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DETRACKING MATH:
AN EXPLORATION OF STUDENT SELF-CONCEPT IN AN INDEPENDENT SCHOOL

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Table of Contents

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Executive Summary

Area of Inquiry

Schools throughout the country are grappling with the notion of tracking versus detracking students in math based on their achievement in grade six or lower. Also known as ability grouping, tracking "is the separation of students into different classrooms... on the basis of ability" (Chiu et al., 2010, p.125). Ambrose Academy chose to detrack seventh-grade math to be more sensitive to students' self-concepts and broaden future opportunities for math placement. Legette & Kurtz-Costes (2021) note, "although these practices may benefit youth in high tracks, placement in a lower track often puts youth on a downward achievement trajectory that is resistant to change" (p.962). This change occurred during the Covid-19 pandemic when distance learning and asynchronous work became the norm. The school hopes to ascertain a more detailed understanding of the ramifications of detracking. Understanding student self-concept is paramount to choosing the next steps.

Research Design

Surveys, information gathered from the school's website and administrative assistants, and interviews are the primary data sources for this project. I utilized surveys of parents and students to build a foundation of understanding regarding student self-concept. The interviews with teachers and administrators that I conducted provided background information regarding the decision-making process and insight into students' experiences within the detracked program. Finally, I addressed project questions using the theory of sensemaking (Weick, 1993) and self-determination theory (Deci & Ryan, 2008).

Project Questions

1. How do students, parents, and teachers describe math tracking at Ambrose Academy?
    a. What is the experience of students within math-tracked coursework?
    b. In what ways do parents define math tracking at Ambrose Academy?
    c. What is the nature and quality of teacher/administrator opinion regarding math tracking at Ambrose Academy?
2. What is the experience of 7th-grade students within the detracked math program?
    a. How has being in an untracked math program affected student efficacy?

Findings

1. **Finding One: Students struggle to define math tracking**

   Of the 256 students who participated in the survey, only 42% could explain the purpose of math tracking. Terms such as *ability, group, level,* and *skill* were the primary terms of note, although other words such as *comfort* and *holding back* were observed on multiple occasions.

2. **Finding Two: Parents struggle to define math tracking**

   Only 39.5% of the 55 parent respondents could explain math tracking. Other than those listed above, pace and cohort did appear multiple times.

3. **Finding Three: Disagreement amongst faculty**

   While most of the eight interview subjects, including four teachers and four administrators, are on board with the decision to detracking math for the seventh grade, there is less consensus for later years and the practice. Most of those interviewed also felt that most parents and students understand math tracking; however, survey results did not agree, as noted above.

4. **Finding Four: Students regularly compare themselves to others**

   70.8% of students either sometimes, often, or always compare themselves to students who perform better than they do in their math class, and 43.5% of students sometimes, often, or always compare themselves to students who do worse than they do in their math class. In the seventh-grade class, students compare themselves to those in other classes who do worse than they do at a rate higher than any other grade.

5. **Finding Five: Students and parents feel they are in the correct math class**

   91% of students sometimes, often, or always believe they are in the suitable math class for their skill level. This is good news, especially as 97% of parents feel the same way.

Recommendations

1. **Recommendation One: Develop agreement among faculty and administration**

   Building consensus among the faculty and administration is necessary to continue math detracking. Change can be challenging. However, once a decision has been made, and the practice put into place, a joint agreement must be seen to move forward. This is the case especially when success is found.

2. **Recommendation Two: Detrack eighth-grade math**

The success of the detracked seventh-grade math program should now lead to the eighth-grade program being detracked. Program continuity is essential, especially in an academically rigorous setting.

3. **Recommendation Three: Identify opportunities for parent learning**

   As noted in the low rates of parent understanding of math tracking, developing a robust parent education program is a valuable next step. Starting with educating parents on the math curriculum and tracking in general, the school can move into other avenues of parent learning. School-parent communication and collaboration are some of the most vital elements of academic success for a child.

PART 1: BACKGROUND

– INTRODUCTION –
– ORGANIZATIONAL CONTEXT –
– PROBLEM OF PRACTICE –

Introduction

During the 2020-2021 school year, Ambrose Academy, an independent Pre-K through twelfth-grade day school in Virginia, decided to stop the practice of tracking math students in the seventh-grade year of middle school. Instead of delineating an honors section and a regular section for seventh-grade students, all students were placed in the same math course. This change coincided with the Covid-19 pandemic. For years, the school set students on a particular math track based on their 6th-grade performance. Support for tracking came from the belief that teachers could provide more targeted instruction for homogeneous groupings, additional support for struggling students, and additional advancement opportunities for high-achieving students. Administrative support for detracking stemmed from the prospect that math tracking limited a student's ability to alter a predesigned path and that the rigor of the course would decrease. Ambrose Academy received some pushback from parents and teachers due to this programmatic design shift. The school hopes to understand the ramifications of the decision to stop math tracking and to help parents and other adult stakeholders develop more of a growth mindset.

Math tracking in the United States is a controversial and often debated topic. This practice has been utilized for generations and aims to set a distinct path for students concerning math class placement (LeTrende et al., 2003). Proponents of math tracking argue that it allows teachers the ability to modify instruction to meet the needs of both low and high-achieving students in separate classes (Chiu et al., 2008), thus providing opportunities for all students to succeed. Those who find fault in math tracking argue that the practice can significantly negatively impact a child's self-perception and school and career trajectory (LeTrende et al., 2003), especially if they are deemed to be in the "lower" math class. Opponents to math tracking contend that it leads to the creation of remedial courses in which students lag behind their peers and are at a sizeable disadvantage moving forward even if they are successful in their math class (Tyson & Roksa, 2016).

The purpose of this project is to help the school develop an understanding of the impacts of tracking versus detracking. Because tracking and detracking math impact many stakeholders within the school, it is vital to understand how students, parents, teachers, and administrators conceptualize tracking. Students' experiences within math-tracked coursework are an integral part of this, as is how students and parents define math tracking. The opinions of teachers and administrators are also important because of their position in implementing such practices. Finally, understanding the experiences of the seventh-grade students within the detracked math program is also significant.

Organizational Context

Ambrose Academy is an independent pre-school through twelfth-grade day and boarding school. The institution is split into two campuses, with the preschool-eighth grade students in one location and the ninth-twelfth grade students in another. There are 909 students in the school, which breaks down somewhat evenly among the three divisions: lower, middle, and upper schools. The school was founded in 1910 and is accredited by numerous accrediting bodies.

The tuition at the school ranges from $16,470 for pre-school students to $32,240 for upper school students and $68,550 for seven-day boarding students in the upper school. About 33% of students receive some form of financial aid. The average class size for each division is ten students in the pre-school, 12 for the lower school (grades K-4), 14 for the middle school (grades 5-8), and 15 for the upper school (grades 9-12). 77% of faculty hold advanced degrees, and 100% of the faculty members participate in professional development. The school-wide student/teacher ratio is eight to one, ranging from six to one in the lower school and ten to one in the upper school.

The school's website notes that the core purpose is "To inspire and prepare the next generation of exemplary citizens and visionary leaders." The core values include integrity, curiosity, diversity, creativity, agency, and impact. Ambrose Academy upholds an Honor Code which strictly prohibits lying, cheating, and stealing. As the school enters the final year of the most recent five-year strategic plan, various stakeholders reflect on the three areas of focus,

including inspired teaching and enduring learning, close community, and sustainable resources. The school uses these three areas as it sets a path for the next strategic plan.

The senior leadership team of the school comprises the following positions:

- Head of School
- Associate Head of School for Advancement
- Head of the Upper School/Assistant Head for Academics
- Assistant Head of School for Enrollment Management
- Chief Financial Officer
- Chief Strategic Communications Officer
- Director of Athletics
- Head of the Lower School
- Head of the Middle School

The school's board of trustees includes seventeen members, fifteen of whom are parents of current and former students.

Stakeholders for this project include students, teachers, administrators, and parents, particularly those involved with math in grades seven through twelve. This project is designed to help the school administrators, primarily the academic deans, math department chairs, and division heads, better understand math tracking, the impact of detracking, and student self-concepts. This project will help these stakeholders in their sensemaking process regarding further implementing math detracking.

The school follows different academic schedules for middle school and upper school students. See Appendix A for sample schedules.

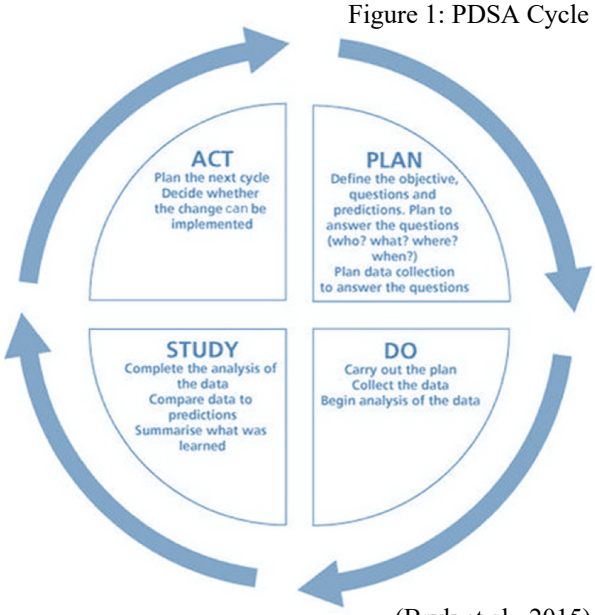
Problem of Practice

The decision to detrack the seventh-grade math program during the 2020-2021 school year has had ripple effects since implementation. Not all stakeholders are on board with the programmatic shift, and a similar change has not continued in the upper-grade levels. The school administration continues to discuss and debate the benefits and concerns of detracking and whether this practice should or could proceed in the upper grades and across multiple content areas. The Covid-19 pandemic also impacted the further implementation of detracking as the school changed from in-person instruction in 2019 to entirely online in the spring of 2020, then

to a hybrid of online and in-person during the 2020-2021 school year and returned to entirely in-person at the start of the 2021-2022 school year. A long-term substitute requirement for the eighth-grade math classes also delayed further implementation of detracking. Due to these challenges, the school has not been able to realize the benefits or deficits of detracking fully.

Along with the challenges above, there has been some pushback from students and teachers regarding the value and reasoning behind detracking. The school hopes to understand the ramifications of the decision to stop math tracking, understand students' self-concepts related to this endeavor, and help stakeholders have a growth mindset. This problem is essential because parents want to ensure their child receives the most purposeful education possible at such a high tuition level. Students and their parents also have high expectations regarding college acceptances and opportunities beyond college. The school wants to encourage a growth mindset for students, teachers, and parents. Part of this aspiration rests with the belief that students can participate successfully in a detracked math class in seventh grade and possibly beyond. Stakeholders' buy-in is crucial in this endeavor. In their work concerning improvement science, Bryk et al. (2015) offer a tool known as the Plan-Do-Study-Act (PDSA) cycle (Figure 1). This instrument aids in continuous improvement and "follows the logic of systematic experimentation" (Bryk et al., 2015, p.121). Indicating what we hope to achieve, the techniques we will utilize to note the degree of improvement, and the modifications we need to make to increase the likelihood of improvement are central to improvement science. Through empathy interviews with administrators and teachers, I was able to ascertain that the philosophical differences between such stakeholders are one of the barriers to the necessary continuous improvement endeavors of the school's intention to detrack. While some teachers and administrators are on board with the change, others are not. In utilizing a PDSA cycle, the school has gone through one full rotation and is now stationed in the planning stage of the second cycle.

Figure 1: PDSA Cycle



(Bryk et al., 2015)

PART 2: ESTABLISHING IDEAS

– LITERATURE REVIEW –
– CONCEPTUAL FRAMEWORKS –
– GUIDING QUESTIONS –

Literature Review

"The practice of tracking can be seen as an attempt to respond to heterogeneity in students' abilities and academic achievement by sorting them into more homogeneous groups, allowing teachers to cater instruction to students' needs" (Chmielewski et al., 2013, p.926)

CONCEPTS AND TERMS

Relevant concepts and terms (Figure 2) associated with this project include those of the practice of math tracking, academic self-concept (ASC) of students and their parents (Arens et al., 2007) (Herrmann et al., 2016), as well as the notion of a cumulative advantage (Merton, 1988) (Tyson & Roksa, 2016). Trautwein et al. (2006) note the effects of tracking and assimilation, while Ireson and Hallam (2001) offer the perspective of teachers and their attitudes toward ability grouping. LeTendre, Hofer, and Shimizu (2003) extrapolate what people think tracking is, while Marsh & Craven (2002) provide a specific definition of academic self-concept and the constructs. The works of authors and researchers such as Chiu et al. (2008) and Irizarry (2021) are used to provide a broader picture of tracking. Finally, parent communication will be addressed as that is a fundamental aspect of any school-based systematic change.

Figure 2: Concepts and Terms

Sensemaking	"Sensemaking emphasizes that people try to make things rationally accountable to themselves and others" (Weick, 1993)
Self-Determination Theory	"SDT postulates that autonomous and controlled motivations differ... and suggests that behaviors can be characterized in terms of the degree to which they are autonomous versus controlled" (Gagné & Deci, 2005)
Tracking	"Heterogeneous groups of students... are assigned to different streams within that school on the basis of their prior achievement" (Trautwein et al., 2006)
Academic Self-Concept	"Evaluations of specific abilities or qualities" (Trautwein et al., 2006)
Cumulative Advantage	"Processes by which relatively small initial advantages lead to disproportionate accumulation" (Baumert et al., 2012)

In addition to the relevant concepts and terms listed above, there is also the notion regarding the complexities of change. In their work on improving organizational performance, Langley et al. (2009) provide a roadmap in the development of a model for improvement. While PDSA cycles (Bryk et al., 2015) are one such method, there are others which are advantageous in the journey toward change and improvement. Within the recommendations for this project, I note the importance of change. Langley et al. (2009) offer factors for the development of change, including assisting the team in understanding how the various processes at play work, encouraging creative thinking, and maintaining a willingness to adapt existing strong ideas.

Perspectives on Math Tracking

Educational and psychological researchers have studied the advantages and disadvantages of math tracking. Many specifically focus on the lens of students' self-concept. Students tend to compare themselves to peers, especially in their immediate environment, and use those comparisons to cultivate a sense of self (Trautwein et al., 2006). Teachers and parents also utilize similar strategies when developing perceptions of their child/student, and in the case of teachers, themselves as professionals (Ireson & Hallam, 2001). Regarding a relative benefit of math tracking and ability placement, Ireson and Hallam (2001) argue that teachers are more confident and amicable when their students are grouped by ability and that the primary benefit of combining various ability groups into one class is that of socialization. Marsh & Craven (2002) further explain the notion of an "academic self-concept" (ASC) and suggest that it "has been established as one of the key constructs that determines academic success and shares vital structural characteristics with academic interest" (p. 83).

Mixed messaging has been a factor surrounding the debate on math tracking. Trautwein et al. (2006) note that there was no relationship between track level and how students perceived themselves, while LeTendre et al. (2003) argue that tracking can negatively impact a student's pathway. Chiu et al. (2008) explain both the positive and negative effects by articulating that math tracking, in general, can impact academically gifted students who are aware of their placement, while the reverse is true for academically weaker students. Irizarry (2021) discusses racial gaps inherent within tracking and contends a "sizeable racial gap in the likelihood of staying on (and getting on) the accelerated math track" (p. 1). The contradictory nature of this research may be an extenuating factor in the reluctance for schools to halt tracking practices and for parents to question schools' decision-making process.

In utilizing social identity theory, Legette & Kurtz-Costes (2021) set the groundwork for identifying the benefits and challenges of tracking. This longitudinal study connects belonging with academic identity and concludes that "ability grouping has significant consequences for students' motivational beliefs" (p.976). Teachers of standard math courses tend to hold lower expectations for their students than teachers of honors courses (Ansalone & Biafora, 2004). This significantly impacts how students see themselves in relation to their peers in other classes. Ansalone & Biafora (2004) generalize much of the research by arguing that "lower tracks assist in the creation of a cycle of failure with instructors holding more positive views and expectations of students in upper tracks" (p. 255).

Chmielewski et al. (2013) note the significant disparity of agreement regarding the positive and negative impacts of tracking. In some studies, low-level tracks developed a greater academic self-concept, whereas, in other studies, low-level paths developed a lower academic self-concept. Chmielewski et al. (2013) point to the differences in tracking policies as one potential reason for the disagreement. To account for these differences, Chmielewski et al. (2013) studied three different forms of tracking: between-school tracking, within-school tracking, and course-by-course tracking. Conclusions show that students in lower tracks have a lower math self-concept in course-by-course tracking. However, for students in between-school and within-school tracking systems, lower-tracked students have higher math self-concepts. To maximize the effectiveness of detracking, Chmielewski et al. (2013) propose accompanying "policies for instructional practices that bolster the academic self-concept of low-achieving students" (p.950).

Cumulative Advantage

Merton (1988) describes the cumulative disadvantage of those who lag as a part of the Matthew Effect. The Matthew Effect is the idea that younger students who take more challenging classes continue that trend through high school and thus develop a more substantial reputation (Tyson & Roksa, 2016). This is a cumulative advantage, where younger students develop more clout socially, a stronger self-concept, and accumulate more information (Merton, 1988). Tyson and Roska (2016) expound upon cumulative advantage as "an advantage held by an individual or group accumulates over time, meaning that the benefits of this advantage increase over time" (p. 125). The relevance to this project is that students who are tracked at a higher level at a younger age tend to hold a more significant advantage down the road.

The opposite is true for students who were weaker in those younger years and did not have the opportunity to take more challenging courses; they could not develop the cumulative advantage and thus were at a disadvantage compared to their peers. Tyson & Roksa (2016) specifically articulate the benefits that all students receive from taking part in more academically challenging classes. Being identified as a "success breeds success" (Perc, 2014, p. 1), cumulative advantage illustrates a scenario where those performing well at a young age tend to build on that success. Hindmen, Erhard, and Wasik (2012) articulate the negative ramifications of the Matthew Effect, namely that it can negatively impact students receiving interventions.

In his study regarding math tracking and the transition to high school, Irizarry (2021) explains, "Taking higher-level math courses in high school has strong, positive effects on a host of post-secondary educational outcomes" (p. 1) and has a significant impact depending on the race of a student. The importance of coursework starts in the middle school years, and the transition is most important (Irizarry, 2021). "Promotion to ninth grade, widely regarded as the start of high school, signals a different stage" (Irizarry, 2021, p.2) and sets a course for varying degrees of "academic expectations" (p. 2). The cumulative advantage of students can be disproportionately impacted, particularly if those students happen to be Black or Black Latinx (Irizarry, 2021). These students tend to diverge from the advanced track more easily. However, students who are white or Asian are less likely to see their routes altered, according to Irizarry's (2021) study results.

"The persistence of racial inequality in access to advanced math not only reinforces racial stereotypes and notions of a racial hierarchy of academic ability but also contributes to disparities across a host of post-secondary outcomes" (Irizarry, 2021, p.13)

Academic Self-Concept

An academic self-concept (ASC), as Marsh & Craven (2002) indicate, is established through the many experiences that students have throughout their schooling career and includes "interpretations, combining attitudes, beliefs, and perceptions" (p. 83) that form. Academic success and failure are directly tied to the child's ASC. How students conceptualize their place as a student and person in class relates to how they compare themselves to others. Arens et al. (2017) ask the question, "whether self-concept is an outcome of achievement or whether achievement is an outcome of self-concept?" (p. 622). It is a chicken and egg dilemma that

coincides with the "big fish in ponds" notion identified by Herrmann et al. (2016). They discuss that the ASC declines when students compare themselves with a higher achieving group. The argument is that if a student is in a lower math track and sees that their friends and peers are in a more elevated track, they will most likely see themselves as inferior. Fortunately, Herrmann et al. (2016) indicate that ASC is "a multidimensional construct" (p. 224) where children will have a different ASC for each class or activity. This suggests that if a student might have a low math ASC, they might also have high writing or reading ASC; the two don't necessarily impact the other.

Marsh et al. (2018) describe self-concept as a "key construct in developmental psychology" (p. 263). In their study regarding an integrated model of academic self-concept development, Marsh et al. (2018) outline three theoretical models: internal/external reference framing, which "relates math and verbal achievement to corresponding measures of ASC" (p. 263), the reciprocal effects model which relates changes over time to ASC, and the "big-fish-little-pond" (p. 264) that can have negative impacts on ASC. Marsh et al. (2018) conclude by reiterating the importance of feedback that students receive, caution against grading on a curve as that can establish a situation where some succeed while others fail and individualized standards for grading. Their final recommendation is that an ASC's implications should be front and center when discussing schools and courses for students (Marsh et al., 2018).

Parent Communication

In their experiment studying the targeting of parent trust in enhancing a communication system, Houri, Thayer, and Cook (2019) note, "Student academic success can be influenced by a multitude of factors, such as parental behavioral and relationship engagement with schools" (p. 421). Houri et al. (2019) go on to discuss the importance of "trust, communication, and respect" (p. 421) as vital elements in the development of such success. This experiment, a double-blind, randomized control trial, focused on parents with diminished levels of engagement (Houri et al., 2019). A positive correlation was found in the development of an intervention that increased "parental behavior engagement, which can ultimately improve student academic and behavioral outcomes in school" (Houri et al., 2019, p. 430). The meta-analysis of Sheridan et al. (2019) describes communication and collaboration as "elements that are generally instrumental in driving outcomes" (p. 313). Parent-teacher relationships are crucial in fostering home-based involvement (Sheridan et al., 2019). The relationship between the school and home is

foundational in developing childhood learning and success and can lead to positive student behavior (Froiland & Davison, 2013). Developing practical communication tools and methodologies allows for such success (Houri et al., 2019).

Conceptual Frameworks

After thoroughly reviewing the relevant research, I landed on two conceptual frameworks to help me develop and structure this project. Academic self-concept and cumulative advantage, the primary features revolving around the notion of detracking math, tie into sensemaking (Weick, 1993) and self-determination theory (Ryan & Deci, 2000). While sensemaking provides a window into understanding how we make decisions, self-determination theory reflects our desire to maintain autonomy over our lives. Academic self-concept relates to sensemaking via the reflection process, and it relates to self-determination theory via motivation. Cumulative advantage also ties into both approaches in how our past can impact our future and influence our decision-making and drive.

Sensemaking is a term that I, along with my cohort members, became familiar with early in our doctoral studies at Vanderbilt University. This capstone project revolves around the notion of developing an understanding and using that conceptualization to implement a practice illustrative of the process of sensemaking. In essence, the school wants to understand how tracking and detracking impact students so they can make an educated decision as to the next steps. Sensemaking denotes "that reality is an ongoing accomplishment that emerges from efforts to create order and make retrospective sense of what occurs" (Weick, 1993, p. 635). On the other hand, self-determination theory (SDT) is a theory I was not as familiar with initially, yet it did present itself throughout my research. Gagne & Deci (2005) describe self-determination theory as a "theory of work motivation" which is utilized in the "education, health care, and sports domains." Self-determination theory relates to our desire to grow, and how that desire influences our behaviors (Deci & Ryan, 2008). In this project, there are a variety of stakeholders with different drivers and influencers. We have students who want to succeed, teachers who wish to support their students in this growth process, parents who want their children to live lives of success, and administrators who want to foster an environment to allow all of this to occur.

Behaviors of students, teachers, parents, and administrators are thus altered via their desires and motivations.

Sensemaking is a critical component of this study as it helps illustrate the actions required to make sense of the complicated nature of detracking and what it could mean for students and their future trajectory. In this project, I'm not only hoping to understand the motivations of students but also those of parents, teachers, and administrators. SDT allows us to see and better understand the motivations required when developing an academic self-concept. This will be a driving force in developing school administration recommendations.

SENSEMAKING

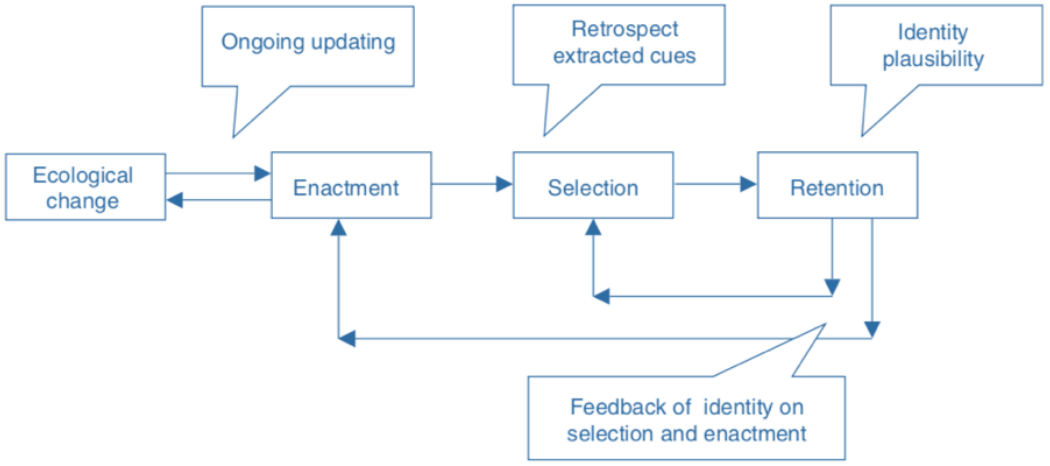
In his article analyzing the Mann Gulch disaster, Weick (1993) asserts that within the sensemaking process, everyone must be engaged. Leaders take a central role in this process to help others engage. The collapse of the sensemaking process at Mann Gulch is an example of what could happen when a map is not delineated to understand a situation better and tools for reevaluation and reassessment are not embedded.

The Mann Gulch disaster was an event in which smokejumpers were tasked with eliminating a fire developing in Montana. As the fire quickly spread, the men were ill-prepared to handle the diminishing circumstances. Thirteen men died in the fire. This event has subsequently been used as a teaching tool to help rangers and forest service firefighters avoid making the same mistakes. During the incident, one leader, as he saw the fire approaching, set a minor fire near himself, put it out, and then laid down in the burnt grass. The worst of the oncoming fire burned around him without injuring him too severely. Those who did not follow his directions to do the same, attempted to race the fire met a sad end. As noted in the table of relevant terms above, "sensemaking emphasizes that people try to make things rationally accountable to themselves and others" (Weick, 1993, p. 635). In this dramatic incident, the smokejumpers had one set of expectations yet struggled to modify those expectations. They could not construct a new reality based on the new circumstances.

Confidence and hope can be the reward of an effective sensemaking expedition (Weick, 1993). The same need for sensemaking is also apparent when considering detracking a math program. How teachers, administrators, parents, and students make sense of the many aspects of tracking versus detracking dictates the level of success the school can hope to achieve in making changes. The following visual (Figure 3) represents the sensemaking process. This circular

process incorporates the need for ongoing updates, retrospection, the identification of plausibility, and feedback. Starting with a change, there is the enactment of that change, selection of aspects to the change, and decisions regarding what should and should not continue. In this project, the change was that of detracking math for seventh-grade students. The change was enacted, and now the school is in the process of choosing whether to retain the change, adjust the change, or if there are alternative options.

Figure 3: Sensemaking



(Weick, Sutcliffe, & Obstfeld, 2005)

Weick (1993) argues that there is not an accurate or correct answer when experiencing the process of sensemaking and furthers this claim by indicating that the maps of sensemaking should evolve. Pulling away from rigidity, and realizing that a map is a starting point, helps with the necessary engagement. This valuable framework is accurate for all major decisions and changes in the workplace. "Turning circumstances into a situation that is comprehended explicitly in words and that serves as a springboard into action" (Weick, Sutcliffe, & Obstfeld, 2005, p. 409) is a primary aim of sensemaking.

Structures are also essential elements in the sensemaking process, according to Weick (1993). Assigning specific roles for individuals, which incorporate the wisdom of individuals' various experiences, can impact the outcome of events. However, as necessary, there should be room for modifications (Weick, 1993). Weick (1993) notes:

> *"the role system best able to accept the reality that ignorance and knowledge grow together may be one in which the organization culture values wisdom" (p. 641)*

Developing wisdom while respecting one's ignorance are elements in this sensemaking process. Within this project, past experiences of all stakeholders impact how everyone perceives the notion of math tracking and then further impacts their conceptualization of such a process. I aim to root through these perceptions to help the school identify its path forward.

Self-Determination Theory

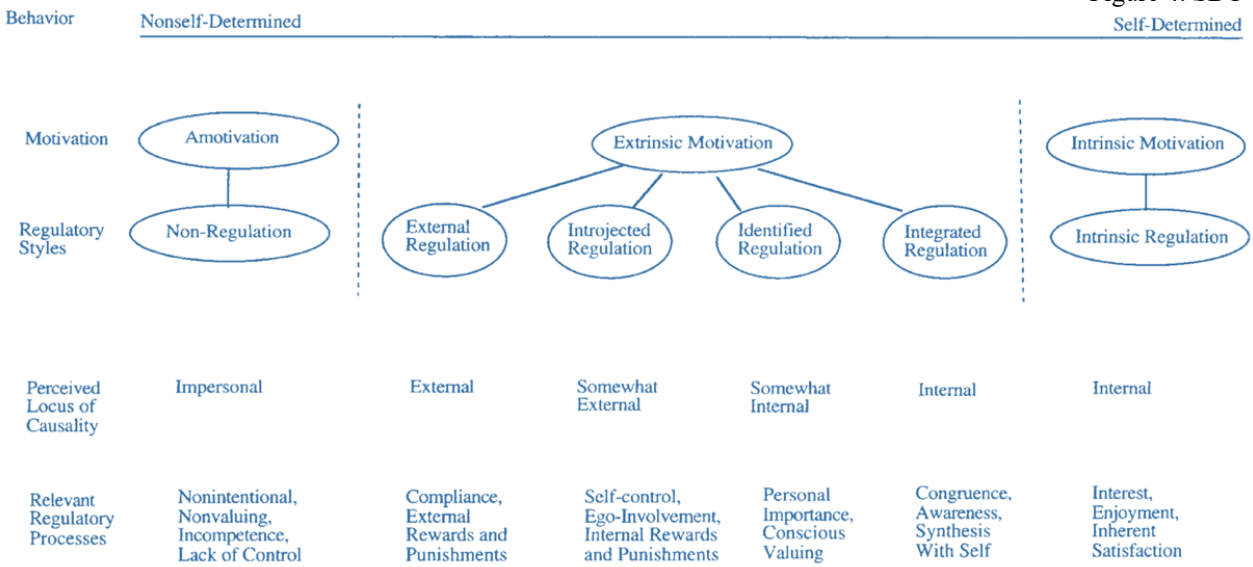
The framework of self-determination theory (SDT) consists of motivation, growth tendencies, and outside influences (Deci & Ryan, 2008). Intrinsic and extrinsic motivation are elements of this theory, as are the differences between autonomous and controlled motivation (Marylène & Deci, 2005). Marylène and Deci (2005) describe the latter as doing an activity because you like it versus feeling pressured into it. For example, a daily hour of exercise might be relaxing and almost therapeutic to some while a chore to others. Much of the research I have examined deals with how motivation is impacted by math tracking and ability placement, which further affects the potential for growth and success and how others influence those.

> *"As a macro theory of human motivation, self-determination theory (SDT) addresses such basic issues as personality development, self-regulation, universal psychological needs, life goals and aspirations, energy and vitality, nonconscious processes, the relations of culture to motivation, and the impact of social environments on motivation, affect, behavior, and well- being."*
> *(Deci & Ryan, 2008, p. 182)*

The following visual (Figure 4) provides an excellent representation of how self-determination theory can be explained. From non-self-determined behaviors to self-determined behaviors, there is a spectrum. Elements such as motivation, self-regulation styles, internal versus external, and regulatory processes are examined through the abovementioned spectrum. All behaviors can be modeled as part of this visual. For example, a student who aims to succeed in math because they love the subject and it brings them joy would fall into the intrinsic motivation category as the locus for causality is internal, there is interest in the matter, and the student finds enjoyment in math, and there is an inherent satisfaction. However, a student who aspires to succeed in math because they know it will get them into a better college would fall closer to the extrinsic motivation category. More specifically, the regulatory style may fall more into introjected regulation with a sense of internal rewards and punishments (the satisfaction of acceptance into a college) and some ego-involvement (how the student sees themselves

compared to others). In both cases, student behavior is driven by their actual and perceived growth, which is a significant element of self-determination theory (Deci & Ryan, 2008).

Figure 4: SDT



(Deci & Ryan, 2000)

Deci and Ryan (2008) further explain how SDT "addresses the social conditions that enhance versus diminish these types of motivation" (p. 182) and that one's goals and aspirations are directly tied to how they are motivated and see themselves. This theory dates to the 1970s yet has become more prominent in recent decades (Deci & Ryan, 2008). Self-determination theory provides an excellent assessment of how the math track can impact students, teachers, and parents and how students' self-concept might have changed with the removal of such practices.

Ownership of prospective paths in life is fundamental to self-determination theory (Deci & Ryan, 2008). In the case of this project, we have students with goals and aspirations as well as desires and preferred mechanisms to help them get from point A to point B. Understanding how they see themselves concerning themselves and others is necessary to develop adequate recommendations for this school.

Guiding Questions

The following questions guided this capstone project. These questions focus on the discovery of stakeholder (student, faculty, parent) conceptualization of detracking. Ambrose Academy

aims to understand better the impact of detracking and how stakeholders view tracking, in general, to make decisions for future efficacy.

1. How do students, parents, and teachers describe math tracking at Ambrose Academy?
    a. What is the experience of students within math-tracked coursework?
    b. In what ways do parents define math tracking at Ambrose Academy?
    c. What is the nature and quality of teacher/administrator opinion regarding math tracking at Ambrose Academy?
2. What is the experience of 7th-grade students within the detracked math program?
    a. How has being in an untracked math program affected student efficacy?

Sensemaking and Self-Determination Theory are the primary frameworks for developing a rationale behind these questions. Discovering how these stakeholders are making sense of tracking while also exploring students' experiences within the program help guide administrators in the decision-making progress regarding the program's future implementation.

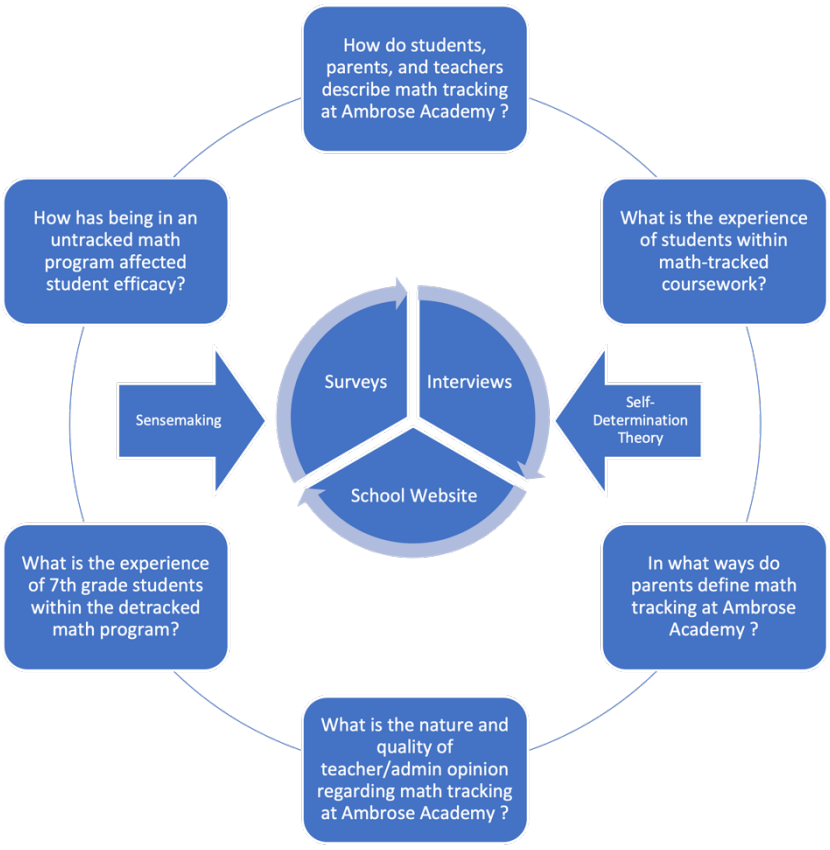
PART 3: METHODS

– PROJECT DESIGN –
– DATA COLLECTION –
– DATA ANALYSIS –

Project Design

The following visual (Figure 5) represents this project's primary elements. Project questions are on the graphic's outside circle, denoting the project's scope. The inner-circle represents the core of data collection. Finally, the two frameworks help focus the questions on the data with arrows.

Figure 5: Primary Project Elements



In utilizing the frameworks of sensemaking and self-determination theory, I collected data from three primary sources: interviews with teachers and administrators, the school's website, and surveys of parents and students. Sensemaking influenced the development of interview questions, while self-determination theory played a direct role in establishing survey questions. This mixed-method approach is a combination of both qualitative and quantitative data collection.

The interviews with teachers and administrators I conducted helped me to investigate motivations. Motivations are an important component of this project as there can be internal and external influences (Deci & Ryan, 2008). These interviews also provided me with a better

understanding of the differences between respondents' autonomous versus controlled motivations (Marylène & Deci, 2005).

An exploration of the school's website provided ample information as to the essential functions of the school. Schedules, tuition, faculty and staff directories, and quick facts about the school are all present and help paint a fuller picture of the school.

I surveyed to investigate students' experiences and parents' opinions. Again, the survey helped to distinguish the motivations of respondents.

Data Collection

Interviews, surveys, and information gathered from the school website and registrar were the primary data sources. I started with a review of the school website. This was a helpful endeavor because the school regularly updates facts, figures, and statistics. Interviews took place before surveys due to availability and Covid-19 regulations. This gave teachers and administrators additional time to ask me questions about the surveys before the surveys went live. The surveys went to parents first and students the following week during their math classes. Other necessary data, such as numbers of students and additional statistical information, was gathered before interviews, between interviews and surveys, and after surveys. Much of the data collection revolved around school schedules, particularly before and after winter break.

INTERVIEWS

To understand the sensemaking (Weick, 1993) process of teachers and administrators, I conducted several interviews with teachers and administrators. The Assistant Head of School for Academic chose the administrator interview candidates based on their administrative positions, and the math teacher interview candidates based on the grade they teach and to provide a diversity of viewpoints. The interviews took place via Zoom or over the phone with

Figure 6: Interview Candidates

Interview Candidate	Position	Modality
Administrator 1	Head of Upper School	Zoom
Administrator 2	Head of Middle School	Zoom
Administrator 3	Math Department Chair	Zoom
Administrator 4	Middle School Academic Dean	Phone
Teacher 1	Seventh Grade Math	Zoom
Teacher 2	Eighth Grade Math	Zoom
Teacher 3	Upper School Advanced Math	Zoom
Teacher 4	Upper School Math and Economics	Zoom

four administrators and four math teachers (Figure 6). The interviews with administrators took place between November 1-10, 2021, and interviews with teachers took place between December 6-17, 2021.

Teachers and administrators were given the basic interview questions (Figure 7) ahead of time to provide them with the opportunity to frame their responses. Each question relates to the purpose of this project, while also providing additional background information. Seven interviews were conducted via Zoom while the eighth took place on the phone. Interview subjects consented to the interviews being recorded to allow me the opportunity of reviewing their responses. Utilizing Zoom's dictation software, I was able to print out a full transcript of each interview to aid in the coding of responses. My goal in the development and execution of these interviews was to understand the decision-making process that led to detracking and the impacts since that time. Figure 7 identifies the interview questions asked of all participants along with the thematic codes.

Figure 7: Questions & Thematic Codes

Interview Questions	Thematic Codes
What data and research did you utilize as part of this decision?	Ability Group Level Skill Sensemaking Self-Concept
What were initial student responses, if any, regarding this decision?	
What were parent responses regarding this decision?	
Do you believe that students understand what math tracking is?	
Tell me about the decision-making process that led to the school discontinuing the practice of math tracking.	
Do you believe that parents understand what math tracking is?	
Tell me about the process of discontinuing the practice of math tracking	

I utilized the following codes when analyzing these interviews: ability, group, level, skill, sensemaking, and self-concept. These are many of the same topics chosen to analyze the final survey question asking parents and students to identify the purpose of math tracking. Through my research, these terms regularly appeared when studying detracking of math. These terms were inspired by the survey developed by Chiu et al. (2008), which I adapted for this project, and I wanted to ensure that the interviews were categorized in a similar way

When I printed out the survey responses and compared them to my notes, I used a color-coded system to identify the thematic codes. For example, any time a teacher or administrator mentioned the word *ability* or described *ability*, I highlighted their response in light blue. I did the same when the term *skill* was involved, but with light pink. In doing so, I was able to create a visual representation of the codes to visually identify the most and least common terms.

The terms *level*, *group*, *skill*, and *ability* were represented almost equally in all teacher interviews. *Sensemaking* was the least prevalent term, and *self-concept* was most prevalent in the question regarding the decision-making process.

SURVEYS

All parents of students in grades seven through twelve received the survey via email (See Appendix E). Each survey consisted of eight questions. Of the total number of parents invited to take part in the survey, 81 responded. See Figure 8 for the breakdown of parent participation by each grade level. Surveys of students in grades seven through twelve were given during their math class. Of the 476 students in grades seven through twelve, 292 participated in the survey. See Figure 9 for the breakdown of participation in each grade level.

The surveys were delayed several weeks due to challenges both Ambrose Academy and I faced with Covid-19 complications. Survey results started to return during the week of February 21-24, 2021. I provided parents with information regarding the project as well as the opportunity to opt their child out of the survey if they so desired. I sent the link to the survey, along with a paragraph explaining the project, to the upper school and middle school heads, who then reformatted the email to send to parents. The survey for parents was open for two weeks and the survey for students was open for one week. The middle school head and the upper school head sent reminder emails to teachers asking them to provide time during math class for students to complete the survey. The following charts (Figure 8 & Figure 9) represent participation levels by grade.

Figure 8: Parent Participation by Grade

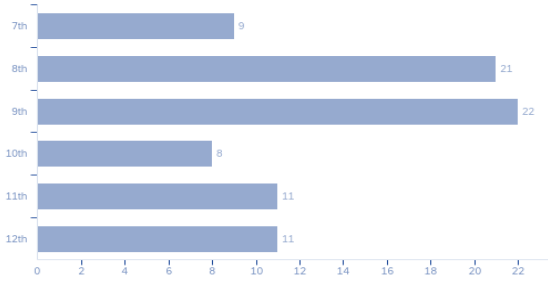
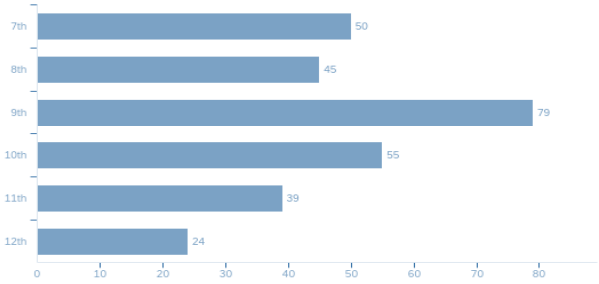


Figure 9: Student Survey Participation by Grade



The surveys were designed to gather additional information regarding students' self-concept in math. The questions (See Appendix D) were adapted from a study designed by Chiu et al. (2008). Chiu et al. (2008) designed their survey to assess students' social comparison and included seven questions that were adapted from Eccles et al. (1993). By utilizing an adaptation

of these surveys, my aim was to develop an understanding of how students view their math abilities in relation to others. The questions asked students to identify how often they compare themselves to others, whether they compare themselves to others in higher or lower math classes, indicate whether they believe they are placed in the appropriate math class, and how they define math tracking. Parents were given similar questions but were asked their views of how their child self-identifies.

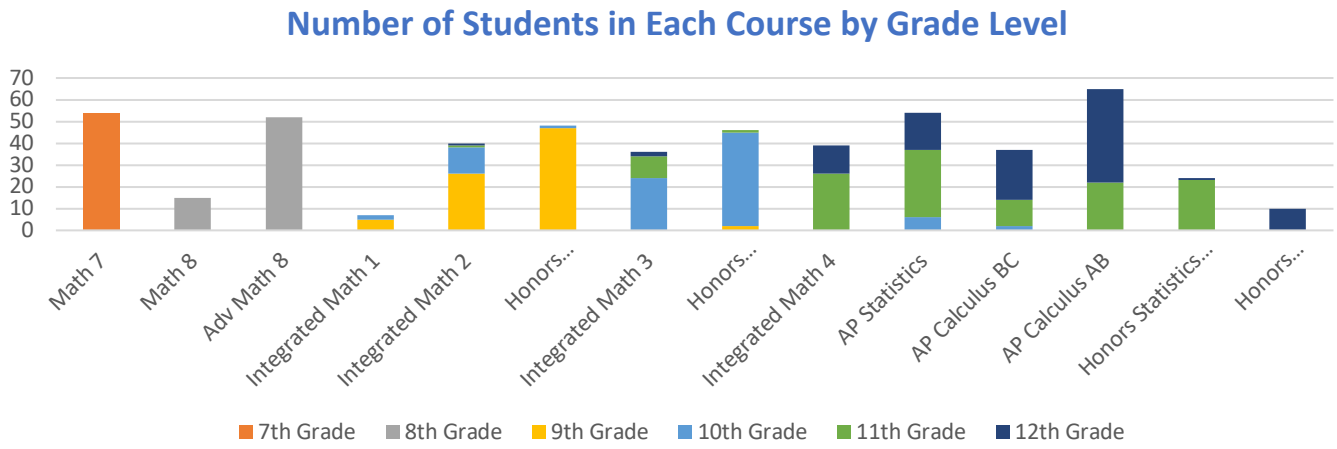
Both surveys were administered via Qualtrics. This online survey tool allowed participants to respond by computer, cell phone, or tablet. The link to the survey was provided via email and only allowed each participant to respond once. Figure 10 shows the total number of students in each grade. 61.3% of students participated in the survey, with grade nine being the only grade level with 100% participation.

Figure 10: Total Number of Students by Grade

Grade Level	Number of Students	Student Percent Participation in the Survey
Seventh Grade	54 Students	92.6%
Eighth Grade	67 Students	67.2%
Ninth Grade	79 Students	100%
Tenth Grade	85 Students	64.7%
Eleventh Grade	94 Students	41.5%
Twelfth Grade	97 Students	24.7%
Total Number	476 Students	61.3%

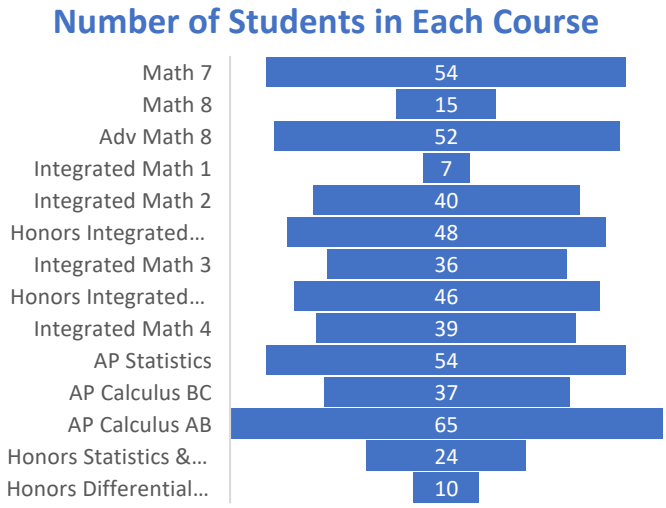
Figure 11 specifies the grade level distribution by course of all seventh through twelfth-grade students. See Appendix B for the corresponding table. Colors represent the grade of students in each class. For example, integrated math 2 and honors integrated math 2 are predominantly ninth-grade students, according to the light orange color. Whereas honors statistics is mostly eleventh-grade students, as noted in the light green color.

Figure 11: Grade Level Distribution by Course



The chart to the right reflects the total number of students taking each course (Figure 12). Total numbers are listed in Appendix B. AP Calculus AB has the greatest number of students at 65 and only has juniors and seniors enrolled. Integrated math 1, a course of primarily freshmen and sophomores, has seven students.

Figure 12: Number of Students in Each Course



I utilized a five-point Likert Scale for the questions regarding self-concept. The final question asked participants to identify the purpose of math tracking in their own words.

Data Analysis

Utilizing sensemaking and self-determination theory, I conducted student and parent surveys and interviewed four teachers and four administrators. The interconnected nature of my project questions meant that I would also have to utilize a mixture of data collection methods and, in some cases, multiple concepts for individual questions. While this did complicate my ability to analyze the data and the process, I feel it provided more nuanced information to share with the school. By this, I mean that the data, being broken up by grade level, leads to multiple conclusions beyond this project's scope. Answering specific questions by combining the concepts of sensemaking and self-determination theory allowed me to incorporate responses from surveys and interviews. Figure 13 demonstrates each research question and sub-question, along with the corresponding concept and data collection method. Below I also provide additional rationale regarding each specific question.

As noted in the chart below (Figure 13), I have two primary questions, each with its secondary questions. The primary questions are pointed out in the dark blue below the chart, and their secondary questions are in bold black.

Figure 13: Data Analysis

Research Question	Concept	Method of Data Collection
How do students, parents, and teachers describe math tracking at Ambrose Academy?	Sensemaking	Surveys (Students & Parents) Interviews (Teachers/Admin)
• *What is the experience of students within math-tracked coursework?*	Sensemaking	Survey (Students)
• *In what ways do parents define math tracking at Ambrose Academy?*	Sensemaking	Survey (Parents)
• *What is the nature and quality of teacher/administrator opinion regarding math tracking at Ambrose Academy?*	Sensemaking Self-Determination Theory	Interviews (Teachers/Admin)
What is the experience of 7th grade students within the detracked math program?	Sensemaking Self-Determination Theory	Survey (Students) Interviews (Teachers/Admin)
• *How has being in an untracked math program affected student efficacy?*	Sensemaking Self-Determination Theory	Interviews (Teachers/Admin)

Primary Question 1: How do students, parents, and teachers describe math tracking at Ambrose Academy?

To answer this question, I focused on the theory of sensemaking. To understand the rationale behind making the systemic change to detrack the seventh-grade math program, I had to know how each specific stakeholder made sense of the concept itself. Surveys of parents and students provided two sets of relevant data. The first, via the Likert Scale questions (see Appendices D & E), provided data regarding how students compare themselves to others in their own and other math classes and had parents compare their children the same way. This comparison provided information on the assumptions students and parents make. The second set of relevant data came from the free-response questions asking students and parents to define math tracking. I took these responses and judged whether they accurately depicted math tracking. Using the same thematic codes from the interview section, I could ascertain whether each answer fit the necessary criteria for accuracy. Some responses were easy to judge as they were either left blank or noted: "I don't know." Others were more challenging and required additional focus. There were some responses to which I gave the benefit of the doubt, especially if they were somewhat on the right track to accurately defining tracking. This is because my goal is to know to what extent parents understand the essence of tracking, and if they have the foundation, then that is valuable information to share with the school.

Secondary Question 1.A: What is the experience of students within math-tracked coursework?

To answer this question, I also utilized sensemaking. Within the survey, there is a question asking students, and their parents, to note the setting in which they perform best, whether that is with students with similar skills or not. Another question asks students and their parents whether the child is in a suitable class for their skill level. These questions directly tie into the past and present experiences of the students in that they are being asked to reflect. Reflection is key in sensemaking as it impacts decision-making moving forward (Weick, 1993).

Secondary Question 1.B: In what ways do parents define math tracking at Ambrose Academy?

This question directly ties into the primary question, but it delves into the variety of ways parents conceptualize the notion of tracking and how they articulate it. Again, the thematic codes were utilized in this process. Sensemaking was the primary theme, and surveys were the primary tool to gather information. This prompt has a secondary question, as parent opinions are critical in developing and executing a systematic shift at any school.

Secondary Question 1.C: What is the nature and quality of teacher/administrator opinion regarding math tracking at Ambrose Academy?

To answer this question, I combined sensemaking and self-determination theory concepts. At Ambrose Academy, the role of administrators is to develop and guide the process of programmatic shifts. The role of teachers is to implement those shifts. In this case, the change was from tracking all math students in grades seven through twelve to detracking the seventh-grade math class. To better understand how teachers and administrators make sense of the ideology behind tracking and detracking, I conducted interviews with four math teachers and four administrators. Questions posed to each group focused on the relevant background regarding the initial thought process to detracking, the process of implementation, their specific views of tracking, and student and parent responses. The motivation aspects of self-determination theory are also an essential component of this response. Each teacher and administrator hold their ideologies regarding education and childhood development. Ascertaining their biases and beliefs helps draw the picture of the overall impact of detracking math.

Primary Question 2: What is the experience of Seventh-Grade students within the detracked math program?

Again, the process of answering this question relied heavily on combining the concepts of sensemaking and self-determination theory. Through interviews with teachers and administrators and surveys of seventh-grade students and their parents, my goal was to understand how members of the seventh-grade class, the only class currently detracked, viewed their experiences in the math classroom. The Likert Scale questions provided one aspect to this, especially those focusing on how students compare themselves to others. There is also a question asking students to discern whether they are in a suitable math class for their skill level, and another asking if they feel they perform best in a class of students with similar skills. Because all students in this grade level are taking the same math class, their responses to these questions are valuable because the setting is more controlled. Every seventh-grade student has the same teacher with the same curriculum. The only difference from class to class within the grade is the level of differentiation by the teacher.

Secondary Question 2.A: How has being in an untracked math program affected student efficacy?

This final project question relates to the success of detracking the seventh-grade math program. Teachers' and administrators' interviews were the primary data collection method for this question. The interviews with the seventh-grade math teacher, the eighth-grade math teacher, and the math department chair were particularly valuable in answering this prompt. Unfortunately, due to the Covid-19 pandemic, I could not access student testing results. This means that the focus of answering this prompt is primarily on the opinions and beliefs of these individuals. However, I do feel that their responses were accurate and valuable.

Response Rates

Students participated in the survey at the following rates: 92.6% of seventh-grade students, 67.2% of eighth-grade students, 100% of ninth-grade students, 64.7% of tenth-grade students, 41.5% of eleventh-grade students, and 24.7% of twelfth-grade students. Altogether 61.3% of students participated in the survey.

I was unable to ascertain parent percentages as that data was not available. However, the number of parent responses is. The following numbers of parents participated in the survey: nine

seventh-grade parents, 21 eighth-grade parents, 22 ninth-grade parents, eight tenth-grade parents, 11 eleventh-grade parents, and 11 twelfth-grade parents.

PART 4: NEXT STEPS

– FINDINGS –
– RECOMMENDATIONS –
– DISCUSSION & CONCLUSION –

Findings

I developed five findings as a result of the data. These findings came primarily from student and parent surveys and interviews with math teachers and administrators and will be used to help offer recommendations. Utilizing the tools within Qualtrics, I started by comparing agreement responses to participant grade levels. I combined the total percentages of sometimes, often, and always answers while identifying the lowest and highest levels of agreement in each question. I combined the responses of sometimes, often, and always because they represent a level of agreement, whereas the other two represent a level of disagreement. My goal for this project is not necessarily to gauge the exact level of agreement but instead to discover if students do or do not agree with the statement. However, understanding the degree of agreement is valuable in some respects, particularly to know how many students always and never agree with a statement. This will be explained in the future. The following is an explanation of each question, along with a visual representation of responses. Questions were adapted from an instrument by Chiu et al. (2008). Figure 15 represents the mean and standard deviations of the social comparisons of total respondents.

Figure 15: Mean and Standard Deviation of Student Survey Questions

Question	Mean	SD
1. I compare myself to students who do better than me in my math class	3.09	1.17
2. I compare myself to students who do worse than me in my math class	2.33	1.11
3. I compare myself to students who do better than me in other math classes	2.34	1.26
4. I compare myself to students who do worse than me in other math classes	1.85	1.05
5. I perform best when I'm in a class of students with similar math skills	3.82	0.90
6. I believe I am in the right math class for my skill level	4.00	0.98
Note: The range for answers of each of these questions was 1-5; higher scores indicate greater support.		

I took the same steps in the data analysis of parent responses as with student responses. I implemented similar questions for the parents, with the alteration being "My child compares

themselves" instead of "I compare myself." The mean and standard deviation of responses are outlined in Figure 16.

Figure 16: Mean and Standard Deviation of Student Survey Questions

Question	Mean	SD
1. My child compares themselves to students who do better than they do in their math class	2.64	1.11
2. My child compares themselves to students who do worse than they do in their math class	2.18	0.94
3. My child compares themselves to students who do better than they do in other math classes	2.19	1.08
4. My child compares themselves to students who do worse than they do in other math classes	1.73	0.87
5. My child performs best when in a class of students with similar math skills	4.03	0.86
6. I believe my child is in the right math class for their skill level	4.17	0.79
Note: The range for answers of each of these questions was 1-5; higher scores indicate greater support.		

Finding One: Students Struggle to Define Math Tracking

Of the 256 responses to the question "To the best of your knowledge, what is the purpose of math tracking", 121 students responded with accurate descriptions. 135 students either did not know the purpose of math tracking or provided a response that did not adequately describe the purpose of math tracking. There were 289 total respondents in the survey, and 33 did not respond to this prompt. This signifies that about 42% of students could adequately describe the purpose behind math tracking.

The terms *ability*, *group*, *level*, and *skill* were foundational in searching for accurate responses based on the relevant research involving math tracking and detracking. A few other terms appeared on multiple occasions throughout the responses. *Comfort* appeared on multiple responses, as did *holding back*. A handful of students noted that the purpose was to help teachers, while a few others discussed the pathway or trajectory through school that tracking provides. Figure 17 demonstrates the number of times and percentages of responses each topic was observed using the Text IQ feature of Qualtrics.

Figure 17: Topic Words

Topic	Instances Occurred	Percentage Occurred
"Ability"	16	6.25% of Responses
"Group"	9	3.52% of Responses
"Level"	57	22.27% of Responses
"Skill"	41	16.02% of Responses
"I don't know"	26	10.16% of Responses

The following responses reflect a handful of viewpoints that either adequately describes the process of math tracking or describes opposing perspectives regarding the process of

tracking. All responses are exactly as provided by the students, including spelling and grammatical mistakes.

"I think that it should be even until high school because in middle school it shouldn't make a decision of what classes can efect your high school classes witch get you into college"

"I think the purpose of math tracking is to ensure that students can be appropriately challenged according to their skill level. If some students' skills are significantly advanced compared to other students' in their class, they may not be challenged in that class, and if some students are significantly behind, they may not be able to keep up."

"I don't really know but I think it is to make sure you are with people that are at the same math level as you so you can be the best you can be without comparing yourself to people doing a lot better or worse than you."

"The smart kids learn better and faster with smarter kids. The dumber kids learn at a slower pace "

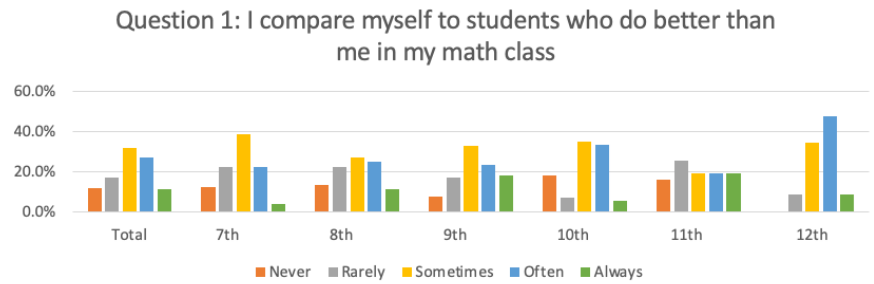
"I believe that people should get the same oportunitys and if there is an advanced math class then the people who want to do it should be allowed to do it not matter there skill level and if somone is struggling they will just need more atention than the others to stay along but give the kid what he wants let him learn if he wants to learn and if he struggles than help him a little more than the others. ok heres an example say that im at a soccer camp and i am a little worse than the others so you kick me out of the soccer camp, that not the right thing to do just give me a little more attention so i can get better and stick with the other kids but you have to give me that opportunity to get better and get progression instead of not getting better."

Less than half of student respondents adequately described the purpose of math tracking, signifying a lack of understanding of this system at Ambrose Academy. Results of the survey indicate that students are comparing themselves to others and have a general awareness of classroom placement. The table to the right (Figure 18) shows the levels of students comparing themselves to others who perform better than they do. This conveys agreement with the relevant research, which also suggests that students are

Figure 18: Compare-Better

Question 1

70.8% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within the junior class, at 58.1%, while the highest level pertained to the senior class at 91.3% of respondents.



generally aware of their place amongst their peers and that a portion of their academic self-concept is related to class-level assignments (Arens et al., 2017).

The challenging aspect of academic self-concept is that a child's misrepresentation of their abilities can impact the reality of their circumstances. Almost 88% of seventh-grade students found that they sometimes, often, or always perform best when in a class of students with similar math skills. However, this is the only grade level in which students of all academic abilities are in the same fundamental math class. Pair this with the fact that almost 92% of seventh-grade students sometimes, often, or always believe they are in the suitable math class for their skill level, and we see a slight disagreement between student perceptions and reality.

The following chart (Figure 19) represents grade-level responses to the final two prompts of students' beliefs regarding how they perform and their math class placement.

Figure 19: Student Beliefs

Question	7th	8th	9th	10th	11th	12th	Level of Agreement
I perform best when I'm in a class of students with similar math skills	12.2%	9.3%	6.8%	3.7%	9.7%	0.0%	Never, Rarely
	87.8%	90.7%	93.2%	96.3%	90.3%	100.0%	Sometimes, Often, Always
I believe I am in the right math class for my skill level	8.2%	4.5%	9.1%	3.7%	22.6%	8.7%	Never, Rarely
	91.8%	95.5%	90.9%	96.3%	77.4%	91.3%	Sometimes, Often, Always

Finding Two: Parents Struggle To Define Math Tracking

Of the 55 responses to the question "To the best of your knowledge, what is the purpose of math tracking," 32 parents provided accurate responses, and 23 either did not know or provided an inaccurate answer. As 81 parents participated in the survey, and 26 did not respond to this prompt, this signifies that 39.5% of parents could provide an adequate description of the purpose behind math tracking, a similar percentage to student responses. Besides the studied *ability, group, level*, and *skill* topics, the term *pace* appeared in numerous responses, as did *cohort*. Figure 20 demonstrates the number of times and percentages of responses each topic was observed using the Text IQ feature of Qualtrics.

Figure 20: Topic Words

Topic	Instances Occurred	Percentage Occurred
"Ability"	3	5.45% of Responses
"Group"	5	9.09% of Responses
"Level"	10	18.18% of Responses
"Skill"	4	7.27% of Responses

The following parent responses are notable and, again, are strictly as provided by the parents studied, including spelling and grammatical mistakes.

"Tracking is designed to challenge students who know the material and learn quickly, while not leaving students who need more support behind. In high school, math track often aligns with AP test preparation."

"To let the kids who are better work on better material"

"The teachers are more effective when they can teach a group of kids at a similar level as opposed to having a classroom of kids at varying levels."

"Possibly it designates students being guided into classes of lower or higher level assuming skills early on in education, and possibly is heavily influenced by implicit biases."

While 42% of student respondents could identify some semblance behind the purpose of math tracking, only 39.5% of parents were able to do so. Although these numbers are close, it does signify that, again, less than half of the respondents provided an accurate conceptualization of the processes inherent within this practice. As primary stakeholders in the process of their child's education, parental understanding of the practices within a school, at least on a surface level, is essential. Most parents want to stay well-informed about their child's academic trajectory. The high tuition level at Ambrose Academy demonstrates the willingness of parents to pay for a specific product. When parents choose to send their child to an independent school rather than a public school, they are demonstrating their willingness and ability to invest in their child's future. The low level of parental understanding does not concur with the views of teachers and administrators interviewed, the majority of whom felt that parents did understand math tracking. This signifies a potential discrepancy between faculty perceptions and parental realities.

Finding Three: Faculty and Administrators Do Not Agree on Tracking

Throughout the interview process, I noticed differences in professional opinions regarding the value of math detracking. While most administrators appear to be on board with the shift to detrack math in seventh grade and eventually into eighth grade, there is not as much agreement about continuing into the upper school grade levels. Only one of the four classroom teachers was fully on board with detracking, and the others expressed skepticism regarding the

feasibility of the endeavor. One teacher expressed concern about the ability to differentiate in a detracked classroom. Another teacher spoke of the benefits of tracking outweighing the benefits of detracking. Teachers who are also parents discussed their personal opinions regarding tracking and its impact on their children. This, in turn, sways their professional opinion, each teacher articulated. All teachers and administrators mentioned the common argument against tracking regarding students in standard courses seeing themselves as being in the "dumb" class.

Faculty also do not seem to be on the same page as parents and students regarding understanding math tracking functions. The following table (Figure 21) demonstrates faculty and administrator responses to prompts asking if parents and students understand what math tracking is. The nuanced nature of tracking one teacher's notes is prevalent in teacher and administrator beliefs regarding how well parents and students can define the concept. While all teachers and administrators believed that students and teachers know what tracking is, the reality is that less than half of the survey respondents provided accurate responses.

Figure 21: Notable Quotes

Do you believe that students understand what math tracking is?	"Yes, students have been known to say 'I'm in the dumb math class'"
	"In the Upper School they have a good awareness... they know where it's leading them"
	"Kids are pretty aware"
Do you believe that parents understand what math tracking is?	"Yes. The parent body is engaged and educated"
	"They might not understand the nuances"
	"In the Upper School, they have a good awareness"

As the primary purveyors of the math content and curriculum, all teachers need at least some level of agreement regarding school protocol. As a relatively small independent school, with less than 100 students in each grade level and ample opportunities for teacher collaboration due to block periods and shared planning periods, crafting consensus should not be too difficult a task. Creating a new technique or system is easy, but it is challenging to undergo unanimity. How teachers conceptualize their content and place in the math trajectory varies widely among those interviewed.

Finding Four: Students Regularly Compare Themselves To Others

Figure 22: Student Beliefs

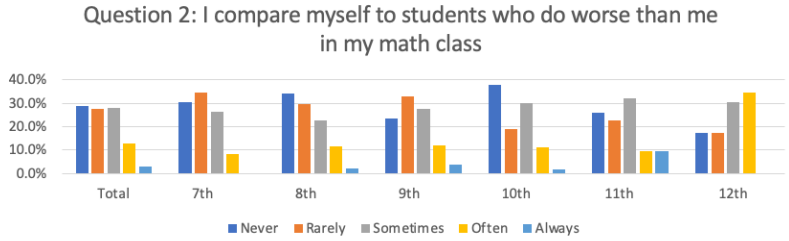
	I compare myself to students who do better than me in my math class.	*I compare myself to students who do worse than me in my math class.*	*I compare myself to students who do better than me in other math classes.*	*I compare myself to students who do worse than me in other math classes.*
Never	12.2%	30.6%	40.8%	59.2%
Rarely	22.4%	34.7%	24.5%	28.6%
Sometimes	38.8%	26.5%	20.4%	6.1%
Often	22.4%	8.2%	10.2%	6.1%
Always	4.1%	0.0%	4.1%	0.0%

As indicated in the chart above (Figure 22) 70.8% of students either sometimes, often, or always compare themselves to those who do better than them in their math classes, while 43.5% of students sometimes, often, or always compare themselves to those who do worse than them in their classes. Less than half of student respondents sometimes, often, or always compare themselves to students who do better in other math classes. Less than a quarter sometimes, often, or always compare themselves to students who do worse than them in other math classes. These results indicate that while many students are comparing themselves to others, such comparisons usually occur in their math section and with students performing better than they are performing.

Figure 23: Compare-Worse

Question 2

43.5% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within the seventh-grade class, at 34.7%, while the highest level pertained to the senior class at 65.2% of respondents.



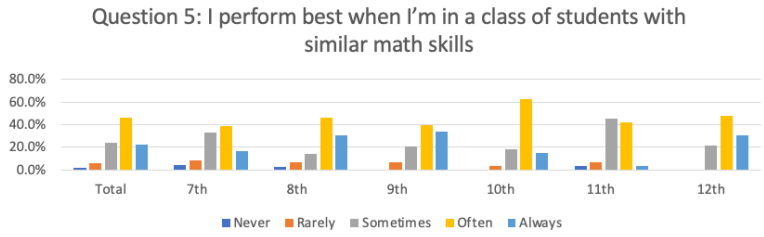
All seventh-grade responses fell within ten percentage points of the average. The seventh-grade class saw the lowest level of agreement for the second question. This indicates that more students in the seventh grade compare themselves to those who do worse than them in their class at a rate higher than any other grade level measured. See Figure 23. This same trend resides within the fourth question. More seventh-grade students are comparing themselves to those who do worse than them in other classes than in any other grade level measured.

Regarding preference between homogenous and heterogenous, most students believe they perform best when in a class of students with similar math skills. See Figure 24. Almost 93% of students sometimes, often, or always agreed with preferring homogenous groupings. 100% of the senior class sometimes, often, or always agreed with the statement, whereas about 88% of the seventh-grade class sometimes, often, or always agreed.

Figure 24: Similar Skills

Question 5

92.7% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within the seventh-grade class at 87.8%, while the highest level pertained to the senior class at 100% of respondents.



Most students will compare themselves to others at some point in their academic careers. This is a natural part of childhood development. This allows students to relate to one another, develop healthy competitiveness and relationships with others, and provide an avenue for self-growth and maturity. However, comparing oneself to a peer can damage a child's academic self-concept. Unrealistic expectations, false equivalencies, and a lack of distinguishing circumstances influence misrepresentations of one's abilities concerning others. Most seventh-through twelfth-grade math student respondents at Ambrose Academy are comparing themselves to others, usually with those they perceive to be performing better in their class. Perception is key in this instance, and these perceptions can dramatically influence a child's progress and academic self-concept.

Finding Five: Students and Parents Feel They Are in the Correct Math Class

91.4% of students sometimes, often, or always believe they are in an appropriate math class for their skill level. This compares to 93.7% of parents who sometimes, often, or always feel their child performs best when they are in a class of students with similar abilities and 97% of parents who sometimes, often, or always feel their child is in a suitable math class for their skill level. The following (Figure 25) compares students and parents based on grade levels.

Figure 25: Class for Skill Level

	7TH		8TH		9TH		10TH		11TH		12TH	
	ST	P	ST	P	ST	P	ST	P	ST	P	ST	P
N	0.0%	0.0%	4.5%	0.0%	1.3%	0.0%	0.0%	0.0%	3.2%	0.0%	0.0%	0.0%
R	8.2%	0.0%	0.0%	5.0%	7.8%	4.5%	3.7%	0.0%	19.4%	0.0%	8.7%	0.0%
S	18.4%	12.5%	11.4%	10.0%	23.4%	18.2%	14.8%	33.3%	12.9%	22.2%	26.1%	10.0%
O	40.8%	62.5%	22.7%	30.0%	26.0%	45.5%	53.7%	16.7%	45.2%	44.4%	43.5%	60.0%
A	32.7%	25.0%	61.4%	55.0%	41.6%	31.8%	27.8%	50.0%	19.4%	33.3%	21.7%	30.0%

St = Student Responses; P = Parent Responses
N = Never, R = Rarely, S = Sometimes, O = Often, A = Always

The slight discrepancy between parent and student perceptions is an essential factor here. The one outlier resides among eleventh-grade students. Combined, 23% of students never or rarely feel they are in the appropriate math placement, and zero percent of their parents think this. This is an anomaly, as in every other grade level, less than ten percent of students either never or rarely feel they are not in the correct math class. This may have been impacted by Covid-19, as that was when they were in the ninth-grade.

Another statistic from these responses is that, on average, parents are more confident in their child's math placement than the students themselves. All parents of seventh, tenth, eleventh, and twelfth-grade students sometimes, often, or always perceive their child to be in the correct math class, and less than six percent of eighth and ninth-grade parents never or rarely feel their child is in the correct class. What is particularly notable here is that all parents of seventh-grade students, who all are in the same math class, feel they are in the correct math class.

Recommendations

Recommendation One: Develop Agreement Amongst Faculty & Administration

The variety of opinions and beliefs regarding math tracking is noticeable among the faculty and administration at Ambrose Academy. While some teachers favor detracking, others do not. There are also those who feel tracking should begin at various stages of a child's scholastic career. For this systematic change to succeed, all faculty and administrators must be on board with at least the essential elements and beliefs regarding detracking.

Change can be challenging for schools. Some of the goals of math detracking on a broader scale include supporting all students at their current level and dismantling the achievement gap and racial disparity amongst students. A change like this aims to improve students' prospects and potential success rate. Improvement principles are twofold; the development of a shared understanding of the necessity to improve and identifying factors that demonstrate whether improvement has taken place (Langley et al., 2009). As Ambrose Academy traverses its understanding of developing a program to improve the prospects of math students, teachers and administrators must hold a shared notion of what improvement is. To do so, they must collectively decide if detracking is the ideal method for their goals.

One of the factors in testing change is deciding "what action is warranted" (Langley et al., 2009, p.19). In the case of Ambrose Academy, the appropriate action, according to administrators, was that of detracking math for seventh grade.

Recommendation Two: Detrack Eighth-Grade Math

Ambrose Academy has completed two years during which time the seventh-grade math program has been detracked. The first class of detracked math students is on the cusp of entering high school, and the teacher responsible for implementing the plan has now had two years to gather the necessary data. Because the eighth-grade program has not yet been detracked, it is essential to now continue the process and continue to study the impact.

As noted in the self-reporting of academic self-concepts, students at Ambrose Academy are opinionated regarding their math placement and their place among their peers. Most students surveyed believed they are in the appropriate math class placement, while the majority also believe that they perform best in a class of students with similar skills. This is a challenging conclusion to conceptualize, primarily based on the results from seventh-grade students. Students in the seventh grade are in mixed-abilities classes, yet most also believe they are in the correct math placement and agree with the statements mentioned above.

For program continuity, it would benefit the school to move forward with detracking the eighth-grade math course. Bolman and Deal (2017) note that "internal or external changes force every structure to adjust, but structural change is rarely easy" (p. 84). The eighth-grade teacher must be on board with the objectives of detracking if this practice continues in their classroom.

Several supports are in place at Ambrose Academy to assist teachers in instructing their content areas and students in their mastery of the content. From college counselors, learning specialists, and Bring Your Own Device initiatives, to teachers who are consistently undergoing professional development opportunities, Ambrose Academy offers a wide variety of supports to ensure that students receive a robust and thoughtful education.

Each division at Ambrose Academy contains a learning specialist. This person is charged with supporting students with learning differences and supporting teachers in working with diverse learners. College counselors and learning specialists are instrumental in delivering the school's mission and vision. The following is a direct quote from the school's website regarding learning support specialists:

> *"Academic and Learning Support Specialists are available to consult with any student who needs support with study skills, time management, and organization. They collaborate with grade-level deans, classroom teachers, and advisors to encourage students' growth."*

College counselors and learning specialists are also valuable entities in the math program. Students with aspirations of college want to ensure they are moving at the appropriate pace to apply to the colleges of their choice. Students who struggle with being in a more advanced course have the support of a learning specialist when necessary. These resources are available to students and faculty and should be utilized.

Additionally, I recommend that the school utilize the publication "Catalyzing Change in High School Mathematics" by the National Council of Teachers of Mathematics for additional information regarding the specific process of detracking additional grade levels. Within this publication are two particularly valuable articles. The first, "Work to End Tracking and Offer Four Years of Meaningful Math Instruction, details how San Francisco detracked math using heterogeneous math courses. The second, "A Systemic Approach to Change", explains how valuable a growth mindset is, and how a school can utilize the strengths of students and teachers to build a foundation of math success. Both case studies, as well as the publication in whole, can be found on the NCTM website.

Recommendation Three: Identify Opportunities for Parent Learning

Parent professional development is a valuable and worthwhile endeavor for Ambrose Academy. As noted above, less than half of parent respondents could accurately define math tracking. If this low number of parents understand math tracking, there may be other significant

programmatic policies of which parents have little understanding. Ambrose Academy should consider developing programs aimed at parent learning. Parent participation is always a challenge for most independent schools. The high tuition cost sometimes comes with the notion from parents that "I'm paying you to do this so that I don't have to." However, in a college preparatory school such as Ambrose Academy, parents must know and understand the "how's" and "why's" of various changes throughout the school. The construction of such a program would allow for further collaboration amongst parents, teachers, and administrators. While the subject of the project is that of detracking math, and this recommendation will focus on parent learning regarding detracking math, similar parent learning opportunities could be replicated in other areas.

Emails, mail home, phone, and the school website are the primary communication tools for Ambrose Academy. These methods can be effective, primarily used in conjunction with one another. Communication is two-way, so anything expected to go out to parents must have an apparatus to return from the parents to the school. The school-home relationship is one of the essential aspects of student success (Houri et al., 2019). The school could boost parental engagement via webinars, parent packets of valuable information, and in-person orientation programs for new families. Allowing for additional home-based involvement (Sheridan et al., 2019) would help ensure that parents and teachers are on the same page.

Discussion & Conclusion

LIMITATIONS

This project is limited to a few factors influencing data interpretation and project participation. Surveys of students were distributed to math teachers, but there was no requirement that teachers, in turn, mandate that students participate. Because of this, some grade levels had significantly lower levels of participation than others. Regarding parent participation, although multiple prompts were emailed to parents to submit, there were considerably fewer parent participants than student participants. More significant numbers of parent participation would have helped to strengthen data figures. I could also not field questions from parents as all communication went through the school administration.

While valuable for this project, interviews were also limited to eight participants. One additional teacher was supposed to be interviewed, but we could not find a mutually agreeable time to meet. Other participants would have broadened the breadth of opinions, but it was difficult due to time and Covid-19 restraints.

Another limiting factor within this project's scope revolves around the impacts of the Covid-19 pandemic. Students' and parents' opinions and beliefs have been altered throughout the last three years, so this extenuating circumstance must be considered. Additionally, results may be impacted because the detracking of the seventh-grade math class took place at the start of the pandemic, while the school briefly transition to a hybrid of online and in-person learning.

Conclusion

Ambrose Academy initiated the shift of detracking the seventh-grade math program during the Covid-19 pandemic. Since then, two years of students have been educated in the newly redesigned program, and the third will begin in the Fall of 2022. Since the change took place, there has been some pushback from parents and teachers. Initially, one of the goals of the change was to mitigate the feeling of being in the "dumb class" for those not placed in the honors sections. Another goal was to increase collaboration and provide additional learning opportunities for all students.

Through surveys, interviews, and reviews of relevant data from the school website, I have discovered some of what drives parents, students, teachers, and administrators regarding math tracking and detracking. I have found that most students compare themselves to others and develop academic self-concepts with these comparisons. Most students at Ambrose Academy believe they are in the correct math placement for their skill level, including those in seventh grade who are all in the same math class. Parents are also confident in their child's math placement. This begs the question "if students are content with where they stand, why recommend that eighth grade should detrack?" For the same reasons as detracking the seventh grade: to aid in student's academic self-concept, limit the amount of negative cumulative advantage, and provide additional opportunities for student engagement.

Ambrose Academy is a thriving independent, college-preparatory school with the ability to serve a multitude of students. The school should welcome all opportunities to support students with varying learning needs, those from different socioeconomic statuses, and those who may

need that extra boost of encouragement. Fostering agreement amongst faculty and administration and developing opportunities for parental learning and growth can do just that.

PART 5: ADDITIONAL INFORMATION

– REFERENCES –
– APPENDICES –

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Appendices

APPENDIX A: SCHOOL SCHEDULES

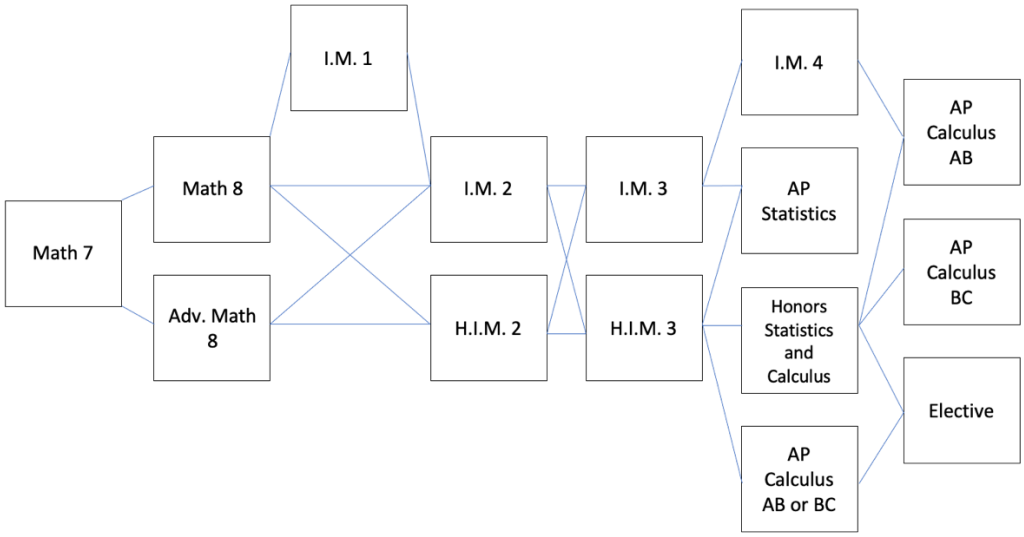
Middle School Schedule			
Sample Schedule for 5th and 6th Grades		Sample Schedule for 7th and 8th Grades	
Early Drop-Off	7:30 - 8:00 a.m.	Morning Care	8:00 - 8:20 a.m.
Advisory	8:20 - 9:00 a.m.	Advisory	8:20 - 8:30 a.m.
Class Time	9:00 - 9:50 a.m.	Class Time	8:30 - 9:25 a.m.
Break	9:50 - 10:05 a.m.	Transition	9:25 - 9:30 a.m.
Class Time	10:05 - 10:55 a.m.	Language	9:30 - 10:10 a.m.
Physical Education	11:00 - 11:45 a.m.	Break	10:10 - 10:25 a.m.
Lunch	11:50 a.m.- 12:15 p.m.	Art or Quests	10:30 - 11:25 a.m.
Language	12:20 - 12:50 p.m.	Lunch	11:30 a.m. - 12:00 p.m.
Art	12:50 - 1:40 p.m.	Class Time	12:05 - 1:00 p.m.
Break	1:40 - 1:55 p.m.	Transition	1:00 - 1:05 p.m.
Class Time	1:55 - 2:45 p.m.	Class Time	1:05 - 2:00 p.m.
Class Time	2:45 - 3:35 p.m.	Life Skills/Chapel/Study Hall	2:00 - 2:45 p.m.
Dismissal	3:35 p.m.	Athletics/Physical Activity	2:50 - 4:10 p.m.
		Dismissal	3:35 or 4:10 p.m.
		Saints After School (SAS) (if applicable)	3:35 - 5:30 p.m.

Upper School Schedule					
Monday	Monday (Reverse)	Tuesday	Wednesday	Thursday	Friday
Health Screening & Check In 8:00-8:45	Health Screening & Check In 8:00-8:45	Health Screening & Check In 8:00-8:45	Health Screening & Check In 8:00-8:45	Health Screening & Check In 8:00-8:45	Health Screening & Check In 8:00-8:45
Period 1 8:45-9:50	Period 4 8:45-9:50	Period 1 8:45-10:15	Period 4 8:45-10:15	Period 3 8:45-10:15	Period 2 8:45-10:15
Period 2 10:10-11:15	Period 3 10:10-11:15	Period 2 10:30-12:00	Period 1 10:30-12:00	Period 4 10:30-12:00	Period 3 10:30-12:00
Lunch by Advisory 11:15-12:15	Lunch by Advisory 11:15-12:15	Lunch 12:00-12:30 Advisory/Clubs 12:30-1:15	Lunch 12:00-12:30 Advisory/Clubs 12:30-1:15	Lunch 12:00-12:30 Advisory/Clubs 12:30-1:15	Lunch 12:00-12:30 Advisory/Clubs 12:30-1:15
Period 3 12:15-1:20	Period 2 12:15-1:20	Period 3 1:15-2:45	Period 2 1:15-2:45	Period 1 1:15-2:45	Period 4 1:15-2:45
Period 4 1:40-2:45	Period 1 1:40-2:45				
Student Support, Co-Curricular Programming, College Counseling 2:50-3:35					

Appendix B: Grade Level Distribution by Course

Course	Number of Students	7th Grade	8th Grade	9th Grade	10th Grade	11th Grade	12th Grade
Math 7	54	54	0	0	0	0	0
Math 8	15	0	15	0	0	0	0
Adv Math 8	52	0	52	0	0	0	0
Integrated Math 1	7	0	0	5	2	0	0
Integrated Math 2	40	0	0	26	12	1	1
Honors Integrated Math 2	48	0	0	47	1	0	0
Integrated Math 3	36	0	0	0	24	10	2
Honors Integrated Math 3	46	0	0	2	43	1	0
Integrated Math 4	39	0	0	0	0	26	13
AP Statistics	54	0	0	0	6	31	17
AP Calculus BC	37	0	0	0	2	12	23
AP Calculus AB	65	0	0	0	0	22	43
Honors Statistics & Calculus	24	0	0	0	0	23	1
Honors Differential Equations	10	0	0	0	0	0	10

APPENDIX C: POTENTIAL MATH TRAJECTORY FROM GRADE 7 ONWARD



H. = Honors
Adv. = Advanced
I.M. = Integrated Math
A.P. = Advanced Placement

APPENDIX D: STUDENT SURVEY QUESTIONS

Current Grade: 7, 8, 9, 10, 11, 12

1. I compare myself to students who do better than me in my math class
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
2. I compare myself to students who do **worse** than me in **my** math class
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
3. I compare myself to students who do **better** than me in **other** math classes
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
4. I compare myself to students who do **worse** than me in **other** math classes
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
5. I perform best when I'm in a class of students with similar math skills
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
6. I believe I am in the right math class for my skill level
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
7. To the best of your knowledge, what is the purpose of math tracking?

APPENDIX E: STUDENT SURVEY QUESTIONS

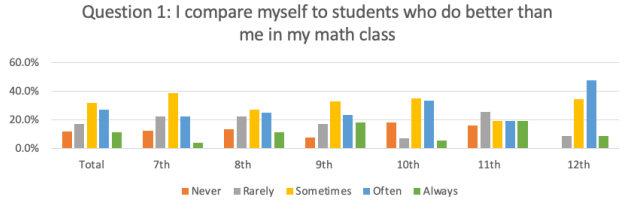
My Child's Current Grade: 7, 8, 9, 10, 11, 12

1. My child compares themselves to students who do **better** than them in **their** math class/section
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
2. My child compares themselves to students who do **worse** than them in **their** math class/section
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
3. My child compares themselves to students who do **better** than them in **other** math classes/sections
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
4. My child compares themselves to students who do **worse** than them in **other** math classes/sections
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
5. My child performs best when he/she is in a class of students with similar math skills
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
6. I believe my child is in the right math class for their skill level
   a. Never
   b. Rarely
   c. Sometimes
   d. Often
   e. Always
7. To the best of your knowledge, what is the purpose of math tracking?

Appendix F: Student Survey Responses

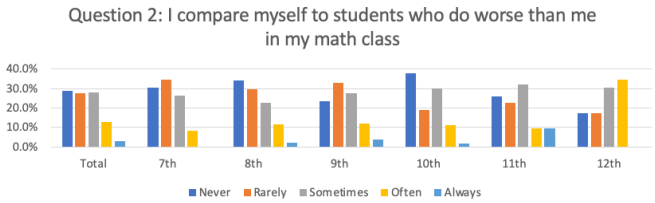
Question 1

70.8% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within the junior class, at 58.1%, while the highest level pertained to the senior class at 91.3% of respondents.



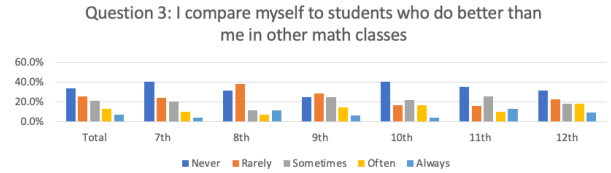
Question 2

43.5% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within the seventh-grade class, at 34.7%, while the highest level pertained to the senior class at 65.2% of respondents.



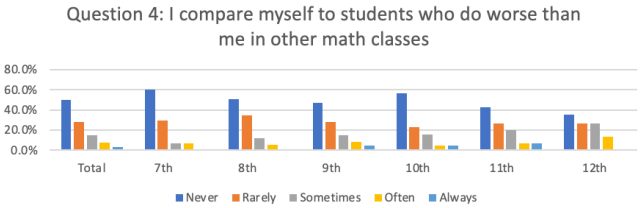
Question 3

40.9% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within the eighth-grade class, at 29.5%, while the highest level pertained to the junior class at 48.4% of respondents.



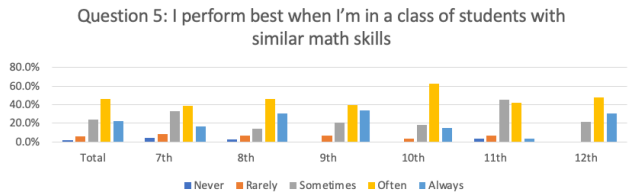
Question 4

23.1% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within the seventh-grade class at 12.2%, while the highest level pertained to the senior class at 39.1% of respondents.



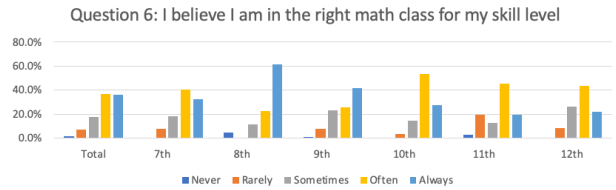
Question 5

92.7% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within the seventh-grade class at 87.8%, while the highest level pertained to the senior class at 100% of respondents.



Question 6

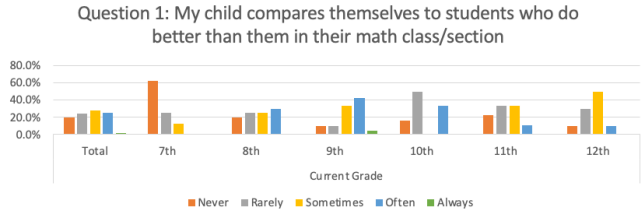
91.4% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within the eleventh-grade class at 77.4%, while the highest level pertained to the sophomore class at 96.3% of respondents.



Appendix G: Parent Survey Responses

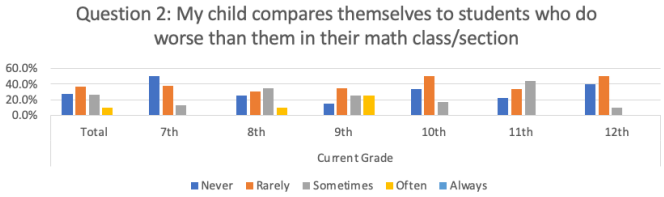
Question 1

55.4% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within parents of the seventh-grade class, at 12.5%, while the highest level pertained to the freshmen class parents at 81% of respondents.



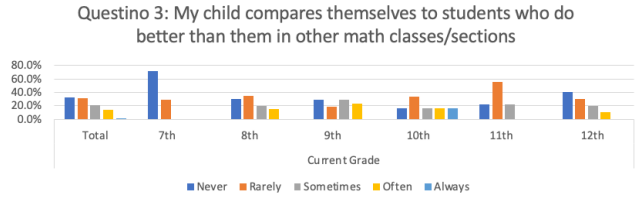
Question 2

35.6% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within parents of the twelfth-grade class, at 10%, while the highest level pertained to the freshmen class parents at 50% of respondents.



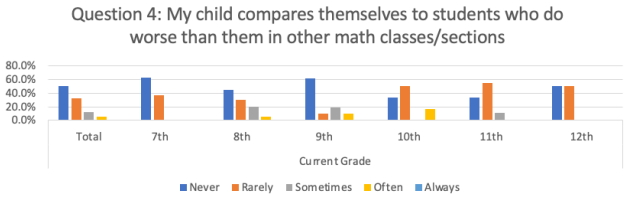
Question 3

35.6% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within parents of the seventh-grade class, at 0%, while the highest level pertained to the freshmen class parents at 52.4% of respondents.



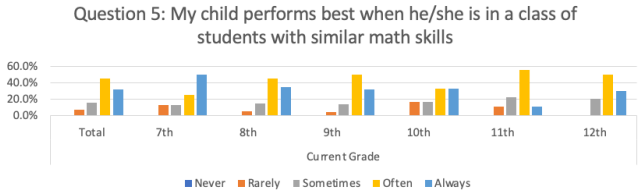
Question 4

17.6% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within parents of the seventh-grade class and the twelfth-grade class, at 0%, while the highest level pertained to the freshmen class parents at 28.6% of respondents.



Question 5

93.3% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within parents of the tenth-grade class, at 83.3%, while the highest level pertained to the senior class parents at 100% of respondents.



Question 6

97.3% of total respondents either sometimes, often, or always agreed with this statement. The lowest level of agreement resided within parents of the eighth-grade class, at 95%, while the highest level pertained to the seventh-grade, tenth-grade, eleventh grade, and twelfth-grade parents at 100% of respondents.