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THESIS

Student Motivation: The Connection to Improved
Mathematical Achievement at the Secondary Level

Submitted by

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In partial fulfillment of the requirements

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Abstract

This study's purpose is to research motivational strategies and survey high school students in mathematics to determine student motivation toward attending an after school tutoring program. The research focuses on after-school tutoring programs at the secondary level and their effectiveness in demonstrating academic growth. This study evolved from measuring the effectiveness of tutoring to determining how to motivate students to attend, communicate with parents to support, and encourage staff to promote attendance to after school teacher led tutoring. This study and literature review covers four themes that connect current research on this topic. The methodology used for this study was a mixed methods approach of explanatory sequential design. Explanatory sequential design is composed of quantitative then qualitative data. Observations of tutoring took place, attendance sheets were reviewed, and staff, parents, and students were surveyed. Based on survey results, while parents and staff members stated they believe the same things about tutoring, the students' opinions were extremely varied from class to class. This study determined there is indeed a connection to motivation and student connectedness in implementing tutoring as a sustainable school-wide academic intervention program. The results showed that students with the most academic deficits have the least buy-in to tutoring and overall indifference to intervention and supports provided to them.

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Chapter 1

Is after school tutoring led by teachers effective to improve student learning? The results of a national educational longitudinal study show that high school math scores are the most powerful predictor of continuing education post high school. (Lee, 2008). The number of students classified with low socioeconomic status (SES) that continue their education post high school is significantly lower than their higher SES peers. In an effort to fill these learning gaps, the comprehensive high school where I work has implemented a teacher-led targeted after school intervention each day. When I began my study, I discovered that it was difficult to measure effectiveness if the students weren't attending the intervention. If my comprehensive high school is utilizing local control funds and writing goals on their plan for student achievement for this intervention, we need to know if the program is effective, specifically in math. I must first identify students who will most benefit from tutoring and then guide them in determining real-life connections. Research shows by doing this it will increase their motivation and competency in high school mathematics, but how?

My research focuses on after-school tutoring programs at the secondary level and their effectiveness in demonstrating academic growth. This study has evolved from measuring the effectiveness of tutoring into determining how to motivate students to attend, communicate with parents to support, and encourage staff to promote attendance to after school teacher led tutoring.

Purpose of Study

Through this study I aspire to find the balance between academic rigor and student motivation to create a sustainable after school tutoring program at a local comprehensive high school. To improve student achievement, we must first create an environment where students feel motivated to achieve. In order to best help our struggling learners, implementing a teacher-

led tutoring program after school hours is a proven effective intervention; consequently, only if students attend the intervention. This study will determine if there is a connection to motivation and student connectedness in implementing tutoring as a sustainable school-wide academic intervention program.

Therefore, for the purpose of the study I must take several steps back from the research of implementing effective tutoring programs at the high school level because if students aren't motivated to attend after school programs in the first place, the existing data on effectiveness is unreliable. How will I know if the school's tutoring program is effective? Do the students who attend these additional after school services and interventions show improvement in their math classes and assessments? Are these students classified as students who meet the eligibility of low Socioeconomic Status (SES)? How can I be sure the students who are close to failing math utilize this resource? Can I motivate students to attend tutoring? As I ask these questions I realize most students aren't going to attend a program, especially after school, if they don't think it will benefit them and immediate feedback isn't given. The research supports after school tutoring and, as you'll read in Chapter 2, tutoring programs promote learning in all areas. However, there is little research on how to motivate students to attend tutoring. This research study will build upon the limited research on secondary students attending tutoring. Ultimately, the current research on tutoring at the secondary level does not show how to implement attendance to optional tutoring, but states tutoring is effective. Before it can be effective though, students must first believe in, support, and ultimately be motivated enough to attend tutoring so its effectiveness can be measured. This research study seeks to fill the gap in current research by identifying factors to improve student attendance to tutoring, especially for students who do not

currently feel they will benefit from time invested in attending a tutoring program at the secondary level.

Preview Literature

According to the research found in my literature review I discovered that high school students who are identified as low SES often struggle in mathematics. Murayama, Pekrun, Lichtenfeld, and Vom Hofe (2013) found that in a control group, long-term growth in math achievement was predicted by motivational and strategy factors, not by the students' intelligence. They note, "an intriguing message from this study is that the critical determinant of growth in achievement is not how smart you are, but how motivated you are and how you study" (p. 1486). This information guided me to learn more about high school students and the mathematics classes in which they were enrolled.

I further integrated concepts I learned through key areas of Martin's work (2008) to inform this research study. The most significant area that informed my research study is Martin's development of the Motivation and Engagement Wheel, see Figure 1(below).

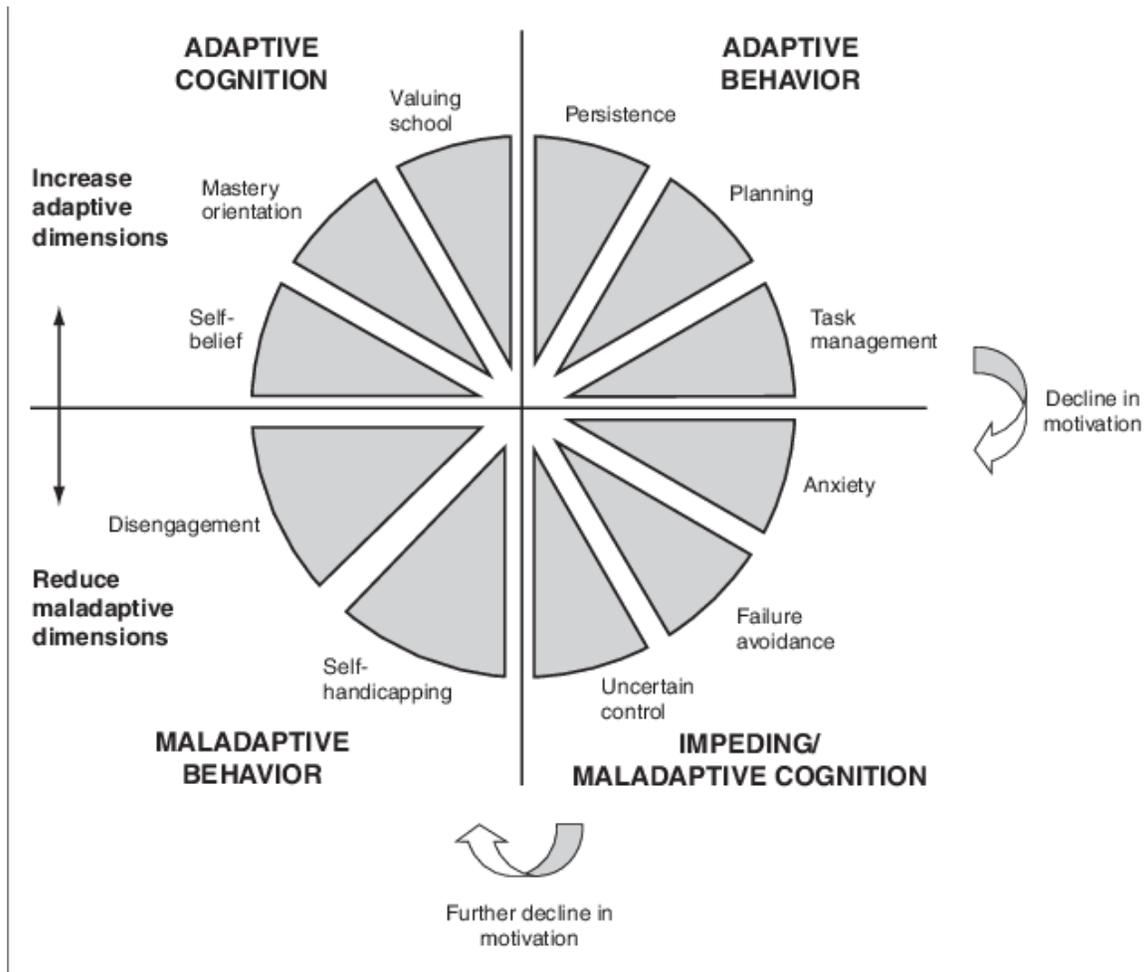


Figure 1: Motivation and Engagement Wheel (Martin 2010)

When comparing what I learned through others' studies, assessing current needs in the newly implemented tutoring program, and applying Martin's Motivation and Engagement Wheel to what I was observing, I determined the issue with the intervention is motivation to attend. The theories of Dweck and Martin ultimately guided my research study as I searched to determine why students were not attending the tutoring program now in place at their high school.

Preview Methodology

To answer my question regarding the effectiveness of motivational strategies for students to attend math tutoring at the high school level, I determined using a mixed methods design was the best option. More specifically, the mixed methods approach of explanatory sequential design was selected to accurately study the phenomenon of measuring effectiveness of motivational strategies in attending math tutoring. Explanatory sequential design is composed of quantitative then qualitative data. This methodology design best aligns with my research question as I can gather quantitative data (observations) and sequentially elaborate and explain this data by following up with the qualitative data component, in this case a likert-scale survey.

Significance of Study

The significance of this study has the potential to identify themes and address common misunderstandings regarding student motivation at the secondary level. This study also has the potential to improve educational practice by providing insight and direction for teachers to specifically target how to improve motivation in secondary students. My study will investigate how other researchers have addressed student motivation when implementing a school-wide tutoring program. I will add to the existing research by determining specific motivators for today's students and by identifying these current needs positively impact academic achievement.

The literature review section helps to answer the question of why increasing student motivation is critical to improving attendance in after school tutoring programs. My research is different than prior studies as I will be determining if there is a correlation between students who are classified as low SES, in foster care, migrant, homeless, or English language learners, are

indeed performing overall lower than the rest of the student population or if student motivation is a larger factor when given the support of after school tutoring.

Conclusion

The data reviewed in preparation of my research study demonstrates the significance and need to identify how to better support all students with additional interventions like after school tutoring, especially for secondary students who are struggling in this area and at risk of failing mathematics.

Definitions

LEA - Local Educational Agencies

LCAP - Local Control and Accountability Plan

LCFF - Local Control Funding Formula

The LCAP is an important component of the LCFF. Under the LCFF all LEAs are required to prepare an LCAP, which describes how they intend to meet annual goals for all students, with specific activities to address state and local priorities identified in Education Code. The LCAP is a three-year plan that describes goals, actions, services, and expenditures to support positive student outcomes at the LEA.

Socioeconomic Status (SES) - is a combined total measure of an individual's or family's economic and social position in relation to others, based on income, education, and occupation.

Motivation - the reason a person has for acting or behaving in a particular way, typically connects with a high level of engagement and focus to the subject or content

Engagement - the degree of attention, curiosity, interest, optimism, and passion that students show when they are learning or being taught, which extends to the level of motivation they have to learn and progress in their education

Adaptive Cognition - learning that organizes a person's knowledge, assumptions, and mental processing habits that are beneficial to his or her survival and well-being

Adaptive Behavior - the type of behavior that enables a person to cope and appropriately adjust to his or her environment

Maladaptive Cognition - learning that organizes a person's knowledge, assumptions, and mental processing habits that are contradictory to his or her survival and well-being

Maladaptive Behavior- the type of behavior that inhibits a person's ability to adjust to certain situations in his or her environment.

Chapter 2

As discussed in Chapter 1, the missing link in measuring the effectiveness of after school tutoring is student attendance. Being able to identify student motivation is critical to encourage students to attend tutoring sessions and thereby measure the effectiveness of math tutoring intervention at the secondary level. In this chapter we will review literature and make connections between current research and the literature reviewed for this study.

Overview of the Context of Literature

The research on motivational theory is abundant; however, there is limited research about motivating students in the area of mathematics. The following research study and literature review cover four themes that connect the current research on this topic. The four themes are: 1) The Dimensions of Motivation: Increasing Student Motivation Increases Student Academic Achievement, 2) Successful Interventions Support Student Motivation In and Out of the Classroom, 3) Positive Impacts of After-School Programs and Interventions on Students, and 4) Longitudinal Studies Show Students with Improved Motivation and Success in Math Have Long Term Success Post High School.

Literature Review Areas

Theme 1: The Dimensions of Motivation

Usher and Kober (2012) released an article summarizing six prior research papers. Within these papers, they demonstrate changes in practice and in motivational research theories from Dr. Ernest Dichter, considered being the “Father of Motivational Research” from the 1940s to Dr. Carol Dweck’s research in 2010. Motivational researchers have found connections between motivation and achievement, although researchers define terms differently; they do agree that increasing student motivation directly correlates to improving student engagement and achievement. Before looking at specific strategies and interventions (Theme 2), we must first

understand the aspects of motivation as an integral part of the teaching framework and the underlying terms that each motivational researcher agrees upon.

There are several theorists who have researched the dimensions of student motivation. The four major dimensions of motivation include: competence, control/autonomy, interest/value, and relatedness (Kober, 2012). According to Usher and Kober's Appendix: How Do Different Experts View the Dimensions of Student Motivation (2012), competence is defined when the student believes he or she has the ability to complete the task. Next, control/autonomy is when the student feels in control by seeing a direct link between his or her actions and an outcome, and retains autonomy having some choice about whether or not to undertake the task and/or how to complete the task. Thirdly, is interest/value when the student has some interest in the task or sees the value of completing it. Lastly, relatedness is when students complete a task that brings them social rewards, such as a sense of belonging to a classroom or other desired social group or approval from a person of social importance to the student.

According to Ryan and Deci's self-determination theory, they suggest that a framework of competence/autonomy and relatedness must be present for students to be motivated (2012). Next, Pintrich's Motivational science perspective identifies five "social-cognitive constructs" that must interact to lead to increased motivation, basically the greater one's confidence in one's abilities, the greater the motivation (2012).

Moreover, they continue to explain that Seifert's Reconstructing Motivation Theory is a survey of several other theories that comprise five basic behavior patterns that distinguish causes of motivation including learned helplessness, failure avoidant behaviors, and passive-aggressiveness. Dweck's Mindset Framework is best explained by how one conceptualizes their own ability as either fixed-based on innate ability-or a growth mindset-based on effort or

learning. Bandura's Self-Efficacy Theory (1977) explains that this motivation theory is based entirely on whether or not a person feels capable of a task or not. Bandura's theory is the Kober and Usher reference Bandura's theory in the competence dimension of motivation. Another researcher, Weiner (1985), and his Theory of Attribution surmises that all motivation is an emotional reaction to an outcome and perceived cause of that outcome. Covington's Self-Worth Theory (1984) states that students are encouraged to base their self-worth on their performance outcomes and alter their behavior to avoid failure or the appearance of failure.

Lastly, the combined efforts of Dweck, Leggett, Nicholls, Pintrich, and Garcia (2011) concur that the Achievement Goal Theory, when students think others judge them by their mastery or performance and find value in this, their motivation is achievement based, or at least based on the perception of achievement. All of these researchers and theorists reviewed, with the exception of Bandura, all align their theories fully to the four defined dimensions of motivation previously outlined: competence, control/autonomy, interest/value, and relatedness.

Subsequently, Bobis, Anderson, Martin, and Way (2011) summarize their predecessor researchers in their chapter, Motivation and Disposition: Pathways to Learning Mathematics Seventy-Third Yearbook. They refer to Holmes (1990) to begin the conversation of motivation, specifically in the classroom, as he described motivation as the 'fuel' for mathematics learning. He viewed motivation as "an essential component of mathematics instruction" (p.32). Because motivation is ultimately the fuel that guides students and educators, according to Bobis et al (2011), if educators wish to address "all aspects of student motivation, they must focus on both the mind - student beliefs and expectations - and their actions, such as students' abilities to plan, manage, and persist at tasks such as homework and challenging problems" (p.32). In order to address student motivation and expectations given appropriate interventions, we must then refer

to the literature to determine what factors qualify an intervention as successful.

Theme 2: Successful Interventions Support Student Motivation In and Out of the Classroom

Now that we understand the aspects and dimension of motivation and research theories as an integral part of the teaching framework, it is time to connect the part (motivation) to the whole (interventions in teaching) and thereby increasing academic achievement in students. The following research includes interventions for teachers and parents to guide, support and motivate students. Each of these studies reviewed here address the four main dimensions of motivation theory in their own right. Although there are studies targeting specific perceptions that impact motivation including multi-dimensional approaches in the classroom, socioeconomics, geography as well as effects of targeted interventions, the research ultimately demonstrates the need for more research in the area of motivation.

In the article, “Exploring the Effects of Project-Based Learning in Secondary Mathematics Education” (2016), Holmes and Hwang found that students who participated in Project-Based Learning (PBL) “outperformed Non-PBL in learning motivational gains and these differences are statistically significant. Therefore, we can conclude that the gains were not due to maturation, but are due to the PBL pedagogical approach” (p.1470).

In addition to project-based learning, Lazarides, Rubach and Ittel (2017) found in a recent study that the perception adolescents have in beliefs and career related conversations had a direct impact on the motivation they had in mathematics. They summarize that their results show that how students perceive their parents value in mathematics affected their own value in mathematics. Based on the Dimensions of Motivation, this concludes that students’ perception of control is swayed by the view their parents hold.

Martin (2008) determined that multidimensional interventions show the greatest effect when enhancing student motivation and engagement in the classroom. The findings from his study showed that “motivation and engagement had emerged such that the treatment group was more motivated than the comparison sample. Specifically, by the end of the intervention, the treatment group scored significantly higher than the weighted comparison archive sample on valuing, mastery orientation, planning, task management, and persistence” (p.259).

Martin created the Motivation and Engagement Wheel based on other research combined with his findings. We review this wheel in more detail in Theme 3. Bowman (2011) also studies to rethink what motivates and inspires students creating successful interventions in his study. His research summarizes, “The primary determinant of the success of an instructional intervention is the interior state of the intervener. Exceptional educators sense that the quality of their teaching depends on the quality of their awareness” (p. 269).

Theme 3: Positive Impacts of After-School Programs and Interventions on Students

Next, we transition from successful interventions relating to student motivation to specifically the effects of after-school programs. Hock, Pulvers, Deshler, and Schumaker (2001) researched the effects of after-school tutoring and recommend to readers

“Those considering implementing after-school tutoring programs should note several findings relative to these studies. First, the core purpose of the after-school tutoring program should be clearly defined. The program’s core purpose (e.g., assignment assistance, instructional or strategic tutoring) will determine, in large measure, the outcomes attained by students. Second, tutors-who are expected to teach students the knowledge, skills, and strategies necessary for learner independence-need to receive well-designed, professional development opportunities. Good instruction does not automatically happen in one-to-one tutoring. Finally, strategic tutoring is ineffective for students who do not attend classes or tutoring sessions regularly. Students in these studies who were tutored for short periods of time (i.e., 4 weeks or less), who did not attend class and take quizzes and tests, or who did not want to work with tutors were unable to attain

independence or earn passing grades. Meeting the needs of these students would require additional intervention beyond tutoring in after-school programs. Recognizing that strategic tutoring is not effective under these conditions is important as educators strive to meet the needs of diverse learners” (p. 184).

Furthermore, Klem and Connell (2004) focused their research on relationships. They explain the positive effects of an after school tutoring program align with linking teacher support to student engagement, specifically, examining the links between teacher support, engagement, and academic success. In 2005, Robinson, Schofield, and Steers-Wentzell found that peer and cross age tutoring programs showed consistent positive results but only when the students ranged in age from 2-4 years apart. (p. 357).

Martin (2010) continued his research from 2008 (reviewed in Theme 2) and validated that multidimensional interventions have the greatest impact on student motivation. Digging deeper into the specific intervention of after-school tutoring, Bobis, Anderson, Martin, and Way (2011) further expanded on Martin’s original research and summarized that the Motivation and Engagement Wheel, which includes prior research and motivational definitions, connect behavior and cognition related to motivation and engagement. “Although the wheel’s general dimensions (adaptive cognition, adaptive behavior, impeding/maladaptive cognition, maladaptive behavior) have been important for research and theory, its specific dimensions - that is, the eleven factors of multidimensional motivation and engagement - are particularly relevant to practitioners” (p. 33).

In summary, Grolnick, Farkas, Sohmer, Michaels, and Valsiner demonstrate in their article, “Facilitating Motivation in Young Adolescents: Effects of an After-School Program,” (2007) that facilitating motivation and the effects of after-school programs is important and “Future work should examine the long-term effects of after-school programs” (p. 343).

Theme 4: Longitudinal Studies Show Long Term Success Post High School

In the prior three themes of this literature review I have covered motivational theory and elements of successful interventions and strategies - specifically positive impacts of after school tutoring programs by improving student motivation and engagement. I hoped to connect these themes to an ultimate fourth theme that demonstrated improved motivation and mathematical achievement correlate to long term success but the research simply isn't there yet.

Murayama, Pekrun, Lichtenfeld, and Vom Hofe's (2013) research combines motivation and cognitive strategies to predict long term growth in students' mathematics achievements. They summarize that, "motivation and learning strategies should, by their nature, facilitate long-term learning processes. The present research documents that these variables are indeed important for students' academic growth over the school years" (p.1484). However, they also state that their findings "should be interpreted in the context of several limitations that suggest directions for future research" (p. 1484).

Connections to the Literature

Although the literature supports more research is certainly needed to identify specific long term factors that are influenced by improved student motivation and the connection of improved math achievement to this success, the evidence that student centered activities and improved self-concept improve academic achievement is sound.

Conclusion

The literature reviewed demonstrates there are indeed connections between student motivation, effective intervention programs and subsequently improved math achievement. Though more research is needed in the area of longitudinal studies to determine the suggested positive effects of improved academic achievement in math being connected to improved motivation and long term success in students post high school, the current research is clear. Increased motivation in students directly impacts their academic achievement in a positive way.

Chapter 3

The literature reviewed in Chapter 2 suggests more research is needed to identify specific long-term factors that are influenced by improved student motivation and the connection to overall math achievement.

Murayama, Pekrun, Lichtenfeld, and Vom Hofe's (2013) research combines motivation and cognitive strategies to predict long term growth in students' mathematics achievements. They summarize that, "motivation and learning strategies should, by their nature, facilitate long-term learning processes. The present research documents that these variables are indeed important for students' academic growth over the school years" (p.1484). They also state that their findings "should be interpreted in the context of several limitations that suggest directions for future research" (p. 1484). Motivational theory and academic interventions have been researched, but how effective are these theories when applied to an optional tutoring intervention at the high school level?

Design

To answer my question regarding the effectiveness of motivational strategies for students to attend math tutoring at the high school level, I determined using an explanatory sequential design mixed methods approach was the best option to accurately study the phenomenon of measuring effectiveness of motivational strategies in attending math tutoring. Explanatory sequential design is composed of quantitative then qualitative data. This methodology design best aligns with my research question as I can gather quantitative data (observations) and sequentially elaborate and explain this data by following up with the qualitative data component, in this case a likert-scale survey.

This choice best aligned with my question as the study evolved from measuring effectiveness of tutoring at the secondary level to determining who attends and if and how these

students are motivated to do so. I first needed to develop an approach to the problem of attendance while also quantifying the problem comparing attendance to tutoring and the effectiveness of motivational strategies; thereby it seemed appropriate to use mixed methods to gain answers. To address my research question, I first met with math teachers to learn more about general education math standards. I also observed classes and tutoring sessions. I later surveyed teachers, students, and parents, collected and analyzed tutoring attendance log in sheets over three months and cross referenced the sign in sheets to students earning Ds and Fs in mathematics. In order to best answer my research question, both qualitative and quantitative data were needed. I effectively used the mixed method explanatory sequential design as the data I gained from the qualitative survey results helped to elaborate and better explain the quantitative data collected during observations and discussions with teachers and administration.

Participants

The participants in this study were selected randomly from tutoring attendance logs and a report of students earning Ds or Fs in Math during spring semester 2017. The survey sampling included ninth, tenth, eleventh, and twelfth grade students currently enrolled in a math class at a comprehensive high school in southern California with an enrollment of 2,198 students. Surveys were given to each teacher teaching a different level of math from Transitional Math (basic math), Math 1 (equivalent to Algebra), Math 2 (Geometry), Math 3 (Algebra 2), Math 4 (Trigonometry), and Calculus. 163 total surveys were collected across the six classes.

Regarding school enrollment, 48% of the total student population is female. Meanwhile, the total minority enrollment is 57% and 31% of the student population is considered economically disadvantaged. Other participants in this study included the high school's

administrators (3), school counselors (4), teachers, staff, and parents. Parent surveys were given to parents at high school registration, a total of 53 were collected.

Setting

The surrounding community is transitioning from a rural area to suburban. In 1980, Murrieta had just 2,200 residents. By July 1, 1991, when Murrieta officially became a city, there were more than 24,000 residents. And by 2005, more than 85,000 people had moved to the community, making it one of the five largest in Riverside County at that time. There has been considerable growth in the community (34%) over the past two decades growing from 38,035 people in 1996 to a population of 111,674 in 2016. In the past two years, school enrollment growth reflects that of the surrounding community still growing.

Murrieta Mesa High School (MMHS) is a four-year comprehensive high school located in Murrieta, California. MMHS offers students an excellent 21st Century academic program that allows students their choice of five college and career pathways, a well-rounded student activities program, and a competitive interscholastic athletic program. The school was named Murrieta Mesa High School because of its geographical location. With a view of the entire valley and the Santa Rosa Mountains, Murrieta Mesa High School sits high on a mesa identified in an 1884 surveyor's map of the valley. It is operated by the Murrieta Valley Unified School District. The 256,988 square foot school opened in 2009 to keep up with population growth in Murrieta. The first graduating class was the class of 2012. The campus has 82 classrooms, a library, administration offices, the Rams Den, a 750-seat performing arts theater and state-of-the-art athletic facilities including a stadium, pool complex, varsity and junior varsity baseball and softball fields, tennis courts, basketball courts, sand volleyball court, and handball courts.

The 62 acre campus has a commanding view of the valley and the Santa Rosa Plateau.

The total cost of the \$126 million school includes \$92.8 million for construction, \$26 million for the land acquisition and \$7.4 million for grading. Funding for the school was provided through the State School Facility Program, local bond measures, and other sources, including developer fees. MMHS's current student enrollment is: 2,200; the school's capacity is: 2,400. All research conducted for this study took place on the MMHS campus in Murrieta, California.

Instruments

Research instruments used in this study included surveys given to parents, students, and staff at the school; log-in sheets from spring semester math tutoring classes; and math grades for students classified as low socioeconomic at this school site. The tutoring program is being funded with LCAP monies, so this factor was included in my research. The survey was given to a randomly selected group of parents at registration days from each grade level (9-12), a random group of students enrolled in mathematics (from basic math to calculus) after the school year began, and all school personnel (all subjects), in an anonymous digital format.

Procedures

Teachers were surveyed via an internet survey link to ensure anonymity. Although my focus area is math tutoring, I included all teachers and all subjects to determine overall attitude, buy-in, and perception of the tutoring program. I also surveyed teachers, staff, students, and parents anonymously. Surveying staff is to determine if staff buy-in could play a role in motivating students to attend tutoring sessions.

I surveyed parents, chosen at random, to determine their knowledge of the school tutoring program being offered. The questions asked included if they knew there was tutoring available after school, if their student attended tutoring, if they had an opinion on what motivated their student to attend tutoring, and ultimately if they viewed it as a positive use of time and resources.

Data sources were varied and included tutoring attendance logs cross referenced with student grades, observations of tutoring classes done by researcher, and a survey regarding buy-in and the importance of tutoring was given to parents, school personnel, and students (grades 9-12). The initial plan to collect data was to analyze attendance logs that students signed as they attended tutoring and cross reference them to the student math classes in which they were enrolled, and the grades they were earning. This, based on current research, would tell me if our program was effective for these students. However, I quickly discovered that the students who were earning Ds and Fs in mathematics were not the same student names I was observing on the log in sheets and “when examining after school programs for quality and effectiveness, researchers scrutinize attendance rates and participation rates of students” (Lauer et al., 2006; Maynard et al., 2013; Yang et al., 2014). I could not adequately measure the effectiveness of the tutoring program at this high school if students weren’t consistently attending. I had to dig deeper and ask more questions. How do I increase attendance to tutoring? How can I measure the effectiveness of motivating strategies to attend tutoring? These questions must first be answered before we truly will know if the after school tutoring program is considered effective. I had to ask others how they felt about tutoring and that is when the survey process began. I interviewed parents at the beginning of the school year, pre-implementation of any motivational strategies in order to gather baseline data of the students’ views on motivation in four main areas: autonomy, competence, relatedness, and relevance. I then surveyed students and school staff to determine their views on tutoring.

Analysis

I analyzed the responses from each group individually and then collectively by cross referencing each survey question to obtain an overall response percentage. The survey was a list of five statements and each response was on a scale of 1 (absolutely disagree) to 5 (absolutely agree) and were as follows:

1. Tutoring is an important additional intervention that supports student learning.
2. I am aware that MMHS provides free teacher-led after school tutoring for students.
3. I feel MMHS has a solid home to school/school to home communication system.
4. I know the process of where to go and who to talk to if I have academic concerns.
5. I believe that teachers and staff genuinely care about MMHS students.

After reviewing and comparing survey results and working with implementation of motivational strategies based on The Motivation and Engagement Wheel (Martin, 2010) and Self-Theory (Dweck, 2000), I want to find out through this research if positive buy-in and increased motivation improves attendance and attitude of the tutoring program or if these factors remain unchanged.

Conclusion

It is evident through the literature review, research study, and data analysis that after school tutoring is a viable and effective intervention. Based on survey results, while parents and staff members believe the same things about tutoring, the students' opinions were extremely varied from class to class. Students enrolled in lower level math classes did not agree with these statements as often as their peers in higher level classes. In addition, when asked about access to tutoring, who to go to if there are academic concerns, and the overall communication between home and school, answers varied widely. This information is valuable as it highlights specific

areas requiring additional intervention if tutoring is to be a successful intervention for all students at the secondary level. These results, to be outlined in more detail in chapter 4, informed my research to better answer how to improve motivation to attend tutoring may be partially answered in first improving buy-in and communication regarding tutoring and creating a clearer process on how to access support.

Chapter 4

This research study focuses on student motivation regarding after-school tutoring programs at the secondary level and the effectiveness of these programs in demonstrating academic growth in mathematics. The research I conducted to determine the effectiveness of after school tutoring has evolved drastically from where I began to what the research findings presented in this chapter show.

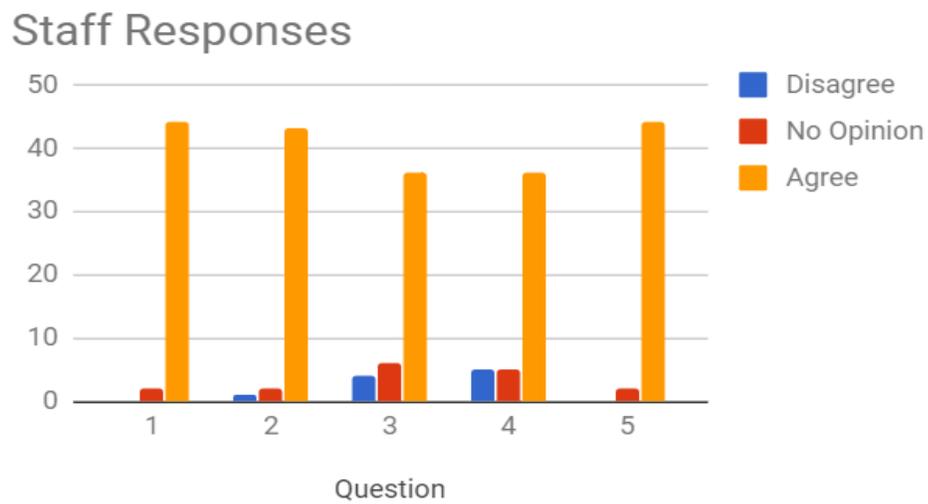
This research study began because current research is limited regarding how to best implement after-school tutoring at the secondary level. What does exist is what led me to conducting my own research on an afterschool program at my high school. The studies of Durlak & Weissberg (2007), Gordon (2009), Grolnick, Farkas, Sohmer, Michaels, & Valsiner (2007), and Heinrich, Burch, Good, Acosta, Cheng, Dillender & Stewart (2014) all reviewed ways to successfully improve tutoring programs but the moving target in all of these studies is student motivation. As I worked to determine if the after school tutoring program at my high school was to be effective, I had to first focus on student attendance to the after school program.

The studies of Rattan, Good, & Dweck (2012), Martin (2008), and Klem & Connell (2004) guided me in effectively determining the steps to take in order to better motivate students to attend, parents to support, and staff to encourage tutoring. It is a combined result of this existing research and my quantitative observation and notes that guided me to ask the survey questions for the quantitative portion of my multi-mixed study. The research findings reviewed in this chapter will provide important data to guide future professional development and staff training in the implementation of increasing social and emotional connections with our students enrolled in lower level math classes at the secondary level.

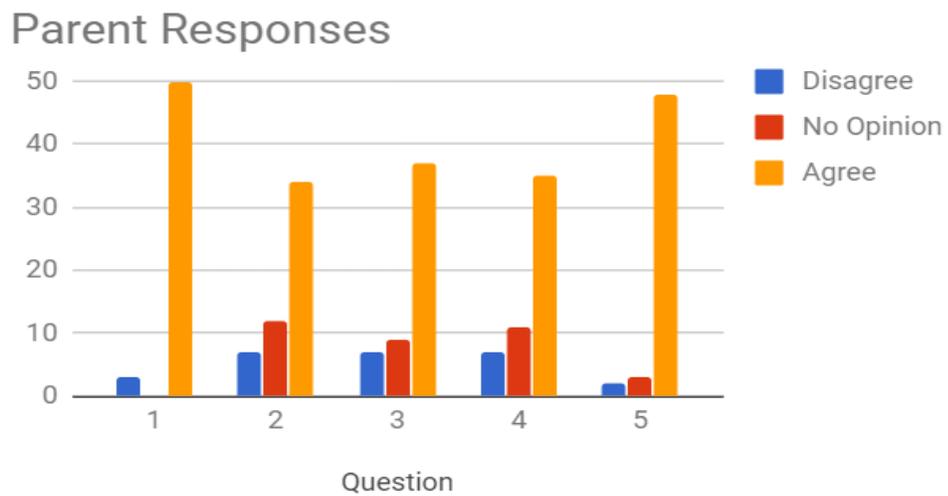
Data Presentation

The survey results of students, staff, and parents are presented in this section. First, the results show that parents and teachers answer similarly to all questions, agreeing most in the areas of tutoring being an important intervention and that teachers and staff genuinely care for their students. The graphs below provide a side by side comparison of these results.

Bar Graph of 46 Total Staff Responses



Bar Graph of 53 Total Parent Responses



While parents and teachers agreed across the board, students' responses varied widely; their results will be discussed in the Data Analysis section later in this chapter.

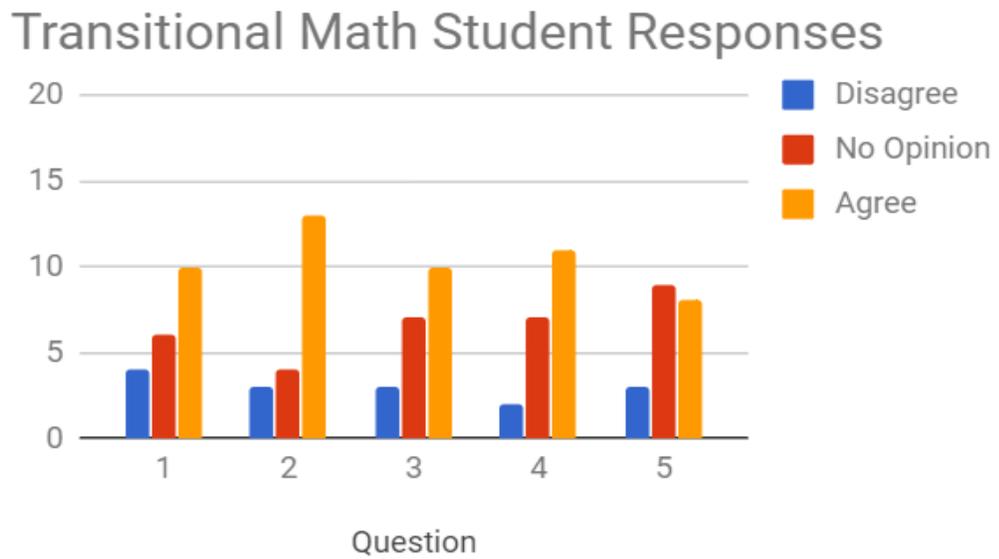
In total, 163 students, 53 parents, and 46 staff members anonymously completed surveys providing 262 different perspectives of interventions, communication, and connectedness. I surveyed groups of parents randomly at registration day (mandatory for all students to attend), sent an all staff email through an online survey creator to maintain anonymity, and students surveyed were selected throughout the school day by surveying six different math classes at random. By distributing surveys to each math level, the data collected provides an overall representation of students from every grade level enrolled in every level of math at this high school. The six math classes include Transitional Math, Math 1, Math 2, Math 3, Math 4, and Calculus. These class names reflect current changes to better meet Common Core and A-G Requirements. Another way to better understand the class levels is outlined in the table below in Figure 2 with the more familiar class names on the left and their corresponding new names currently used listed on the right.

Figure 2: Math classes by traditional name (left) corresponding with the new common core name (right)

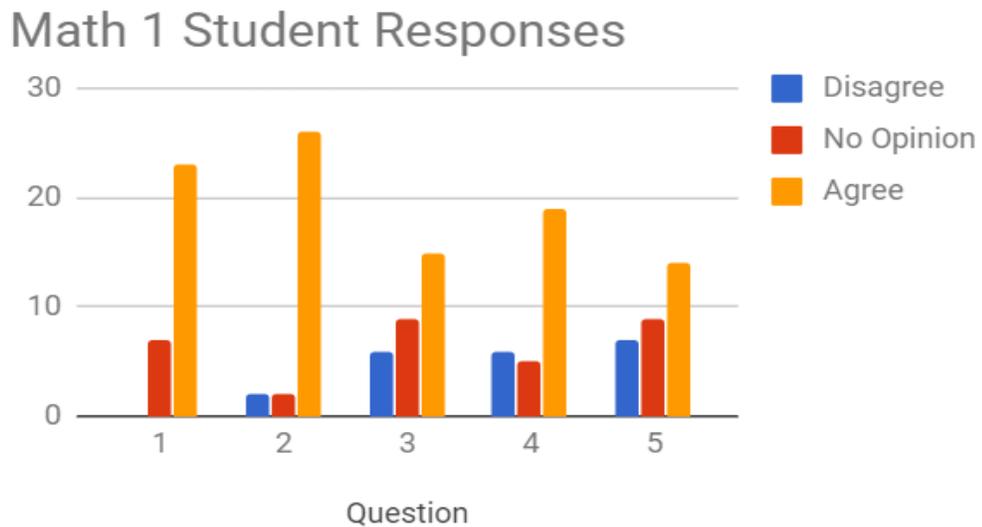
Math Classes Titled by Familiar Name	Math Classes Titled with New Name
Basic Math	Transitional Math
Algebra 1	Math 1
Geometry	Math 2
Algebra 2	Math 3
Trigonometry	Math 4
Calculus	Calculus

Below are graphs to visually summarize student responses organized by math class in which they are enrolled with a total number of student responses on the left of each graph.

20 Transitional Math Student Responses

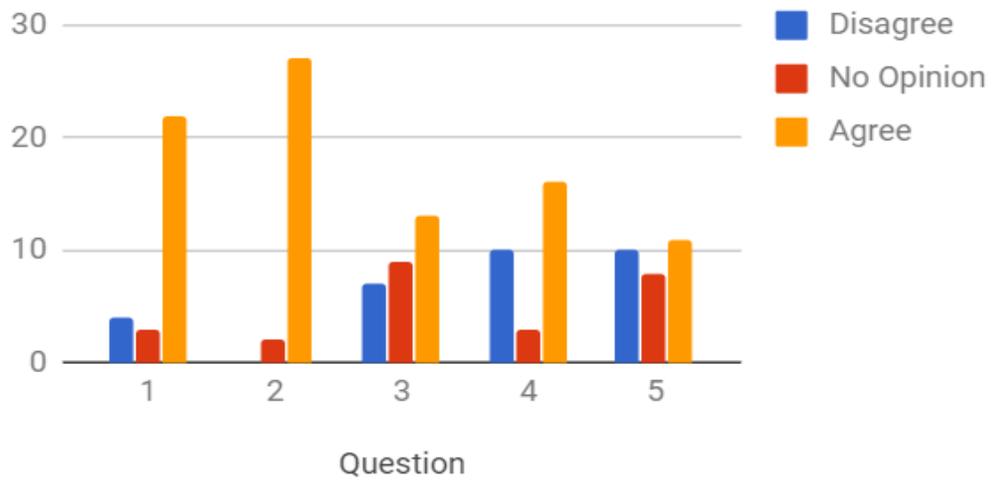


30 Math 1 Student Responses



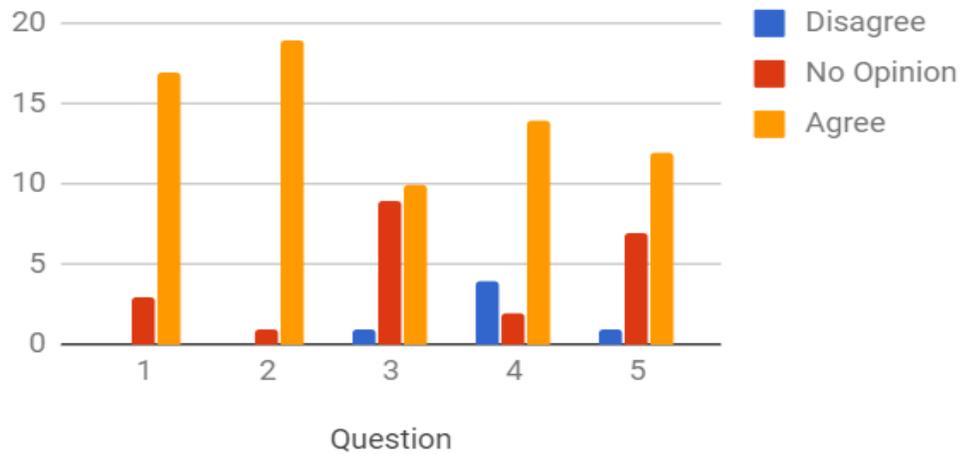
29 Math 2 Student Responses

Math 2 Student Responses

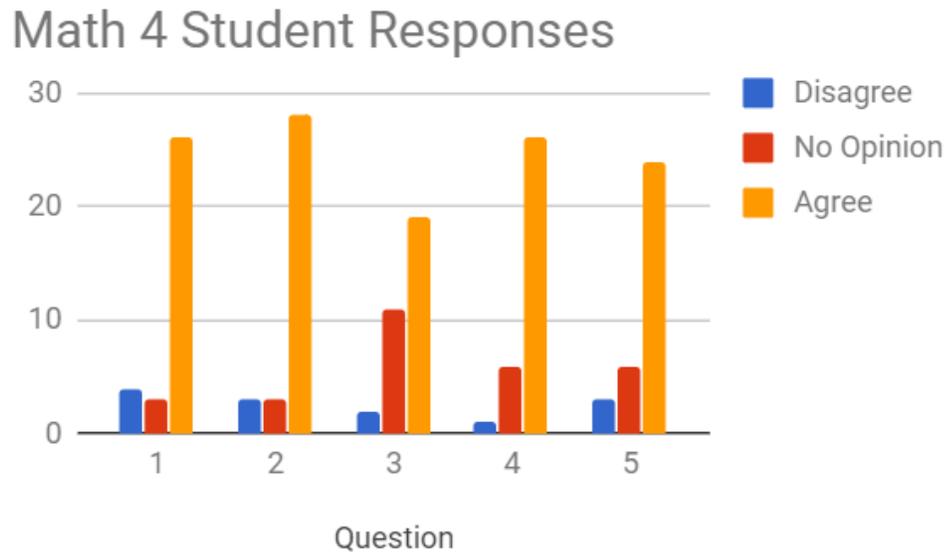


20 Math 3 Student Responses

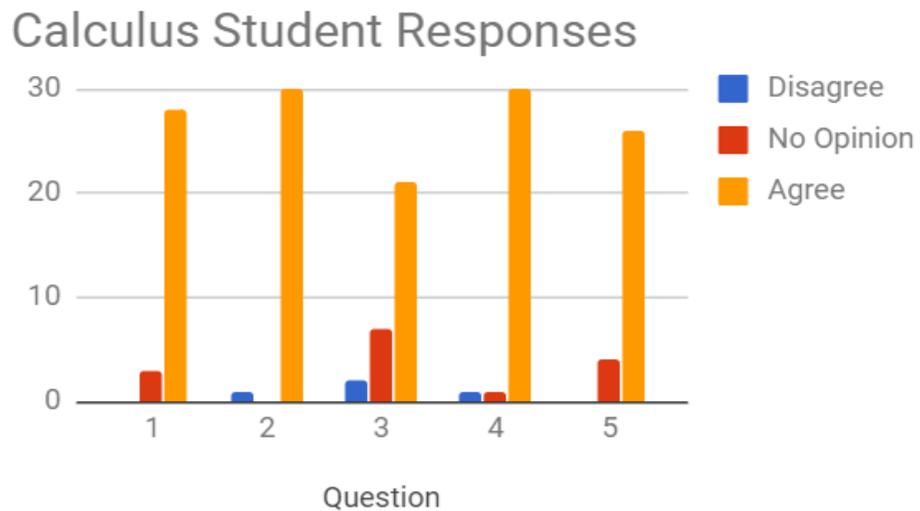
Math 3 Student Responses



33 Math 4 Student Responses



31 Calculus Student Responses



When comparing these graphs of student responses, it is evident that students enrolled in transitional math (the lowest math class) to students enrolled in calculus (the most advanced math class) vary widely in their perspectives with barely half of the lowest math students agreeing with the survey questions and nearly all of the highest math classes in agreeance.

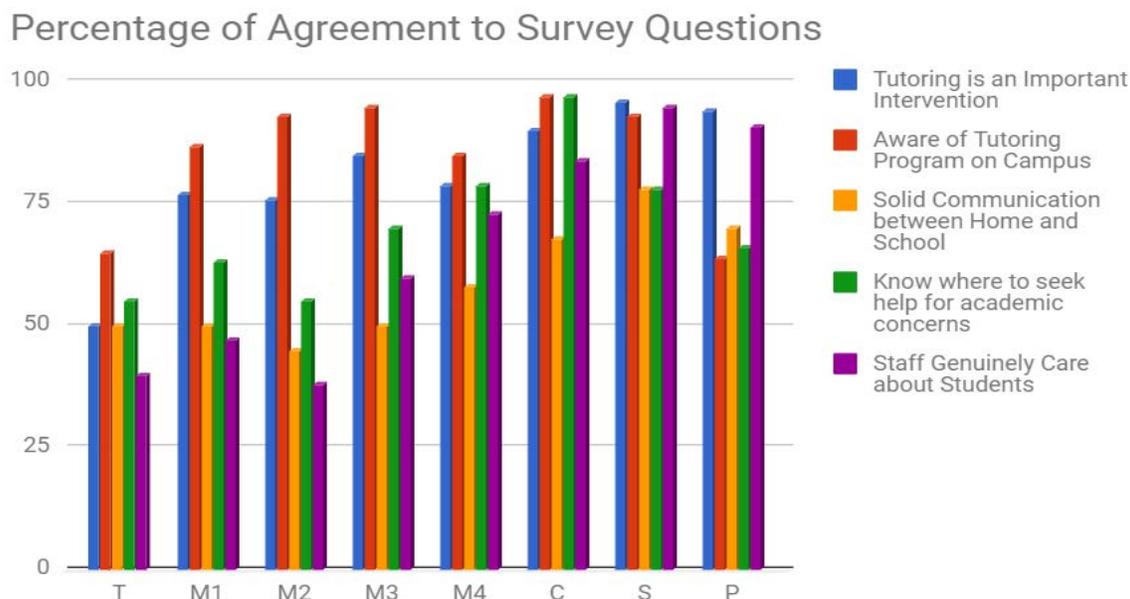
Specifically, when answering if they believe tutoring is an important intervention to support student learning, only 50% of the students enrolled in Transitional Math agreed, while 90% of the students enrolled in Calculus agreed. Similar sentiments about believing if teachers and staff genuinely care about them, only 40% of the students in Transitional Math agreed while 84% of the students in calculus believe they are genuinely cared about. The starkest difference came when comparing answers for if students know the process of where to go and who to ask if they have academic concerns. Of the students enrolled in the lowest math class, only 55% stated they knew where to turn for help while 97% of students enrolled in calculus knew where to go and from whom to seek academic advice.

In addition to the qualitative surveys results, I relied on additional quantitative data including observations, discussions with teachers, as well as notes I had made regarding the LCAP math list and tutoring logs I reviewed to prepare for the survey. From analyzing these qualitative and quantitative measures, I also found that of the students who qualify as low SES and are also receiving a D or F in math, only 16% of their names were also on the tutoring lists. Only 16% of the students who, based on current research of low SES students who are also earning low grades in math and therefore requiring the most academic support, are currently motivated to attend tutoring.

Data Analysis

Side by side comparisons were also helpful when analyzing the survey results as presented in a graphic representation below of the percentage from each group that agreed with the question asked.

Bar Graph of 280 Total Survey Responses by Percentage of Agreement over 8 Groups Surveyed



Key: T=Transitional Math; M1=Math 1; M2=Math 2; M3=Math 3; M4=Math 4; C=Calculus Math; S=Staff; P=Parents

After reviewing the responses side by side, it is evident that students enrolled in the lowest level math class disagreed most with the survey questions. Note the data presented in blue and the significant jump from left to right. Only 50% of the students in transitional math feel tutoring is an important intervention. And more disheartening, only 40% of this population believes that staff genuinely cares about them. When comparing these results to the highest level math class responses, 90% of the students in calculus agree that tutoring is an important intervention and 84% of these students feel they are genuinely cared about by the staff.

Another noticeable difference when comparing classes is student awareness of the tutoring program, the data shown in red. Although there are posters throughout the school and announcements made via the school news channel, only 65% of the students in transitional math state they are aware of the tutoring program while 97% of the students in calculus state they are

aware of the tutoring program on campus. That's a 32% discrepancy between our lowest and highest math classes.

Interpretation

Of the 644 names on the LCAP list who are enrolled in math, 223 have a GPA of less than 2.5. I read through each name again and again. There are over 200 students of 2,200 enrolled at this local comprehensive high school who are struggling in math. I cross-referenced these names to our tutoring sign in sheet each week and of the students attending tutoring, an average only 16% of the total number of students are classified as LCAP students with a GPA lower than 2.5 who are also struggling in mathematics. From this data I now am prepared to have more focused conversations with key stakeholders to streamline processes to support this demographic group at the school site.

As discussed in chapter 2, Bowman (2011) makes us rethink what motivates and inspires students creating successful interventions in his study. His research summarized, "The primary determinant of the success of an instructional intervention is the interior state of the intervener. Exceptional educators sense that the quality of their teaching depends on the quality of their awareness" (p. 269). The data collected in this study demonstrates a need to improve awareness of interventions. According to Yeager and Walton's study (2011), simple strategies which directly reinforce a student's sense of belonging is shown to boost their individual achievement and reduce the achievement gap. Interpreting the data collected in this study, a more direct focus on teachers connecting with students enrolled in transition math, Math 1 and Math 2 classes could have a drastic impact on student achievement across all subject areas.

Another interpretation of the data analyzed is uncovering a need to improve communication and direct instruction for students in lower level math classes on where to obtain academic help. According to survey results, the students who would most benefit from closing their gaps in math achievement by attending tutoring are the same students who state they do not know the process to get help and feel that teachers do not genuinely care about them. What is unknown from anonymous survey results is if these same students who have the perception they are not cared for are the same students who are already identified on the LCAP.

Conclusion

The school LCAP data I reviewed for this research study as well as the information compiled from my survey results prove there is a need to dig deeper to better support students in mathematics at the secondary level, especially students who are enrolled in basic courses (transitional math). This information is valuable as collaboration with teachers and counselors continues to take place in identifying solutions moving forward to improve attendance and engagement in our tutoring program. Implementing a new tutoring program will be a continual improvement process and because of the research gathered for this study, there is now a focal point to target efforts in improving communication, social and emotional learning, and making sure students feel teachers care about them. More educational recommendations will be reviewed in chapter five as the school team continues to identify specific factors utilizing Martin's (2008) research of enhancing student motivation and engagement at Mesa.

Chapter 5

In this chapter, the findings of this study will be reviewed by identifying variables that impacted the study. A rationale will be provided and relationships between past research and this study will be discussed. Recommendations based on the results of this study and correlations with existing literature reviewed for this study will be presented as well as a reflection and identification of lessons learned from this experience. Limitations of the study will be inspected and reviewed and ascertaining how this study can guide future research on student motivation and buy-in to tutoring programs at the secondary level will be given.

Finding Summary

This study was conducted to determine the effectiveness of after school tutoring and to find research to support and guide how to successfully implement a tutoring program at the secondary level. I was unable to determine if the program was effective because students were not attending regularly. Why were students not attending free tutoring? What could the causes be? I set out to find the answer. Through observation, studying existing research, connecting literature and identifying common themes to my research questions, and ultimately conducting this research study, my hypothesis that increasing student motivation would improve attendance to math tutoring was correct; however, the results told so much more. By using a mixed methods explanatory sequential design, I was able to research student and staff perceptions of tutoring as well as motivational strategies that will improve attendance to the intervention. The results of this study found that students enrolled in the lower level math classes were less “bought-in” to tutoring overall than their peers in higher level math classes. The findings of this study will be discussed in greater detail in the following sections.

Finding Interpretation

Predictable variables included tutoring being offered to all students regardless of who attended each week. A dependent variable was attempting to measure student motivation to attend an optional tutoring session which varied student to student. Due to the number of students and teachers on campus there were thousands of possibilities and combinations of variables that ultimately impacted this study. The samples collected, in each math class/level, provided an adequate sampling of the overall student demographic at Murrieta Mesa High School.

To accurately measure motivation this study would require more in depth research into class makeup, socioeconomic status, and more time to complete the study along with follow up of students' perceptions pre and post tutoring. While reflecting on my research results, I realized there was one independent variable and multiple dependent variables. The independent variable is that tutoring is a program that exists at Mesa High School. The dependent variables are factors that impacted student attendance to tutoring. These variables included: difficulty of the unit at the time of survey, teachers reinforcing attendance, parents encouraging (or discouraging) attendance, parent involvement (or lack thereof), as well as after school jobs and participation in sporting practices and other extracurricular activities.

When the survey was given, students could be excelling in the current content being taught in math thus not needing tutoring at that time; however, they could be struggling with overall content. The systems observed to support tutoring are not consistent from teacher to teacher. Some teachers offered incentives for students to attend, others did not. This also applies to parents; some sought out help for their student and ensured they attended. Others when filling

out the survey commented that the focus of time after school should be with family or at work, not at school.

Findings in Context

The results of this study in context with literature reviewed showed a correlation to improving student motivation and thereby mathematical achievement. Though studies from the past three decades all state that motivation is the key to success, they are only partially true. This study shows that students may indeed be motivated, but if they do not feel their teachers genuinely care for them, their desire to do well isn't as high as those students who feel genuinely cared about in the school setting. According to Martin (2011) the tutoring program will be successful when there is buy-in to attend. The results of this study support Martin's research comparing adaptive and maladaptive cognition when related to mathematics. To determine if socioeconomic status played a significant role in this study, further research and follow up would be needed in comparing class rosters to survey responses and the LCAP lists.

Recommendations

Based on the survey results, the first recommendation is to review this study and supporting research with the administration team. The math classes are leveled and teachers are highly qualified experts in their content so next, I recommend providing this study to the math department to use as a guide as they collaborate to best support all students at Murrieta Mesa. Additional recommendations for the team are to encourage future discussions with the focus to explore ways to provide additional opportunities to connect with students. In addition, discuss with admin and teachers way to incentivize both teachers and students to engage and seek assistance that is provided through tutoring. I also recommend conducting additional surveys, interviews, and focus groups to determine connections or differences in motivational strategies

between calculus students and Math 1 students. To be able to apply the results from this research study and other research based approaches, including Dweck and Martin, to the classroom will make a positive impact on the students enrolled in mathematics. To prioritize understanding of student perspectives will improve best practices, improve student motivation, and ultimately improve academic achievement.

Limitations

Limitations of this study were external variables, students, schedules, and the number perspectives. Secondly, the condensed timeframe to conduct this research study was a limitation comparisons to longitudinal studies and further research into the impacts of motivation were not able to be part of this study, specifically, the ability to complete a pre and post survey as originally planned was not possible. In addition, more detailed research could have been completed by comparing LCAP lists and math class rosters, not only tutoring sign in sheets with the LCAP lists. Further questions could have been asked to teachers with high numbers of LCAP students to help support attendance to tutoring, if these students were at risk of failing. The possible comparison of math and other core subjects could also be compared to determine if it is math tutoring or tutoring in general that is inhibiting motivation to attend. These were limitations for this study but could be a starting point for future research.

Conclusion

Concluding this research study is difficult because the results show that our students enrolled in lower math classes are reaching out for more adults to connect with them. Only 16% of the low SES population earning D's and F's in math were attending tutoring. With further research and implementation of motivational strategies, I believe this percentage will increase but there isn't time to test this belief for this current study.

This research study supports prior research given that connections with students and improving their motivation will ultimately improve mathematical achievement. A limitation of this study was there was not adequate time to fully show this growth at Mesa. However, the results show a need to implement strategies to motivate this population, thereby improving their mathematical achievement.

Using a mixed methods design provided opportunities to both observe and quantify the study. This method was able to show the disconnect that exists between students enrolled in different levels of math and their buy-in and beliefs of tutoring and connections with their school.

The purpose of this study was to find the balance between academic rigor and student motivation to create a sustainable after school tutoring program at a local comprehensive high school. Creating an environment where students feel motivated to achieve must come first. In order to best help our struggling learners, implementing a teacher-led tutoring program after school hours is a proven effective intervention; consequently, only if students attend the intervention. This study determined there is indeed a connection to motivation and student connectedness in implementing tutoring as a sustainable school-wide academic intervention program. The results showed that our students with the most academic deficits have the least buy-in to tutoring and overall indifference to intervention and supports provided to them. If anything this study proves that motivation is key to increase learning but to motivate is to care. To improve rigor, we must first motivate students to care and, as Martin's research states, comes from increased engagement and self-belief; then motivation to learn will follow. From my observations, teachers that led by example are the people the students willingly followed. This research study added more information to current research by identifying factors to improve

student attendance to tutoring at the secondary level. This especially applies to students who do not currently feel they will benefit from time invested in attending a tutoring program.

Undeniably, Aristotle was accurate in asserting “Educating the mind without educating the heart is no education at all.”

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