses at MBHS as it provided teachers ease and the perception of ability to teach more effectively to students with similar ability levels. Supporting teachers’ perceptions of being more effective during tracking, students in the below average and above average groups earned higher grades when they were taught in tracked classrooms. However, the difference was not statistically significant for students in the average group. In the following section, I discuss the findings of each research question in relation to prior research and Self-Efficacy Theory.

**Teachers’ Reactions to Unexpected and Dissatisfied Changes**

The first theme that emerged from the data was “Unsatisfactory Changes” which encompassed teacher’s feelings when they first received the news that Algebra II was changing from being a tracked course to a detracked course. The Algebra II teachers felt that they were completely blindsided when they were informed that the administration made the decision to change Algebra II to a detracked class, filled with students of mixed ability. The bottom line was that teachers felt that there was a lack of respect for teacher expertise and input, which is a subtheme under “Unsatisfactory Changes.” Teachers felt that if administration were to make such an impactful decision, their voices and input should have been considered. This is similar to
the opinion of experts in which Lin (2014) contends that since teachers have authentic knowledge of their students, they should be given the opportunity to be active participants in decision-making for school-based change. Additionally, Gozali et al. (2017) found that teachers reported to have a variety of perspectives on policy and practice which can be used when restructuring initiatives, far better than policymakers.

Many Algebra II teachers questioned, “why change something (removing the Intermediate Algebra course and detracking students) when it’s already working so well for all the students?” At MBHS, from my own experience, planning lessons and creating material to ensure a teacher is delivering effective instruction takes time and requires hard work. When the detracked Algebra II course began, teachers felt that they did not have enough hours in a day to create new lessons, assessments and most importantly, differentiated material which was a requirement to fulfill in a heterogeneous classroom. The way these Algebra II teachers felt is exactly how a teacher in Mason and Burns (1995) study felt. She stressed that it took a “horrendous amount of preparation time” when it came to planning for a heterogeneous classroom (p. 41).

The administration believed that detracking Algebra II would encourage the lower ability students to “rise to the challenge” from being surrounded by higher ability students, resulting in overall higher achievement scores. The administration’s beliefs are similar to what Boaler (2006) found in relation to detracked classrooms. In his study, Boaler (2006)’s results indicated that in some schools, mixed-ability approaches resulted in higher overall achievement. However, as the quantitative data findings have shown, this was not the case at MBHS. The reasoning behind the difference at MBHS might be attributed to the teacher’s low expectation of students, specifically the lower ability students. As a result, the teacher’s expectations could have affected the lower
ability students and made them uncomfortable which hindered their ability to perform well and overall, made their experience in the heterogeneous classroom unpleasant.

The Algebra II teachers who participated in this study emphasized that the directive they received was top-down, where administration simply “told” them about the change. From the responses in the interview, I found that this change added an immense amount of stress on teachers and a feeling of uncertainty as the Algebra II teachers prepared for the detracked Algebra II classes filled with mixed ability students. Participants claimed that administration was using research to support their argument for the change. However, many teachers expressed that the research they spoke of was idealistic that theoretically sounded wonderful but in actuality, was not practical. Unfortunately, the directive was already put in place and there was not much the teachers could do about it at the time it was implemented. The “top-down” administrative approach that was found in this study connects identically with prior research in which DuFour (2007) has found that leaders make a mistake when they say, “I have looked at the data and research, and I know what needs to be done” without teacher engagement and teacher knowledge (p. 38). As seen in the study and in prior research, DuFour (2007) found that without teacher “buyin,” any type of new initiative will only generate resentful compliance from teachers (p. 38). Overall, the negativity that emerged towards the detracked model was the beginning of the upward battle the Algebra II teachers faced for the next few years trying to use best practices to reach the needs of all students in their classroom.

From the theoretical framework lens of teachers’ teaching self-efficacy, prior research has found that with an increased opportunity for teachers to participate in decision-making, teacher self-efficacy has positively strengthened (Ingersoll et al., 2018; Lin, 2014; Liu, Bellibas, & Gumus, 2021; Siuty, Leko, & Knackstedt, 2018). In addition, Liu et al. (2021) found that
when teachers are given the chance to collaborate on shared decision-making efforts, there is also a direct positive effect on teacher self-efficacy. Interestingly, Lin (2014) shared in his study that to increase a teacher’s self-efficacy regarding decision making, it is essential for teachers to have confidence in performing the “new roles” that they might have in their educational setting (p. 55). Although in this study, the Algebra II teachers may not have had new roles per say, they still took on a new challenge of teaching mixed ability students, something that was once foreign to them.

**Algebra II Teachers Yearned for Assistance**

The Algebra II teachers’ interview responses in relation to administrative support generated one theme, “Support and Guidance from Administration.” Within this theme was teacher agreement that there was a lack of administrative support to help teachers effectively deliver instruction in their heterogeneous math classrooms. The need for support was something each Algebra II teacher craved during this detracking time but failed to receive. In previous research, the importance of support is stressed. El-Haj and Rubin (2009) stated that most teachers need support to reach the needs of all students and struggle to actually implement these types of changes in the classroom without support. Historically, Lotan et al. (2000) emphasized the importance of follow-up and extensive support for teachers especially when the detracking implementation is new. This was supported by the teachers in this study. From the responses I received in the interview, teachers shared that even simple administrative check-ins, such as dropping by the classroom to see how their classes were running, would have been enough to satisfy them. They shared that they just wanted to feel like they had someone in the building who they could count on when support was needed.
Second, the Algebra II teachers in the current study often spoke about the professional development they received which did not relate to their subject area of mathematics. Previous research stated that professional development on differentiation where teachers are given opportunities to practice and learn expectations of how to successfully teach a heterogeneous classroom has proven to be effective (Avramidis & Norwich, 2002; Dixon et al., 2014; Stanovich & Jordan, 1998; Van Reusen et al., 2001). However, teachers in this study did not receive that type of professional development. Instead, they received professional development on unrelated and elementary school-based topics when they needed professional development on differentiated instruction in order to teach students with such mixed abilities in one classroom. With the detracking model, there was an added pressure on Algebra II teachers to meet the needs of all students while ensuring that all students across ability groups learn the full Algebra II curriculum to ensure higher PARCC exam scores. As Van et al. (2001) stated, teachers are under a tremendous amount of stress and pressure especially from the state to be able to successfully deliver instruction in heterogeneous classrooms. Hence, it makes sense that the Algebra II teachers were frustrated and felt defeated under the pressure and stress of the detracked course. At MBHS, it is sad and disheartening to share that according to the Algebra II teachers, administration was more focused on giving professional development on technology and new textbooks as opposed to best practices on effective teaching pedagogies focused on differentiation. Overall, from the responses I received from the Algebra II teachers, it seems as though the lack of knowledge on how to teach heterogeneous classroom is a big reason why the teachers were looking for support and guidance from administration as they were the individuals who put them in this situation in the first place. It is a shame they did not get that support.
Algebra II Teachers Lean on Each Other for Support

From the Algebra II teachers’ feelings of frustration and unpreparedness to teach heterogeneous classrooms from the administration’s directive of detracking, a theme called “Teacher Collaboration” emerged. It was one of the few positive effects that flourished from the detracking model. In the interviews, from the way the Algebra II teachers spoke about each other and how they helped each other through collaboration made it evident that having this teacher-to-teacher relationship is another support that teachers needed to effectively teach heterogeneous classrooms. As difficult as it may have been, the Algebra teachers had comfort in knowing that they were not alone in their difficult teaching situation.

Specifically, teacher collaboration on differentiation strategies was reported to be one of the best ways the Algebra II teachers got an idea of how to effectively differentiate. From the interview responses, it seemed that teachers were thankful to know that they had someone in the math department who could demonstrate some effective differentiation strategies that could be implemented in their own classrooms. Having the skill to differentiate is importance as prior research has found, “students have profited immensely from a teachers’ competence on differentiated instruction in terms of their achievement and motivation” (Hartwig & Schwabe, 2018, p. 103). In particular, the levels activity that one of the non-tenured teachers shared was to group students by ability in the heterogeneous class to help students move from easier problems to challenging problems. According to the Algebra II teacher who shared this activity, this activity allowed students to use different paths of understanding based on one’s own ability level as they progressed from one math problem to the next. This is similar to prior research in which Dixon et al. (2014) stated that differentiated instruction should be offering different methods to
reach a common goal of understanding in a heterogeneous classroom especially since learning should be welcomed in all kinds of different ways.

Similarly, the Algebra II teachers who participated in this study shared the positive impact of team planning during the year Algebra II was detracked. Normally, it is not common to meet daily for team planning because teachers also use this time for grading papers or other activities they do during their time off. However, during the time of the detracked model, the Algebra II teachers reported meeting every single day. From the interviews, team planning was reported as their absolute best support, almost as if it was something they needed to survive during such a challenging time. Speaking from experience, I know that with any new course, it takes a lot of time and effort to plan lessons, assessments, and instructional activities. Luckily for the Algebra II teachers, they felt that were able to lean on each other and used team planning as a time to talk through best practices in their heterogeneous classes. At the teacher level, previous research has found that with teacher collaboration, better teaching is achieved, teaching is more effective which as a result positively impacts student performance (Vangrieken et al., 2015).

Additionally, the way the Algebra II teachers spoke about their collaboration during shared team planning was cheerful to hear. Their collaboration efforts connect to prior research where Quintero (2017) found that collaboration adds great value to an educational setting which ultimately strengthens the professional environment and teacher effectiveness. In addition to creating new teaching material together, team planning was also a place where teachers vented to one another and commiserated about their frustrations in the heterogeneous classroom. As prior research indicated, employees spend 75% of their day communicating with their colleagues and with this interaction, valuable resources such as advice and support were exchanged through these relationships (Quintero, 2017).
From the interviews, the Algebra II teachers shared the overwhelming feeling they experienced with this detracked course and how it took over their work and personal life for the entire year. This is similar to prior research on creating new material for heterogeneous classes. In a study conducted by Mason and Burns (1995), it was found that 74% of teachers felt overwhelmed as they spent twice the time planning for a class with students of various abilities. Although this prior research is not new, the findings remain relevant today. Nonetheless, the Algebra II teachers persevered during the difficult detracking year.

**Algebra II Teachers Fight for Change**

With the stress of teaching students with mixed abilities, creating new material from scratch, and spending countless hours of preparation, there was still a positive outcome from this entire experience. From the immense amounts of teacher collaboration that took place, another theme that emerged was “Teacher Unity.” Within this theme, the Algebra II teachers joined together and saw themselves being responsible for taking a stance and trying to initiate a change to help improve the structure of the Algebra II courses. An Algebra committee was formed by the teachers to discuss the best way to improve the Algebra II course structure. This is not surprising given that from the beginning, teachers felt strongly that they did not have a voice in the detracking model and with all the hardships they endured during this model, they were fed up with not having any positive change. As Quintero (2017) found, faculty are interdependent members and are effective when they operate as a learning community. This connects directly with how the Algebra II teachers behaved as they depended on each other for support and worked as a team when they came together as a committee to advocate for positive improvements for Algebra II. There is no doubt that the teacher unity that emerged from this
committee was remarkable and something that was strong and uniform where everyone in the committee had the same end goal in mind.

If it were not for teacher unity that fostered this committee, the Algebra II teachers feared that they would still be in the same difficult positive of trying to effectively deliver instruction in a heterogeneous classroom. This connects directly to prior research where Datnow (2018) stressed the importance of a collaborative teacher community, as she found that this is a place where teachers have leaned on each other especially when faced with stress and frustration from school reforms.

From the theoretical framework lens of teachers’ teaching self-efficacy, interestingly, many researchers have found that teachers with a higher level of teaching self-efficacy are more likely to be open to new ideas of instructional practice (Banerjee et al., 2017; Goddard & Kim, 2018; Hoy & Spero, 1997; Shachar & Shmuellevitz, 1997). However, this is the opposite of what happened in my study. The Algebra II teachers felt defeated in the detracked model, which likely negatively impacted their self-efficacy. As such based on prior research findings, one would expect them to be unwilling to learn new information that would help them be successful in the setting. Nonetheless, the Algebra II teachers were still open to learning new differentiated strategies like the levels activity they shared in their interview. It seems as though the Algebra II teachers still persisted and pushed through their setbacks to better their practices to help their students learn. However, it is still important to realize that although the teachers persevered in their difficulties, they were still very uncomfortable with their new teaching setting of the mixed abilities in their classroom. They were trying their hardest to make the best out of the situation which is something I find an admirable quality that my colleagues exhibited during this time.
A Tracked Algebra II Class is More Successful for All Students

With the implementation of the detracked Algebra II course, which was once a tracked course, a theme called “Variability in Course Characteristics” emerged. When comparing the tracked and detracked Algebra courses, the specific differences the Algebra II teachers shared were focused on course rigor, curriculum, pacing and assessment modifications.

From the Algebra II interviews, the teachers shared that with the detracked Algebra II class, the rigor of the course that was once present was reduced to help meet the needs of all learners. As a result of the diminished rigor, they shared feelings that it ended up being a disservice to the higher ability students. According to the Algebra II teachers, the material that was presented to the higher-ability students was too watered down and basic, rather than being rich and challenging, which is what helps higher-ability students thrive in mathematics (Nomi, 2012). They felt that the higher ability students were not given the opportunity to be challenged to their full potential. This is dissimilar to prior research where Burris and Welner (2005) and Boaler (2006) found that in a heterogeneous class there was an increased achievement of all students. This is the complete opposite of what teachers reported occurred at MBHS.

In addition, it is important to share that in my interview, one Algebra II teacher in particular was very passionate about how she felt the mathematical education of the higher-level ability students was being weakened from the detracked class. Although in our interview, this individual claimed that she wanted all of her students of mixed abilities to succeed in her classroom, it did not seem truthful. The way this individual spoke of their higher-level ability students made it seem like she did not care for her lower-level students’ academic achievements. From this interview, not once did this teacher mention the importance of the lower-level students succeeding academically. Her focus was solely on the higher-level ability students and their
academic outcomes. From this particular teacher, I learned that she has only had experience with teaching higher-level math courses which might be the reason for her bias toward these types of students. However, there should be no reason to neglect the lower-level students as it is truly unfair to them. With the poor performance of the lower-level students in the detracked classroom, it seemed as though this disappointed her which might be the reason as to why she did not pay attention to these students. This type of stigma has been found in the literature. Jilk’s (2016) study has found that teachers are typically immersed in students’ outcomes which are mainly students’ shortcomings. Moreover, in prior research, Palacios, Dijkstra, Villalobos, Treviño Berger, Huisman, and Veenstra (2019) have found that in detracked classrooms, teachers are more likely to establish positive relationships with high-track students, alienating low-track students. It is disappointing to see that almost 30 years later, some teachers harbor the same feelings and favor higher-level ability students.

Similarly, with the detracked Algebra II course, the Algebra II teachers shared that the curriculum and pacing were much slower than the tracked course. Again, they felt that this also hindered the higher-level ability students’ education. The Algebra II teachers shared that before the detracked Algebra II class, the tracked Algebra II classes were a good fit for all students because students had a class that was more tailored for their ability as opposed to being placed in one classroom with a variety of different ability levels. Overall, the Algebra II teachers shared how they could see the vast differences with curriculum and pacing and how it was more effective when classes were tracked. Similarly, in previous research, Linchevski and Kutscher (1998) found that teachers have more positive outcomes in homogeneous (tracked) classes because students in the class are in the right level where they are able to easily adapt to class content, pace, and teaching methods. Furthermore, since mathematics is linear, structured, and
cumulative, teachers have an easier time working with groups of students in the same ability level which makes it a more comfortable education for everyone included (Linchevski & Kutscher, 1998).

With assessment modifications, teachers reported that they made fewer modifications for students in the tracked class than the detracked class. The reasoning behind this was due to the placement of the students. From the interviews, the Algebra II teachers shared that since students were in their appropriate track of Algebra II, (i.e., Algebra II Academic, Algebra II Accelerated, Algebra II Honors) they were performing well based on the rigor, curriculum, and pacing. This meant that the teachers did not need to make any additional modifications on an assessment for the students to perform well. Not only did this lessen the time spent to create material for students, but it also helped the students increase their scores significantly.

At last, All Students Are Placed Correctly!

The Algebra II teachers’ interview responses to the comparison of student reaction and behavior in the tracked versus the detracked Algebra II class generated a theme called, “Comfort of Students.” Within this theme was teacher’s collective agreement that students were more comfortable in the tracked classroom than the detracked classroom.

From the interviews, it was found that the Algebra II teachers noticed that in the detracked classroom, the lower-level students were extremely shy and did not want to speak much in fear of looking stupid. This is dissimilar to the prior research where researchers found that in heterogeneous (detracked) classrooms, teachers spent a lot of their time managing disruptive behavior (Hallam & Ireson, 2005; Mason & Burns, 1995). Although there were no behavioral issues occurring in the detracked classrooms at MBHS, there was a lack of understanding that hindered the lower-level students’ success.
However, when the implementation of the new Algebra II course called Algebra II Accelerated developed, teachers shared that they finally felt that students were placed appropriately based on their abilities. Teachers reported that since students were placed in classes that had similar abilities, groupwork was more effective. Instead of placing students in groups of mixed abilities where some students finished math problems quicker than others, all the students in the tracked classes were in groups that worked more collectively. Prior research has found that a collaborative interaction on groupwork has been effective in heterogeneous (detracked) classrooms (El-Haj & Rubin, 2009; Staples, 2008). This is dissimilar to what teachers reported here. According to the Algebra II teachers, groupwork was actually more effective in a tracked classroom and students had a more positive experience with their classmates. The importance of cooperative learning is something the Algebra II teachers spoke of during the interviews. This aligns directly with previous research where Boaler (2006) found that with groupwork helped facilitate communication and as a result, ultimately helped students feel more valued with their mathematical skills. Several of the Algebra II teachers did report that students were more at ease in their tracked classrooms and felt more comfortable to be themselves. In general, the Algebra II teachers tended to their classroom with more care and knowledge on how to best teach their students in the tracked classroom setting. They shared that they were able to help their students better and as a result, students of lower-level abilities were less neglected as they were in the past. The relationships that were built here was the opposite of Palacios et al. (2019) findings where teachers are more likely to alienate low-track students. I am proud to find that this was not the case at MBHS.
Algebra II Teacher’s Positivity Has Returned

One of the most disheartening findings in this study was to hear how the Algebra II teachers’ frustration and stress significantly diminished their high morale and teaching self-efficacy when the detracking model was first implemented. But then, with the implementation of the Algebra II Accelerated class, which helped bring tracked classrooms back, the Algebra II teachers shared that they were feeling more successful and at ease. From these findings, a theme called “Positive Teacher Outcomes” emerged which explained how the Algebra II teacher’s teaching self-efficacy and instructional practices improved in their tracked classrooms.

The Algebra II teachers shared that when they taught detracked classes, they felt discouraged and ineffective. It was concerning to hear that teachers questioned their effectiveness. Researchers have found that teacher self-efficacy is subject to change based on a teacher’s experience (Shachar and Shmuelevitz, 1997). This potentially explained why teachers had low self-efficacy when they taught their detracked classrooms. From the findings of this study, the Algebra II teachers shared numerous aspects of the entire detracking model that negatively affected their experience. From the combination of difficulties with teacher practice and unhappy feelings of the Algebra II teachers, it is no surprise that teachers reported low teaching self-efficacy.

With the development of the Algebra II committee which helped develop the Algebra II Accelerated class and moved the course structures back to tracking, teachers’ teaching self-efficacy drastically improved. The collaboration that finally resulted in a significant change in the Algebra II course structure also resulted in an increase in teachers’ morale. This connects directly to prior research where Vangrieken et al. (2015) found that benefits of teacher collaboration included more motivated teachers and positive impacts on teacher morale.
Moving back to a tracked model, the Algebra II teachers no longer fought the clock trying to teach material to students within the period nor did they have to create differentiated lessons every day. Many of the Algebra II teachers shared that they actually had time to get to know their students on a deeper level. Specifically, one Algebra II teacher shared that she had enough time to teach the material at a pace that worked best for her students. With her remaining class time, she was able to discuss students’ weekend plans and students’ birthday celebrations. She was able to form a connection and relationship with students, something she found to be extremely rewarding as an educator. Connecting to prior research, it has been found that classroom management is much easier in a homogeneous (tracked) class setting (Hallam & Ireson, 2005; Mason & Burns, 1995). Even though this research is more than a decade old, it is relevant to this study. Algebra II teachers did not mention having any disruptive behavior in their tracked classroom. As a result, they reported being able to teach more effectively, form connections with students, and witness more positive student performance. This ultimately helped increase their teaching self-efficacy along with more smiles, moderate relaxation, and overall success in their classrooms.

Although there were many hardships with the detracked classes, there was a positive aspect that stemmed from this model. It was an increase in the variability of the Algebra II teachers’ instructional practices. Several of the Algebra II teachers shared that they were more flexible with assignment submission, more knowledgeable about effective differentiation strategies, and more successful with scaffolding for lower-level students. The Algebra teachers’ new instructional qualities connected directly with previous research where researchers found that teachers become more flexible with adjusting their teaching approach when they are expected to teach to a classroom with mixed-ability students (Avramidis & Norwich, 2002;
Dixon et al., 2014; Stanovich & Jordan, 1998; Van Reusen et al., 2001). As a result, teachers are able to develop a higher teaching efficacy, which ultimately helped teachers reduce their feeling of being unprepared to teach all students (Avramidis & Norwich, 2002; Dixon et al., 2014; Stanovich & Jordan, 1998; Van Reusen et al., 2001). The Algebra II teachers may not have been as successful as they wanted to be when they were first taught heterogeneous classrooms. However, the new instructional practices they learned could greatly benefit their students in their future classes. This connects directly to prior research where although Mason and Burns (2004) found that teachers were overwhelmed with the amount of work they were required to do to teach a heterogeneous (detracked) class, the Algebra II teachers felt that these hardships helped improve their instructional practice. This is exactly how the MBHS Algebra II teachers felt. Today, the Algebra II teachers have a wider range of instructional practices from their experience during the detracked time that they are currently still using in their tracked classrooms. It may have been a difficult time for them in the past, but they seem to be grateful to have more effective teaching techniques under their belt.

**Students Performance Improves in Tracked Algebra II Classes**

The average final Algebra II student grades were statistically significantly different between different groups of students in heterogeneous and homogeneous classes. More specifically, looking closer at the data, the Algebra II average final grade of students in the tracked class organization were found to be higher than those in the detracked classification. This connects directly to prior research where it was found that students perform better in in tracked Algebra II courses than detracked Algebra II courses (Domina et al., 2016; Loveless, 2009; Nomi, 2012; Reed, 2008; Trautwein, Lüdtke, Marsh, Köller, & Baumert, 2006). It is likely that students were better in tracked classrooms because teachers were able to make connections with
students and felt more committed to teaching. In addition, the courses’ pacing was better and more manageable for students to handle which as a result can explain why students performed better in their tracked classroom setting.

A linear regression analysis of student Algebra II final grades identifies a statistically significant Class Organization -by- Student Geometry Ability Classification interaction. While the analysis indicates the Algebra II final mean score is statistically significantly higher overall for students in the tracked classes, it is the students in the below average geometry classification who benefited from the tracked class organization with nearly a 9.3 percentage point advantage. Although the above average group results were statistically significant for the linear regression, it does not imply practical significance because it was only a difference of 1.9 percentage point between the detracked and tracked years. For the average group, there was no practical or statistical difference between the detracked and tracked years. However, there was a practical significance for the below average group with a near 9.3-point final grade advantage for the tracked class organization. Consequently, a practical interpretation of the analysis findings is that the final Algebra II grade of students in the tracked class organization, on average, is at least as high as the mean of those students in the detracked class organization with the students in the below average geometry ability classification exhibiting, on average, a near 9.3-point final grade advantage.

Implications

Several implications that can be drawn from the findings of this study. First, I will describe those policies. Second, I will delve into implications for practice and finally future research.
Policy Implications

Based on prior findings, teaching heterogeneous classrooms is reported to have the potential to help students of all different ability levels succeed (Rubin & Noguera, 2004). However, in this study, findings indicate that secondary math teachers struggle with this type of classroom setting. As such, teachers need training and practice on how to effectively teach heterogeneous classrooms to meet the needs of all students with different levels of ability. This training could include a required course for teachers to learn how to differentiate in the classroom as well as on-going professional development for all secondary math teachers throughout the course of the school year. Although the findings from the present study demonstrated that teachers spent countless hours trying to differentiate for their students, they may not have had the necessary training to do so in way that positively effects the students’ learning experiences in their heterogeneous classrooms. District and state policies requiring relevant courses and in-service training would be an important step toward ensuring that teachers have the knowledge they need to support all students.

In addition, the importance of including teachers in important decisions cannot be overlooked. The results of the present study highlight the importance of teacher’s opinions and ideas when it comes to decision making in the district. As mentioned in the findings, the teachers felt blindsided when the district decided to detrack the Algebra II courses that were once tracked. Since teachers had the experience of teaching and had built a strong knowledge of their students’ performance and skills over the years, there should be a plan for administration to communicate and consider teacher opinion when any course and/or curriculum change is being considered before it is permanently put in place.
Implications for Practice

The first implication for practice is that math teachers at MBHS relied on one another for help and team planning with respect to teaching heterogeneous Algebra II. Participants in this study indicated that they spent countless hours planning and helping one another figure out best practices, that included differentiation, to help address the needs of all students. Teachers benefitted from collaboration about the curriculum, instruction, and even received social and emotional support from one another. However, many participants indicated that they could have improved their practices and ways of differentiating if they had observed classrooms where other teachers had successfully differentiated. If the district could provide more opportunities for cross curricular interaction amongst teachers that includes professional time to observe other teachers in content areas where successful differentiation is taking place, it could positively impact teacher practice and help teachers get a better idea of what they could do in their own classrooms.

Another implication for practice is for administration to converse with teachers before implementing a new plan that can drastically affect teachers. If there was conversation about the detracking model, teachers would not have felt blindsided by this new model and could have tried to prepare for the change without being overwhelmed and stressed. Additionally, another implication for practice is to develop training for teachers to effectively learn how to teach lower ability students. The findings indicate that many of the Algebra II teachers at MBHS are uncomfortable with teaching lower ability students and have a hard meeting the needs of such learners. Implementing some type of training to help teachers learn different ways to reach the lower-level students would be greatly beneficial for both the teachers and students.
Recommendations for Future Research

The present study contributed to a small body of research on the support’s teachers need to successfully teach heterogeneous classrooms as well as secondary math teachers experiences while teaching heterogeneous and homogeneous classrooms. As such, there are many additional opportunities for future research.

This study included a small number of participants, all of whom were Algebra II teachers in a secondary school setting. If we had an increase in the number of participants, it would broaden the sample to include other math subject teachers as well as other content area teachers, such as science and English, which could result in richer data. It is possible that science and English teachers use different instructional approaches to teach heterogeneous and homogeneous classrooms since these subjects rely more on experiments and technical vocabulary to arrive at conceptual understandings.

To extend the results of this study and explore teachers’ experiences and practices, an adjust for research is recommended. In addition to the qualitative data collected through semi-structured interviews, observation data from teachers’ classrooms should be collected. This would provide the opportunity to inquire participants about the specific practices in the classroom which would generate a separate data set apart from interviews. Different types of questions such as teacher reasoning and student behavior could be asked as well as witnessed. Also, with observations, it would be beneficial for me to conduct more than one observation in order to collect a variety of information. Additionally, since Algebra II teachers signaled a willingness to adjust their instruction heterogeneous classrooms but lacked any relevant training, future research that employs a training intervention would be a natural next step.
Lastly, additional research that moves the focus from teachers to students is recommended. This will help students determine their own needs and how the efforts of teachers are affecting them in the classroom. It would give teachers insight on how they can best prepare their students from the transition of switching from a heterogeneous (detracked) classroom to a homogeneous (tracked) classroom.

**Limitations**

There are a few limitations of this study design. The first one is the small size of the convenience sample. Although the study consisted of eight participants sharing their experiences, it only represents a very small portion of the experiences that teachers have had with teaching homogeneous and heterogeneous math classes. Although the findings of the study cannot be generalized for this reason, the results are nevertheless useful in a broader consideration of the importance of supports that are needed to help teachers teach in heterogeneous classrooms, as well as the outcomes of student performance in a tracked setting. Elaborating on generalization, it is important to acknowledge that the validity of the comparative findings of Algebra II is limited due to conducting interviews in a singular site (i.e., Mulberry High School). Although my study solely focused on Algebra II teachers who are only located at the high school, the interview responses I received were very similar which solidifies the reasons as to why generalizations might be formed from this study on this specific topic.

Another limitation is that I only collected semi-structured interviews. Therefore, the experiences my participants described were rich with details, but without doing observations, I was unable to witness if the experiences the participants described were really what the teachers were in fact experiencing. This is a limitation that is important to consider as it may lead to misinformation from participants.
With the quantitative data that was collected to measure student performance while in detracked and tracked classes of Algebra II, a limitation to consider is that all teachers do not grade assessments the same way. It is very possible that some teachers graded more harshly than others, which could be something that directly affects the assessment grades of students. This is something to be cautious of when considering the overall assessment and final grades of the Algebra II students within the past 2-3 years. Nonetheless grades are important outcomes as the have very strong social validity (Schultz, Evans, Langberg, & Schoemann, 2017). As can be seen in this study, grades are used to determine student placement and strongly valued by parents and teachers (Tyson & Roksa, 2017).

My own role as a mathematics teacher conducting research in the district where I work can also be viewed as a limitation. Since my study was focused on the detracking and tracking changes that strictly affected the Algebra II courses, Algebra II teachers may have also felt an obligation to participate in the study. With keen awareness of these possibilities, I took the steps recommended by the research community to attempt to minimize the impact. When interviewing the Algebra II teachers, I emphasized the voluntary nature of their participation as well as the procedures in place to ensure confidentiality. All participants received a copy of their interview and observation transcripts and had the opportunity to make corrections or request that portions be omitted. Apart from minor clarifications, I did not have any of my participants exercise the opportunity to revise the transcript.

In addition to possible effects on participants, my insider perspective and personal biases could also have affected the way I interpreted the data and reported the results. To address this concern, I maintained a research journal throughout the study, in which I recorded not only all the actions I took, but also my reflections on the concepts and insights that emerged as I
collected and reviewed the data. I shared my data and findings and discussed these reflections with fellow researchers throughout the study in order to invite alternate interpretations and consider critical feedback.

Lastly, it is important to discuss the influence Covid-19 has had on my study. This pandemic caused by SARS-CoV-2 that trigger one’s respiratory tract infection has shook the lives of so many Americans within the past two years. As a result, schools, educators, and students have had to quickly make changes to move to a remote learning setting in order to ensure everyone’s well-being and safety while still holding the integrity of a rich educational experience for all students. When I asked the teachers that I interviewed if there was anything additional they would like to share with me at the end of the interview, many teachers shared their pride and resilience to still provide a wealthy education to their students even with the setback of not being in person. They commended our district’s flexibility and ability to adjust to the circumstances put in place by this pandemic. Although teaching looks different in today’s current situation, they were proud to step up and be there for their students and truly appreciated that students’ motivation and drive to be successful rarely withered down.

Due to this pandemic, the Algebra II teachers who were teaching the new model of the Algebra II courses were unable to complete their full year in person during the 2019-2020 school year. It is for this reason that I have found it important to only gather data from September of 2019 to January of 2020, when MBHS was still in session in-person, to ensure that the comparative study holds true in comparison and does not have outside affects such as Covid-19 jeopardizing the comparisons. It is unfortunate that the Algebra II teachers were not able to complete their newly tracked courses in person but looking to the future with more vaccinations
and safety protocols put in place, I am confident that they will get this experience in the near future.

**Conclusion**

As more schools detrack their mathematic courses in secondary schools, more teachers are expected to differentiate and work their hardest to meet the needs of all students. It is important to consider what supports and structures with allow teachers to have a smooth transition from teaching a tracked to detracked classroom setting. From my own experience of teaching heterogeneous classrooms, I have felt and seen the hardship that many of my colleagues have gone through. This study indicated that teachers felt their voices should be heard, relied on one another for support and collaboration and together came forward and tried their best efforts to teach heterogeneous classrooms. These results also point the way toward prioritizing our teacher unity more intentionally for the support teachers need to teach heterogeneous classrooms. Although results have shown that homogeneous classrooms have been more effective at MBHS, it is the hard work and dedication that the Algebra II teachers have shown that truly make this school extraordinary.

With the knowledge I gained from this research study, I hope to be able to help my colleagues in the future. I have learned that there is a lot of research on this topic and that I have merely brushed the surface. This makes me extremely eager to dig deeper into research in this area and expand my own knowledge on this topic from questions that have yet to be answered. With an eager and determined mindset, I look forward to the next steps ahead of me.
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Appendix A: Pilot Study Survey

Survey for Secondary Algebra II Teachers at MBHS

Thank you very much for participating in this brief questionnaire. This questionnaire aims to glean an understanding of secondary Algebra II math teachers’ experiences when teaching heterogeneous classes. The assessment will take approximately 10-13 minutes. Your responses will remain completely confidential. If you have any questions, please contact me at sarpaul@scarletmail.rutgers.edu.

* Required

1. Name: *

Your answer

2. How many years have you been working in the East Brunswick Central District? *

Your answer

As you know, a few years ago, the district eliminated a level of Algebra II (specifically the Intermediate Algebra course). This change has affected the grouping of the students in the Algebra II course. As you reflect back to your experience with this course, I would like you to answer a few questions.

3a. How many of these classes of Algebra II did you teach? *

- 1-3 years
- 4-6 years
- More than 6 years
3b. From your experience, did the grouping of the students work better for one class as compared to another? If so, please explain why. *

Your answer

4. What was your most positive experience while teaching this class? *

Your answer

5. What was your most negative experience while teaching this class? *

Your answer

6a. Are you familiar with the best teaching strategies needed to meet the needs of a set of diverse learners? *

☐ Yes
☐ No

6a. If you answered yes to the previous, please explain some of the best teaching strategies you found to be effective. If you answered no, you may respond with N/A. *

Your answer

7a. What were some of the difficulties you faced while teaching this heterogeneous class? *

Your answer
7b. From the difficulties you stated, what type of support did you receive to help you overcome these hardships? *

Your answer: 
Appendix B: Interview Protocol

Research Questions:

1) What supports do teachers report were needed to effectively deliver instruction in heterogeneous math classes?

2) What were teacher’s comparative experiences when teaching in heterogeneous and homogeneous classes?

3) Do average final Algebra II student grade significantly differ for the various subsets of heterogeneous and homogeneous student tracks?

Interview Questions:

1) What specific grades or classes have you taught?

2) How long have you been teaching in this current district?

3) As you may already know, the new tracked model of the Algebra II classes came into action during the 2019-2020 school year. The following questions are designed so that you can compare your experiences BEFORE and AFTER the new tracked model was put in place.

4) What can you tell me about the detracking process (removing Algebra II)?

<table>
<thead>
<tr>
<th>Before - 2018 (Alg II Honors, Alg II Academic)</th>
<th>After - 2019 (Alg II Honors, Alg II Accelerated, Alg II Academic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5a. What did you do to motivate students who showed low interest in schoolwork?</td>
<td>5b. During this past year… What did you do to motivate students who showed low interest in schoolwork?</td>
</tr>
<tr>
<td>If yes, how did you do it? If no, how did the students respond to that?</td>
<td>6b. Did you modify assessments? If yes, how did you do it? If no, how did the students respond to that?</td>
</tr>
<tr>
<td>6a. Did you modify assessments?</td>
<td>7a. What classroom management system did you use? How well did it work?</td>
</tr>
<tr>
<td>7b. What classroom management system did you use? How well did it work?</td>
<td></td>
</tr>
<tr>
<td>8a. Did you have to differentiate instruction? If so, how did you do it?</td>
<td>8b. Did you have to differentiate instruction? If so, how did you do it?</td>
</tr>
</tbody>
</table>
9a. How much time did you spend when planning for your Algebra II courses before and after the new tracking model was put in place?
9b. How much time did you spend when planning for your Algebra II courses before and after the new tracking model was put in place?

10a. How effective did you feel when you were teaching Algebra II before and after the new tracking model was put in place?
10b. How effective did you feel when you were teaching Algebra II before and after the new tracking model was put in place?

11a. Before the year started in 2018 and you knew you were going to be teaching Algebra II Academic, what did you think about the ability of your students?
11b. Before the year started in 2019 and you knew you were going to be teaching Algebra II Academic, what did you think about the ability of your students?

12a. Before the change, what input did teachers, parents administrators have?
12b. From what I know, an Algebra II committee was formed, what input did teachers, parents administrators have?

Now that we have compared, I would like to focus our attention to the current tracking model from this past year.

13) Describe the current Algebra II course structure.

14) What do you think about current math classroom structure at your school?
   - (a) What aspects do you believe are effective?
   - (b) What aspects do you believe are is not effective?

15) Since the change…
   a. In what ways, has the curriculum changed?
   b. How have your instructional practices changed?
   c. How do you feel about this change?
   d. How do your colleagues feel about this change?

For questions #16-18, I have transcribed interviews that answer the questions about heterogeneous classes.

16) What are some of the challenges you have experienced while teaching your homogeneous classes?

17) What supports are put in place to help you successfully teach your homogeneous classes?

18) What supports would you like to help you successfully teach your homogeneous classes?
   - Specifically, how has administration supported you since this change?

19) Is there anything else you would like to share on this topic?
Appendix C: Letter to Administration

May 3, 2017

Dear Administrators,

The Mathematics Department at Mulberry High School would like to formally request a meeting with you, the Administration Team, regarding how to best meet the growing needs of our students. We would like the opportunity to have an open discussion with you, at your earliest convenience, to share our curricular and personnel concerns.

The Mathematics Department’s main focus has always been serving the best interest of all students, and as we continually strive to help all of our students, we need your help. We are concerned that our students’ education has suffered and continues to suffer. To that end, at our November department meeting, many of us expressed our deep concern and frustration over the direction that the curricular changes have taken over the last few years, and the resulting impact on many of our core courses. The melding of widely varying academic levels into one course and the impact it is having on all students, from the lowest to highest performing students, is the biggest issue of all.

During this meeting, we requested the opportunity to participate in an open dialogue with administration from Central Office. Jennifer Hummingbird (Mathematics Supervisor for K-12) did attend our February 14th department meeting where we expressed our concerns. We appreciated this initial conversation and the opportunity to discuss these issues. Our concerns still remain.

For these reasons, we are requesting to have a transparent conversation with a wider range of those that have the power to make decisions and effect change, and so that the message does not have to be passed through separate channels. We think it is important for all of you to hear and consider our professional experiences and perspectives. We would greatly appreciate the opportunity to fully express our concerns. We look forward to your response.

Respectfully yours,

Tenured Members of the
MBHS Mathematics Department
Appendix D: Teacher Notes on Department Meeting

Notes for meeting with Administration on May 9, 2017 at 2:15pm

Christine:
- Thank you for attending. Purpose of meeting
- Appreciate it if admin. waits for us to have our say before responding
- We are on the frontlines, we see the students everyday
- Another level of Algebra 2 needed
- 25 years teaching math here
- Ever since these changes in the levels were proposed, we have had and expressed our concerns
- Mr. Superintendent was not present
- We can differentiate, but we cannot do so every day.
- What is the point of having 2 lessons in one classroom every day? Have 2 separate classes with the different levels

Joanna & Robert:
- Push in perspective – how weak the students are, even the “stronger” kids
- Huge disparity/gap in levels in classes – students who will take Fundamentals and who will take AB.
- Doing a disservice to all levels of students
- All students need to feel some sort of success or they will give up. Currently the pace of the curriculum is too fast, too much material is learned, and they give up. Whereas there are others who are not being challenged.

Megan:
- Students who are currently in Advanced Algebra and Trig THANKED HER – finally they are in a math class where they can do well and feel success. They can learn at the pace they need, and they are THANKFUL for that.
- Dealt with parent phone calls – they wish their students to be in Precalculus but not prepared
- True algebra 2 content not being raised to the level they need for success

Taylor:
- Students who drop from Precalc Honors to Precalc (or refuse to make the change)
- OBSERVED that teachers are constantly hitting brick wall everyday – not getting through to students as well as they would like

Emy:
- Impact of all of these levels of students as well as the constant changing of courses, rooms, buildings on teachers –
- Lack of family time/life
- Teacher Stress
- Our strengths and preferences are not considered
- We work as hard as we can to ensure the success for our students. But at what cost? Our health? Family lives? And is this really for the betterment of the students?
- If it is working, why change it? It could be teacher experience, background, even cultural differences (some cultures respond better to different sexes)
- We are working for the best interests of the students, but at the same time, it should also be in our best interests, also, because if we are not passionate about what we do, how can we impart that into our students?

Lisa:
- Algebra 1 have a higher standard of “passing” to ensure success at future levels of math
- Change in algebra 2 levels (at least 3 levels needed)
- Smaller classes for lower levels