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Creation of a College Math Club for High School Students

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CREATION OF A COLLEGE MATH CLUB FOR HIGH SCHOOL STUDENTS

A Thesis

by

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ABSTRACT

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This study aimed to investigate the variables that contribute to high school students' desire to join a math club, specifically the FMiM VIP Club, which is an extension of UTRGV's Follow Me into Math research project. The research utilized multiple questionnaire s to examine the combination of factors that contribute to the students' attitudes toward the math club. The participants were high school Algebra 2 students from two different schools, and the study was conducted in two stages. The first stage was conducted in the Spring of 2022, focusing on girls' math identity and their interactions with the FMiM VIP Club, while the second stage was conducted in the Fall 2022 – Spring 2023 and was open to all Algebra 2 students. The study had two main research questions: “What influences high school students to join the FMiM ViP Club?” and “What does the student’s participation in the club indicate about their mathematics identity development?” Each research question had its own sub-questions, and parts of each question were investigated depending on the stage of the study and the school district. The results showed that students had positive attitudes toward the math club, and some of the reasons that influenced them to join included wanting experience for their resume and creating fun social media posts. Positive attitudes toward the math club were associated with higher levels of math achievement, suggesting that such clubs have the potential to encourage students to pursue STEM-related careers.

DEDICATION

I dedicate my work to my family and friends. A special feeling of gratitude to my parents, who have always emphasized the importance of education and have inspired me to always do more. Thank you to my sisters and their words of encouragement. Special thanks to my fiancé, for always being there by my side even in the most stressful times. And finally, thank you to my best friend, even in heaven, she's my biggest cheerleader.

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CHAPTER I

INTRODUCTION

Historical Perspective

The concept of math clubs has a long-standing history in American high schools. According to the National Council of Teachers of Mathematics (2018), math clubs first emerged in the United States during the 1930s. Initially, these clubs provided a forum for students to engage in mathematical activities outside of the classroom. Math clubs have since evolved to encompass a broad range of activities, goals, and interests. Some clubs focus on competition, while others emphasize exploration and discovery. The National Association of Math Circles (n.d.) suggests that math clubs encourage collaboration, problem-solving, and mathematical communication skills among students. To design and implement a high school math club, it is essential to consider students' diverse needs and interests. One approach may be to provide a variety of activities and events that cater to different skill levels and interests, including problem-solving sessions, speaker series, and math competitions. The club should establish clear goals, expectations, and a system for communication and organization to ensure its sustainability and success.

Women are underrepresented in science, technology, engineering, and mathematics (STEM) fields (National Science Foundation, 2021). With a current and projected scarcity of

STEM workers, it is more critical than ever to encourage young women to pursue careers in these subjects. In a report published by the American Association of University Women (2010), men continue to outnumber women in scientific and engineering occupations, even though girls are just as well prepared as boys to pursue a STEM related major at the end of high school. This report also states that a few reasons why women are underrepresented in STEM careers include social, cultural, educational, and self-confidence concerns. It doesn't help that mathematics is usually associated with negative stereotypes in that it is too "hard", and they don't see the value that math has outside of the classroom. However, Merle Froschl and Barbara Sprung state that "without a solid background in math, these students will not be eligible for at least 60% of the jobs of the future." They also state that this is a concern especially for females of all ethnic background since they remain less likely than males to be attracted to math careers. This is where the importance of Math identity comes in. Math identity is described as a "person's beliefs, attitudes, emotions, and dispositions about mathematics and her or his resulting motivation and approach to learning and using mathematics knowledge" (Froschl & Sprung, 2016). In his paper, "Being a Mathematics Learner: Four Faces of Identity," Anderson discusses how "as learners of mathematics, they will not only need to develop mathematical concepts and skills, but also the identity of a mathematics learner" and thus, they need to participate within a mathematical community so they can see themselves and be viewed by others as valuable members of those community (Anderson, 2005). Therefore, by creating a community inclusive to high school girls where they can create mathematical content for a university research team, the girls will get a sense of belonging and can potentially increase their identity toward math.

Purpose

Before explaining the purpose of this study, it is important to note that this study is an extension of the "Follow Me into Math" project. The "Follow me Into Math" project is a research study funded by the National Science Foundation conducted by professors in the School of Mathematics and Statistical Sciences at UTRGV. The goal of this study is to motivate interest and academic choices in mathematics in partnership with a high school in the region. These interactions are divided into three categories: math shows, social media, and a summer internship. During the math shows, the FMiM team travels to the high school and presents mathematical topics in an informal and fun way to engage the students. Social media serves as an extension of these math shows in where we (FMiM team) are constantly posting content related to math for the DHS students. The summer internship took place summer of 2021, and it was a one weeklong experience where DHS students could join us and be exposed to our research project. Students that participated in the FMiM project were pre-tested and post-tested after each interaction with the FMiM team to check if there was any effect on the student's mathematical identity. Since this project is an extension from the "Follow me Into Math" research project, the target population, for the first stage, was high school girls (grade levels 9-12) that attend school number 1 and that have participated in the "Follow me into Math" project. For stage number 2, the target population is now algebra two students who attend school number 2. The purpose of this study is to investigate why high school students join a math club and the different motivators behind it. Since the study is composed of two stages (two different schools), the first stage has an emphasis on gender since only girls joined the club, while the second stage, it is more general.

CHAPTER II

LITERATURE REVIEW

The first part of the literature review is in regard to girls' interest and confidence in mathematics and what factors influences a math identity to be formed. The second part of the literature review describes what a math club is and what it entails as well as the four constructs of mathematics identity.

Math Identity Development in Girls

Teacher Influence

According to Kunter, Klusmann, Baumert, Richter, Voss, and Hachfeld (2013), teacher influence refers to "the impact that teachers can have on the cognitive, motivational, and social-emotional development of students" (p. 126). The impact of teachers on their students' interest and confidence is often underestimated. According to McCarthy and Slater (2011), teachers should foster a culture of openness and inclusion. It is important for teachers to be equitable with the words they use. They should refrain from using phrases like "you guys." They should create learning experiences that encourage research, design, forming solutions, and evaluating products. Teachers need to eliminate the feeling of competition and encourage a culture of collaboration and innovation among their students. By offering a variety of choices for students and focusing

on the human needs connection to help people in real life situations, women will be more likely to take an interest in the program.

Parent Encouragement

Parent encouragement is defined as the impact that parents can have on the interest and confidence of their children in the classroom. The American Society for Quality (2012) found that 21% of parents of girls between the ages of 8-17 encouraged their children to become actresses while only 10% of parents encouraged their adolescent girls to become engineers. However, 31% of boys were encouraged by their parents to think about pursuing a STEM related career. Rowan-Kenyon, Swan, & Creager (2010) report responses from girls that parents help them with their math homework and expect them to receive high grades. Support and encouragement from parents play a crucial role in girls' success and retention in math. Additionally, teachers state that parent encouragement and support is a powerful indicator of math success. The American Association of University Women (2010) also suggest that parents can encourage their daughters' interest and performance in mathematics by eliminating the stereotypes that boys are usually good at math and encourage them to pursue a STEM related career.

Peer Influences

Peer influence refers to the "powerful effect that peers can have on each other's attitudes, behaviors, and beliefs" (Prinstein & Dodge, 2008, p. 101). Adolescents are particularly susceptible to peer influence as they strive to establish their identity and social status within their peer groups. According to Lizzo, Dempster and Neumann (2011), adolescent peer relationships play a big role in how connected they are to school. As a result, it's no surprise that females'

course choices are impacted by their friends. Liem and Martin (2011) studied how same-gender and opposite-gender peer connections affected a variety of school-related characteristics. They discovered that same gender peer interactions substantially predicted academic achievement and that same gender peer relationships have a greater beneficial impact on school involvement in their research. The study also discovered that peer interactions between people of the same gender and those of the opposite gender have an influence on overall self-esteem, which in turn has an impact on confidence levels.

Mentoring Program

Mentoring program is a type of intervention program aimed at countering gender stereotypes in science and mathematics through the use of female role models (Holmes et al, 2012). The employment of female role models is one sort of intervention aimed at combating gender stereotypes in science and mathematics. Exposure to female role models who were regarded to be competent in mathematics, according to Marx and Roman (2002), boosted women's performance on mathematics tests. Similarly, having female role models in the scientific classroom has been shown to influence ninth-grade girls' views about professions in science and mathematics (Evans, et al, 2006). Lee (2006) recommends two important criteria for selecting a mentor: choosing someone whom you admire as a person and professional and seeking generosity in the mentoring relationship. The ideal mentor should also be willing to provide opportunities that will advance your career. Additionally, it is beneficial to have multiple mentors who are at various professional levels, are clinically and research-focused, and possibly of both genders. From the mentee perspective, a mentor is someone who helps you advance your professional career, genuinely assisting in your academic and personal success. In looking for a mentor, one should identify someone who: serves as a role model, has hands-on experience as a

mentor, is willing to invest their time in you, is someone with whom you are comfortable with, and most importantly, someone who provides constructive criticism of you and your work. (Lee, 2006).

Math Club

Mathematics clubs are usually constituted as informal spaces, outside of school, although often based at a school or a university, where learners are encouraged to engage in mathematics as a sense-making activity, to become mathematical problem-solvers, to relate mathematics to real-world situations, and to develop increased enjoyment of mathematics (Prescott & Pressick-Kilborn, 2015; Schlosser & Balzano, 2014; Sherman & Catapano, 2011; Turner, Gutierrez, & Sutton, 2011). It is also hoped that clubs might improve learners' mathematics achievement (Sherman & Catapano, 2011) and build on learners' diverse experiences to support them to talk about, interact with and become more confident in mathematics (Amit, et al., 2007; Diez-Palomar, et al., 2006). Mcleroy (1958) states that a benefit of a mathematics club is the extension of knowledge beyond the possibilities of class instruction. Clubs as part of middle school programs have been identified to support the academic program in several ways. More specifically, by participating in clubs' students can benefit educationally and emotionally since they allow students to be with peers, to feel accepted by teachers and peers as well as to engage in positive learning experiences According to Papanastasiou (2004), "such clubs can provide opportunities that can support the academic challenges faced by children each day in school, which can also foster a connectedness inside and outside of the regular school day" (p. 16).Clubs have the advantage that they provide opportunities for students to develop personal self-esteem, inquiring minds, relatively close human relationships and a sense of belonging and purpose or

usefulness (Aiex, 1996; Hale, 1993; Whitaker and Hays, 1998). Another advantage of academic clubs is that they enable boys as well as girls to participate in them with the goal of attempting to increase the attitudes, achievement, and skills of all students in certain subject matters. For example, clubs have been acknowledged to impact the attitudes of girls and boys regarding the subject matters of mathematics and science (Nicholson, 1988). The activities in extracurricular math clubs can include individual or collaborative problem-solving (Papanastasiou & Bottiger, 2004), or authentic activities that situate mathematics in real-life contexts (Karp & Niemi, 2000). Math clubs may sometimes target high performing mathematics students and focus on providing extension and enrichment task. In such clubs, the focus is on creating an opportunity to engage in learning mathematics content beyond the regular curriculum with other mathematically capable students (Papanastasiou & Bottiger, 2004). Other math clubs have included students who range in ability but share an interest in participating in mathematics-related activities outside of class time (Karp & Niemi, 2000).

Measures of Math Identity

Math identity is described as a "person's beliefs, attitudes, emotions, and dispositions about mathematics and her or his resulting motivation and approach to learning and using mathematics knowledge" (Froschl & Sprung, 2016). In his paper, "Being a Mathematics Learner: Four Faces of Identity," Anderson discusses how "as learners of mathematics, they will not only need to develop mathematical concepts and skills, but also the identity of a mathematics learner" and thus, they need to participate within a mathematical community so they can see themselves and be viewed by others as valuable members of those community (p. 91). Therefore, by creating a community inclusive to high school students, they will get a sense of belonging and

can potentially increase their identity toward math. For Kilpatrick et al. (eds. 2001), productive disposition ‘refers to the tendency to see sense in mathematics, to perceive it as both useful and worthwhile, to believe that steady effort in learning mathematics pays off, and to see oneself as an effective learner and doer of mathematics’ (p. 131). Learners’ social identities can be developed as members of a mathematical community of practice oriented towards mathematical enquiry and mathematics, and their personal identities can be developed as effective problem-solvers in and outside of mathematics. Math identity is a complex construct that encompasses various dimensions, including students' beliefs, attitudes, values, and experiences related to mathematics. Boaler (2002) defines math identity as "the degree to which individuals identify with and value mathematics and perceive themselves as capable mathematics learners." Similarly, Blackwell et al. (2007) describe math identity as a "sense of self that is related to mathematical ability, the perception of math as valuable and relevant, and the feeling of belonging or not belonging in the mathematical community." Several measures have been developed to assess math identity, and each measure focuses on different aspects of math identity. The Mathematics Identity Scale (MIS) developed by Boaler (2002) measures the degree to which students identify with and value mathematics. The Math Self-Concept Scale developed by Marsh (1990) measures students' beliefs and attitudes about their mathematical abilities. The Math Anxiety Rating Scale developed by Richardson and Suinn (1972) assesses students' anxiety towards mathematics. Other measures, such as the Attitudes Towards Mathematics Inventory (ATMI) developed by Tapia and Marsh (2004), and the Mathematics Beliefs and Attitudes Scale (MBAS) developed by Castro et al. (2019), assess different dimensions of math identity, such as attitudes, beliefs, and interest in mathematics. Research has consistently shown that math identity is a significant predictor of academic achievement in mathematics. Studies have found that

students who have a positive math identity perform better academically than those who have a negative math identity (Blackwell et al., 2007; Meece et al., 1990; Simpkins et al., 2006). Moreover, students who have a strong math identity are more likely to pursue further education and careers in STEM fields (Linnenbrink-Garcia & Tsai, 2013). This suggests that promoting a positive math identity is essential for enhancing students' academic achievement and future career opportunities. Several factors can influence students' math identity, including gender, race/ethnicity, socio-economic status, and instructional practices. Research has shown that girls tend to have lower math identity than boys due to societal gender stereotypes that portray math as a masculine domain (Steffens & Jelenec, 2011). Similarly, students from low socio-economic backgrounds tend to have lower math identity due to a lack of resources and support (Fuchs et al., 2006). Instructional practices, such as ability grouping, tracking, and a focus on memorization, can also negatively impact math identity (Boaler, 2002). On the other hand, positive instructional practices, such as inquiry-based teaching, collaborative learning, and focusing on problem-solving, can enhance students' math identity and academic achievement (Boaler, 2014).

Four Measures of Math Identity

Boaler (2016) explains that math identity is a multidimensional construct that includes different facets, such as enjoyment, motivation, self-concept, and value. Enjoyment of math has been found to be an important predictor of math achievement, motivation, and persistence. For instance, Boaler (2002) found that enjoyment of math was a significant predictor of math achievement, with students who enjoyed math achieving higher scores than those who did not enjoy it. Moreover, enjoyment of math has been found to be positively associated with motivation and persistence in math (Tapia & Marsh, 2004). Enjoyment of math has also been found to be influenced by several factors, such as gender, teaching style,

and culture. For instance, research has shown that female students often report lower levels of enjoyment of math than male students (Boaler, 2002; Tapia & Marsh, 2004). Additionally, teaching styles that focus on memorization and speed have been found to decrease enjoyment of math (Boaler, 2002). Finally, cultural beliefs about math and its usefulness have been found to influence enjoyment of math, with students from cultures that value math reporting higher levels of enjoyment than those from cultures that do not value math (Chen, 2002). In addition, enjoyment of math has been found to be related to other facets of math identity, such as motivation, self-concept, and value. Tapia and Marsh (2004) found that enjoyment of math was positively correlated with motivation towards math. Similarly, Castro et al. (2019) found that enjoyment of math was positively associated with self-beliefs in mathematics, which in turn predicted math achievement. Finally, value of math, or the extent to which students perceive math as important and relevant, has also been found to be positively associated with enjoyment of math (Linnenbrink-Garcia & Pekrun, 2011).

Motivation in math has been found to be a significant predictor of math achievement, persistence, and engagement. Research has shown that students who are motivated in math tend to perform better in math and are more likely to persist in challenging math tasks (Wigfield & Eccles, 2000). Moreover, motivation in math has been found to be associated with students' engagement in math, such as their willingness to participate in math activities and their interest in math-related topics (Ma, Klinger, & Springer, 2010). Motivation in math can be influenced by various factors, such as teacher support, parent involvement, and cultural beliefs about math. For example, research has shown that teacher support, such as providing feedback and encouragement, is positively associated with students' motivation in math (Wang & Eccles, 2013). Similarly, parent involvement, such as helping with math homework and discussing math-related topics at home, has been found to promote students' motivation in math (Bempechat & Shernoff, 2012). Finally, cultural beliefs about math and its usefulness have been found to influence students' motivation in math, with students from cultures that value math reporting higher levels of motivation than those from cultures that do not value math (Stevenson & Lee,

1990). Motivation in math has also been found to be related to other facets of math identity, such as self-concept and value. Research has shown that students' motivation in math is positively correlated with their self-concept in math, or their beliefs about their ability to succeed in math (Ma, Klinger, & Springer, 2010). Additionally, students' motivation in math is positively associated with their value of math, or their perception of math's importance and relevance to their lives (Linnenbrink-Garcia & Pekrun, 2011).

Self-concept is one of the four faces of math identity and refers to an individual's beliefs about their ability and competence in math. Research has shown that self-concept in math is an important predictor of math achievement and motivation (Wigfield & Eccles, 2000). Students who have a positive self-concept in math tend to perform better in math and are more likely to be motivated to learn math. Self-concept in math can be influenced by various factors, such as teacher support, feedback, and instructional practices. For example, research has shown that teacher support and feedback are positively associated with students' self-concept in math (Eccles et al., 1990). Similarly, instructional practices, such as providing opportunities for students to engage in challenging math tasks, can enhance students' self-concept in math (Hannula & Pehkonen, 2005). Self-concept in math can also be influenced by gender and cultural beliefs about math. Research has shown that girls tend to have lower self-concept in math than boys, which may be due to cultural beliefs about gender and math (Eccles, 1994). Additionally, cultural beliefs about math and its usefulness have been found to influence students' self-concept in math, with students from cultures that value math reporting higher levels of self-concept than those from cultures that do not value math (Stevenson & Lee, 1990). Self-concept in math has also been found to be related to other facets of math identity, such as motivation and value. Research has shown that students' self-concept in math is positively correlated with their motivation in math, or their willingness to engage in math-related tasks and activities (Klinger et al., 2010). Additionally, students' self-concept in math is positively associated with their value of math, or their perception of math's importance and relevance to their lives (Linnenbrink-Garcia & Pekrun, 2011).

The concept of value is one of the four faces of math identity, and it refers to an individual's beliefs about the significance, importance, and usefulness of math. Research has demonstrated that students' value of math is related to their motivation, achievement, and career aspirations in math-related fields (Linnenbrink-Garcia & Pekrun, 2011). Students' value of math can be influenced by several factors, including family support, teacher encouragement, and cultural beliefs about math. Studies have found that family support and encouragement from parents can positively influence students' value of math (Gonzalez-DeHass & Willems, 2003). Similarly, teachers who are enthusiastic about math and emphasize its importance can enhance students' value of math (Wentzel, 1998). Cultural beliefs about math can also impact students' value of math. For example, research has shown that students from cultures that value math tend to have higher levels of value for math than those from cultures that do not value math (Stevenson & Lee, 1990). Moreover, students' value of math can be affected by their own personal experiences with math, such as their success or failure in math classes. The value of math can also be influenced by the type of math being taught. For instance, research has shown that students are more likely to value math when it is presented in an applied or real-world context (Ginsburg & Ertle, 2008). Additionally, students tend to value math more when they are able to see its relevance to their lives and future career aspirations. Furthermore, the value of math has been found to be associated with other facets of math identity, such as motivation and self-concept. Studies have shown that students who value math tend to have higher levels of motivation to learn math and a more positive self-concept in math (Linnenbrink-Garcia & Pekrun, 2011;Klinge et al., 2010).

Recruitment Strategies for a Math Club

Math clubs can provide a supportive environment for students to develop their interest in mathematics and pursue STEM-related careers (Stupnisky et al., 2017). However, recruiting students to join math clubs can be challenging, particularly given the negative stereotypes and

attitudes toward mathematics that are prevalent in society. Therefore, identifying effective recruitment strategies is critical to increasing student participation in math clubs. One strategy that has been found to be effective in recruiting students to math clubs is providing them with positive experiences in math-related activities. This can include hands-on projects, field trips, and real-world applications of math. Research has shown that students who participate in math clubs that focus on these types of activities are more likely to have a positive attitude toward math and to consider pursuing STEM-related careers (Kusuma & Kusuma, 2021). Peer mentoring is another effective strategy for math club recruitment. Several studies have shown that high school students who are mentored by college students or other peers are more likely to join a math club and have higher levels of math achievement (Stupnisky et al., 2017; Lopatto et al., 2014). Peer mentoring can provide students with role models who can share their experiences and offer support and guidance. Social media can also be an effective tool for promoting math clubs and increasing student participation. Platforms such as Instagram and Facebook can be used to share photos, videos, and testimonials from current math club members, as well as to promote upcoming events and activities (Kang et al., 2019). Social media can also be used to connect with students who may not be aware of math clubs or who may be hesitant to join. Addressing negative perceptions of math is another critical component of math club recruitment. Many students perceive math to be difficult, boring, or irrelevant to their lives. To overcome these perceptions, math clubs can provide engaging and relevant activities that show students the practical applications of math. For example, a math club could focus on using math to solve real-world problems or to design video games or other interactive projects. In conclusion, effective recruitment strategies for math clubs include providing students with positive experiences in math-related activities, peer mentoring, social media promotion, and addressing negative

perceptions of math. By implementing these strategies, educators and policymakers can increase student participation in math-related activities and promote the value of mathematics as a pathway to STEM-related careers.

Theoretical Lenses

Social identity theory is a theoretical perspective that emphasizes the importance of social groups in shaping an individual's sense of identity (Tajfel & Turner, 1979). This theory suggests that individuals define themselves in terms of their membership in various social groups, such as their gender, race, ethnicity, religion, and academic affiliation, including math clubs (Abrams & Hogg, 2010). According to social identity theory, the groups to which individuals belong provide them with a sense of social identity and belongingness (Tajfel & Turner, 1979). This sense of identity is based on a comparison of the individual's group to other groups and may lead to feelings of pride or superiority in some cases and inferiority in others (Tajfel & Turner, 1979). Social identity theory suggests that the sense of identity that comes from belonging to a particular group can have a powerful impact on an individual's attitudes, beliefs, and behaviors (Abrams & Hogg, 2010). In the case of math identity, social identity theory suggests that belonging to a math club or other math-related group can positively impact an individual's math identity by providing them with a sense of belongingness and social identity related to math (Hornsey et al., 2003). This sense of belongingness may lead to increased engagement and motivation in math, as well as a more positive attitude toward the subject (Hornsey et al., 2003). Social identity theory also suggests that group membership can lead to intergroup bias, where individuals view members of their own group more positively than members of other groups (Tajfel & Turner, 1979). In the case of math identity, this could manifest as students who are part

of a math club viewing themselves as ‘math people’ and viewing students who are not part of the club as less capable or interested in math (Hornsey et al., 2003). This potential for intergroup bias highlights the importance of promoting inclusivity and avoiding elitism in math clubs and other math-related groups (Hornsey et al., 2003).

CHAPTER III

METHODOLOGY

This chapter will serve as a comprehensive guide for the research design, datal collection, and analysis procedures employed to address the research questions. This section will outline the framework for the study, the research methods employed, and the strategies used to ensure the validity and reliability of the findings.

Research Questions

The two main research questions for this study are the following:

- What influences high school students to join the FMiM ViP Club?
- What does the student's participation in the club indicate about their mathematics identity development?

Additionally, each research question has its own sub-question as followed: "In which ways participants creations and experiences align with the four constructs of mathematics?" and "What are the challenges faced when recruiting high school students to join the FMiM VIP Club?" One thing to note is that this study was conducted under two stages with two different school districts for each stage. In the first stage, the focus was on girls' math identity and their interactions with the FMiM VIP Club. However, on the second stage, the FMiM VIP club was

open to all Algebra 2 students. Therefore, parts of each question will be investigated depending on the stage of the study and the school district.

Participants and Context

The present study builds upon the "Follow Me into Math Project" and includes the same participants who were involved in the initial research. The study was conducted in South Texas, which is characterized by low-income and low resource areas. All participants were high school students enrolled in Geometry (School A) and Algebra 2 (School B). In the first stage of the study, School A, participants were recruited through focus group sessions in which students were asked who would be interested in joining a math club that served as an extension of the "Follow Me into Math" project. In this stage, the study aimed to investigate the math identity of girls, and as a result, seven female participants joined the club and participated in the study's events.

In the second stage of the study, School B, the club was opened to all Algebra 2 students from two different high schools in a different school district. A total of 38 students participated in this stage of the study, with 24 female and 14 male participants. By opening the club to a wider range of participants, the researchers were able to obtain a more diverse sample, which allowed for a broader understanding of the factors that influence high school students' decision to join a math club. The recruitment process was crucial to the success of the study, as it ensured that the participants were representative of the target population and that the research findings could be generalized to other similar populations.

School A

Recruitment Strategy

For School A, the recruitment was done through the PI's during a focus group for their research group. When asked who would be interested in joining a math club that served as an extension of the "Follow Me Into Math" project, several students showed interest. Since the first stage was focused on investigating math identity formation in girls specifically, I reached out to the girls who showed interest through our social media page, and I made a group chat in our social media with all of the participants so that we could coordinate meeting times.

FMiM VIP Club Structure

For the first stage, the goal of the club was for the participants to feel as part of the "Follow Me into Math" team by creating content for our social media page, engage other classmates to follow along, help facilitate new activities, and bring in a new perspective into the project. In order to join the club, the participants had to answer a questionnaire that asked them questions regarding why they want to join the club, what do they wish to bring into the club and what do they want to get out of from being in the club. The club lasted for two months, March – April 2022, with a total of 4 events. The first event served as an info session where the participants learned about the team, the project, and the club. Additionally, the first challenge was introduced which was to research what makes a good Instagram post and based on those findings, they had to create their first post for our social media. The participants were given ideas of the posts they could create such as a meme, a math trick, relating math to something they like, and they had the option to work individually or in partners. However, if they decided to work in

partners, then they had to create two posts in total. On the next meeting, each of the participants presented their posts and then we did a drawing to determine the order that the posts will be posted. They all had a week to promote their posts and the post who received the most likes and comments would be the winner and they would win a gift card. This encouraged the participants to take ownership of their creation but also to help promote the "Follow Me into Math" project. In this same meeting, their second task was presented which was for them to create a logo for the club. The third event was a little different than the usual meetings because it was a game night. This game night served the purpose for all of us to get to know each other more and build a sense of team building with their teammates. For the fourth and final event, the winner of the first challenge (the post who had received the most likes and comments) was presented.

School B

Recruitment Strategy

For School B, the recruitment strategy was done in different stages. The first stage was done through the "Follow Me into Math" social media (Instagram) page. For four weeks (every Friday) the "Follow Me into Math" Instagram page story would have a poll asking the followers, which were School B participants, who would be interested in joining the "FMiM VIP Club." Based on the responses, an individual message would be sent with a link to a questionnaire in where they could sign up to be part of the club. The second stage of recruiting was done during the Math Shows. At the end of every Math Show, I introduced the VIP Club to the students and a QR code was shown on the screen so that students could easily scan the code and it would take them to the questionnaire to sign up. The third stage of recruitment took place when the Research

Assistants of the “Follow Me into Math” project went to the school to administer questionnaire s. A part of that questionnaire was if they were interested in joining the VIP Club. Through these different stages, 38 students completed the questionnaire.

FMiM VIP Club Structure

The structure of the “FMiM ViP Club” was different for School B than in School A. The focus for the club in this stage was to investigate the research question “What type of activities promote the value of mathematics? Participant’s self-confidence? Engagement in mathematics? Enjoyment in mathematics?” Based on this, the events were designed to fall in one of the four categories: mentoring, enjoyment. Educational and informative. It is important to note that the events would be hosted during zoom in the afternoons depending on the best time and availability of the participants. For the mentoring component, activities were designed for the research assistants to serve as mentors for the high school students and develop that mentorship relation. For enjoyment, the events were those such as game nights or social media competitions that were hosted by the research assistants. Educational and Informative events were composed of tutoring sessions and professional development in where the research assistants talked about college and the different majors and opportunities. The duration of the club events was from January 2023-March 2023. The table below shows the proposed events and the timeline of such events.

Table 1

Timeline of "FMiM ViP Club" Events

Week #	**Description**
Week 1	Game Night
Week 2	Tutoring Session
Week 3	Social Media Challenge
Week 4	Professional Development
Week 5	Game Night
Week 6	Tutoring Session
Week 7	Social Media Competition
Week 8	Professional Development

However, since students did not attend the first few events, a re-design of the club was created. Instead of hosting an event every week, I decided to create a "FMiM Magazine/ Newsletter" that would summarize the information of several events, and this would be emailed to the students every other week. Also, the zoom link to join the events were also emailed to all of the students who showed an interest in joining the club. Because of this, the timeline and details of the events were as followed.

Table 2

Revised Timeline of "FMiM ViP Club" Events

Week #	Type of Event	Description
Week 1	Game Night	Participants will play two games, “Thirteen” and “Scribl.io” using Algebra 2 terms.
Week 2	Game Night	Since no participants signed into the event, then the same games will be played.
Week 3	FMiM Magazine #1	Theme is “Math is Fun” and it showcases different math jokes, riddles, and real-life math applications.
Week 4	Tutoring Session	Participants will submit problems they need help with prior to the session. If no problems are submitted, then we will go over common Algebra 2 problems.
Week 5	FMiM Magazine #2	Theme is “Math in Other Areas”, and it showcases different careers in math.
Week 6	Professional Development	Showcase the different careers and scholarships that UTRGV has to offer.
Week 7	Game Night	Play Prime Climb

Data Analysis

To gather data for the analysis, a questionnaire was administered to students who showed interest in joining the math club. The questionnaire was designed to capture information on why the student wanted to join the club, how they could benefit from the club, and what value they

would bring to the club. Additionally, the questionnaire asked students to suggest the type of activities they would like to see in the club. A copy of the questionnaires can be found in the appendix.

After the questionnaires were collected, the student's responses were coded to identify common themes. The codes were then categorized according to the four measures of math, which include motivation, enjoyment, self-confidence, and sense of value. Responses were also analyzed based on the sub-questions of the research questions. For instance, responses were analyzed to determine the type of activities that promote the value of mathematics, participants' self-confidence, engagement in mathematics, and enjoyment in mathematics. In addition, responses were analyzed to identify factors that influence high school students to join the FMiM VIP Club. This was done in reference to the book "The Coding Manual for Qualitative Researchers" by Saldaña (2016). Saldaña (2016) mentions that researchers should start by familiarizing themselves with the survey questions and responses to gain a general understanding of the data. Next, Saldaña researchers should identify the research questions they want to answer and develop a coding scheme that captures the key themes or categories relevant to those question (Saldaña, 2006). The coding was done through a deductive approach which, assumes that the researcher has a priori knowledge or hypotheses about the topics of interest and the potential themes or categories that may emerge from the survey data (Saldaña, 2006). The first step in a deductive approach to coding surveys is to develop a coding scheme, which outlines the categories or themes that will be used to code the survey responses (Saldaña, 2006). This scheme is typically informed by the research questions and hypotheses, as well as by existing theories or frameworks in the field (Saldaña, 2006). Once I developed the coding scheme, I applied it to the survey data by assigning the appropriate category to each response. This was done using the

online website “Air Table.” After all of the questionnaire’s responses had been coded, I began to analyze the data by examining the frequency of the different categories (enjoyment, sense of value, self-confidence and motivation).

Overall, the data analysis method for this study involved a qualitative approach, using coding and categorization to identify common themes and patterns in the students' responses to the questionnaire. This method allowed for a rich and nuanced understanding of the students' perspectives and expectations of the math club, which was used to guide the development and implementation of the club's activities.

CHAPTER IV

RESULTS

This chapter will present a comprehensive analysis of the research findings that can contribute to the understanding of the factors influencing high school students' decision to join the "Follow Me into Math" VIP Club. Results are categorized by school; first School A and then School B. By categorizing the results by school, the chapter may be able to identify similarities and differences in the factors that influenced high school students' decision to join the club in each school. This can provide insights into the unique challenges and opportunities faced by each school and inform the development of tailored interventions to enhance interest and engagement in math among students. the results presented can contribute to the understanding of the factors that promote interest and engagement in math among high school students, which can have implications for math education and career choices in STEM fields.

School A Results

During the first stage of the project, a questionnaire was administered to the participants who were all female high school students taking Geometry at School A. The questionnaire aimed

to gather information on their attitudes towards mathematics and their motivation for joining the math club. The questionnaire included questions on their previous experiences with mathematics, reasons for joining the club, expectations and goals, and desired activities. The questionnaire was completed by all seven participants, and the responses provided valuable insights into their perspectives on mathematics and their motivations for joining the math club. To analyze the questionnaire responses, a qualitative approach was taken, and the data was coded for common themes. The themes that emerged from the responses were then categorized according to the four measures of mathematics, namely enjoyment, self-confidence, sense of value, motivation, The categorization of the themes helped to provide a comprehensive picture of the participants' attitudes towards mathematics and their motivation for joining the math club. The following table and graph summarize the participants' responses to the questionnaire:

Table 3

Summary of Student Responses (School A)

Question	**Motivation**	**Self-Confidence**	**Sense of Value**	**Enjoyment**
Q3: What made you join this collaborative team?	2	2	4	4
Q4: What do you want to get out of this project?	5			2
Q5: What do you want to bring into this project?	1	2	4	3

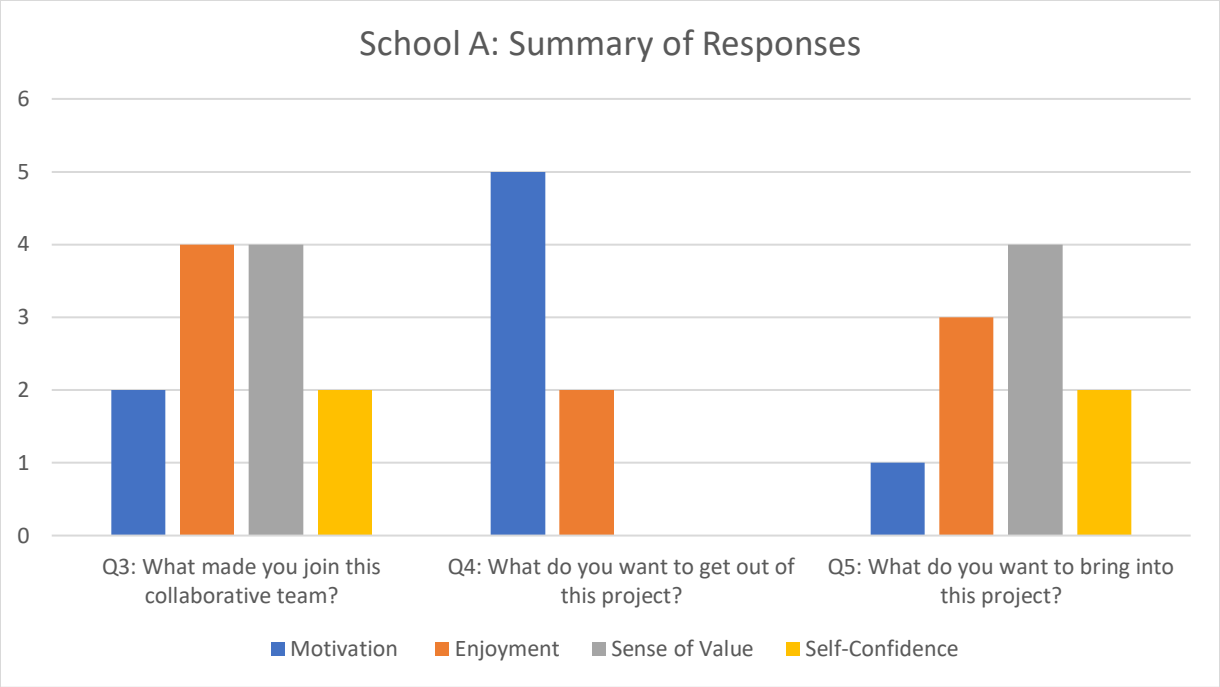

Figure 1: Graph of Summary of Student Responses (School A)

The table and graph mentioned in the statement above represents a summary of students' responses to three different questions related to their participation in a collaborative team. The first question was "What made you join this collaborative team?", the second was "What do you want to get out of this project?", and the third was "What do you want to bring into this project?"

According to the table and graph, four student responses to the first question aligned with enjoyment and sense of value, while two student responses aligned with motivation and self-confidence. This suggests that some students may have been motivated to join the collaborative team because they found it enjoyable and valuable, while others may have been motivated by their own confidence in their abilities or external motivation factors such as recognition or competition.

When asked about what they wanted to get out of the project, students' responses aligned the most with motivation, with five responses indicating that they were motivated by the project

in some way. Only two student responses aligned with enjoyment, suggesting that the project may not have been as enjoyable or rewarding for students as other factors such as motivation. None of the responses aligned with sense of value or self-confidence, suggesting that these factors may not have been as important to students when it came to their expectations of the project.

Finally, when asked what they wanted to bring into the project, four student responses aligned with sense of value, followed by three responses aligning with enjoyment, two with self-confidence, and only one with motivation. This suggests that students placed a greater emphasis on the value they could bring to the project and on enjoying the project than on external motivators or their own self-confidence.

Overall, this analysis provides a basic overview of the themes that emerged from students' responses to these questions. To gain a more in-depth understanding of each of the themes, it would be necessary to examine the specific responses given by students in more detail and to consider the broader context in which these responses were given.

Math Clubs Contribute to Gain New Experiences and Growing: Motivation

Through the questionnaire responses, 7 students were asked what made them want to join a collaborative team (FMiM ViP Club). Two students revealed that they joined a collaborative team because they were motivated to learn something new. Student AR explained that joining the team would provide a "good experience," as well as an opportunity to work as a team and develop learning skills that would be useful in the future. This demonstrates that they were motivated to join the team because they wanted to learn something new. Additionally, this

suggests that students were highly motivated by personal growth and development and saw the team as a way to expand their knowledge and skills. When asked about their goals for the project, five students expressed their motivations. Student CG hoped to gain "experience in a research project," while student AG wanted to try "something that [she] hasn't done before." Similarly, student AR was excited about the chance to work on the project and gain experience, while student SH wanted to "help people learn in a better way." Student SA hoped to use the project as an opportunity to learn new things. This reveals that the students were highly motivated to gain specific benefits from the project and that they had clear goals in mind when they joined the team and were motivated by a desire to gain specific benefits. Finally, when asked about what they wanted to contribute to the project, student AR was motivated by a desire to "help and influence young individuals." This specific response reveal that the students were motivated by a desire to help and influence young individuals, which demonstrates that they were not only motivated by personal gain but also by a desire to make a positive impact on others. These responses suggest that the students were highly motivated and excited to be part of the project, with a strong focus on personal growth and development.

Math Clubs are Fun for Students: Enjoyment

The student responses on the questionnaire provides insights into the motivations and goals of the students who joined the collaborative team. Four students joined the team because they enjoy mathematics and/or social media. As student CG stated, "I joined the collaborative team because of my interest in math as well as to enhance my social media outreach." This shows that the student was motivated by her interests in math and social media and saw the project as a way to engage with both. Student AG was attracted to the team because it seemed

"super fun and creative." This response suggests that the student was motivated by the potential for enjoyment and creativity in the project. When asked about their goals for the project, two students responded that they were primarily motivated by enjoyment. As student LZ stated, "I want to have fun." Meanwhile, student SA hoped to "spend more of [her] time dealing with math." These responses indicate that the students saw the project as an opportunity to engage with something they enjoy, rather than as a task or chore. Furthermore, when asked about what they wanted to bring into the project, three students focused on enjoyment. Student CG wanted to "help create more social media content to reach out to fellow math enthusiasts." This shows that the student was motivated by the idea of connecting with others who share her interest in math. Meanwhile, student LZ hoped to bring more "posts" into the project, indicating a desire to contribute to the project's content and engage with the material. Student SH expressed a desire to bring more "fun equations" into the project, which suggests a focus on making the project enjoyable and engaging. Overall, the responses suggest that the students were motivated by their interests and passions, and that they saw the project as an opportunity to engage with something they enjoy. The students' focus on enjoyment, creativity, and contribution indicates that they were highly invested in the project and motivated to make a positive contribution.

High School Students Can Contribute to Math Clubs: Self-Confidence

The fact that students joined the team because of their self-confidence in their skills is an interesting observation. It suggests that they are confident in their ability to contribute and make a difference in the project. For instance, Student NL stated that they joined the team because they "believe [they] are really good with social media." This suggests that they feel confident in their social media skills and believe they can contribute effectively to the project. This level of self-

confidence can be valuable in a collaborative project as it can lead to greater initiative and willingness to take on responsibilities. Interestingly, none of the students' responses regarding what they want to get out of the project align with self-confidence. This could suggest that the students may not have a clear understanding of their own strengths and abilities. It may also suggest that they are more focused on learning and gaining new experiences rather than showcasing their own skills and abilities. Alternatively, it could be that the students are already confident in their abilities and don't feel the need to mention it specifically when asked about their goals for the project. However, two students' responses related to what they want to bring into the project correlate with self-confidence. For example, Student NL stated that they will be bringing a positive attitude and lots of hard work to the project, indicating a belief in their ability to contribute positively to the team. Similarly, Student SA stated that they want to be a dependable and responsible member of the team, indicating a level of self-confidence in their reliability and ability to meet commitments. In conclusion, self-confidence can play a significant role in collaborative projects, and it was evident that two students joined the team with a strong sense of belief in their abilities related to the project. Even though their motivations for joining the team did not directly relate to self-confidence, their desire to contribute positively and be dependable within the team correlated with self-confidence. This suggests that self-confidence can still be a valuable asset in how students approach their roles within a team, leading to greater initiative, responsibility, and reliability. Overall, fostering self-confidence in students can help them develop a positive attitude towards teamwork and collaborative projects, contributing to their personal growth and success.

Math Clubs Contribute to Develop Skills: Sense of Value

When examining the responses of the four students who joined the collaborative team because they feel a sense of value when being part of a team, it is clear that their motivations are rooted in a desire to contribute positively to the project and make a meaningful impact. For example, Student SH stated that they joined the team to "help people make math more funny and interesting to learn." This statement suggests that they value the idea of making math accessible and engaging for others, and they see their involvement in the team as a way to further this goal. Interestingly, when asked what they want to get out of the project, none of the students' responses align with a sense of value. This suggests that they may not have a clear understanding of how their contributions can benefit not only themselves, but also the team and potential audiences. It is possible that they have not fully thought through the potential impact of their work on others or may not have a clear idea of what they personally hope to gain from their involvement in the project. This may also indicate a lack of communication or understanding regarding the overall goals and objectives of the project. However, when asked what they want to bring into the project, all four students' responses correlate with a sense of value. For example, Student AG stated that they want to bring "ideas about helping y'all get ideas for ur posts or anything y'all need," indicating a willingness to offer their skills and knowledge to benefit the team. Similarly, Student AR expressed a desire to "help and influence young individuals as myself to be more involved in math," indicating a belief in the importance of the project and a desire to make a positive impact. Overall, these responses suggest that the students who value being part of a team are motivated by a desire to contribute positively and make a difference, and their involvement in the project is driven by this sense of purpose.

Students Creations: Social Media Post

As previously mentioned, one of the club's components was to incorporate the "FMiM" Instagram page into the club. As part of this integration, the club participants were tasked with creating a post for the social media page as their first challenge. The following is a compilation of the students' creations.

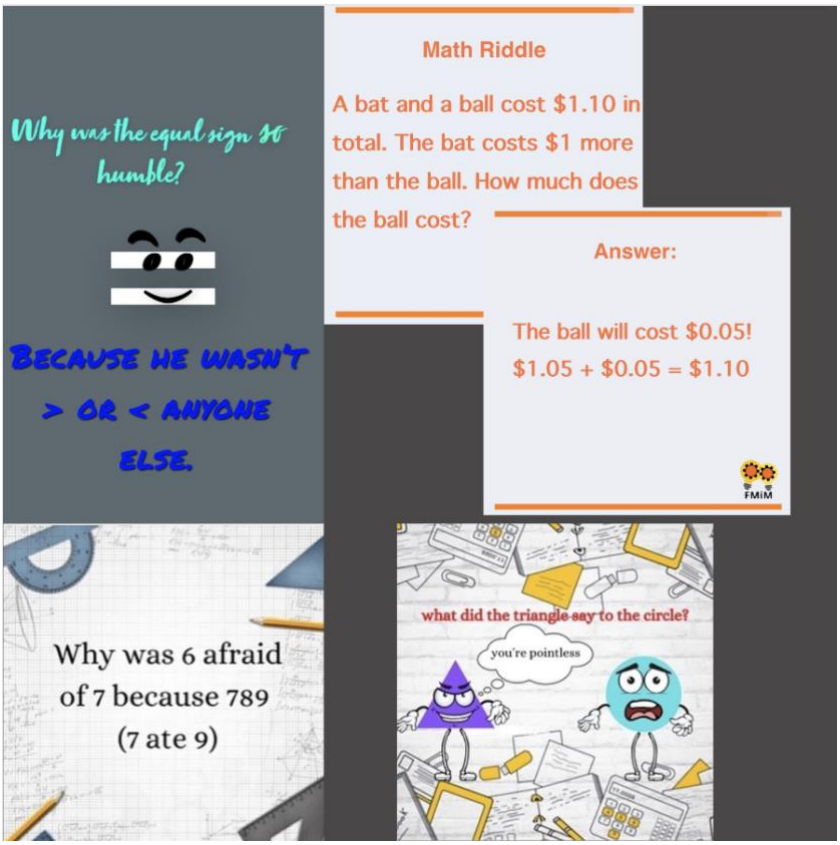

Figure 2: Compilation of Student's Products from School A for Social Media Page

The fact that three out of four students shared math-related jokes in their posts, and only one presented a math riddle, suggests that the students prioritize making math enjoyable over other aspects when creating their posts. This could indicate that the students view math as something that can be fun and enjoyable, and that they see the value in making it more accessible

and entertaining for others. The students' focus on making math enjoyable in their posts could also be an indication of their motivations for joining the club. As previously mentioned, several students mentioned enjoyment and fun as their reasons for joining the club. By prioritizing humor and enjoyment in their posts, the students may be trying to share their enthusiasm for math and inspire others to view it in a positive light. It is also worth noting that the competition aspect of the task, with a gift card going to the participant whose post received the most likes, could have influenced the students' approach. By creating posts that they believed would be popular and well-liked, the students may have been trying to increase their chances of winning the competition. However, even in this context, the fact that they chose to focus on making math enjoyable suggests that this is a value that is important to them.

Attendance of Students

It is important to highlight another significant outcome, which is the attendance of the participants. All seven members of the club were consistently present during meetings, and there was regular communication with them to schedule the meetings. Although there were instances where I proposed a meeting date and time, and some participants could not attend, they would notify me beforehand, allowing us to reschedule. Additionally, it is worth noting that most of the participants were school friends, which fostered constant communication among them.

School B Results

During the second stage of the project at School B, we aimed to attract students who were interested in joining the VIP Club. To achieve this, we utilized the FMiM Instagram page, which

acted as a powerful tool for promoting the club. The process began by creating stories that advertised the club's objectives and goals. We then tracked the students who interacted with the story, after which we reached out to them via direct message to invite them to participate in the questionnaire. The questionnaire was designed to provide valuable insights into the students' attitudes towards mathematics and what motivated them to join the math club. It was similar to the questionnaire administered at School A. Additionally, the questionnaire also assessed the students' motivation for joining the VIP Club, whether it was to improve their math skills, develop leadership abilities, or simply to be part of a supportive community of like-minded individuals. The responses received from the questionnaire were crucial in shaping the development of the VIP Club at School B. By analyzing the data, we were able to gain an understanding of the students' needs and tailor the club's activities to match their interests. Furthermore, we were able to identify the areas that required more attention in terms of supporting students who may be struggling with math and provide resources to help them improve their skills. Overall, the questionnaire was a valuable tool in enabling us to create a positive and engaging environment for students to learn and grow in their mathematical abilities. Similar to the analysis conducted for School A, a qualitative approach was utilized to analyze the questionnaire responses collected from School B. The data obtained from the questionnaire was coded to identify common themes. The themes that emerged from the responses were then categorized based on the four measures of mathematics. The following showcases the student's responses.

Question 1: Why are you interested in joining? What would you like to see in the club events?

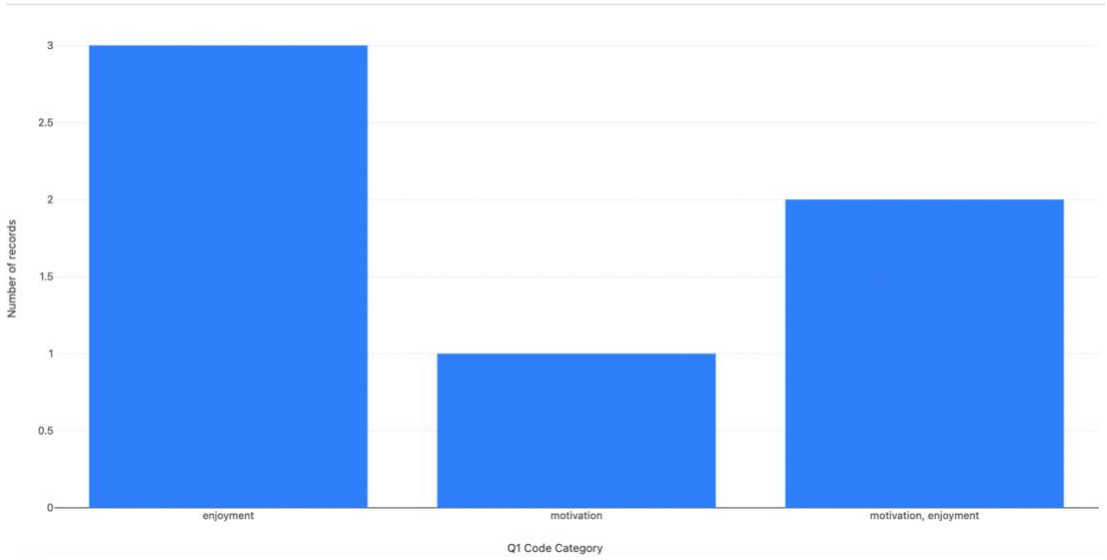

Figure 3: Code of Student's Responses of School B for Question 1

The student's motivations and expectations for joining the team have been captured through their responses. Student MC's response indicates that she values new experiences and is hoping for a fun and interactive environment. This highlights the importance of creating a positive and engaging atmosphere for the team, which could contribute to the motivation and dedication of team members. Similarly, student KG's response also emphasizes the importance of enjoyment and fun, which suggests that incorporating activities and tasks that are engaging and stimulating could help maintain interest and engagement. Student AG's response stands out from the others in that she is primarily motivated by the potential for academic growth and learning. This highlights the importance of recognizing and valuing different types of motivations among team members and finding ways to incorporate opportunities for learning and growth into the team's activities and projects. Finally, both student AF's responses show a combination of enjoyment and motivation, indicating that they see the team as a great opportunity to have fun while also gaining valuable experience and skills. This highlights the

potential benefits of creating a team culture that fosters both enjoyment and growth, as it could attract and retain members who are motivated by a variety of factors.

Overall, these responses demonstrate the importance of understanding the motivations and expectations of team members and using this information to create a team culture and activities that are engaging, stimulating, and meaningful to all members. By recognizing and valuing different types of motivations and interests, teams can create a more inclusive and supportive environment that promotes growth, learning, and success.

Question 2: Did the “FMiM Instagram Page” influence your decision in joining the FMiM ViP Club?

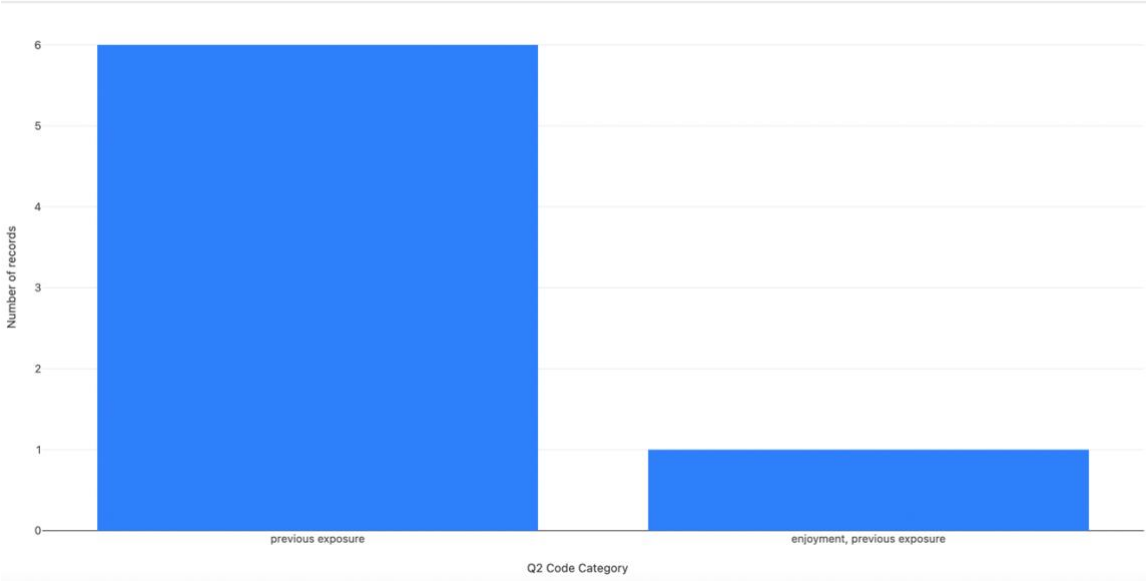

Figure 4: Code of Student's Responses of School B for Question 2

The influence of social media in attracting students to the FMiM ViP Club was evident from the responses of the students who participated in the questionnaire . One student directly acknowledged that the FMiM Instagram page played a role in her decision to join the club. She

noted that the page looked fun and that math is fun, indicating that the enjoyment factor was a key factor in her decision to join. This response highlights the importance of making the club and its activities fun and engaging, as students are more likely to participate in extracurricular activities that they find enjoyable. The impact of the FMiM Instagram page on students' decisions to join the club was further illustrated by the responses of six other students. These students noted that their previous exposure to FMiM had influenced their decision to join the club. This suggests that building a strong online presence through social media platforms such as Instagram can play a crucial role in attracting potential members to the club. By promoting the club's activities and events through engaging posts, stories, and interactive features, the club can create a sense of excitement and curiosity among potential members, making them more likely to participate. Overall, these responses highlight the importance of leveraging social media platforms to attract and engage potential members. By building a strong online presence, the FMiM ViP Club can increase its reach and impact, and create a community of students who share a passion for mathematics and its applications.

Attendance

An essential finding to highlight regarding School B is the level of interest from the student body. The questionnaire received responses from 38 students who expressed interest in joining the club, indicating a strong desire for a math-focused extracurricular activity. However, it is noteworthy that only eight of these students completed the questionnaire in its entirety, which suggests that some students may not have been fully committed to the idea. Despite this

level of interest, none of the students who completed the questionnaire ended up joining the actual events, which raises questions about the effectiveness of the recruitment strategy or the students' level of follow-through.

CHAPTER V

DISCUSSION/CONCLUSION

In this section, we will discuss and draw conclusions from the results obtained from the questionnaire s conducted in School A and School B regarding the FMiM ViP Club. The purpose of this project was to explore the impact of a social media-based math club on student attitudes towards mathematics and their motivation to learn more. The questionnaire s aimed to gather information on students' attitudes towards mathematics, their motivation for joining the math club, and the impact of the FMiM Instagram page on their decision to join. The results presented in the previous sections provided insight into the factors that influence student participation in math clubs, the potential benefits of a social media-based approach, and the challenges that need to be addressed to increase participation. In this section, we will discuss these findings in more detail and provide recommendations for future research and practice.

The findings of the study reveal several interesting insights regarding the promotion and recruitment of students for a math club through social media platforms such as Instagram. The results of the questionnaire conducted in School A showed that most students were motivated to join the math club because they wanted to improve their grades in math and develop their math skills. Furthermore, a majority of the students expressed a desire for the math club to be fun and engaging. On the other hand, the questionnaire conducted in School B showed that while there was a significant interest in joining the math club, the number of students who completed the

questionnaire was low, and none of the interested students eventually joined the club. An in-depth analysis of the questionnaire responses revealed that most students were motivated to join the math club to improve their math skills and grades. This indicates a strong desire among students to perform well academically and highlights the potential role that math clubs can play in supporting students' academic goals. Additionally, the importance of making the math club fun and engaging was highlighted, with several students mentioning their desire for interactive activities and games. This underscores the importance of creating an enjoyable learning environment to sustain student engagement and interest. The influence of social media platforms such as Instagram on students' decision to join the math club was also evident in the study findings. The presence of a strong online presence and engaging content on the “Follow Me into Math” Instagram page played a role in motivating students to join the math club. This highlights the importance of leveraging social media platforms to promote and recruit members for math clubs. While the findings of the study provide insights into the recruitment and promotion of math clubs through social media platforms, the low number of students who completed the questionnaire in School B and the absence of any actual participants in the club underscore the challenges in recruiting and retaining members for such clubs. Further research is needed to explore effective strategies for promoting and sustaining student interest in math clubs.

The recruitment strategy used for the FMiM ViP Club had a significant impact on the number of students who showed interest in joining the club. For School A, the recruitment strategy was through word of mouth and flyers, whereas for School B, the recruitment strategy was through social media. The use of social media as a recruitment tool was particularly effective, as it allowed for a wider reach and increased engagement with potential members. This is demonstrated by the higher number of students who expressed interest in joining the club at

School B compared to School A. However, the conversion rate of students who completed the questionnaire and actually joined the club was low for both schools.

One limitation of the recruitment strategy was the lack of a targeted approach towards students who might benefit the most from joining the club. For example, students who struggle with math may benefit greatly from joining the club, but they may not have shown interest in joining based on the recruitment methods used. A more targeted approach, such as working with teachers to identify students who could benefit from the club and reaching out to them directly, could increase the likelihood of these students joining. The recruitment strategy used in both School A and School B had a limitation in that it did not specifically target students who may have been struggling with mathematics. While the strategy was successful in attracting students who were already interested in the subject and those who had a positive attitude towards it, it did not necessarily reach those who could benefit the most from joining the club. As noted in the findings, students who expressed interest in the club were more likely to have a positive attitude towards math and to view it as enjoyable. However, there may be students who do not have such a positive attitude towards math but could benefit from participating in the club. To address this limitation, a more targeted approach could be adopted in future recruitment efforts. This could involve working with teachers to identify students who may be struggling with math and who could benefit from joining the club. Teachers could recommend specific students who they believe could benefit from additional support and encouragement, and the club could reach out to these students directly. This approach would help ensure that the club reaches a broader range of students and that those who could benefit the most from joining are given the opportunity to do so. Additionally, the club could consider expanding its recruitment efforts to include targeted outreach to underrepresented groups, such as girls and students from underprivileged

backgrounds, to help promote diversity and inclusivity within the club.Overall, the recruitment strategy used for the FMiM ViP Club was effective in generating interest in joining the club, particularly through the use of social media. However, there is room for improvement in terms of a more targeted approach towards students who could benefit the most from joining the club, as well as considering potential biases introduced by the recruitment strategy.

In conclusion, the findings of this project indicate that there is a strong interest among students in combining mathematics and social media. The FMiM ViP Club was successful in attracting students who were motivated by the enjoyment of math and the opportunity to engage with others who share their interests. However, the recruitment strategy had some limitations, including a lack of targeting towards students who may have benefited the most from the club, and a low conversion rate from questionnaire responses to actual participation in the club events. Despite these limitations, the project highlights the potential for using social media platforms like Instagram to promote and engage with students in mathematics-related activities. Additionally, the project provides insights into the attitudes and motivations of students towards mathematics, which can inform the development of future programs and initiatives aimed at promoting mathematics education. Moving forward, there is a need to develop more targeted recruitment strategies to reach a wider range of students, including those who may be struggling with math. This could involve working closely with teachers and school administrators to identify students who would benefit from the club and to provide additional support and resources to help them succeed. Overall, this project demonstrates the importance of creating opportunities for students to engage with mathematics in a fun and social way and provides valuable insights into the attitudes and motivations of students towards mathematics education.

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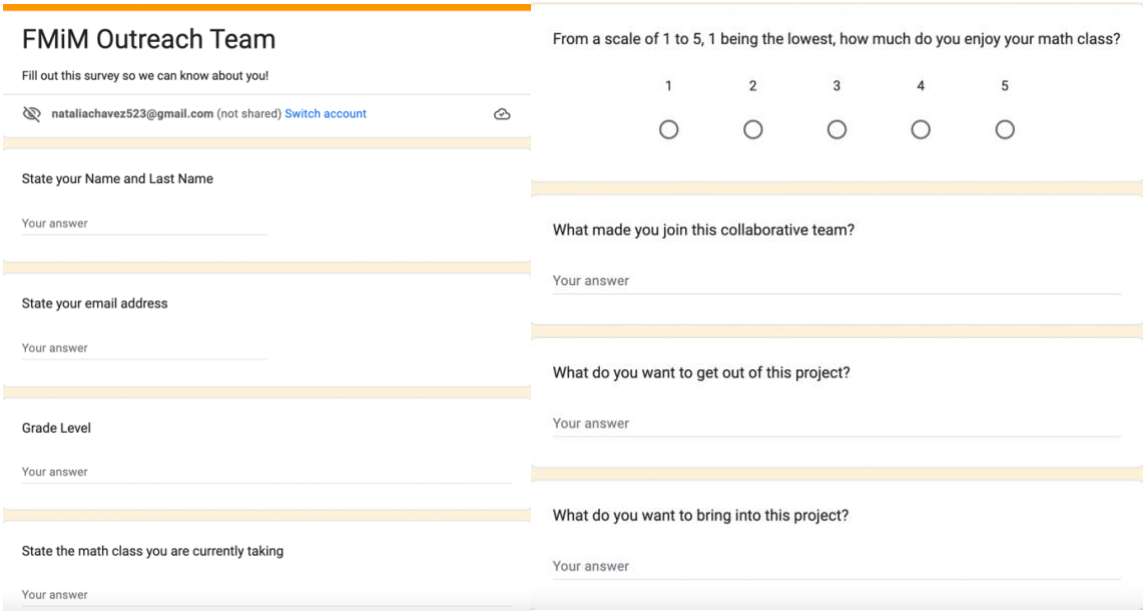
APPENDIX A

APPENDIX A

QUESTIONNAIRE FOR SCHOOL A



FMiM Outreach Team

Fill out this survey so we can know about you!

nataliachavez523@gmail.com (not shared) Switch account

State your Name and Last Name

Your answer

State your email address

Your answer

Grade Level

Your answer

State the math class you are currently taking

Your answer

From a scale of 1 to 5, 1 being the lowest, how much do you enjoy your math class?

1 2 3 4 5

What made you join this collaborative team?

Your answer

What do you want to get out of this project?

Your answer

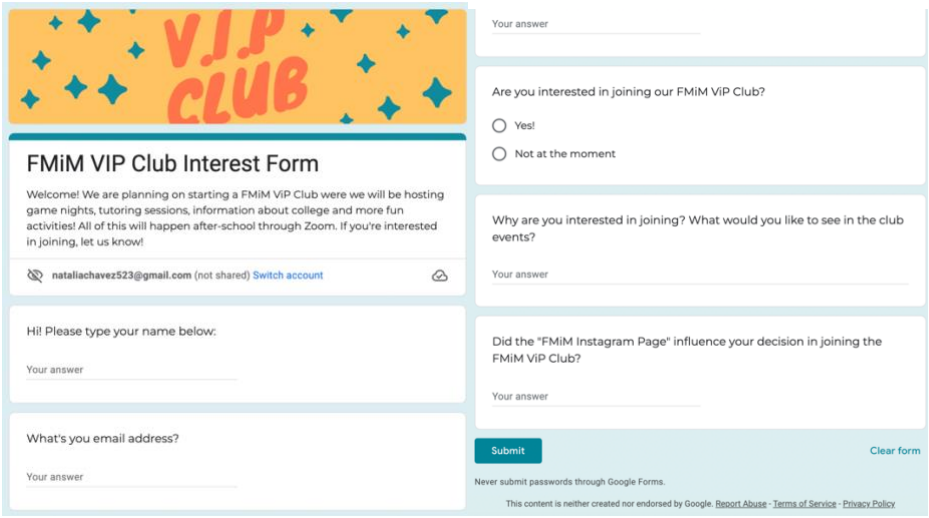
What do you want to bring into this project?

Your answer

APPENDIX B

APPENDIX B

QUESTIONNAIRE FOR SCHOOL B



APPENDIX C

APPENDIX C

SAMPLE OF NEWSLETTER EMAILED TO STUDENTS

BIOGRAPHICAL SKETCH

Lilian Natalia Chavez was born on August 15, 1999, at Linares, Nuevo Leon, Mexico. She is the youngest of three children of Javier Chavez and Eva Gloria Flores. She grew up in Burgos, Tamaulipas but moved to McAllen, Texas at the age of 4 and she started elementary school in Castaneda Elementary. She continued in De Leon Middle School and completed her high school at the International Baccalaureate in Lamar Academy. She further her studies by obtaining her Bachelor of Science in Mechanical Engineering in May 2021 and her Master of Science in Mathematics with a Teaching Concentration in May 2023.

Lilian Natalia Chavez's childhood in Burgos, Tamaulipas was filled with family gatherings and cultural traditions. Her parents instilled a strong work ethic and a love of learning in her at a young age, which helped her succeed academically throughout her schooling. After moving to McAllen, Texas, Lilian quickly adapted to her new surroundings and embraced the diverse community. She excelled in her studies and was actively involved in extracurricular activities.

During her undergraduate studies in Mechanical Engineering, Lilian developed a passion for problem-solving and analytical thinking. She participated in various research projects, including the design and testing of nanofibers. Her interest in education led her to pursue a Master of Science in Mathematics with a Teaching Concentration, where she hopes to inspire the next generation of learners. In her free time, Lilian enjoys reading, and spending time with her family and friends. She can be reached at nataliachavez523@gmail.com and 4323 North 27th Lane, Mcallen Texas, 78504.