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Math Support Programs: A Case Study of Marina High School

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Abstract

A case study is on how mathematic support programs help students achieve a higher test score average has been done within this project at Marina high school. We will focus on the variety of mathematic support that the school has to offer and how that affects these students. For this particular study, we will be looking at the test results for 2013, 2015, and 2016. Qualitative methods, interviews and collection of data, has been conducted to give us a better understanding of how students have progressed or stayed the same in a three year span. After creating graphs with the data that has been collected, we notice that there is not much change in the past three years.

Mathematic Support Programs; A Case Study of Marina High School

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Introduction

When one looks at test results from your average high school, one does not typically look at any problems that may possibly be underlying that could affect the test results. This research project is based on a case study conducted at a local High School in the California Central Coast community of Marina (Monterey County). The case study focuses on the type of mathematic support programs that are offered and how it can conceivably effect the way students perform overall in class. Marina High offers a variety of different help to their students, according the chair of the mathematic department. This includes tutoring, specific online help, and support from teachers. Aside from reading and writing, mathematics is one of the other main subjects that is taught from k-12. Secondary education should equally prepare their students for an education after high school. The data collected in this project, contrasted with other similar evidence published shows the importance of having a vast variety of mathematic support programs and the effect that it can have fostering high school students success.

This project is a contribution to the current discussion on this topic as it shows the importance of Mathematics in local schools such as the one being reviewed. While the literature states that students who partake in the help that is being offered to them tend to succeed more than students who do not seek for help. This project emphasizes that schools are also entitled to a certain amount of federal funding, which means that schools can offer programs that can help students that need the extra help.

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It is important as a society to be aware of the kind of social issue that can be an outcome from the lack of resources. It is also relevant for our communities to be informed of what these students are being offered throughout their secondary education and what we can do to help further their success and help them continue into a higher education. Creating a case study for Marina High School can be useful because it can help us better understand, and possibly create, ideas to enhance a better learning environment.

I am interested in this topic because I want to go into the education career and become a superintendent one day. By creating a case study at Marina High School, I was able to use quantitative and qualitative to analyze how students are doing as a whole in mathematics.

This report is comprised of such and such section. It starts by providing an overview of the current and recent literature on the matter as a way to frame the theory and method that has been utilized to collect and analyze the data. By using the literature review and theory, we will have a better understanding of the findings. The methods used were qualitative and quantitative data. I conducted interviews within the mathematic department staff. I also gathered data from a statewide data base and compared three different years: 2013, 2015, and 2016. As of July 1, 2013, the STAR testing was discontinued and the California Assessment of Student Performance and Progress (CAASPP) testing was created. Instead of focusing on basic algebra, the CAASPP focuses on analytical thinking, problem solving and communications skills. The project concludes that Marina High school does poorly compared to the Monterey Peninsula Unified School District. We also conclude that within the high school, there has been a stable balance on the overall test scores. If we look at each section individually; exceed, met, nearly met, not met, we can see very subtle increases within the four years.

Literature Review

This section provides a review of two topics that are central to explain academic success. Some of the key factors being focused on are (1)The California Local Control Funding Formula, (2)how teachers contribute to students' academic success, and (3)how students use these math programs and resources during school or after school in order to improve their academic performance. These topics are here to demonstrate that they are some key factors effecting students success, particularly, in a secondary education level.

California Local Control Funding Formula

Before the Local Control Funding Formula was created, dating back to 1970, California public schools received their money primarily from local property taxes (Heilig et. al., 2015, p.874). The Local Control Funding Formula was designed by the state of California in June 2013. The state passed a new law that radically reforms how California funds its schools for the first time in forty years, substantially devolves educational decision-making to local districts and communities, and revises how to improve outcomes in low-performing districts (Affeldt, 2015,p. 8). The LCFF was created to give students from lower-class K-12 schools the opportunity to have equal programs as other more privileged schools. By creating this reform, the state of California also creates grants for these schools in order to give extra assistance. Each of these authors do not state whether there has been a great impact on schools or not.

Parental Involvement

Parental involvement is another factor that can affect students in their academics. Cavanagh & Fomby (2012, p.88) state, “young people who experience changes in family structure in childhood are less likely to complete high school compared to those who remain in

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two-parent families. Moreover, adolescents who reside in single-parent or stepparent families during high school have lower academic aspirations and school engagement (Astone and McLanahan 1991)". This shows us that as students are going through high school, it is essential that parents take the time to be involved in their child's school and make sure that they are meeting school criteria. Morgan & Todd (2009) concluded that parental closure does not generate higher levels of students' achievement in the public sector. They also back up the factor that parental involvement is essential for student success. They can be part of the students' motivation to continue to do well in their classes. Teachers can also be part of the effect. Darden & Cavendish (2011) state in their article, "schools with lower-paid teachers commonly have a disproportionate share of their budget earmarked for expenses they do not have and cannot be shifted for resources they need (Liu, 2006, p. 10; Rubenstein, & Miller, 2005, pp. 9-10; Warner-King & Smith-Casem, 2005, p. 11)". When teachers do not have the appropriate items in order to teach their classes, chances are that the students will be impacted by the lack of supplies.

Student involvement

Students have different levels of involvement throughout their schools. Some of the factors we might think about when we think of student involvement is the type of influence teachers have. Sometimes we can see how their involvement overall affects the students academics in school. Dumais et. al. (2012, p.21) explain in their article how different races and social class can affect how students do in school. Dumais et. al. also explain how students that come, "from higher class backgrounds benefit educationally because their parents provide them with highly structured, organized lives. In contrast, children from working-class backgrounds lack the structured activities and parental school involvement that may provide them with educational opportunities (Lareau 2003)". This can give the readers an idea that for the most part

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students coming from a higher background get more benefits in education. Wildhagen (2009, p.175) states in her article, “socioeconomic inequality in secondary education is ‘effectively maintained,’ meaning that students from advantaged backgrounds have qualitatively better experiences in high school than do their less-advantaged peers”. She also explains how students that are coming from families from a lower-class setting tend to not do as well as students from an upper-class setting. Cultural capital can play this major factor because it gives us a view point at how social class can make a difference in education. Bianchi & Munroe (2008, p.102) also support the idea of cultural capital and education by explaining the awareness of parental aspirations for the future of students' education is one of the social psychological mechanisms for the intergenerational translation of cultural capital.

We can take into consideration that the people we interact with while attending high school make a big impact on how well we do in school. The students do have to be involved themselves in order to achieve higher academic scores, but overall teachers and staff also have an impact on how well the students think they can do. Looking at it from a different perspective, the government can also partake in the students' achievement. Schools being funded by the government can affect what is being offered to them and the budgets can have some limitations. Some of the pros are that by budgeting school evenly, schools will have a more equal chance of being offered the same things. This is helpful because schools that were classified as a higher-class school would have more opportunities and options at what they can do to enhance their academic achievements in their high schools rather than students from a lower-class school.

Theory

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In order to bring perspective to the information that this project has collected, there will be a discussion in two bodies of theoretical relevance, Social conflict theory and the critical education theory. Social conflict theory and the critical education theory are being used to focus on the public education system pertaining to Marina High School. Karl Marx' social conflict theory, or structuralism, establishes. Karl Marx created this theory as a way to demonstrate the unfairness that there was in society within different social classes, for example the rich and the poor. With this being said, Oberschall (pg. 291) stated in his work, "Social conflict refers to conflict in which the parties are an aggregate of individuals, such as groups, organizations, communities, and crowds, rather than single individuals, as in role conflict. It refers in common usage to interaction in which the means chosen by the parties in pursuit of their goals are likely to inflict damage, harm or injury, but not necessarily in every case." Social conflict can also be seen as "a struggle over values or claims to status, power, and scarce resources, in which the aims of the conflict groups are not only to gain the desired values, but also to neutralize, injure, or eliminate rivals"(Oberschall, 1978). Social conflict theory can be used to compare any type of social class, disregarding where they stand. Dahrendorf (pg. 173) states in his article, "We are therefore faced with the task of determining certain associations, institutions, or processes within this balanced whole, that is -in Merton's definition-of determining the intentional or unintentional consequences of these associations for the functioning and the preservation of the system." This can also be seen in an educational stance. These high schools might not be aware of how they are affecting the students with the programs offered or not offered in each school. This theory will be used for this research project because it will focus on a few different factors and their effects on the schools within the school district. One can see that there is social conflict between the four schools that cause a difference in achievement for the students. Each school has money based on

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the location of the school and because of the local control funding formula, the schools in California now have a certain budget which is supposed to help with funding programs and helping the schools more. With more financial help, we expect to see a higher grade average as the year's progress.

Grounded in the understandings generated by Marxist and Neo-Marxist theories, critical education theory provided a revolutionary new understanding on the emancipatory strength of education. Paulo Freire argues that critical education involves problems posing in which all involved are challenged to reconsider and recreate their prior knowledge (Frankenstein, 1983). Being able to teach and show your students the importance of having an education rather than it being viewed as an object is crucial here.

Theories are created to help deepen our knowledge for any given topic and having a different outlook on it. In this case, we are using theory to help us understand how students are affected by the way the school runs their math support program.

Methodology

The methods used for collecting data was a mixture of quantitative and qualitative data. First, there were meetings made with the head of the math chair department to explain how this project was being approached. There were interviews done within the math department at Marina High School. These interviews asked each individual teacher what types of mathematic support, that they know of, is being offered at school, what help do they personally offer to students, with what they have seen, and if they think that students are taking advantage of the math help being offered to them.

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The first teacher interviewed, teacher A, explained how in ninth grade they have the gear up program to help them be successful throughout their high school years. The gear up program itself is a federally granted college outreach program to help low-income students achieve a postsecondary education. In order to be a part of this program, they must meet certain negotiables, since it is federally granted. Within this program, these students are followed throughout high school to make sure they stay on track. It is not completely based on mathematics, but students who are included must maintain good grades through all of their classes. They usually work in collaboration with counselors, teachers, and administration for extra help. Teacher A also mentioned how each teacher has different office hours available as well for these students to come and ask for help.

Teacher B expressed how when a test is coming up soon, they tend to see about five to seven students come in for help throughout the day. Once the test is over, it usually goes down to about one or two students who come in and ask for help. They also expressed that they typically see a larger group of students at the beginning of the year ask for help. As the year goes on, the amount of students going in for help decreases. They explain that this occurs because the students begin to understand what the teachers teaching style is.

Teacher C mentioned how their prep period hours are on Mondays, Wednesdays, and Fridays. From what they have observed, they explain how they only get about six to eight students during their prep periods and about eight to ten students after school.

Teacher D explained how they offered mathematic support during lunch and after school. They do not believe that students are taking advantage of what is being offered to them. They also mentioned that they feel that students struggle at this school and that they lack motivation to

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do better, but they do think that it is getting better because the standards of the school are becoming higher and require for students to put in more work.

Teacher E also explained how they have a variety of office hours for students to come in for help. On Mondays, students have a zero period where it is mandatory for about fifty students to attend, but usually only about fifteen to twenty go. They also do not think that students really go in for help, unless they are at the border at failing the class.

There were a few common responses that I received from the staff. One of those responses were that each teacher leaves lunch time open for any students that need additional help. They are also open to help out other students that may not necessarily be in their math classes, but they might feel more comfortable speaking with different teachers. They are also very open to letting students walk in during the teachers' prep period. A majority of the teachers claimed that they also stay after school on their own time because they do not get paid after 3:00pm. This shows the vast amount of willingness that teachers give in order to see their students succeed in math.

All teachers also mentioned the variety of programs that students can use to connect with teachers for help and programs designed for student individual use. The first program is called remind.com. This website allows students to personally text any teacher if they have any questions or need help with any assignments. Students are not able to view any of the teacher's phone numbers, therefore, their privacy is respected. This is also a way for teachers to send documents to students showing how to solve problems rather than just handing them the answers. There is also a program that is designed online to help students practice math at a self-paced level. A.L.E.K.S was introduced last year to students. Since it is a recent program, there is not enough data to show how well it is working or helping students. D.E.S.M.O.S is an online

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graphing calculator designed to aid students with their math work. Most of these programs that have been introduced to students are relatively new. Not much information is available for us to see if they are useful to students.

Data and statistics were also collected from a public database that pertains to the state. This information was used to compare MPUSD and Marina High School and show how the school was doing compared to the district. It was also used to compare the three different years within Marina High School to view their progression and how well they were doing. Once the data was gathered, graphs were created to give a better outlook on the progress.

Results/Findings

After collecting all data necessary, there was a small difference in how much students had improved in the school year of 2013, 2015, and 2016. For table 1.1, you notice that in 2013, they did the STAR testing for the last time before they changed the way they did testing. The following charts are going to show Marina High School test results being compared to the Monterey Peninsula Unified School District test results. This data was collected off a public California data base.

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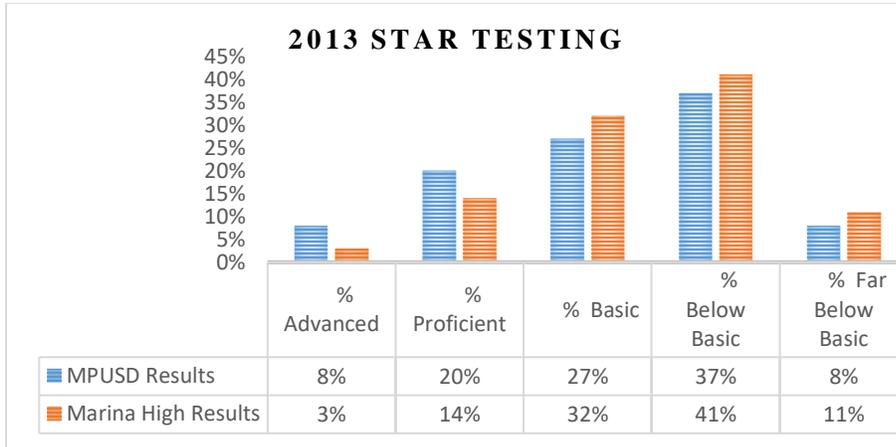


Table 1.1

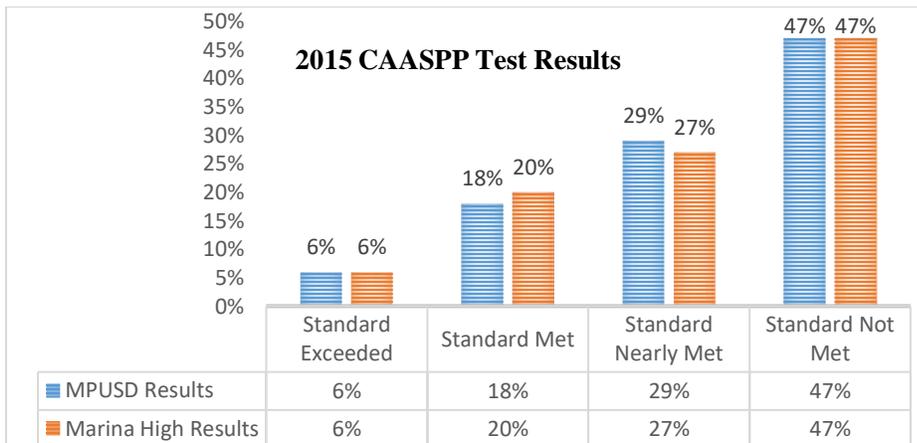


Table 1.2

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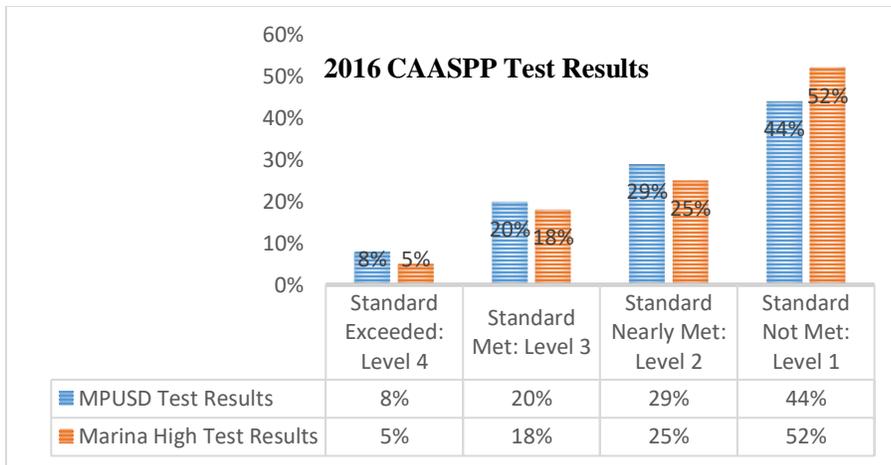


Table 1.3

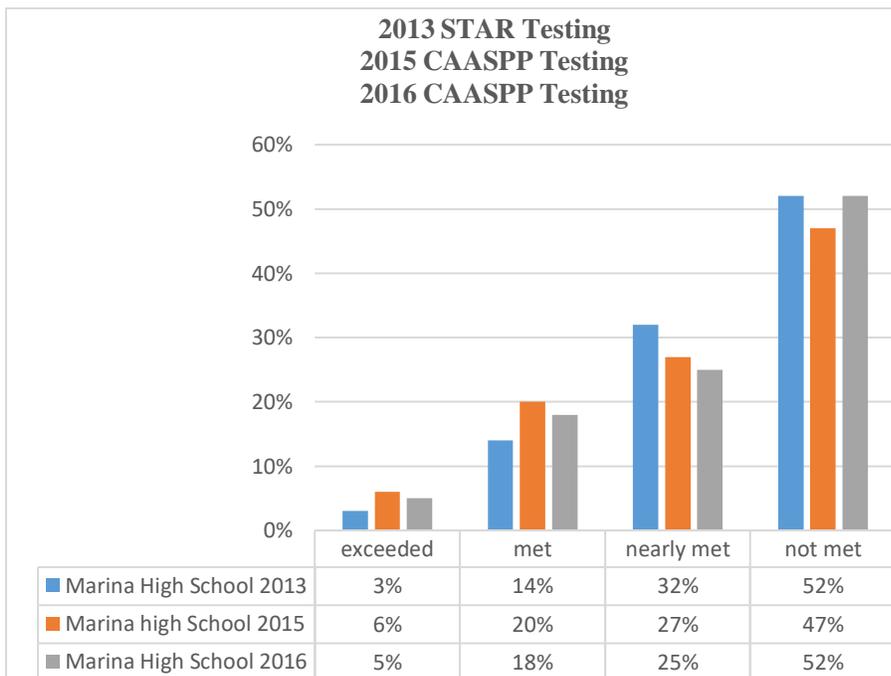


Table 1.4

Tables 1.1, 1.2, and 1.3 shows how Marina High School has fallen below average compared to the school district data. When we look at the graph made only for Marina High School, we can see a stable graph. Between 2013 and 2016, there has been a slight increase in how well students have performed overall. Only the exceeded, met, nearly met, and the not met

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was measured for the purpose of this project. Looking at the nearly met data can be confusing to track. These results do not link up directly to either “not met” or the “met” result sections. In order to verify that there was any improvement, there would have to be a case by case study for each individual student rather than comparing the overall data results. Looking at the 2013 STAR test results and comparing it to the CAASPP results, we see an increase in test results. By using the data collected, we can analyze the other data collected at Marina High school to give us a better understanding of why these test results are the way they are.

Analysis/Discussion

At Marina High School, they offer a variety of mathematic support for students. A few of the programs that are offered are Gear Up, the Strive program, R.I.S.E, and tutoring. R.I.S.E and Strive are not focused on mathematics but they do offer help for students. Paulo Freire’s critical education theory explores how mathematic education reinforces hegemonic ideas which can lead to critical action. Freire continues to explain the importance of an creating that knowledge with his critical education theory in which it compels mathematics teachers to probe the non-positivist meaning of mathematical knowledge, the importance of quantitative reasoning in the development of critical consciousness, the ways in which math anxiety helps sustain hegemonic ideologies, and the connections between our specific curriculum and the development of critical consciousness (Frankenstein, 1983). They changed the way students would be learning math. This is a great example that ties in with critical education theory because it is showing us how Marina High has decided to change their curriculum in order to help students learn mathematics rather than to just memorize it.

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In 2013, Marina High had their very last STAR testing. In 2014, they began the California Assessment of Student Performance and Progress (CAASPP) System. When this test was done in 2014, the data was not posted on the public data base. This is because this was an “experimental” test run on how the new test was structured. This year was used to see how students did on it. The following years, 2015 and 2016, were the first official years that these tests were measured. By looking at the graphs, we see that within Marina High School there has been a stable range of test scores. When we compare Marina High School’s test scores to MPUSD, we see that they do relatively worst.

The fact that Marina High School is half the size of Monterey High School or Seaside High School can explain the amount of funding the school receives. The smaller the school is, the less amount of money it will receive per student enrolled, as explained by the local control funding program. Another factor that can explain the test scores is that there has not been any stable faculty in the mathematics department. When a faculty member was interviewed, they had mentioned how at one point they had to make a part-time substitute teacher into a full-time sub. Even though a substitute teacher may have some knowledge on subjects, like mathematics, they are not fully trained or prepared to create their own lesson plans and teach a class. This can effect students because they might not be learning the right standards of the school or be learning at the correct pace.

Since they have recently changed the curriculum and the way they give students the standardized testing, this can also be a reason why students have not entirely changed on how they score on the CAASPP. It is too early to determine any change since 2015 and 2016 are the first official years that these tests were measured. If we wanted to see if there has been any type

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of change, a case by case study would have to be done on each individual student in order to see their progression.

This case study is limited to data due to the recent change of standardized testing. This is a case study that can be continued in future years once there is more data to observe and compare from. According to the head of the mathematics department, they believe that there will be an increase in test scores once students become more exposed to the critical thinking and analysis in math rather than plain algebra.

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