**Senior High School STEM Students Anxiety level in Pre-Calculus**

**A Research Proposal**

**Presented to**

**Colegio de Sta. Ana de Victorias, Inc.**

**Victorias City**

**In partial fulfillment of the requirements for the Subject Inquiries, Investigations,**

**and Immersion**

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**INTRODUCTION**

**Background of the Study**

Learning Calculus is part of developing students’ Mathematics skills and abilities towards enhancing Science, Technology, Engineering, and Mathematics (STEM) education in Senior High School. Ayebo et al. (2016) stated that College calculus has a great deal of potential to increase the proportion of students majoring in STEM professions. It is a requirement for all STEM fields and, with proper study, should help students have a great college experience and a head start on more difficult courses. The two main objectives of mathematics education are the development of critical thinking and problem-solving skills, which are enhanced by the calculus subject for both STEM and non-STEM students (Hagman, 2019). Students have a hard time learning mathematical concepts. Because students differ in their abilities to acquire mathematics, one learns quicker than the other. Students are concerned and feel anxious about studying mathematics Ablian and Parangga (2022)

In Asia, mathematics is viewed as one of the most critical subjects wherein students are encouraged to study the discipline (Leatham & Peterson, 2018; Ronis, 2017). People know how significant mathematics is in their lives. It can be considered as one of the

pillars built the human civilization It is very important to all disciplines like engineering, sciences, commerce, industries, etc. (Reyes and Castillo, 2015). Individuals who suffer with mathematics anxiety, also known as MA, suffer from a fear of mathematics since it manifests itself in anxiety attacks, tests, homework, and daily life. (Khasawneh et al., 2021; Mendoza et al., 2021; Lanius et al., 2022). When math-related materials are exposed to during learning and assessment, math anxiety is defined as sensations of tension, fear, and apprehension. (Ashcraft, 2018). In a recent meta-analysis, Barroso et al. (2021) discovered a weak to moderately inverse relationship between math achievement and math anxiety.

According to Shukla (2021) anxiety is a sensation of tension, apprehension, and stress that is connected to the activation of the nervous system. A high degree of anxiety makes it impossible for a person who lives a stable life, while distorted behaviors make his life socially uncomfortable. One of the various emotional and behavioral problems is anxiety. Anxiety is a natural response to a stress disorder that triggers a general sensation of apprehension or anxiety. Anxiety is an anticipated belief of psychological distress which is a result of a perception of a potentially dangerous event (Larson et al., 2016). Students with anxiety disorders exhibit a passive attitude toward their studies, as seen by a lack of interest in studying, poor class performance, and incomplete assignments, among other things. Wiedemann (2015) stated that tremors, an elevated heart rate, and muscle soreness are some

of the physical symptoms of anxiety, which is defined by apprehension and fear. Anxiety is a fundamental human emotion that causes bodily reactions to stressors when the body goes into "fight or flight" mode to defend the person against something or someone that could be dangerous. (Sue et al., 2015).Students' self-efficacy and interest in mathematics have decreased. This could be the result of everything happening virtually. Asking for assistance from professors or fellow students can be challenging for students who are struggling with a particular subject (Mamolo, 2022). Several studies, particularly in calculus learning, highlight anxiety. Problems revealed that students' mathematics anxiety level was significant in calculus cognitive failures and performance (Awofala and Odogwu,2017). A high level of anxiety is also attributed to a number of major factors, including the abstract calculus concepts, the teaching style, and the poor analytical skills, students' abilities (Estonanto & Dio, 2019). People that feel anxious or fearful when they have to perform math problems are referred to as "having anxiety."(Richardson & Suinn, 2019).The term "math attitude defines a person's "liking or disliking of mathematics; a tendency to engage in or avoid mathematical activities; a belief that one is good or bad at mathematics; useful or useless (Neale, 2019).

Previous research, conducted before the pandemic, indicated that engaging in active learning activities, volunteering, or being asked to respond to a question could exacerbate anxiety (Aydin, et al., 2020. According to the researchers' personal experiences and their observations, pre-calculus anxiety is present in Grade 11 STEM students. A number of

students voiced complaints on the subject, which intrigued the interest of researchers, who sought to carry out this research to learn

more about the relationship between students' anxiety levels and their academic achievement. In this study, we propose to determine the anxiety levels of STEM Students in Pre- Calculus. The study will be conducted at the Senior High School STEM Student’s Grade 11 at Colegio de Sta Ana de Victorias Integrated School in Victorias City, Philippines. This study aims to provide STEM students in Grade 11 with an understanding of anxiety awareness in pre-calculus. Through this study, the researcher hopes to contribute knowledge on mathematics anxiety, specifically in the context of

**Statement of the Problem**

This study aims to investigate the anxiety level of Senior High School STEM students in Pre- Calculus. Specifically, the researchers sought answers to these questions:

1. What is the demographic profile of the students in Colegio de Sta Ana de Victorias in terms of:

1.1 Name(optional)

1.2 Sex

1.3 Pre- Calculus First Semestral Grade

2.What is the anxiety level of STEM students in Pre-Calculus

3. What is the academic performance of students when grouped according to Sex and Grade level?

4. Is there significant relationship between the anxiety level and academic performance of student?

**Scope and Delimitation of the Study**

The study is delimited only for the Grade 11 Science, Technology, Engineering and Mathematics students in Colegio de Sta. Ana de Victorias. This research's primary goal is to identify the degree of anxiety STEM students have when it comes to studying pre-calculus. The purpose of this research is to ascertain whether the participants' anxiety levels hinder their ability to achieve academic success.

The study only looks at the students' anxiety levels and how they relate to their academic performances. Therefore, this study will take into account the students' personal data, such as Name(optimal), Sex, and Pre- Calculus First Semestral Grade, which have an impact on their academic performance. The duration of the study will be conducted within the first and second semester of the school year of 2023-2024 among the STEM Senior High School Students.

**Hypothesis**

There is no significant correlation between the anxiety levels of senior high school STEM students and the difficulty level experienced in pre-calculus.

**Theoretical Background and Related Literature**

**Theoretical Basis**

This study was anchored to the Deficit Theory by Tobias (1986). According to this theory poor performance, for example in tests or maths, leads to higher anxiety about that situation in the future. Proponents of the Deficit Theory believe that prior maths performance deficits lead to memories of poor maths performance, generating MA (Hembree, 1990). Deficit Theory tries to provide an explanation for why a specific percentage of underprivileged pupils fail a lot in school. These pupils, who come from homes with low socioeconomic status, lack verbal stimulation and didn't have the language tools they needed when they started school (Eller 1989). It should also be noted that cognitive resources are not the only possible deficit which could cause poor mathematics performance and MA. For example, self-regulation deficits have been associated both with MA (Jain and Dowson, 2009; Kramarski et al., 2010) and decreased mathematics performance (Lee et al., 2014).

**Related Literature**

**Academic Pressure.** It has been observed that cognitive stress can impact the ability to think (Mazzoni and Cornoldi, 1993; Barrouillet et al., 2007). The result means it may have an impact on strategic behavior in multiple domains, including studying mathematics, which often involves taking exams under pressure. People may not perform to their full potential

even when they possess the skills they need, especially in math, where stress and anxiety are common and there is a strong desire to perform well (Benny and Banks, 2015). In the study of Sattizahn et al. (2016) found that adults with high working memory resources perform worse under pressure, and attentional control affects performance. Low attentional control leads to decreased performance, while high attentional control prevents pressure interference. Another study by Estonanto and Dio (2019) shows that students had high level of anxiety to surprised quizzes and time-pressured test and some said that having low scores in mathematics can be very traumatic. Tarmizi (2010) conducted a study on visualizing students' difficulties with Calculus. He discovered that students do not perform well in Calculus and require additional attention, such as conducting tutorial sessions to correct their misconceptions about the students. Tapia & Marsh (2004) as Fennema's Theory, which explains the belief that performance in mathematics is a combination of attitudes, mathematics anxiety, and behavior. People differ in terms of emotional readiness in dealing with the issue of learning, and this difference will be visible in their interest’s attitudes and self-conceit.When pressure is applied and anxiety levels rise, it is difficult to perform well. In order to understand the mechanisms underlying the anxiety-performance relationship, we revisit the integrated model of anxiety and perceptual-motor performance (Nieuwenhuys and Oudejans, 2012) and conduct a critical review of current literature. While there is growing evidence that changes in attentional control affect goal-directed action execution, we propose

a more integrated, process-based approach based on our model and emerging evidence from various scientific disciplines. That is, anxiety can impair performance at various levels of operational control (attentional, interpretational, and physical) and, beyond action execution, can have consequences for various aspects of perceptual-motor behavior, such as situational awareness and decision making.

**Self-Efficacy**. Higher anxiety levels are associated with poorer levels of self-efficacy and, thus, fewer abilities to self-regulate learning in students. It has been discovered that anxiety significantly affects academic performance. Low self-esteem and anxiety are more common in students who perform poorly academically (Norman & Yosef, 2010). Students who are highly anxious about mathematics will not perform well tasks (Puteh & Khalin, 2016), as they were uninterested in mathematics. Level of anxiety in mathematics was different between students. Some of them may experience high levels of anxiety and become nervous. When dealing with math problems (Ashcraft & Moore, 2009). Self-efficacy has always influenced a student's image, confidence level, and achievements in mathematics. (Chen, 2017). Furthermore, as stated by Kundu and Ghose (2016), self-efficacy was strongly associated with attitude and reaction to Mathematics. Hodges and Kim (2016) defined attitude toward mathematics as the way that someone reacts and thinks about mathematics problems. Hackett and Betz (1989) also stated that, individuals with lower self-efficacy beliefs in mathematics experienced higher levels of mathematics anxiety. The Failure,

despite efforts, and the resulting disappointment reduce self-efficacy beliefs and increase mathematics anxiety. According to Schunk (1995), self-efficacy influences students' choice of activities. Students with low self-efficacy may avoid difficult lessons and many tasks, particularly challenging tasks, whereas students with high self-efficacy have a strong desire to complete their tasks. High levels of self-efficacy lead to increased problem-solving efforts (Pajares, 1996). They are more accurate in mathematical calculations and more consistent in dealing with difficult problems. Individuals with low self-efficacy tend to have negative attitudes towards challenges, viewing them as both competitive and negative. According to Aid Suraya and Wan Ali (2009), individuals typically set small goals for themselves.

**Difficulty in Pre-calculus**. According to Djamarah (2011), difficult situation is one in which a student is unable to learn naturally due to threats, obstacles, or distractions in the classroom. There are unexpected difficulties and problems, which may result in academic failure (Trimmer, 1992). It is frequently observed that women have a lower math self-concept than men (Fennema& Sherman,1978; Thorndike-Christ, 1991), however, a number of research have discovered that there is no statistically significant gender difference (Hackett & Betz. 1989; Tatre & Fennema,1995). According to Salinas, Tolibao, and Moneva (2019), a student's anxiety level decreases with increasing math performance and increases with decreasing arithmetic performance. Tarmizi (2010) also asserts that

students find Calculus difficult and that further assistance is required, such as tutorial sessions to clear up students' misconceptions. Studies have typically demonstrated a connection between high levels of arithmetic anxiety and subpar performance (1972, Richardson & Suinn). According to a different Shamsuddin (2013) study, academic anxiety has an impact on students' general performance and, in serious instances, can lead to academic failure. Academic performance is also significantly impacted by correlates of intellectual apprehension, as found by Crystal et al. (2012).

**METHODOLOGY**

**Research Design**

This study was substantiated with the use of correlational research design. According to Creswell (2012) correlational research design is a study that employs a correlation statistical test to measure the degree of association between two or more variables. The researches believed that this research design is the most suitable since the study aims to determine the relationship between anxiety level and pre-calculus.

**Research Locale**

This study was conducted at Colegio de Sta. Ana de Victorias. Located at Osmena Avenue in Victorias City Negros Occidental.

**Samples and Sampling Techniques**

The researchers will use purposive sampling. The respondents of the study were the Senior High School Students from the Senior High School Department learning the core subject specifically Pre-Calculus of Grade 11 STEM Students in Colegio de Sta. Ana de Victorias, Inc. for academic year of 2023-2024. The respondents came from a total of

one hundred ninety-nine (199) Grade 11 STEM Students. The respondents came from a total of 6 sections, where in six (6) sections of Grade11 Science Technology Engineering and Mathematics strand (St. Salome, St. Samantha, St. Sandra, St. Sarah, St. Silvana, and St. Sophia). However, since some respondents were not present, the researchers were only able to collect 189 responses.

**Research instrument**

A researchers-made survey questionnaire will be utilized to collect the required data from the respondents. The research instrument consists of (2) parts. The first part of the research instrument consists of the items that will collect the respondent’s profile, such as Name(optional), Sex, and Pre- Calculus First Semestral Grade. The second part of the research instrument was designed to determine the anxiety level of Senior High School STEM students in Pre-Calculus. The participants must check the box that corresponds to their answer using the following scale: 4 – Strongly agree, 3- Agree, 2- Disagree and 1- Strongly Disagree.

**Validity**

Validity must be addressed while creating and assessing any instruments for use in the study. Research with high validity delivers conclusions that relate to genuine traits, characteristics, and fluctuations in the physical or social reality.

Good and Scates specify the validation methods to use in proving the validity of the research instrument. Three (3) experts in their fields validated the items in the test.

Researchers have processed comments and suggestions for revisions to this document. Below is a picture of the validation scale for the instrument. After collecting the inspected questionnaire, the average score of the three consultants was 4.54, with an interpretation of "Excellent". Thus, making it a sign for us to proceed with reliability testing.

**Reliability**

What defines a measure as dependable is its reliability. How regularly a technique monitors something is what determines its dependability. A measurement is considered reliable if it can reliably provide the same result when the same procedures are used under identical circumstances.

**Data Gathering Procedure**

To investigate the study entitled "Senior high school students anxiety levels in pre-calculus", a survey data gathering method will be employed. The research will begin by clearly defining objectives, followed by the development of a comprehensive survey questionnaire addressing factors such as the difficulty of pre-calculus and personal experiences contributing to anxiety. A researchers-made survey questionnaire will be developed. This will be distributed face-to-face, with access granted only after participants provide consent. The survey will then be administered to the selected Senior High School STEM students, with an emphasis on honest and thoughtful responses. A specified period will be allowed for respondents to complete the survey, ensuring a reasonable timeframe for thoughtful responses. Following data collection, a thorough process of data cleaning will be undertaken to identify and rectify any errors or inconsistencies. Appropriate statistical methods will be employed to analyze the collected data. Finally, the findings will be summarized in a clear and organized manner, presenting insights into the identified comparison.

**Data analysis**

The method used for data analysis is quantitative analysis in which the researchers will examine information acquired from diverse sources such as personal interviews, field observation, and surveys. Data was organized around each research question, which related to experiences of students who were taking online and face-to-face classes, and the factors that shaped those experiences. The researchers examined the interviews, observations, and archival data for similarities and differences. Data collection and analysis provided answers to the following

research questionnaire: (1) What is the demographic profile of the students in Colegio de Sta Ana de Victorias in terms of? (1.1) Name (optional) (1.2) Sex (1.3) Pre-calculus first semestral average; (2) What is the Anxiety Level in Pre-calculus?

**Statistical Tools and Treatment**

In problem (1) to determine the demographic profile of the students, Inferential analysis was used.

In problem (2) to determine the anxiety level of stem students in pre-calculus, Inferential analysis was used.

In problem (3) to determine the academic performance of the students when grouped according to sex and grade level, Inferential analysis was used.

In problem (4) to determine the significant relationship between the anxiety level and academic performance of students, Inferential Analysis was used.

**Table 1**. Data Interpretation

|  |  |
| --- | --- |
| Mean Score Range | Interpretation |
| 1.00-1.74 | Low |
| 1.75-2.49 | Moderate |
| 2.50-3.24 | High |
| 3.25-4.00 | Very High |

**Treatment**

In problem (1) to determine the demographic profile of the students, Frequency was used.

In problem (2) to determine the anxiety level of stem students in pre-calculus, Mean and standard deviation were used.

In problem (3) to determine the academic performance of the students when grouped according to sex and grade level, Percentage

In problem (4) to determine the significant relationship between the anxiety level and academic performance of students, Spearman RHO was used.

**Ethical Consideration**

The participants chose to participate in the survey willingly once the researchers got their informed consent for the study. In order to protect private information, stop unauthorized access, and stop improper use of the survey materials, the researchers gave the respondents assurances on

the security of both their identities and the data collected. Data was only collected by the researcher for this investigation. After the study approved, the researcher will delete all the raw digital data, and the questionnaire will be shredded and disposed properly.

**RESULTS AND DISCUSSION**

This chapter presents the analysis, interpretation, and discussion of the data collected pertaining to the Anxiety Level of Senior High School students in Pre-Calculus.

**DEMOGRAPHIC PROFILE**

Below is the frequency distribution on the demographic profile of the respondents in terms of type of respondents, sex and first semestral grade.

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| --- | --- | --- | --- | --- |
| **Table 3** Demographic profile of the participants according to age, sex, year level and area of residence. | | | | |
| **Category** | **Variables** | f | % |  |  |
| Sex  First Semestral Grade | Male  Female  Total  Below 75  75-79  80-84  85-89  90-100  **Total** | 105  84  **189**  **5**  **26**  **28**  **77**  **53**  **189** | 55.6  44.4  100.0  2.6  13.8  14.8  40.7  28.0  **100.0** |  |  |

The table above shows the demographic profile of the respondents wherein the total 189 respondents composed of male and female Senior High School STEM students in Colegio de Sta. Ana de Victorias.

Thus, as to sex, the majority of the respondents were male representing (55.6%) and female was (44.4%). This implies that Senior High School STEM students in Colegio de Sta. Ana de Victorias are dominated by men.

In terms of First Semestral Grade, of the 189 respondents, five students received Below 75 Pre-Calculus grade, which is (2.6%), twenty-six students obtained 75-79 Pre-Calculus grade, which is (13.8%), twenty-eight students accepted 80-84 Pre-Calculus grade, which is (14.8%), and seventy-seven students given 85-89 Pre-Calculus grade, which is (40.7%), and fifty-three Senior High School STEM students earned 90-100 Pre-Calculus grade, which is (28.0 %).

Therefore, the above table imply that most of the respondents were male and least received Below 75 Pre-Calculus grade and majority given 90-100 Pre-Calculus grade of Senior High School STEM students in Colegio de Sta. Ana de Victorias.

**Table 4** Cross tabulation of First Semestral Grade of Senior High School STEM students in Pre-Calculus according to Sex.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| FSA | FREQUENCY (SEX) | | | FEMALE | PERCENTAGES (%) | TOTAL |
| **MALE** | **PERCENTAGES (%)** | |
| BELOW 75 | 5 | | 100% | 0 | 0.0% | 5 (100%) |
| 75-79 | 22 | | 84.6% | 4 | 15.4% | 26 (100%) |
| 80-84 | 16 | | 57.1% | 12 | 42.9% | 28 (100%) |
| 85-89 | 39 | | 50.6% | 38 | 49.4% | 77 (100%) |
| 90-100 | 23 | | 43.4% | 30 | 56.6% | 53 (100%) |
| TOTAL | 105 | | 55.6% | 84 | 44.4% | 189 (100%) |

The result shows the crosstabulation of First Semestral Grade of Senior High School STEM students in Pre-Calculus wherein five (100%) male students received Below 75 grade and zero frequency (0.0%) from the female students. Twenty-two (84.6%) male students obtained 75-79 grades while only four (15.4%) females are included in the list from a total of 26 respondents who received this Pre-Calculus grade. Sixteen (57.1%) male and twelve (42.9%) from a total of 28 respondents who received an 80-84 Pre-Calculus grade. 85-89 Pre-Calculus grade was acquired by thirty-nine (50.6%) males whereas thirty-eight are female from a total of 77 respondents. From 53 respondents who answered that they achieved 90-100 Pre-Calculus grade, 23 (43.4%) of them are male while 30 (55.6%) of them are females.

Therefore, 189 (100%) responses included male and female Senior High School STEM students from Colegio de Sta. Ana de Victorias found that 105 (55.6%) males obtained Below 75 and 90-100 Pre-Calculus grades, whereas 84 (55.6%) females received 90-100 Pre-Calculus grades with zero frequency of Below 75 Pre-Calculus grades. The research by Padernal (2020), had similar results in which males has failing grades and females has higher grades.

**ANXIETY LEVEL OF STEM STUDENTS IN PRE-CALCULUS**

Below are the analyses on the extent of the Anxiety Level of STEM students in Pre-Calculus.

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| **Table 5** Anxiety Level of STEM students in Pre-Calculus as to Academic Pressure according to respondents’ sex. | | | | | |
| **Category** | **Variables** | **n** | **Mean** | **Interpretation** | **SD** |
| **Sex** | Male  Female  **Total** | 105  84  **189** | 3.17  3.26  **3.21** | High  Very High  High | .56  .54  **.55** |

Table 5 shows that female students of have the highest mean 3.26 score of with a standard deviation of .54, and are interpreted as “Very High.". At the same time, the male gets a mean score of 3.17 with a standard deviation of .56 and is interpreted as “High.". This result is similar to the study of Manalaysay (2019), wherein female and male students both have high level of anxiety toward Pre-calculus.

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| **Table 6** Anxiety Level of STEM students in Pre-Calculus as to Academic Pressure according to First Semestral Grade. | | | | | |
| **Category** | **Variables** | **n** | **Mean** | **Interpretation** | **SD** |
| **First Semestral Average** | Below 75  75-79  80-84  85-89  90-100  **Total** | 5  26  28  77  53  **189** | 3.48  3.22  3.09  3.30  3.14  **3.22** | Very High  High  High  Very High  High  **High** | .63  .58  .54  .53  .56  **.55** |

The table 6 shows the Anxiety level of STEM students of Colegio de Sta. Ana de Victorias in Pre-calculus with regard to academic pressure, which was taken from the respondent’s first semestral average. The table displays the highest mean 3.48 score of the standard deviation of.63 and are regarded as "Very High" which came from the 5 respondents, followed by the 77 respondents received 85-89 grades with the mean 3.30 score of the standard deviation of .5 interpreted as “Very High”, next are the grades 75-79 of the 26 respondents which presents the mean of 3.22 score of the standard deviation of .58 interpreted as “High”, followed by the respondents of 53 with grades of 90-100 mean 3.14 score of the standard deviation of .56 and are interpreted as “High”, and the lowest mean 3.09 score of the deviation .54 which came from the 28 respondents and interpreted as “High”. A study by Aryal (2022) showed similar result in which students with high level of anxiety has either a high grades or a failing grade

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| --- | --- | --- | --- | --- | --- |
| **Table 7** Anxiety Level of STEM students in Pre-Calculus as to Self- Efficacy according to respondents’ sex. | | | | | |
| **Category** | **Variables** | **n** | **Mean** | **Interpretation** | **SD** |
| **Sex** | Male  Female  **Total** | 105  84  **189** | 3.09  3.17  3.13 | High  High  High | .63  .57  .61 |

The table 7 shows the anxiety level of STEM students of Colegio de Sta. Ana de Victorias in Pre-Calculus in terms of self-efficacy based on the respondents' gender. The highest mean 3.17 score of the standard deviation of .57 and are interpreted as “High” which came from the number of 84 respondents, and as for male respondents who are equivalent to 105 which represents the mean of 3.09 score of the standard deviation of .63 and interpreted as having “High”. Similar result showed on a study by Rabuya (2023), male and female student has high anxiety level on Pre-calculus in terms to self-efficacy.

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| **Table 8** Anxiety Level of STEM students in Pre-Calculus as to Self- Efficacy according to respondents’ First Semestral Grade. | | | | | |
| **Category** | **Variables** | **n** | **Mean** | **Interpretation** | **SD** |
| **First Semestral Average** | Below 75  75-79  80-84  85-89  90-100  **Total** | 5  26  28  77  53  **189** | 3.40  3.30  2.91  3.17  3.07  3.13 | Very High  Very High  High  High  High  High | .51  .65  .66  .52  .66  .61 |

The table 8 displays the anxiety level of STEM students at Colegio de Sta. Ana de Victorias in Pre-Calculus as to Self-Efficacy according to respondents’ First Semestral Grade. It is viewed in the table above that highest mean 3.40 score of the standard deviation of .51 interpreted as “Very High”, followed by the mean 3.20 score of the standard deviation of .65 also interpreted as “Very High”, next is the mean 3.17 score of the standard deviation of .52 interpreted as “High”, followed by the mean 3.07 score of the standard deviation of .66 also interpreted as “High”, and the lowest mean of 2.91score of the standard deviation of .66. These results are similar to the study of Sevgi and Arslan (2020), their study concludes that students that has failing grade has higher anxiety level

than students that have grade 80-85 and students that are in 90 above has also higher anxiety level.

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| **Table 9** Anxiety Level of STEM students in Pre-Calculus as to Difficulty in Pre-calculus according to respondents’ sex. | | | | | |
| **Category** | **Variables** | **n** | **Mean** | **Interpretation** | **SD** |
| **Sex** | Male  Female  **Total** | 105  84  **189** | 2.10  3.07  3.01 | Moderate  High  High | .69  .61  .66 |

Table 9, shows that Female have the highest mean score of 3.10 with standard deviation of .61 and interpreted as “High”, and as for the Male respondents they represent the mean score of 2.10 with the standard deviation of .69 and interpreted as “Moderate”. A study by Soto and Pena (2022), showed identical results that states there is a significant difference to the anxiety of male and female.

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| **Table 10** Anxiety Level of STEM students in Pre-Calculus as to Difficulty in Pre-calculus according to respondents’ First Semestral Grade. | | | | | |
| **Category** | **Variables** | **n** | **Mean** | **Interpretation** | **SD** |
| **First Semestral Average** | Below 75  75-79  80-84  85-89  90-100  **Total** | 5  26  28  77  53  **189** | 3.16  3.24  2.76  3.03  2.98  **3.01** | High  High  High  High  High  **High** | .77  .71  .62  .62  .66  **.66** |

The table 10 shows the Anxiety Level of STEM students in Pre-Calculus as to Difficulty in Pre-calculus according to respondents’ First Semestral Grade. The highest mean 3.24 score of the standard deviation of .71 which are the grades of 75-79 interpreted as “High”, followed by grades Below 75 with the mean of 3.16 score of the standard deviation is .77 also interpreted as “High ” ,next are the grades of 85-89 which presents the mean of 3.03 score of the standard deviation .62 which are also as “High”, followed by the mean of 2.98 score of the standard deviation .66 interpreted as “High”, and the lowest mean of 2.76 score of the standard deviation .62 and interpreted as “High ”. These results

show similarities to a study by Estonanto (2017), in which students have high anxiety level in terms of the difficulty of Pre-calculus.

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| **Table 11.** Relationship between the first semestral average towards pressure among Stem students and profile variables to sex. | | | | | | |
| **Category** | **Variables** | **Mean** | **SD** | **p-value** | **Interpretation** | **Decision** |
| **Sex** | FSA  PRESSURE  **Total** | 1.0  -.70  186 | .34  .34  .0 | 0.05 | Not Significant | Accept |

We can identify the partial correlation between First Semestral Average and Pressure when controlling for sex. The partial correlation is .70 (p> 0.05). Therefore, the relationship between FSA and Pressure is not significant even when controlling for sex.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table 12.** Relationship between the First Semestral Average towards Self- Efficacy among stem students and profile variables to sex*.* | | | | | | |
| **Category** | **Variables** | **Mean** | **SD** | **p-value** | **Interpretation** | **Decision** |
| **Sex** | FSA  SELF EFFICACY  **Total** | 1.0  -.10  186 | .17  .17  .0 | 0.05 | Not Significant | Accept |

We can identify the partial correlation between First Semestral Average and Pressure when controlling for sex. The partial correlation is .10 (p> 0.05). Therefore, the relationship between FSA and Pressure is not significant even when controlling for sex.

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| --- | --- | --- | --- | --- | --- | --- |
| **Table 13.** Relationship between the First Semestral Average towards Difficulty of Pre-Calculus among stem students and profile variables to sex*.* | | | | | | |
| **Category** | **Variables** | **Mean** | **SD** | **p-value** | **Interpretation** | **Decision** |
| **Sex** | FSA  DIFFICULTY  **Total** | 1.0  -.94  186 | .20  .20  .0 | 0.05 | Not Significant | Accept |

We can identify the partial correlation between First Semestral Average and Difficulty of Pre-Calculus when controlling for sex. The partial correlation is .10 (p> 0.05). Therefore, the relationship between FSA and Pressure is not significant even when controlling for sex.

**SUMMARY AND CONCLUSIONS**

This chapter presents the conclusions/summary. As well as analysis and interpretation of data gathered by the researchers. This study aims Senior High School STEM Students Anxiety level in Pre-Calculus. In this study, a survey questionnaire was used to gather data from 189 Grade 11 Students of colegio de sta ana de Victorias, aimed at identifying the anxiety level of senior high school stem students in pre-calculus. The study’s conclusion shows that a significant number of the STEM students in Colegio de Ata. Ana de Victorias experiences a high level of mathematics anxiety, particularly in pre-calculus subject. The investigation also points out specific scenarios, such as examinations, tests, recitations, and surprise quizzes, which in higher level of anxiety. The study finds among that stem students, pre-calculus anxiety levels do not seem significantly influenced by gender. This suggests that strategies to reduce pre- calculus anxiety should be applicable to students of all genders.

**Recommendation**

According to the conclusion of the study, the researchers present the following recommendations that were useful to the following entities:

**Students.** It is highly suggested that the students should consider exploring various coping mechanisms such as breaking down problems into smaller steps by seeking peer support, or practicing relaxation techniques like deep breathing and to avoid future conflicts in their academic performances, the students is expected to practice time management skills, to do extra efforts to study after class, and to approach the teachers if lost in the lessons.

**Future Researchers.** The study's findings can be used as a guide and foundation for further interpretations and methods relevant to the researcher's research.

**REFERENCES**

Estonanto, A. J. (2018). Impact of math anxiety on academic performance in pre- calculus of Senior High School. Liceo Journal of Higher Education Research, 13(2). <https://doi.org/10.7828/ljher.v13i2.1059>

Padernal, R. E., & Diego, C. V. (2020). Academic performance of senior high school students in pre-calculus. Philippine Social Science Journal, 3(2), 69–70.

Salinas, K. J. H., Tolibao, J. R., Moneva, J. C. (2019). Student’s Anxiety in Mathematics.International Journal of Novel Research in Education and Learning, 6(1), 46-55. <https://www.noveltyjournals.com/upload/paper/STUDENT%E2%80%99S%20ANXIETY%20IN%20MATHEMATICS-1657.pdf?fbclid=IwAR0XTz_ZCz1Xi2X-IBvQoxZLx1mx_sgA1wX-Q6exfRGVMsZgzL1ok6ZXEKE>

Luu-Thi, H.-T., Ngo-Thi, T.-T., Nguyen-Thi, M.-T., Thao-Ly, T., Nguyen-Duong, B.-T., & Tran-Chi, V.-L. (2021, October 19). *An investigation of mathematics anxiety and academic coping strategies among high school students in Vietnam: A cross-sectional study*. <https://www.frontiersin.org/articles/10.3389/feduc.2021.742130/full?fbclid=IwAR2Jx4ct8msviYKQW3vWqGGdVUreddp9SYghZ9HDyRHctQpN6yVhLnZBIVQ#:~:text=The%20results%20show%20that%20there,significant%20predictors%20of%20mathematics%20anxiety>

Ocbian, J., Murot, J., Alejo, A. M., &amp; Tus, J. (n.d.). Amidst the online learning: The self-efficacy and its relationship to ... Amidst the Online Learning: The Self-Efficacy and Its Relationship to the Anxiety Among Senior High School Students. <https://www.researchgate.net/publication/361349829_Amidst_the_Online_Learning_The_Self-Efficacy_and_Its_Relationship_to_the_Anxiety_Among_Senior_High_School_Students>

Wadi, M., Yusoff, M. S. B., Rahim, A. F. A., & Lah, N. A. Z. N. (2022, January 6). *Factors affecting test anxiety: A qualitative analysis of medical students’ views - BMC psychology*. BioMed Central. <https://bmcpsychology.biomedcentral.com/articles/10.1186/s40359-021-00715-2>