THE SCIENTISTS IN THE MAKING: AN IN-DEPTH UNDERSTANDING OF STEM STUDENTS' MOTIVATIONS AND PERCEPTIONS TOWARDS SCHOOL SCIENTIFIC PURSUIT IN PADRE GARCIA INTEGRATED NATIONAL HIGH SCHOOL

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This thesis entitled "**THE SCIENTISTS IN THE MAKING: AN IN-DEPTH UNDERSTANDING OF STEM STUDENTS' MOTIVATIONS AND PERCEPTIONS TOWARDS SCHOOL SCIENTIFIC PURSUIT IN PADRE GARCIA INTEGRATED NATIONAL HIGH SCHOOL",** prepared and submitted by **CAMILLE M. ANTIQUERRA, DOMINIC P. ARGAO, CHLOE DENISE A. CASTILLO, PRINCESS A. CORTES, SEAN KYLE P. DE CASTRO, KATE SHANEL N. JAVIER, FRANCHESKA MARIE L. SAMO, YSHEY ANJOLETH M. VALENZUELA,** in partial fulfillment for the requirements for Practical Research 1 in STEM strand, has been examined and recommended for acceptance and approval of Oral Examination.

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Executive Summary

Title	:	**THE SCIENTISTS IN THE MAKING: AN IN-DEPTH UNDERSTANDING OF STEM STUDENTS' MOTIVATIONS AND PERCEPTIONS TOWARDS SCHOOL SCIENTIFIC PURSUIT IN PADRE GARCIA INTEGRATED NATIONAL HIGH SCHOOL**
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The field of science has been a significant contributor to human progress and development in all aspects of life. However, despite the many benefits that science has to offer, there has been a significant decline in the number of students who are interested in pursuing careers in science. STEM students' perception of the relevance of scientific pursuit to their future career is often hindered by a lack of understanding of the value and application of scientific knowledge in different fields. This study focused on exploring the perceptions of students in the STEM strand regarding scientific pursuits. It aimed to investigate how students perceived these pursuits, understood their motivations towards engaging in them, and determined their views on the relevance of scientific pursuits to their future careers and personal goals. By gaining insights into students' perspectives, this research aimed to inform educational practices and curriculum development in order to align STEM education with students' interests and aspirations.

It made use of interpretative phenomenological analysis in investigating and explaining phenomena and their relationships. It involved nine (9) STEM students' from STEM students from the three (3) sections of STEM in Padre Garcia Integrated National High School which are the Newton, Pasteur, and Einstein, who were selected via purposive and convenience sampling. One-on-one interview using self-constructed semi-structured interview schedule were used to gather the necessary data. After thorough interpretation and analysis, six major themes emerged that constituted to the motivations and perceptions of subject: enlightening intellects towards scientific engagement and development, fostering innovation and surmounting obstacles for scientific advancement, the quest for personal fulfillment and transcedence towards scientific pursuit, the triumph of intellectual

exploration and tenacity, the implication of knowledge-related wisdom on triumph and evolution, and determinants influencing knowledge path.

Based on the conclusions drawn from the study on Grade 11 STEM students' motivations and perceptions towards scientific pursuits, the most important recommendation is to establish mentorship programs and partnerships with industry professionals. These mentors can guide and support students in their scientific endeavors, sharing experiences, insights, and inspiring them to overcome challenges. Such collaborations enhance students' understanding of real-world applications of scientific knowledge, build professional networks, and create opportunities for internships or research collaborations. By implementing mentorship programs, educators can provide valuable guidance to students and help them excel in their scientific journeys.

Keywords: STEM students, motivations and perceptions towards scientific pursuits, IPA

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

THE PROBLEM

Introduction

Education in science is essential for providing people with the knowledge and abilities needed to comprehend the natural world, make wise decisions, and advance society. Students learn to apply the scientific method, critical thinking, and problem-solving abilities to real-world circumstances through the study of science in schools. Additionally, science education encourages curiosity and a drive to learn more about the world around us by encouraging an appreciation for the complexity and diversity of life on Earth. Science education is crucial for building a scientifically literate society that is capable of making decisions on important topics like public health, environmental protection, and technological advancement.

School scientific pursuits refer to the activities and experiences related to the study of science in educational settings. These pursuits may include classroom instruction, laboratory experiments, field trips, science fairs, and research projects. The purpose of school scientific pursuits is to develop students' scientific literacy, which involves understanding the scientific concepts, principles, and methods that underpin scientific inquiry. Moreover, school scientific pursuits aim to foster an appreciation of the scientific process, as well as the ethical and social implications of scientific discoveries and innovations. Through engaging in scientific pursuits at school, students may develop critical thinking, problem-solving, and communication skills, which are essential for success in both scientific and non-scientific fields.

Promoting scientific pursuit in schools is crucial for the development of students' scientific thinking and problem-solving skills. Here are some initiatives that schools can take to encourage scientific pursuit. Schools can organize science fairs where students can showcase their scientific projects and experiments. This can help students develop their scientific skills and encourage them to pursue scientific research. Schools can incorporate technology, such as virtual labs and computer simulations, to make science education more interactive and engaging. This can help students develop their scientific skills and gain a deeper understanding of scientific concepts.

The field of science has been a significant contributor to human progress and development in all aspects of life. However, despite the many benefits that science has to offer, there has been a significant decline in the number of students who are interested in pursuing careers in science.

STEM students' perception of the relevance of scientific pursuit to their future career is often hindered by a lack of understanding of the value and application of scientific knowledge in different fields. They may view science as a subject that is only relevant to those pursuing a career in STEM, and not applicable to their chosen field or career path. Furthermore, students' motivation towards STEM subjects may change over time due to various reasons such as changes in their interests, values, and experiences, which is not directly controllable. “Motivation is not something that people do to others. Motivation occurs within people minds and hearts. Manager can influence the motivational process, but they cannot control it” (Denhardt et al., 2008, p.147).

Perception of school scientific pursuit can also vary among STEM students, influenced by factors such as the quality of teaching, exposure to diverse scientific fields,

and future career prospects. This can result in differing views on the goals and methodologies of scientific pursuit, hindering effective collaboration and communication. Thus, addressing these challenges and enhancing students' understanding and motivation towards scientific pursuit is crucial for promoting scientific advancement.

The STEM strand of the Philippine educational system places a high priority on academic scientific pursuits. Students' preparation for the demands of the modern workforce and upcoming jobs in science and technology is widely acknowledged to depend heavily on STEM education. To encourage and support curricular scientific endeavors in schools, the Philippine government has put in place several initiatives. To give pupils a strong foundation in scientific knowledge and abilities, the Department of Education (deped) has established a comprehensive K–12 curriculum that covers science and technology disciplines (Republic Act No. 2067).

STEM students in Padre Garcia Integrated National High School may face some problems that affect their motivations and perceptions toward scientific pursuits. The pressure to perform well and achieve high grades and also negatively affect STEM students’ motivation and perception of science. Students may feel overwhelmed and stressed, which can lead to a lack of interest or even burnout. The emphasis on standardized testing may also prioritize, memorization and recall over creative and innovative problem-solving skills, which may not align with the true nature of scientific pursuits.

The study aimed to explore the mindset and attitudes of students who are interested in science, with a focus on their motivations for pursuing STEM subjects and their perceptions of the educational process. The term "Scientists in the Making" refers to students who have an interest in science and who may eventually become scientists in the

future. This ensured that STEM students have the skills and knowledge required to continue advancing scientific research it is crucial to conduct an in-depth investigation of STEM students' motivations and perceptions toward school scientific pursuit. The research had the potential to increase student interest, engagement, and achievement in STEM subjects, which can lead to a more innovative and competitive workforce in the future. STEM students are the future of scientific research.

Statement of the Problem

This study aimed to determine the motivations and perceptions of students taking Science, Technology, Engineering and Mathematics (STEM) strand towards the school scientific pursuits in Padre Garcia Integrated National High School.

Specifically, students will sought to answer to the following:

1. How do students perceive the scientific pursuits that are implemented in the STEM strand?
2. What are the motivations of STEM students toward school scientific pursuits?
3. How do the respondents perceive the relevance of scientific pursuits to their future career and personal goals?

Scope, Limitation, and Delimitation

The study focused on understanding the perceptions and motivations of STEM students in Padre Garcia Integrated National High School towards scientific pursuits. Specifically, the study explored how these students perceive the scientific pursuits implemented in the STEM strand, their motivations towards school scientific pursuits, and how they perceive the relevance of these pursuits to their future careers and personal goals.

This study was only conducted in Padre Garcia Integrated National High School. To obtained this, the researchers took into consideration the inspirations, stimulation, insights, and understanding in conducting exhibit and capstone research of the selected STEM students from the three sections such as Newton, Pasteur, and Einstein. This was conducted through interviews of a diverse group of STEM students in various academic levels and backgrounds.

The research did not include external factors. Additionally, the study excluded certain variables or aspects that were not directly related to the research question, such as students' socioeconomic status or family background. The study excluded non-STEM students, teachers, and parents from the research, which may provide additional insights into the motivations and perceptions towards scientific pursuit. Also, the study did not explore the effectiveness of teaching methods and strategies used in conducting scientific pursuit among students.

Significance of the Study

This research is considered significant for it may provide crucial information and knowledge regarding the chosen topic. More so it is specifically important to the following:

The study may benefit all **STEM students** in the Padre Garcia Integrated National High School by helping to share standards and criteria for the intellectual work of carrying out a project. The study may also help STEM students become more self-aware of their motivations and perceptions toward scientific pursuits, which may help them make more informed decisions about their future academic and career paths.

This study may help **science teachers** in the Padre Garcia Integrated National High School understand the motivations or perceptions of STEM students towards scientific

pursuits, which can help them develop effective teaching strategies that go beyond imparting knowledge. When teachers have a deep understanding of their students' motivations and perceptions towards STEM, they can tailor their teaching strategies to better engage their students. This may result in higher levels of student engagement, increased learning outcomes, and a greater enthusiasm for science.

The research findings may benefit **Padre Garcia Integrated National High School** by improving communication skills for student scientists and increasing their enthusiasm for science and their scientific knowledge. They can also help educators and policymakers design effective science programs that promote scientific literacy and encourage more students to pursue STEM careers.

The **municipality of Padre Garcia** may benefit from this study by being informed about the different kinds of inventions that students make in school that they can further develop and use in different aspects of society. It also brings substantial positive outcomes for the municipality through the promotion of skilled employees.

Lastly, this study may be convenient to the **future researcher** for setting new ideas upon the accomplishment of the future development. It can also help them serve as a guide for performing related research on other identified issues.

CHAPTER II

REVIEW OF LITERATURE

This chapter presents the conceptual and research literatures used in strengthening this study. This also contains the synthesis and definition of terms.

Conceptual Literature

This part covers concepts relevant to the themes were identified and developed after an in-depth understanding of STEM students' motivations and perceptions towards school scientific pursuit in Padre Garcia Integrated National High School. Specifically, it will contain ideas about school scientific pursuit, motivation in scientific pursuit, perception in scientific pursuit, and relevance to future career and personal goal. This concept will significantly contribute to further understanding of this topic.

School Scientific Pursuit. Advances in the disciplines of STEM drive innovation and this explains the rationale behind the prioritization of these fields by different societies in this century. These are fields that improve human understanding of the physical environment, support research, and experimentation, in order to gain knowledge and skills needed for the real world. These fields are individually significant and can be taught in isolation, but when collectively applied, they can deepen understanding and be used to solve real-world problems. STEM education blurs the boundaries amongst these disciplines, presenting an integrated approach to solving problems using interdisciplinary or cross-disciplinary knowledge and skills. The separation of subjects in education has become less relevant in the 21st century as students are no longer taught along the lines of

memorization, but are trained to imbibe 21st century skills, develop 21st century approaches and strategies to solving real-life problems.

STEM education is the purposeful integration of STEM disciplines with the objective of expanding students' abilities by supporting technical and scientific education with a strong emphasis on critical and creative-thinking skills. Quality education can only be provided if classes and schools are structured towards 21st century skills and knowledge needed for survival in the current global economy, and this has made the need for STEM education vital to today's society. This is a society projected to be driven by technological innovations such as renew- able energy, advanced materials, 3D printing, energy storage, genomics, advanced oil and gas exploration, internet of things (iot), cloud, advanced robotics, and autonomous vehicles. This implies that the future marketplace will experience a radical change and education systems should adapt and respond to these changes. Learners should be equipped with the skills needed for this future and this involves training them to exercise higher level thinking skills by investigating, creating, debating, and synthesizing knowledge.

In highlighting skills crucial to education in the 21st century, Shaer et al. Insists that there should be a shift from knowledge content-based education to education that focuses more on knowledge use and synthesis, building useful skills and positive character qualities. Some of these needed 21" century skills are creativity, critical thinking, communication, and collaboration. Popularly called the "4c's", these skills have become important considering the volatility, uncertainty, complexity, and ambiguity that dominates this century and the future. Creativity is the ability to produce new and useful ideas, it is the ability to use imagination to create something valuable. A creative student is one that

perceives a situation in a novel way by finding not-so-visible patterns and making connections between intricate facts or phenomena. Such a deep-thinking skill is important for students in the 21st century as they begin to think outside the box, and offer solutions on their own to real life problems (Soo, 2019).

The United States Department of Education (DOE) highlights the need to improve STEM education, including school scientific pursuit, to prepare students for the workforce and compete in a global economy (U.S. Department of Education, 2015). The DOE aims to increase the number of students pursuing STEM careers and promote equity and access to STEM education for underrepresented groups. The United States Department of Education has initiated several programs and initiatives to improve STEM education. Additionally, the department has supported the establishment of STEM-focused schools and programs to provide students with opportunities to develop skills and knowledge in these fields.

The United States Department of Education has initiated several programs and initiatives to improve STEM education. For example, the department has invested in the Teacher Quality Partnership program, which aims to increase the number of highly qualified STEM teachers in K-12 schools. Additionally, the department has supported the establishment of STEM-focused schools and programs to provide students with opportunities to develop skills and knowledge in these fields.

Underrepresented groups, including women and minorities, have historically been underrepresented in STEM fields. To address this issue, the DOE has implemented several programs to promote equity and access to STEM education. For instance, the department has supported the expansion of after-school and summer programs that provide

underrepresented students with opportunities to engage in STEM learning. The DOE has also provided funding to institutions to support research and development in STEM education and promote the recruitment and retention of underrepresented students in STEM fields.

Overall, the United States Department of Education recognizes the importance of STEM education in preparing students for the workforce and promoting economic competitiveness. The department has implemented several initiatives to increase the number of students pursuing STEM careers and promote equity and access to STEM education for all students.

The efforts to promote school scientific pursuit have also focused on equity and inclusion. Provides resources and support to organizations working to engage girls in STEM education and careers. It aims to increase the participation of girls in STEM fields and address the gender gap in STEM careers (National Girls Collaborative Project [NGCP], n.d.).

According to a report by (NSF), women remain underrepresented in several STEM fields, including engineering and computer science, where they constitute only 21% and 19% of the workforce, respectively. Similarly, underrepresented minority groups, including Black, Hispanic, and Native American individuals, are also underrepresented in STEM fields.

Overall, these are critical to address because of the gender gap and underrepresentation of underrepresented groups in STEM fields. However, it can also have broader societal benefits.

There are 2.4 million undergraduate students in the United States were enrolled in STEM fields, with the highest enrollment in biological sciences, followed by engineering, mathematics, and physical sciences (National Science Foundation [NSF], 2018). This also indicates that STEM graduates have higher job prospects and earning potential compared to graduates in non-STEM fields. Additionally, the demand for STEM professionals is expected to continue to increase in the coming years, with an estimated 8.9 million STEM jobs projected to be available by 2028.

Furthermore, emphasizes the importance of diversity and inclusivity in STEM education to address societal challenges and foster innovation (NSF, 2020). Diversity and inclusivity in STEM education can provide a range of perspectives and ideas that can lead to more creative and effective solutions to complex problems. Additionally, it can help increase representation and access for historically underrepresented groups in STEM fields, leading to a more equitable society.

The NSF encourages the integration of diverse perspectives, cultures, and experiences in STEM education to enhance creativity and problem-solving abilities. The report also highlighted the need to improve STEM education to meet the demand for STEM professionals in various industries, including healthcare, energy, and manufacturing.

To promote school scientific pursuit, the Department of Education have launched initiatives and funding programs. For example, the National Science Foundation offers grants for STEM education research, curriculum development, and teacher training (NSF, 2021).

The U.S. Department of Education provides funding for STEM programs, particularly for underrepresented groups, through various initiatives such as the Minority

Science and Engineering Improvement Program (MSEIP) (U.S. Department of Education, n.d.).

The MSEIP provides funding to Minority-Serving Institutions (msis) to support and enhance their capacity to provide quality STEM education and opportunities for underrepresented students. The program aims to increase the number of underrepresented students who pursue and complete degrees in STEM fields and enter the workforce with the skills necessary to succeed in the 21st-century economy.

Motivation in Scientific Pursuit. Motivation is a critical factor that influences students' engagement and success in scientific pursuits, as highlighted by National Science Foundation (NSF). Understanding students' motivations and perceptions towards science is essential for designing effective interventions that can enhance their interest and engagement in scientific activities.

Science activities such as science exhibit and the research capstone of STEM students. National Council of Education Research and Training (NCERT) has organized a national-level science exhibition every year where children showcase their talents in science and mathematics and its applications to various aspects of everyday life. This is done with a view to encourage, popularize, and inculcate scientific temper among the children. NCERT organizes the exhibition in two phases to ensure the widest possible participation and involvement of students and teachers in the program. In the first phase, exhibitions are held in each and every state and various union territories. This first phase is known as the State Level Science, Mathematics and Environment Exhibition (SLSMEE). All participating states and union territories forward their selected entries to NCERT for consideration for participation in the national exhibition. The second phase is held at

national level every year by NCERT in a state/UT, on a rotational basis. The exhibits for display in this national exhibition are selected at NCERT on the basis of a notified criterion (Science Exhibition 2017).

The Initiative for Research and Innovation in Science (IRIS) this program was initiated with the intention to popularize STEM fields and the spirit of innovation among students from class 5 to class 12. It recognizes and rewards outstanding young innovators and provides a platform for them. IRIS workshops are conducted to reach out to schools across the country, after which young students submit research-based STEM projects, which are evaluated, keeping in mind the level of innovation and scientific robustness.

One relevant theory that has been widely referenced in NSF is Self-Determination Theory (SDT), which posits that students are more likely to be motivated when their basic psychological needs for autonomy, competence, and relatedness are satisfied. Autonomy refers to the students' sense of control and choice in their learning, while competence refers to their perception of their own skills and abilities. Relatedness pertains to students' sense of connection and belongingness to the learning environment, including their interactions with peers and teachers.

Research on SDT emphasizes the importance of the internalization of motivation as a crucial factor for determining the quality of motivation. Hence, intrinsic motivation is deemed as an important predictor of learning. Research on epistemic beliefs, on the other hand, focuses on the nature of knowledge, and learning with more sophisticated epistemic beliefs associated with more adaptive outcomes. While learning and achievement are multiply determined, a more comprehensive theoretical model that takes into account both motivational quality and epistemic beliefs is needed.

Another theory that has been cited in NSF is Expectancy-Value Theory (EVT), which suggests that students' motivation is influenced by their expectation of success and the value they attribute to a task. Students are more likely to be motivated when they believe they can succeed in a task and when they find the task valuable and relevant to their goals and interests.

The theory suggests that individuals are motivated to engage in activities that they believe will lead to desirable outcomes and that they value. One prominent application of the Expectancy-Value Theory is in the field of science education. Researchers have used the theory to investigate how students' beliefs about their ability to succeed in science and their attitudes toward science influence their motivation to learn and pursue science-related careers.

Statistical data from National Center for Science and Engineering Statistics (NCSES) in 2018 also support the importance of motivation in scientific pursuit. For example, a report showed that students who reported higher levels of intrinsic motivation, such as curiosity and enjoyment, were more likely to pursue STEM fields in college and career. Additionally, data from the U.S. Department of Education in 2017 revealed that students who felt more competent in science and perceived science as relevant to their lives were more likely to engage in science-related activities outside of school, such as science competitions and clubs.

Furthermore, NCSES emphasize the need to promote intrinsic motivation in students' scientific pursuits. Intrinsic motivation, which refers to students' internal drive and interest in science, has been shown to positively influence students' engagement, creativity, and persistence in scientific activities. Encouraging students' curiosity,

providing opportunities for choice and autonomy, and fostering a sense of ownership in their learning have been suggested as effective strategies to enhance intrinsic motivation.

It also highlight the importance of recognizing and valuing diverse motivations for pursuing science. Students may be motivated by different factors, such as career aspirations, societal impact, personal interests, or curiosity. Acknowledging and supporting diverse motivations can create a more inclusive and engaging learning environment that caters to students' individual needs and interests, as highlighted in reports from the National Science Foundation (NSF) and the U.S. Department of Education.

Motivation plays a vital role in shaping students' engagement and success in scientific pursuits, as highlighted by governmental websites from 2013 up until now. Theories such as SDT and EVT provide frameworks for understanding students' motivation in scientific pursuit, and statistical data support the importance of intrinsic motivation and diverse motivations. Recognizing and supporting students' motivations can inform the design of effective interventions that enhance their interest and engagement in scientific activities, ultimately preparing them to become the scientists of tomorrow.

Perception in Scientific Pursuit. Scientific pursuit among STEM (Science, Technology, Engineering, and Mathematics) students is influenced by their perceptions, which shape their attitudes and behaviors towards engaging in scientific activities. Research conducted over the past decade reveals that STEM students' perceptions of scientific pursuit are multifaceted and are shaped by various factors.

According to a report from the National Science Foundation [NSF] (2015), STEM students' perceptions of scientific pursuit are influenced by their preconceived notions about the nature of science, their experiences with science education, and their socio-

cultural backgrounds. For instance, students who perceive science as complex or irrelevant to their daily lives may be less motivated to pursue scientific activities in school. Furthermore, students who have negative experiences with science education, such as encountering difficulty in understanding scientific concepts or feeling disengaged in science classrooms, may develop negative perceptions of scientific pursuit.

Additionally, research from the National Center for Education Statistics [NCES] (2018) suggests that students' gender, ethnicity, and socioeconomic status can also impact their perception of scientific pursuit. For example, female students and students from underrepresented minority groups may perceive STEM fields as less welcoming or inclusive, which may affect their motivation to pursue scientific activities in school.

Similarly, a study published in the Journal Science (2018) found that even at the undergraduate level, women and underrepresented minorities in STEM fields face greater obstacles than their white male peers. These obstacles include a lack of supportive peers and mentors, feelings of isolation and imposter syndrome, and bias and discrimination. These challenges can make it more difficult for these students to succeed and continue pursuing careers in STEM fields.

Statistics from the U.S. Department of Education (2017) reveal that female students and students from minority groups are underrepresented in STEM fields. For instance, in 2017, only 27% of female students and 15% of Black students earned bachelor's degrees in STEM fields, compared to 37% of male students and 19% of White students. These disparities in representation may be influenced by students' perceptions of scientific pursuit and their beliefs about their abilities to succeed in STEM fields.

Moreover, research from the National Academies of Sciences, Engineering, and Medicine (2018) highlights the importance of fostering positive perceptions of scientific pursuit among students to promote their interest and engagement in STEM fields. Creating inclusive and culturally responsive learning environments, providing opportunities for hands-on and inquiry-based learning, and showcasing the diversity of STEM careers and role models can help shape students' positive perceptions of scientific pursuit.

Furthermore, early exposure to STEM education and positive role models has been found to be crucial in shaping students' interests and perceptions of STEM. A study by Microsoft found that girls who had a female role model in STEM were more likely to express interest in pursuing a STEM career. Therefore, it is important to encourage and support students' interest and engagement in STEM fields to prepare them for future success in the workforce.

In addition, National Institutes of Health (NIH) emphasize the need to promote diversity and inclusion in STEM fields to ensure that all students, regardless of their background, feel empowered and motivated to pursue scientific activities in school. Efforts to address systemic barriers, such as gender biases, racial disparities, and socioeconomic inequalities, can contribute to shaping students' perceptions of scientific pursuit in a positive way.

Relevance to future career and personal goal. Scientific pursuit is an essential aspect of both personal and professional growth, as it provides a framework for understanding the natural world and addressing complex problems. Many of the fastest-growing occupations today require a background in science, technology, engineering, or mathematics (STEM) (National Science Board, 2018). Pursuing a scientific education can

open up opportunities for careers in fields such as healthcare, engineering, and environmental science.

For many scientific communities, engaging early career researchers is critical for success. These young scientists (graduate students, postdocs, and newly appointed professors) are actively forming collaborations and instigating new research programs. They also stand to benefit hugely from being part of a scientific community, gaining access to career development activities, becoming part of strong collaborator networks, and achieving recognition in their field of study — all of which will help their professional development (Pratt, 2017).

The future career researchers bring fresh perspectives and new ideas to the scientific community. They are often at the forefront of emerging fields, developing new techniques and methods, and questioning established theories. By engaging with these young researchers, established scientists can gain new insights and stay up-to-date with the latest developments in their field.

Moreover, they will benefit greatly from being part of a scientific community. They gain access to resources and training opportunities that help them develop their skills, such as attending conferences, workshops, and training sessions. Being part of a community also provides opportunities for networking and finding potential collaborators, which can be essential for career advancement.

According to Fellowes et al. (2016), building a network of collaborators and colleagues is a key professional development activity for Early Career Scientists (ECS) dealing with a challenging job market. At large conferences, young scientists often focus

on interacting with senior researchers, competing for a small number of positions in leading laboratories.

In addition, building a strong network of peers and colleagues in related disciplines can provide long-term benefits for ECS. These benefits include access to new ideas and resources, opportunities for collaboration, and potential career advancement. Collaborating with peers in related disciplines can also provide opportunities for interdisciplinary research, which can be highly valuable in many fields.

Additionally, the Deep Carbon Observatory (DCO) began funding a series of workshops in 2014 designed to connect early career researchers within its extensive network of multidisciplinary scientists. The workshops, by design, are by and for early career scientists, thus removing any element of competition and focusing on peer-to-peer networking, collaboration, and creativity. The successful workshops, organized by committees of early career deep carbon scientists, have nucleated a lively community of like-minded individuals from around the world.

Furthermore, these workshops have been highly successful in connecting young researchers from around the globe who share a common interest in deep carbon science. The workshops were organized by committees of early career scientists who worked together to create a vibrant community that fosters interdisciplinary collaboration and exploration. As a result, a dynamic and enthusiastic group of like-minded individuals has emerged, who continue to work together and support each other's research endeavors long after the workshops have ended.

Research Literature

The following studies were reviewed and analyzed by the researcher in order to gain better understanding on their topic.

Science, Technology, Engineering, and Mathematics (STEM) education has become an important focus for many countries in recent years, as they recognize the crucial role these fields play in promoting innovation, economic growth, and overall societal advancement. However, attracting and retaining students in STEM fields has proven challenging, with many students dropping out of STEM programs due to a lack of interest or perceived difficulty.

Motivation and perception are two key factors that influence students' decisions to pursue STEM education. Research has explored these factors in depth, examining various aspects of students' attitudes towards science and their motivation to engage in STEM-related activities.

As stated by Adams et al. (2014) Lang Science Program was developed to have middle school participants focus on the areas of science involving earth and space, anthropology, biodiversity, and conservation science. When the participants enter high school, the curriculum then shifts to focus more on electives within those areas of science but relate to specific exhibits at the museum the program takes place. The program organizes hands-on learning activities, scientist talks, field trips, and access to the museum’s labs and collections to engage the participants. Throughout the students’ years of involvement in the program, they are given the opportunity to work in groups and design their own research projects. High school participants, during their last years in the Lang

Science Program, are introduced to a college and career readiness curriculum to help them decide where to attend college and what career to pursue.

Students' learning about STEM was more meaningful when they were able to interact with materials and apparatus. The finding also provides evidence to the students' acquisition of procedural skills through hands-on experiences at schools and university. Students commented on how the hands-on activities and experimenting made the content come to life. The experience gained from working in the laboratory had given them appropriate science knowledge and scientific skills and it has led the students to the enhancement of engagement in STEM-related subjects.

Moreover, science subjects taught must have personal relevance to students. In this sense, according to Kang and Keinonen (2018), topics should be relevant to students so that they positively influence interest and performance in science. However, Kapon et al. (2018) highlight the tension between personal relevance of science and school science.

Science achievement during high school, as one of the academic variables, identifies the enrollment of students in STEM majors. Stated by Radunzel et al. (2017) this seems a priority to meet the U.S. labor market needs.

According to the U.S. Bureau of Labor Statistics (2020), employment in STEM occupations is projected to increase by 8% from 2019 to 2029. Even though opening jobs in the STEM field are growing, a well-known leaky STEM pipeline is expanding.

According to the study of Ahn et al. (2016), two reasons can explain this pipeline which leads to lower science achievement. First, the depersonalization of science content does not satisfy the need for the relatedness of students (Ryan and Deci, 2017).

Second, students develop less attractive stereotypes and attitudes toward science and scientists that are exceptionally smart, invincible, confined to a laboratory setting, and detached from reality. This then leads to a repulsive reaction toward learning science, aligning with the study of Zhai et al. (2014).

Previous studies in science have shown that one of the other factor that influences students to opt out of science has to do with the fact that some students perceive the subject as being difficult to learn as compared to other subjects. Students get demotivated due to the high failure rate and poor grades. In the study of Newell et al. (2015) Low achievements during secondary school can also hinder students' abilities to pursue STEM-related programs and discourage the pursuit of education pathways aimed toward STEM related careers.

Based on Roberts et al. (2018) many students have concluded that the STEM subjects are too challenging, yet boring and uninteresting, which limits their participation in STEM subjects and activities. A study by Akalin et al. (2017) have identified interest and motivation as important components in inspiring students to pursue their study in STEM because it contributes to students' learning and success in retaining STEM content. Based on the findings of this study, the students expressed that the partnership changed their perception about science. They have gained the latest scientific knowledge and skills through the STSP program. The partnership enhanced their interests and they became more motivated to learn STEM-related subjects. Moreover, students who have an increased interest in STEM are more likely to pursue that interest resulting in a STEM-related career, as suggested by Roberts et al. (2018).

According to Williams (2013), students give up on science for various reasons. Some perceive science as being too hard; some are afraid to make mistakes and fail, and some are not willing to devote the effort required to prepare themselves to attain a STEM career. Compared to other subjects, science learning involves laboratory work, and it is always considered as the essence of science. Students should perform experiments in the quest of scientific knowledge.

Furthermore, Cetin-Dindar (2016) indicates how motivation to learn science increases when there are more opportunities to relate science to real-world problems. Therefore, science teachers need to put more emphasis on connecting science in school with real life situations, to motivate students to learn science. Hence, effective science instruction programmes should be promoted to take advantage of the positive influence of motivation to learn science and engagement towards science studies. We need to promote interest in a scientific career.

In this regard, Zhao et al. (2019) suggest that involving students in authentic scientific work with mentors could be a good strategy to promote the pursuit of scientific careers by students.

The importance of mastery experiences in promoting science, technology, engineering, and mathematics related careers has also been highlighted (Deemer & Sharma, 2019).

Scientific education based on inquiry, focused on personal improvement, via decision-making and control of actions by students in science classes has been recommended by Ucar and Sungur (2017).

These types of activities also influence engagement in science (Grabau & Ma, 2017). Thus, some activities that use models, and other applied activities are associated with enjoyment of science and personal appraisal of science, while others such as practical activities are associated with self-efficacy and general interest in learning science.

The use of demonstrations in science education can serve to motivate student learning by increasing interest and engagement in the science classroom from high schools to universities (Treagust & Chi-Yan, 2014).

Other strategies could include flipped classrooms, which have lowered negative emotions such as boredom (Jeong et al., 2016), or authentic 5E instruction that can reduce boredom compared to text-based instruction (Parsons et al., 2021). Scientific activities with positive emotional responses can contribute to improving interest and participation in science (King et al., 2015, as stated in Volet et al., 2019).

On the authority of Pedaste et al. (2015) inquiry-based learning was effective pedagogical approach that improves the ability of students to make investigations, solve problems, analyze data and evidence, ask questions, make interpretations and conclusion, and communicate findings. In all STEM disciplines, inquiry-based learning approaches were contributed to facilitate students to participate in authentic, meaningful, and contextualized interactions with the real-world. There were many different definitions of scientific inquiry in the research literature.

A widely used concept given by the National Research Council was as follows: scientific inquiry is composed of skills and comprehensions that cover inquiring scientific questions, making scientific investigations to respond to questions, applying suitable tools

to evaluate and analyze findings, making evidence-based scientific interpretations, and reporting and explaining relationships (National Research Council [NRC], 2012).

In accord with Eijck, Jochems, and Puente (2013) he design based learning principles supported inquiry-based learning in the integration of engineering and technology in STEM education. The design based learning concentrated on the production of new artifacts and original solutions and systems. Students were faced with real life issues and engaged in reflective reasoning processes and applications.

In this sense, the past researcher interpret the results that show the relevant mediator role played by emotions (boredom and enjoyment in science classes) between the motivational variables (relevance of science learning for personal goals, self-efficacy for learning science and interest in a scientific career) and engagement towards science studies. As explained by Sinatra et al. (2014) emotions have a mediating role in science learning, due to their influence on cognition, motivation and engagement.

On the other hand, according to Nagengast and Marsh (2014) instrumental motivation (also called utility value) to learn science reflects students' desire to learn science as a means to achieve a certain goal (i.e., to pursue further studies or for career progression). Related to Canning et al. (2018) instrumental motivation is a predictor of achievement and career choice. Previous research of Rozek et al. (2015) supports that students were more likely to learn science when they perceived the instrumental value of studying science in order to attain STEM-related career expectations or have successful work outcomes later on.

Students at different education levels today learn science both in compulsory primary and secondary education and in non-compulsory ones. Therefore, relevance of

science learning for personal goals, self-efficacy for learning science, interest in a scientific career, and boredom and enjoyment in science classes, can influence students' engagement towards science studies.

Rozek et al. (2017). Science utility pertains to the perception of a student regarding the importance of science as relevant or useful for the current and future goals at the individual and collective levels. One of the psychological theories that explain how perceived science utility shapes the science outcomes is an expectancy-value theory (Eccles and Wigfield, 2002). That is, the value of any task, e.g., learning science, had four aspects which are (1) attainment value, i.e., the importance of learning science for the self-schema or identity of an individual; (2) intrinsic value, i.e., to what degree is learning science enjoyable; (3) utility value, i.e., the perceived usefulness and instrumental merits of science beyond the classroom; (4) cost, i.e., the perceived burden, sacrifices, and the price of learning science. Suppose the students hold an acute sense of the first three values, i.e., attainment, intrinsic, and utility, toward science. In that case, they are more likely to invest effort in learning science, diminishing the effect of the fourth type, i.e., cost value.

Gender-based preferencing of some science subjects has been suggested as an important factor affecting choice of science at school, particularly with respect to the underrepresentation of girls in. According to Regan and dewitt (2015), important factors contributing to fewer girls choosing science are that girls consistently show less positive attitudes to it than boys, display lower self-efficacy in it, and may identify science as being a “masculine” pursuit.

In the study of Anderhag et al. (2013) teachers, parents and peers are believed to influence a students' interest and achievement in science. Students who have parents with better educations are more likely to choose science.

Henriksen, Jensen, and Sjaastad (2015) found in their study of 5007 Norwegian students that parents who were engaged in STEM make the choice of STEM likely for children and that teachers can influence science choice by giving pupils positive experiences with the subject.

In conclusion, the research indicates, then, that the enjoyment of science and strong support from adults are influential in determining if a student will opt to pursue a STEM career. Students who experience success in their scientific pursuits may be more likely to find science enjoyable.

Studies of Lin and Schunn (2016) have shown that students who are intrinsically motivated in science participate more in science-related activities and Burns et al. (2019) stated these factors would consequently influence students' science achievement.

Synthesis

The aforementioned literature and studies provided the researcher with much needed information on the topic.

The Lang Science Program is a specific program with a structured curriculum aimed at middle and high school students, while the research study seeks to gain a deeper understanding of students' personal motivations and perceptions toward scientific pursuit. Both the Lang Science Program and the research study focus on promoting STEM education and engaging students in scientific pursuits.

The importance of hands-on experiences in STEM education and its impact on students' learning and engagement. The findings indicate that such experiences make the content come to life, enhance scientific skills, and lead to increased engagement in STEM-related subjects. Thus, the research title could be supported by this study's findings, emphasizing the significance of hands-on experiences in shaping students' stimulus and intelligence towards scientific pursuits.

The study by Kang and Keinonen (2018) suggests that science subjects taught in schools should have personal relevance to students to positively influence their interest and performance in science. This discovery is comparable to studies that examine students' attitudes and incentives regarding their pursuit of science education in school. Both studies emphasize the importance of student interest and relevance in science education.

Both studies are related to STEM education and the factors that influence students' decisions to pursue STEM careers. However, the study emphasizes the importance of science achievement during high school and the leaky STEM pipeline phenomenon, while the research study is aimed at comprehending the perspective and factors that drive STEM students. Overall, both studies provide valuable insights into the challenges and opportunities of STEM education and how to encourage more students to pursue STEM careers.

Both studies highlight the challenges and opportunities of STEM education and the need to gain insight into the driving forces and attitudes of students towards science and pursuing a scientific career. The study emphasizes the challenges of learning science, while the working research study seeks to understand what drives students to pursue STEM fields.

The study proposes that partnerships and programs can be effective in enhancing students' interest and desire, while the working research aims to comprehend how students' aspiration and enthusiasm towards STEM careers impact their involvement in such fields. Both studies highlight the importance of interest and motivation in STEM education and the need to address the perception of STEM subjects.

The study presented suggests that students give up on science for various reasons, including perceiving it as too hard, being afraid to fail, and not willing to put in the effort required to pursue a STEM career. The research aims to provide a deeper understanding on how students contribute to students' pursuit of scientific careers. It seeks to explore the underlying reasons behind students' comprehension of STEM subjects and their ambition to pursue scientific careers. Both research studies emphasize the significance of comprehending students' perspectives and drives in STEM education. The findings indicate that students' understanding of STEM subjects and their eagerness to pursue scientific careers are multifaceted matters that necessitate thorough investigation.

The study of Cetin-Dindar discusses the importance of motivation in science education. It suggests that science teachers should emphasize connecting science in school with real-life situations to motivate students to learn science. Additionally, the study highlights the importance of effective science instruction programs that take advantage of the positive influence of motivation and engagement towards science studies. Meanwhile, in the working research the variable teacher is in the delimitation.

Ucar and Sungur discusses various strategies that can be used to promote interest in a scientific career, such as involving students in authentic scientific work with mentors and using different types of activities like models and applied activities to promote

enjoyment and self-efficacy in science. The study also highlights the importance of using demonstrations and other strategies like flipped classrooms or authentic 5E instruction to increase interest and engagement in science.

Pedaste et al. And the study of Eijcj, Jochems, and Puente has the same idea that discusses the effectiveness of inquiry-based learning in STEM disciplines. It suggests that inquiry-based learning approaches facilitate students to participate in authentic, meaningful, and contextualized activities with real-world relevance. Their study also provides a definition of scientific inquiry that includes skills and comprehension related to inquiring scientific questions, making scientific investigations, applying suitable tools, making evidence-based scientific interpretations, and reporting and explaining relationships. Inquiry-based learning is one of the theme identified in the working research.

The study of Davis and Bellochi aims to look into the relationship between motivation, feelings, and involvement in scientific classrooms. The working study, in contrast, focuses on understanding STEM students' attitudes and motives about scientific pursuits. To better understand how emotions affect motivation and participation in science lectures, it may approach examines both positive and negative emotions. Moreover, in order to understand the multifaceted nature of motivation. Overall motivation levels for careers in science. In order to develop a more nuanced understanding of these linkages, it may also investigate the moderating impact of gender on the links between emotions, motivation, and engagement. Understanding how gender inequalities affect science education

The concept of instrumental motivation or utility value is similar to the working study, where STEM students were motivated to pursue science for the purpose of future career aspirations. However, the study also found that intrinsic motivation played a significant role in students' decisions to pursue science, unlike the Instrumental motivation which solely focuses on external factors such as career progression. Additionally, the study highlighted the importance of fostering a sense of curiosity and interest in science amongst students rather than just focusing on its practical applications. In comparison, instrumental motivation tends to prioritize the practical benefits of learning science over the intrinsic enjoyment it provides.

The articles discuss students' interest and motivation towards STEM education. It explores how personal factors influence students' engagement at different educational levels, while based on the research, it examines the motivations and perceptions of STEM students towards scientific study by interviewing undergraduate students. The former examines the impact of personal factors on engagement, while the latter aims to reveal the factors that encourage students to take up STEM careers. Furthermore, while the research examines difficulties encountered by STEM students and their persistence, both use different research methods and perspectives to provide insights into students' interest and engagement in STEM education.

The Liu et al. Study stated that the different factors that influence a student's interest and engagement in science education, including social and cultural factors, the role of educators and parents, and the importance of hands-on experiences. They argue that STEM learning requires a supportive and inclusive learning environment that takes into account the diverse needs and interests of students, and that science education should be relevant

to real-world issues to inspire students to pursue STEM careers. On the other hand, Rozek et al.'s study focuses mainly on the psychological factors that drive student motivation in science education, including perceived usefulness, enjoyment, and personal value. Overall, both studies emphasize that science education is a complex and dynamic process that requires attention to the diverse motivations, perceptions, and needs of students.

Articles both discuss the influencing factors in students' selection of science subjects. However, the latter article concentrates on STEM field-interested students, exploring their motivation and perspectives towards scientific endeavors, rather than analyzing the gender-based attitudes that may discourage girls from pursuing science initially. Conversely, the former article indicates that girls may exhibit less favorable attitudes towards science in comparison to boys and tend to regard it as a "masculine" domain. However, the other article indicates that STEM-inclined students are motivated by their curiosity for the topic and their eagerness to pursue a career in a STEM-related profession. In addition, the article emphasizes the significance of having role models and mentorship to shape students' attitudes towards science and their desire to pursue STEM careers.

The working research offers a distinctive approach to exploring students' interest and accomplishment in the field of science. Unlike past studies, which scrutinized external forces such as parental influence and teacher support, this research focuses exclusively on STEM scholars themselves and their underlying motivations and perceptions.

The article looks at the motivations and perceptions of STEM students towards science. Inner motivations such as curiosity and interest are found to be more important than external factors like parental or teacher influence. Students who have a natural interest

in science and find it fascinating are more likely to pursue STEM careers. Participation in science-related activities increases the likelihood of pursuing STEM-related careers.

Definition of Terms

The following terms were essentially used in the study, hence, were defined conceptually and operationally.

Future Career. This is a chosen profession or occupation that an individual aspires to pursue and develop in the upcoming years and it involves envisioning the broad scope and direction of the desired career path, the goals and aspirations associated with it, and the potential impact or contribution one aims to make in their chosen field (Merriam Webster). Here, it is the variable that measures the anticipated professional path or vocation that students aspire to pursue after completing their education, focusing on the field of Science, Technology, Engineering, and Mathematics (STEM).

Impediments. This means that it is the things that hinder or obstruct progress or movement (Merriam Webster). Here, it is the variable measured the students' negative perceptions towards scientific pursuits which may impact the students' overall engagement and enthusiasm of their educational experiences in the STEM field.

Motivation. This means that it is an act or process of motivating someone, the condition of being motivated, or a motivating force, stimulus, or influence that drives an individual towards a desired outcome (Merriam Webster). Here, it is the variable measured to which students exhibit an interest in science and show effort, persistence, enthusiasm, and willingness to engage in scientific activities both inside and outside of school.

Perception. This is the ability to become aware of something through the senses, and also encompasses the way in which that thing is regarded, understood, or interpreted (Oxford English Dictionary). In this study, it is the variable measured the way in which STEM students interpret, process, and make sense of the world around them with regard to their understanding of scientific concepts and methods.

Personal Goals. This is the individual aspirations, objectives, or ambitions that a person sets for themselves in various aspects of their life (Merriam Webster). Here, it is the variable that measures the specific academic and career objectives that STEM students in the mentioned high school set for themselves to pursue scientific knowledge and achievements.

Proficiencies. This means that it is the state or quality of being skilled in something or in a particular activity, task, or field (Merriam Webster). Here, it is the variable measured the students' specific skills, abilities, and knowledge that they acquire and demonstrate in the STEM field.

Relevance. This is the quality or state of being closely connected or appropriate to the matter at hand. It describes the significance, importance, or applicability of something in relation to a particular context, topic, or situation (Merriam Webster). Here, it is the variable that measures the extent to which the students perceive the scientific pursuit in school as meaningful and applicable to their interests and future aspirations.

School Scientific Pursuit. This is the investigation or study of the natural world conducted within an educational institution or under the guidance of trained educators, using scientific methods and techniques to collect and analyze data, form hypotheses, and

draw conclusions based on empirical evidence (Merriam Webster). Here, it is the variable measured to promote scientific knowledge and skills among students.

Scientist. This is a person that is curious and dedicated who uses systematic methods to study and understand the natural world and its phenomena (Merriam Webster). Here, it is the variable that measure the students' engagement and interest as individuals actively engaged in school science activities with the pursuit of scientific knowledge and exploration.

Surmounting. To deal successfully with a difficulty or problem (Cambridge Dictionary). Here, it's the students' recognition of the benefits of overcoming obstacles faced in cultivating profound scientific endeavors that contribute to enhancing their intellectual thoughts and ideas.

Tenacity. It is the quality or fact of being very determined; determination (Oxford Languages). Here, it is the empowering influence of their unwavering commitment to scientific exploration.

Transcendence. Experience that goes past normal limits, or the ability to achieve this (Cambridge Dictionary). Here, students showed that effective communication and collaboration within the scientific community are crucial. Clear goals and curiosity were seen as important for advancement in scientific learning.

Triumph. It is a feeling of great satisfaction and pride resulting from a success or victory (Collins Dictionary). Here, it is the students' thinking abilities and provides individuals with a broader understanding in the world of science to navigate challenges, innovate, and achieve success in their careers.

CHAPTER III

RESEARCH METHODOLOGY

This chapter presents the research methodology that will be utilize by the researchers in accomplishing the study. It specifically discusses the research design, subjects of the study, data gathering instrument and procedures, and treatment of data.

Research Design

The researcher employed qualitative research. Qualitative research is an exploratory approach that aims to gain an in-depth understanding of a particular phenomenon or experience from the perspective of the participants. Qualitative method is used to understand people's beliefs, experiences, attitudes, behavior, and interactions. It generates non-numerical data (Pathak, Jena, & Kalra, 2013). Moreover, phenomenology is a qualitative research approach that seeks to describe the lived experiences of individuals. As noted by Creswell (2013), phenomenology is particularly useful in educational research as it allows researchers to explore complex and nuanced experiences that cannot be adequately captured by quantitative methods. In this study, the researchers sought to explore the experiences of STEM students' motivations and perceptions of STEM students and to identify the underlying motivations and perceptions that drive their interest in scientific pursuits.

These methods were utilized to gain a rich and detailed exploration of the experiences, perceptions, and motivations of STEM students towards scientific pursuits in school. It captured the complexity of the students' experiences, providing insights that can inform future educational practices and policies. As a result, this study could contribute to

our understanding of how to promote and support the interest and engagement of STEM students in scientific pursuits.

Subjects of the Study

The subject of this research were nine (9) STEM students from the three (3) sections of STEM in Padre Garcia Integrated National High School which are the Newton, Pasteur, and Einstein. The researchers selected fairly homogenous sample to ensure the topic was relevant for the sample and could be explored in-depth. All of them were STEM students who experienced joining science exhibit and made a research capstone.

Purposive and convenience sampling were used in identifying the said subjects. In purposive sampling, the researchers chose the sample based on characteristics of a population and the objective of the study (Crossman, 2020). Meanwhile, convenience sampling is a non-probability sampling method where units are selected for inclusion in the sample because they are the easiest for the researcher to access (Nikolopoulou, 2022).

Data Gathering Instrument

The researcher used semi-structured interview guide containing open-ended, non-directive questions to encourage free narrative and detailed responses as required for IPA.

Construction. The instrument was constructed by the researchers base on the objectives of the study. As mentioned, the interview guide contained open-ended, non-directive questions to encourage free narrative and detailed responses and to gain deeper understanding of the topic and to come up with the themes. The initial draft was sent to the subject teacher for checking and constructive criticism.

Validation. The researchers sought assistance from professionals in the field of education particularly in the subject science and to research enthusiast who checked the grammar and validated the content of the research instrument. Comments and suggestions were considered in improving the questions.

Administration. After the validation, the researcher proceeded to the actual interview with the STEM students. This was done after acquiring consent from the adviser of each section. With the permission of the interviewees, the interview session w recorded in order for the researcher to have bases in transcription of the answers that will give by the respondents.

To observe ethical considerations, the interviewees assured that the information they provided will be keep with utmost confidentiality and the results of the study will be use for research purpose only.

Data Gathering Procedure

In order for the researchers to gain and come up with relevant and essential ideas for this study, they looked for recent research, books, and other literature related to this. After finalizing the interview schedule, critiqued and validated by the experts, they will go to the adviser of the three sections of combined grade 11 and grade 12 to secure the permission to conduct interview with and observation among the STEM students. The researcher will spend two weeks for the formal interview in consideration of the convenient time of the STEM students. The guide questions was personally asked to the selected STEM students of three sections in Padre Garcia Integrated National High School.

Treatment of Data

The researchers employed IPA to analyze the transcripts. They read each transcript numerous times to ensure familiarity. Thoughts, reflections, and preliminary codes will be noted. Then, they read through the transcript again and recorded preliminary themes. These themes represented the beginning of the conceptualization process. Next, the preliminary themes were clustered into groups of themes according to common features in terms of meaning. The researchers will remove any theme that was not sufficiently grounded.

The process was repeated for each transcript. The researchers compared and combined into master themes all the preliminary themes for each transcript. They checked and rechecked the master themes against the interview transcripts to ensure that these adequately represented the STEM students' motivation and perception towards school scientific pursuit. Commonalities among the preliminary themes will be represented as sub-themes, which will be judge to reflect lower order aspects of master themes. Their research adviser, then, will check the coding system and verify that the themes will be sufficiently grounded in the data.

Descriptive data about the subjects of this study was also considered and the perspective of the researchers will also acknowledge. Finally, the themes and interpretations were cross-analyzed with the gathered literatures to uphold quality findings.

CHAPTER IV

PRESENTATION, INTERPRETATION, AND ANALYSIS OF DATA

This chapter aims to provide an interpretative narrative of the motivations and perceptions towards school scientific pursuit of selected Grade 11 and Grade 12 STEM students in Padre Garcia Integrated National High School. It presents a comprehensive description of the participants' interviews.

Two major or super-ordinate themes emerged from the interpretative analysis after gathering data from the nine STEM students in Padre Garcia Integrated National High School. These include "Enlightening Intellects towards Scientific Engagement and Development", and "Fostering Innovation and Surmounting Obstacles for Scientific Advancement". More so, some sub-ordinate themes were identified for each major theme to gain a better understanding of the perceptions employed by STEM students when conducting scientific pursuits that are implemented in the STEM strand**.**

Theme 1: Enlightening Intellects towards Scientific Engagement and Development

The theme, "Enlightening Intellects towards Scientific Engagement and Development" emerged from the sub-themes that emphasized the expansion of intellectual capacities of STEM students, particularly the importance of evolving perceptions, interests, and involvement to promote scientific inquiry and invests in the empowerment of individuals through the enhancement of STEM education. This theme highlights the students' journey towards cognitive growth and maturation and their active participation and involvement in scientific exploration progress.

The researcher achieved a comprehensive understanding of the theme through a meticulous analysis of the sub-themes derived from the answers obtained during the research interviews. The researcher acknowledged that the students were aware of the importance of this resources in enhancing their understanding of knowledge and abilities in solving problems. By analyzing the students' experiences, preferences, and perceptions related to implementing scientific activities, the researcher gained a comprehensive understanding of how students' viewpoints and perspectives played a significant role in their scientific endeavors voyage. This understanding allowed the researcher to establish the major theme, emphasizing the importance of enlightening intellects towards scientific engagement and development. They derived two (2) subthemes including "evolution of perception and interests", and "simplifying scientific participation and strengthening STEM education".

Table 1 presents the first sub-ordinate theme "Curiosity in Science and Changing Views" under major theme, "Enlightening Intellects towards Scientific Engagement and Development". The table also shows the transcriptions of the interview, which the researchers coded and where they obtained cues.

TABLE 1

Curiosity in Science and Changing Views

Theme	Transcripts
Guide Question 1	How you became interested in scientific pursuit in this field?
Curiosity in Science and Changing Views	**Participant 1**: Naging interesado ako dito sapagkat ang daan na tatahakin ko papunta sa aking pangarap ay konektado at may kaugnayan sa mga agham na nasa stem strand.
	Participant 2: I actually wanted to pursue engineering that's why I take this system I

	think this is strand and I became interested in here since i've been participating in different activities while I'm still in lower level.
	Participant 4: I became interested in stem strand because this is align in my course which is seaman though it is, it can be available in TVL but this vocation I think will help me more improve myself and my skills towards other people and the subjects taking in STEM strand is more I think more privilege than others strands.
	Participant 5: I want to be software engineer and being software engineer is related in science that's why I'm interested in sciencetific pursuit.
	Participant 6: I chose stem because i have interest in science and math, hence I want to become nurse and in stem strand I know that my skills will enhance that will help me to become a great nurse in the future.
	Participant 7: For me ang experience ko sa stem ay mahirap sya pero masaya, hindi naman ako nahirapan dahil ang pinupursue ko sa college ay engineering at alam ko may passion din ako pag dating sa field na ito at bet ko kase ang math at science kaya ang pinili kong strand and sabe din kase madaming opportunities nga ang stem strand kaya pinili ko ito tulad ng DOST scholarship. Mean curiosity din so sabi ko nga madami kang matutunan sa stem strand sa iba't to bagay tulad sa science at mathematics.
	Participant 9: So of course we all known that stem is very hard strand we all known that it focuses in science and mathematics and theres misconception about this strand na mahirap daw kaya it was really hard na mag take ng stem imean mahirap mag decide kung stem ba talaga pero dahil I plan taking nursing in college napilitan akong mag stem however noong nasa stem na ako naging dedicated ako at mas na motivate ako na mas galingan sa pag aaral at mas maging masipag para matuto at

	makapasa so mahirap sa stem kase it will a lot scientific an explanation and ofcourse resolving mathematics hindi ka talaga makakapasa kung hindi ka talaga mag aaral kaya it's really hard at the same time it was challenging but also motivate . So, science is very interesting subject, interesting field of knowledge we all known na kailangan nating matutunan kase it can apply sa life natin kagaya ng kay newton law of motion nakikita natin everyday at by just thinking na andaming interesting thing na dapat nating malaman mas marami ding ma ooffer ang stem na knowledge na kailangan nating matutunan everyday, Doon naging interesado ako sa pursuit ng stem sa pag pursue ng scientific pursuit ng field na ito.
Guide Questions 2	How has the perception of scientific pursuits within the STEM strand evolved over time?
Curiosity in Science and Changing Views	**Participant 2:** The more that i participate in different scientific activities the more that i became interested in pursuing and right now to tell you this honestly, before entering this stem strand I am not yet decided to which academic track I should pursue and then i've then realized that I have interest in this so I'm going to pursue this and here I am.
	Participant 3: I actually didn't have the chance to witness the scientific pursuit here in our school overtime, but during our or my time witnessing our scientific pursuit, I believe that we have been this modernizations kind of stuffs and we are also advance in doing uhm exhibit project or exhibit product.
	Participant 4: I think the perceptions of scientific pursuit within the STEM strand evolved over time is through the activities, the performance tasks that the advisers and teachers give to us to improve our learnings to this strand or academics.
	Participant 5: I believe that overtime me being in this strand has improve my perception in scientific pursuit because all

	the topics and lahat ng tinuturo nila sa stem ay nakatulong sa pagpapatalas ng aking perception sa scientific things.
	Participant 6: Every lesson that our teacher teaches us it aid us to learn and practice our scientific knowledge and skill.
	Participant 7: Sa pag lipas nga ng panahon alam naman natin na ang mundo ay patuloy na umuunlad or nagiging modern, so sa curiosity ng mga tao gusto nila ng panibagong technology kung paanong makakatulong sa pagkakaroon ng pag unlad sa isang community so nag iisip sila ng mga innovation so siguro yun ang kanilang dahilan.
	Participant 9: A lot of people are pursuing scientific science and mathematics nag kakaroon ng improvement sa field of knowledge sa stem na through that gradually nagkakaroon ng change of study at mas nagkakaroon ng materials kase mas naka focus na ang mga tao sa technology sa science sa mathematics kaya nag kakaroon ng madaming tao gustong mag pursue sa stem strand over the time.

In this table, the interviewee is expressing their interest in a particular subject or field. They are explaining that their motivation for being interested in it is because it aligns with their career aspirations or dreams. Moreover, the world continues to progress and become more modern. People are naturally curious and seek ways to enhance development within their communities. The subtheme of "Curiosity in Science and Changing Views" emerged as a result of the inherent human drive to explore and understand the world of science around us. As our scientific knowledge evolves, our views and perspectives on various subjects change, challenging existing beliefs and opening up new avenues of exploration. This subtheme acknowledges the role of curiosity in sparking scientific advancements and the ongoing process of questioning, re-evaluating, and expanding our

understanding in science learning. This curiosity leads them to be interested in scientific pursuits and explore new technologies that can contribute to progress. They recognize that innovation plays a crucial role in advancing society and improving the quality of life. By delving into scientific pursuits, they hope to discover and create innovative solutions that can address various challenges and promote development in their communities.

According to Nagengast and Marsh (2014) instrumental motivation which is also called utility value to learn science reflects students' desire to learn science as a means to achieve a certain goal (i.e., to pursue further studies or for career progression).

Related to Canning et al. (2018) instrumental motivation is a predictor of achievement and career choice. The researchers found that individuals who are instrumentally motivated tend to have higher levels of achievement in academic settings. This could be attributed to their strong desire to attain specific goals or outcomes, which drives them to work harder, persevere through challenges, and engage in productive behaviors that lead to success.

Previous research of Rozek et al. (2015) supports that students were more likely to learn science when they perceived the instrumental value of studying science in order to attain STEM-related career expectations or have successful work outcomes later on.

According to the U.S. Bureau of Labor Statistics (2020), employment in STEM occupations is projected to increase by 8% from 2019 to 2029. The BLS projection implies that there will be more job opportunities available in various STEM fields, such as computer science, engineering, mathematics, and healthcare. This increase in employment

can be attributed to several factors, including technological advancements, expanding industries, and the need for highly skilled professionals in these areas.

In this sense, according to Kang and Keinonen (2018), topics should be relevant to students so that they positively influence interest and performance in science. When the topics being taught align with students' interests, they are more likely to engage actively in learning and develop a deeper understanding of scientific concepts.

Lastly, Cetin-Dindar (2016) indicates how motivation to learn science increases when there are more opportunities to relate science to real-world problems. Therefore, science teachers need to put more emphasis on connecting science in school with real life situations, to motivate students to learn science. Hence, effective science instruction programmes should be promoted to take advantage of the positive influence of motivation to learn science and engagement towards science studies. We need to promote interest in a scientific career.

In conclusion, promoting instrumental motivation, relevance of science topics, and real-world connections in science education can enhance students' interest, motivation, and engagement in science studies, which is crucial for promoting interest in scientific careers.

Another sub-theme drawn from the interpretation of the participants' responses was "Simplifying Scientific Participation and Strengthening STEM Education". A study conducted by the National Science Foundation (2015). Research studies show that involving students in authentic research projects and providing hands-on laboratory experiences and inquiry-based learning can increase student engagement, interest, and understanding in STEM fields. This evidence underscores the importance of students'

involvement and engagement to broaden and strengthen the knowledge of students towards scientific activities and STEM education as a whole.

TABLE 2

Simplifying Scientific Participation and Strengthening STEM Education

THEME	TRANSCRIPTION
Given Equation 1	How do you think these challenges can be improved?
Simplifying Scientific Participation and Strengthening STEM Education	**Participant 1:** Sa aking palagay magagawa ng mga hamong ito na pagbutihin ang mga gawaing pang-agham sa stem strand sa pamamagitan ng pakikipagtulungan at pagkakaisa kung meron tayo nito mas mapapabuti natin ang mga gawaing pang-agham at kung meron tayong inklusibo at pagkakaiba-iba pwede nating i-open ang ating mga sarili sa mga way kung paano mapapabuti ang ating mga gawaing pang-agham sa stem strand.
	Participant 2: I think we can improve the problems by buildings strong connection between the members as well as putting our motive putting our hearts or putting our interests to that after we do so that they result of it will be exactly what we are expecting.
	Participant 3: Siguro, particularly in the whole parang ikaw na din yan self implement muna rin sa sarili mo kung pano mo pagbubutihin kasi diba iba't ibang related challenges dito sating scientific pursuit so ikaw lang talaga kung pagbubutihin mo or not it is a self declaration kung gusto mong pagbutihin o hindi**.**
	Participant 4: Para sa akin nakatulong ang mga ito para mag improve pa kami lalo to collaboration and partnership para kami'y magkaisa, magkaroon ng resource availability at ito is hindi naman problema masyado kasi if we have or meron kaming

	pagtutulungan, contribution na magiging outcome namin kahit papano.
	Participant 5: I believe this would be improve by trying to overcome them and finding solution such as halimbawa, resource availability we would try to be resourceful and then we use thing , the things that available to soficed to do the things necessary and student engagement we can and we can try to motivate our peers more try to engage with them and motivate them and engage us well para don sa benefits for all, i would say that we try to overcome them.
	Participant 6: While working with my groupmates or classmates I learn many different things and skills. I also build trust and connection while working with them.
	Participant 7: Edi mag-aral ka ng mabuti yun langpataasin yung level of perseverance and pangalan mo naman passion mo yung ginagawa mo pagbubutihan mo talaga kahit anong challenges yung dumating so kung may pangarap ka or kung gusto mong makamit edi forda go lahat malalagpasan mo at mao-overcome mo.
	Participant 8: I think school have been doing a great job with promoting this stem strand than can helping student and with promoting with this strand I think school have been doing a great job specially when the student with a junior high school student nowadays school have been.
	Participant 9: As what he said school particularly principalities very supportive of stem strand we all know that I think that teachers are very hands-on to teaching from stem so I think the problem that should be will be the student they should of course they motivation study harder and if you are them to understand the lesson by other teachers.
Guide Question 2	How do you think schools can better support and motivate students to pursue science activities?

Simplifying Scientific Participation and Strengthening STEM Education	**Participation 1**: Sa aking palagay mas masusuportahan ng ating paaralan ang mga mag-aaral na ituloy ang mga aktibidad sa agham sa pamamagitan ng pag implementa ng mga science activities at tsaka mga science exhibit na nag yung parang ang point ay mas mapalawak ang mga kaalaman sa mga pang-agham na aktibidad.
	Participant 2: The first things that comes to my mind about how can the school support and motivate these scientific activities is that providing funds for this because many students here in Padre Garcia Integrated National High School have limited resources so it is one of the factors why they don't make that to not do their activities correctly and appropriate.
	Participant 3: Siguro promotion, promotion lang kasi diba parang hindi naging enough yung pagpapapunta dito ng mga student na para manood ng science exhibit siguro yung promotion na even na bago pa lang magkakaroon ng announcement pa lang ng exhibit na magkakaroon dapat meron ng mga fliers na pinamimigay ang mga schools yung mga administrator natin about this na mga activities na ganto.
	Participant 4: Kailangan nilang magsimula sa basic na mga activities to caught the attention of the student para hindi na lang sila matakot kapag yung mga big performance tasks na agad yung pinakita or pinagawa dahil nga dun it will improve the students interest.
	Participant 5: I think by improving the interest in science activities which is conducting activities related to science para makuha yung mga attention ng student and makapag introduce sa kanila tas take ng positivity na mas interested sila kasi mas madami na silang alam sa science.
	Participant 6: The school help us in scientific pursuit in a way that they provide

	the learning materials and equipment or tools that we'll need.
	Participant 7: Feeling ko, for me so makakatulong ang schools na suportahan or ma-motivate mga estudyante na pumasok sa stem strand sa pamamagitan ng anong ginagawa nila ngayon sa pagsasagawa ng symposium mga career expro kung saan ineencourage nila yung bawat student yung mga grade 10 students na pumasok sa stem strand sa pamamagitan ng pagpapakita ng iba't-ibang activities katulad ng mga innovation mga exhibit yun lang.
	Participant 8: As I said earlier there are no problems of challenges of stem strand so I think the or are supporting the stem strand are the best and I think improvement as of now to think others and to pursue the stem strand**.**
	Participant 9: So for me I think the first eradicate those information focus more on career guidance since a lot of students from grade 10 of course who will be experienced high school transition so they get to chose stem strand out of their skills and severance and as being said of course it will be harder for them for stem kung hindi talaga nila gusto iyon so I think who would be able to science is more eradicate to this information that is math is very smart who will those a fortunate those is gifted and I think there's no problem we should for their info.
Guide Question 3	How do you think the scientific pursuits in the STEM strand can be improved to better engage students?
Simplifying Scientific Participation and Strengthening STEM Education	**Participant 1:** Sa palagay ko mas mapapabuti ang mga siyentipiko na mga gawain sa stem strand kung tayo ay mas makikita sa mga gawaing ito at kung ang mga bawat mag-aaral ay may interes sa mga gawaing siyentipiko sa stem strand.
	Participant 2: For example, we are going to do an activity related to computer keme keme so it is really beneficial for me like

	me just being a student who wanted to pursue our computer engineering to be related and have interest because it will provide the essential information that I may use in college.
	Participant 3: Siguro relatatibility and interest ang kailangan, yung mga scientific pursuit na binibigay sa bawat like for example nga sa exhibit is dapat mabilis nakaka relate sa mga estudyante at pasok sa interest nila.
	Participant 5: Start from the basic activities that having enough materials siguro para maintimidate yung mga student na mag engage kasi very simple pa naman and mag bubuild up pa naman sya katulad ng iba na nag start sa complicated things na nakaka intimidate sa mga student na walang alam sa topic na yon.
	Participant 6: Magkaroon ng mga program na nag e engage sa science.
	Participant 7: So, for me tulad ng sabi ko sa pagsasagawa ng iba't-ibang activities na related sa stem strand nga sa better lang na provided ng school ang iyong mga materials para sa mga estudyante na kapos sa pera na gusto ko ng manatili sa stem strand.
	Participant 8: I also think providing students the materials what they need this great students enagegement they tend as we experienced problem with regards to some materials and making a great innovative.
	Participant 9: Since a lot of students consider finance so I think pursuing stems specialist in order to help students to engage the experiments to show should provide the material that they need and show that would be able achieves such things like a lot of students will be interested in.

The idea of "Simplifying Scientific Participation and Strengthening STEM Education" is about making science easier to understand and encouraging people to get involved. In today's changing world, it's important for everyone to have a good understanding of science and technology. This subtheme recognizes the need to explain complex scientific ideas in a simpler way so that more people can understand them. It also emphasizes the importance of strong education in science, technology, engineering, and mathematics (STEM) to give people the knowledge and skills they need to succeed in a fast-changing society. By combining a genuine interest in the subject matter with sufficient access to materials, one can adopt a proactive and resilient approach towards challenges. This includes seeking guidance from experts in the field, collaborating with peers, and actively engaging in continuous learning. Maintaining an open mindset and embracing the iterative nature of scientific inquiry allows for the refinement of ideas and methodologies, leading to breakthroughs and the successful resolution of challenges.

According to Adams et al. (2014) students' learning about STEM was more meaningful when they were able to interact with materials and apparatus. The finding also provides evidence to the students' acquisition of procedural skills through hands-on experiences at schools and university. Students commented on how the hands-on activities and experimenting made the content come to life. The experience gained from working in the laboratory had given them appropriate science knowledge and scientific skills and it has led the students to the enhancement of engagement in STEM-related subjects.

As suggested by Roberts et al. (2018) they have gained the latest scientific knowledge and skills through the STSP program. The partnership enhanced their interests and they became more motivated to learn STEM-related subjects. Moreover, students who

have an increased interest in STEM are more likely to pursue that interest resulting in a STEM-related career.

In summary, hands-on experiences and interaction with materials in STEM education contribute to meaningful learning and the acquisition of procedural skills. Furthermore, programs like STSP can enhance students' interest in STEM, leading to increased motivation and a higher likelihood of pursuing STEM careers.

Theme 2: Fostering Innovation and Surmounting Obstacles for Scientific Advancement

The major theme developed from a common pattern observed in the research interviews, where students recognizes the challenges and barriers that exist and they experienced in conducting science projects and the importance of incorporating effective and successful scientific pursuits and innovation in improving their scientific knowledge. The sub-themes within this major theme highlight the students' recognition of the benefits of overcoming obstacles faced in cultivating profound scientific endeavors that contribute to enhancing their intellectual thoughts and ideas. They emphasized the need for fostering an innovation that promotes scientific advancement and addresses the hurdles encountered along the way. This major theme underscores the importance of providing students with opportunities to engage in transformative exploration and develop the necessary skills and knowledge to drive innovation forward.

The findings of Baker (2022) study revealed that Turning cutting-edge basic science into new technologies, medicines and other inventions that benefit our daily lives,

while simultaneously bringing commercial rewards is the foundation of a knowledge economy.

For this major theme, two sub-ordinate themes were identified: “Exploring the Obstacles in Sustaining Scientific Progress” and “Integration of Advanced Scientific pursuits in STEM education.”

Table 3 presents the transcripts of the interview as deemed relevant to the theme: “Exploring the Obstacles in Sustaining Scientific Progress”.

TABLE 3

Exploring the Obstacles in Sustaining Scientific Progress

THEME	TRANSCRIPTION
Guide Question 1	How do you describe your challenges in implementing scientific pursuits in the STEM strand in the following: A. Resource Availability
Exploring the Obstacles in Sustaining Scientific Progress	**Participant 1:** So ang hamon ko sa una pagiging mapagkukunan, sa mapagkukunan naman ng mga impormasyon sa mga pang-agham sa stem strand ay meron naman tayong mga limited na impormasyon na about sa mga subject na itinuturo sa stem na strand kaya naman hindi ako masyadong nahirapan sa pagkuha ng mga ito.
	Participant 2: The last time i conducted a scientific person or scientific activities which involve science exhibit where in really have to give or maglabas ng pera so we can finish this activity and by that we realize that we can never finish this activity without spending money and since i'm i am not born in rich family i find it hard to pay for the exhibit expenses for the activity and but at least we finally make it done.
	Participant 3: It is actually hard kase saming exhibit talagang need namin ng mga materials na hindi lang basta basta

	nakukuha sa mga pamilihan or sa mga tindahan that's why we also came we also gathered from like for example pharmacy then example dun is yung sa bahay namin availability ng mga products na kailangan namin sa bahay namin kung meron kaya yon mahirap talaga kasi hindi talaga namin alam kung san kukuha ng ibang materials especially yung iba need pa orderin online something like that**.**
	Participant 4: Kapag merong mga performance tasks na binibigay ang mga teachers then kailangan namin gumastos dahil nga nasa public kami kulang or insufficient yung binibigay na kagamitan, hindi totally na nabibigay ang mga kailangan namin para sa mga gagamitin namin sa performance tasks such as nga exhibit.
	Participant 5: One of the difficulties that we have experience is about the resource availability we are in public school that's why the materials although there are present materials sometimes is it not efficient to support the needs of the students in terms of learning in terms of science and as well as because I'm not that rich and this is not, that is why sometimes learning resources might be difficult to me.
	Participant 6: The amount of money that needed and required in scientific pursuit greatly affect my allowance. I often swept and spend my extra allowance for me to pay the need.
	Participant 7: For me naman wala namang lack of resources ng school problema lang is duration ng time line ng ano students masyado siyang maikli may mga activities na hindi na gagawa pero nandun naman yung resources.
	Participant 8: For me here in Padre Garcia Integrated National High School we've been experiencing lack of resources in regards of stem strand with the experiments and everything involved in stem strand but with the learning modules

	learning materials I think we have lack of resources or type of resources.
	Participant 9: In terms of resources availability there's a lot instructional material after online and I think those material are enough of course however there's some topics na kailangan pa ng mas specific kasi nagkakaiba you posted online kesa nasa libro kaya nagkakaroon ng confusion at mas nalilito ang mga students sa binabasa nila kaya mas nagkakaroon ng confusion mas nag ttense sila na mag overthink sa mga sagot ginagawa nila ginegenerate na mag lead sa nagkakamali sila so in terms of resources availability there's a lot of information pero mas specific sana.
	B. Students' difficulties towards educators
	Participant 2: Maybe it is the pressure that's any good deadline pressure due to the deadline and it's really a big factor why an activity isn't done perfectly. Sometimes students tend to cram things and it doesn't result in a good way.
	Participant 4: Ang tingin ko naman dun is yung pagiging close ng isang estudyante sa kanyang teacher kasi minsan nababastos yung teacher to the point na yung tingin na lang sa teacher is parang kaibigan na lang nila na hindi na nila nirerespect na kagaya ng authorities.
	Participant 5: Sometimes kahit na naiintindihan naman minsan talaga hindi ko naiintindihan yung topic kasi complicated sya and maybe hindi suitable yung ano yung teaching method ng teachers kapag nagtuturo sila, that's why hindi ko naiintindihan minsan kapag nag tuturo sila that's why hindi ko naiintindihan minsan.
	Participant 6: I often get fuzzled and confused about the directions and lesson. Thus, I nearly have hatred in a subject and teacher.
	C. Inclusivity and Diversity

	Participant 2: Based on my experience and the last science team between have a little conflict within the group and masasabi kona isa siyang naging malaking factor or hindrance, malaking hindrance para mapursue namin kung ano yung outcome na gusto namin
	Participant 3: I think the challenge lang na napansin ko dito is yung engagement siguro kasi yung diversity yung mga product naming na inilabas sa science exhibit yun parang kung paano namin mas maiinggage yung mga manood sa aming exhibit yun yung pinaka challenge dito.
	Participant 4: We have different skills, sometimes the things that I can do are the things that my co-members can't and vice versa which can lead or result na to the point na yung mga gagawing activities by group is nagiging individual.
	Participant 5: Maybe na-challenge nga kami because of the different skills that we have, such as kung ano man yung skills mo tas yung skills nga ay very different sya minsan yung ginagawa ko ay hindi nya magawa and yung pagkakaisa naman namin, nagkakaisa pero minsan talaga, because we have different skills nagiging individual task na lang yung mga ginagawa namin**.**
	Participant 6: We sometimes fight and have misunderstanding in some parts of our scientific tulad ng sinabi nila ulit siyempre may serious type na kumakalat ay puro matatalino ganyan ganyan mga taong gusto nilang magpasa ng kanilang chosen career so hindi nila tinutukoy ang kanilang mga gusto dahil nga doon sa doubt magkakaroon sila ng doubt hindi nila kakayanin yung hirap sa stem strand so ayon so lahat naman ng tao may diverse talent at capable skills so kayang kaya yang mga projects and activities. It involves our different opinions and perceptions.
	Participant 8: The stem strand different with other strand have been inclusivity and

	diversity I think it just the student mindset about the different kind of strand specially when they regards to stem strand I think as being said have been feeling misconception that only they smart those students are welcome with this strand but inclusivity and diversity have no have expectation challenges regards those factors**.**
	Participant 9: Inclusivity and diversity I think that since there are misconceptions about STEM strand/students at may mga times na isolate sila pag nasasama sila sa ibang strands kaya nagkakaroon ang gap between students at tsaka nagkakaroon ng expectations like when someone from stem strand failed parang naiisip nila totoo ba galing sa stem ma ffailed parang there's a lot misconception and expectation from them nagkakaroon ng pressure and that essence masyadong nagiging exclude sila dito sa school but inclusivity naman and very diversity they have a lot na natutunan sa lahat ng bagay ay natutunan naman**.**
	D. Students' engagement and motivatiom
	Participant 1: Para sa akin hindi naman mahirap ang makipag-ugnayan sa aking mga kamag-aaral sapagka't friendly din naman sila at magaling makipag approach at para naman sa motibasyon meron kaming iba't-ibang motibasyon pero isa lang ang aking hangarin ang makapagtapos ng grade 11 at maabot yung aming mga pangarap.
	Participant 2: I don't think students are motivated in doing that that actually but rather they want to have a good grade that's why they don't have any excuse na how to do it.
	Participant 3: To be honest talaga eh hindi naman talaga ako mahilig sa mga ganitong gawain eh kasi parang hindi naman to yung pinaka major sub ko na tinatahak ko talaga pero dahil requirements parang yun parang naging challenge lang namin sa motivation

	namin yun nga yung wala talagang parang hindi palagay sa mga ganitong activity.
	Participamt 4: It can be a challenge through their confidence that they can't built enough through the academic subjects that even the fact that we have oral communication, we can improve our communication skills through that subjects but through motivation that we have in our classroom we can face the challenges that we encounter.
	Participant 5: Student engagement and motivation, siguro this can be a challenge taking generally because of engagement yung sa tingin nila wala silang confidence para mag engage don sa nga activities, feel nila hindi nila kayang kaya pero kaya naman nila and this will tackle in motivation as well yung mababa yung motivation nila that's why it can be a challenge.
	Participant 6: I sometimes lose motivation because of how complicted is our lesson and project.
	Participant 7: What they said is nagkakaroon nga ng students' engagement, tulad ng sabi ko kanina nagkakaroon ng student learner ng iba-ibang talent so may mga matatas ang IQ, may mga mabababa, yung iba nagkaroon sila ng hindi sila masyadong motivate sa kakulangan ng self-confidence so yung iba kaya di nila hindi nila naisip yun.
	Participant 8: For me student challenges factor specially because stem students have been diverse there are smart people there are less opportunite there are still opportunite but they chose want to have but students engagement I think several students has been experienced challenges the our engagement and motivation and day having a doubt that they can't continue and finish their strand with the hard subject and surrounding environment that has been de student smart evolved to students with engagements.

	Participant 9: Student engagement and motivation since we all known a STEM is hard than other strand we have less they have more mas nagkakaroon sila nang bonding together and of course and same challenges and problems in terms to pursuits since nagkakaroon silang bond we can share the styles of studies habit and dahil sa essence na namomotivate sila to each other since sabay silang nag fe-failed at nakaka experience ng problema inoovercome nila ang problems together at nagiging goal nila na tulungan ang isa't isa together with their dreams and their motivations to pursue.
	E. Collaboration and Partnership
	Participant 1: Sa pakikipagtulungan naman lahat naman ng estudyante dito sa stem strand ay nagtutulungan sapagkat isa ito sa strand na kailangan pagtulungan upang magawa natin ang mga gawaing pang-agham subalit mayroon din namang ibang estudyante na minsan ay hindi nakakatulong dahil mayroon din silang pinagkakaabalahan na mas importante.
	Participant 2: Like what i said in the inclusive and diversity you can never be done or you can never work an activity or output in a group in your if you're not if you're not if you aren't able to understand each other.
	Participant 5: In terms of collaboration nga very similar nga sya katulad ng sabi nyo, minsan hindi talaga nagkaka ari yung aming collaboration because of our difference skills, pero minsan talaga it is just conflict.
	Participant 6: We often get the off start at the beginnings of our project so we end up havimg a bad or worst outcome.

The subtheme of "Exploring the Obstacles in Sustaining Scientific Progress" emerged as a response to the crucial need to understand and optimize the factors and

obstacles that may convert as the pathways that can contribute to the continuity and advancement of scientific knowledge. The combination of inherent difficulties, pressures, and the ever-changing nature of scientific pursuits can create challenges for researchers. By exploring these, we can identify and implement strategies that foster long-term scientific progress, ensure the accessibility and integrity of research, and address the challenges and opportunities that arise in the ever-evolving landscape of scientific inquiry. Overcoming these challenges requires perseverance, creativity, and a willingness to adapt in the face of obstacles, ultimately driving scientific progress and advancing our understanding of the science world.

Aligning with the study of Zhai et al. (2014) develop less attractive stereotypes and attitudes toward science and scientists that are exceptionally smart, invincible, confined to a laboratory setting, and detached from reality. This then leads to a repulsive reaction toward learning science.

Previous studies in science have shown that one of the other factor that influences students to opt out of science has to do with the fact that some students perceive the subject as being difficult to learn as compared to other subjects. Students get demotivated due to the high failure rate and poor grades.

In the study of Newell et al. (2015) low achievements during secondary school can also hinder students' abilities to pursue STEM-related programs and discourage the pursuit of education pathways aimed toward STEM related careers.

Lastly, according to Williams (2013), students give up on science for various reasons. Some perceive science as being too hard; some are afraid to make mistakes and fail, and some are not willing to devote the effort required to prepare themselves to attain

a STEM career. Compared to other subjects, science learning involves laboratory work, and it is always considered as the essence of science. Students should perform experiments in the quest of scientific knowledge.

The pursuit of scientific research is often challenging due to various factors such as inherent difficulties, pressures, and the constantly evolving nature of the field. Researchers must exhibit perseverance, creativity, and adaptability to overcome these challenges, which ultimately drives scientific progress and enhances our understanding of the world. However, studies have shown that there are certain perceptions and barriers that deter students from pursuing science. Stereotypes portraying scientists as exceptionally intelligent, invincible individuals confined to laboratories and detached from reality contribute to negative attitudes towards science. Additionally, students may perceive science as a difficult subject, leading to demotivation caused by high failure rates and poor grades. Low achievements during secondary school can also discourage students from pursuing STEM-related programs and careers. Finally, some students give up on science due to the belief that it is too hard, fear of making mistakes and failing, or unwillingness to invest the necessary effort for a STEM career, especially considering the emphasis on laboratory work in science education.

Another sub-theme "Integration of Advanced scientific pursuits in STEM Education" emerged as a prominent finding during the research interview process. It became apparent through the participants' responses that they know some innovative, successful and promising innovation and scientific pursuits that was implemented in the STEM strand and the things that made the innovations or the projects effective that will be

helpful for them in the future. The next table presents the coded transcript of the participants' interview.

TABLE 4

Integration of Advanced Scientific Pursuits in STEM Education

THEME	TRANSCRIPTION
Guide Question 1	What are some of the most innovative or successful examples of scientific pursuits being incorporated into the STEM strand that you have seen, and what made these examples effective?
Integration of Advanced Scientific Pursuits in STEM education	**Participant 1:** Ang ilang mga pinakabagong matagumpay halimbawa ng gawain mga pang-agham isinama sa stem strand na aking nakita ay ang ginawa naming exhibit na kung saan kami ay gumawa ng mga 3D model about sa topic na pinag-aaralan namin sa Science na pinakita rin namin sa junior high school at naging epektibo din ito dahil hindi lang kami ang natuto dito pati na rin ang mga junior high school ay natutong upang mas malaman nila nang mas maaga kung ano ang mga gawaing pang agham na nasa stem strand.
	Participant 2: I think the research capstone that is conducted by grade 12 students this little health dash student to be more created the more complex and to be productive so they didn't reduce an output that will really help not only the students but then the entire school population on the school stuff.
	Participant 3: Kung papipiliin ako dito ng one of successful ano dito na innovative siguro sa grade 12 kila sa grade 12 sa yung about sa about dun sa kasi mahirap yung programming but then still nagawan ng paraan yung parang sasakyan na kinakabitan ng program para gumana.
	Participant 4: Para sakin is the robotics that mam mich conduct na ito'y nakatulong para makakuha ng interest saming mga

	nasa STEM na sumali sa ganong klaseng activity para ma improve pa namin ang aming learnings about science and physics.
	Participant 5: Siguro sasabihin ko yung exhibit because nag show silang mga example na creation nila na nag introduce into different topics of science and it also showcase students' skills in necessary para gawin mga iyon and makapag increase ng interest ng mga student katulad na lang ng mga junior high na bumisita doon sa exhibit**.**
	Participant 6: The innovative scientific pursuits that inspire me are the Grade 12 Stem Einstein innovative Trash bin. It amazes me to the extend that it causes me to think of many ideas and designs.
	Participant 7: So basic experience one of the most innovative successful examples of scientific pursuits being incorporated into the stem strand yung robotics na ginanap last year so marami akong natutunan doon na tulad ng introduction ng earthquake so yun madami akong natutunan doon for me nagamit ko naman siya ngayong grade 12 and yung isa pang successful ay yung science exhibit namin sa PC kung saan ay na showcase namin galing namin sa pag create and innovate ng isang bagay gamit ang mga patapon na bagay.
	Participant 8: I think the incorporated between the research capstone to the research of stem strand is one of the most innovative and successful scientific pursuits incorporated to stem strand as they been with the great predation research are example of the rfid attendance system being most kay justine and kenneth which is a create internal plastic bag and they have been they are biodegradable get easily.
	Participant 9: I have see a product like machine generate electric of course jerwin's product is very prototype under research from practical research 2 so day it is innovative water will which generate

	electricity so I think that the machine to machine to generate electricity really helpful to our community and it really important to continue the energy to that it really able to achieve such as things those experiments and most product and that build up.
Guide Question 2	What are some of the most exciting or promising emerging scientific pursuits that you think should be incorporated into the STEM strand curriculum?
Integration of Advanced Scientific Pursuits in STEM education	**Participant 1:** Para sa akin ang mga pinaka kapana-panabik or promising na umusbong na gawaing pang agham na dapat isama sadya sa stem strand curriculum ay yung paggawa ng mga science exhibit at science activities na kung saan ito ay dadaluhan ng lahat ng mag-aaral na nasa stem strand.
	Participant 2: The most are exciting or promising emerging scientific pursuit we already have an exhibit we already have the research and research capstone i think those activities are enough for stem strand and if there are still activities that isn't needed in this strand i believe the future students will be think of it.
	Participant 3: Siguro yung kasi pinapakita talaga sa science exhibit yung about more on science at engineering dapat pinapakita rin dito yung mathematics since related to sa stem tsaka yung mga minor subject gaya ng related sa mga pagbigkas ganon yung sa mga makikita talaga creativity like pwede syang magincorporate sa mga scientific pursuit natin like for example yung mga dance machine pede syang iincorporate, dapat ano din sakupin din yung ibang subject na para mas lolong engagable sa students.
	Participant 4: Ang science naman is not totally about physics and chemistry lang pero kasali rin yung gen bio so I wanna try disecting the frog and the planning of mam

	ladielyn na blood testing and mga gawain for nurses.
	Participant 5: In this activity in my mind is parang incompetent na siya this is the robotics coding in this week. I think this is very exciting for me kasi I'm interested in coding and robotics tsaka I would take software engineering as well as necessary talaga akong matuto sa robotics then it's beneficial and interesting to me talaga.
	Participant 6: Mga program tungkol sa robotics, at mga science exhibit na naganap or gaganapin palang.
	Participant 7: Sa tingin ko maganda ang program na robotics sa school natin. Maganda isa sa mga subject in stem strand para maboost ng knowledge ng mga students pagdating sa iinovative nang isang bagay so the skills na magagain nila sa robotics na maari nilang magamit yun pagdating sa college kung ippursue nila yung engineering at mga computer programming na course.
	Participant 8: I think the school should cooperate more forsooth between the knowledge to help technology two computers to engineering and it is what stem strand before we've been experience taking note the pandemic less experiments to scientific suits.
	Participant 9: Robotics encoding affected the students in really help them a lot of stem of course more on science technology and mathematics so incorporating that those are pursuing it help stem strand those are scientific pursuits we are filipino particularly to pursue if you plan the higher education.

Activities such as robotics, science exhibits, and research capstone projects can effectively engage students and encourage them to pursue scientific endeavors as it can increase their scientific knowledge expands, it becomes crucial for educational systems to

keep pace with these advancements and equip students with the latest tools, concepts, and skills. By participating in robotics, students are exposed to the practical application of scientific concepts, enhancing their problem-solving skills and fostering creativity. Science exhibits provide an interactive platform for students to explore various scientific disciplines, sparking their curiosity and igniting a passion for discovery. Lastly, research capstone projects allow students to delve deeper into specific scientific topics, enabling them to develop critical thinking skills, conduct experiments, and contribute to the existing body of knowledge.

These types of activities also influence engagement in science (Grabau & Ma, 2017). Thus, some activities that use models, and other applied activities are associated with enjoyment of science and personal appraisal of science, while others such as practical activities are associated with self-efficacy and general interest in learning science.

As stated by Adams et al. (2014) Lang Science Program was developed to have middle school participants focus on the areas of science involving earth and space, anthropology, biodiversity, and conservation science. When the participants enter high school, the curriculum then shifts to focus more on electives within those areas of science but relate to specific exhibits at the museum the program takes place. The program organizes hands-on learning activities, scientist talks, field trips, and access to the museum's labs and collections to engage the participants. Throughout the students' years of involvement in the program, they are given the opportunity to work in groups and design their own research projects.

Engaging students in activities such as robotics, science exhibits, and research capstone projects has proven to be effective in fostering their interest in science and

encouraging further exploration. Robotics exposes students to practical applications of scientific concepts, enhancing problem-solving skills and fostering creativity. Science exhibits provide an interactive platform for students to explore various scientific disciplines, igniting curiosity and passion for discovery. Research capstone projects allow students to delve deeper into specific scientific topics, developing critical thinking skills and contributing to the existing body of knowledge. These activities also influence engagement in science by promoting enjoyment, self-efficacy, and general interest in learning. For instance, the Lang Science Program focuses on earth and space, anthropology, biodiversity, and conservation science for middle school participants, transitioning to elective courses related to specific exhibits in high school. The program offers hands-on learning, scientist talks, field trips, and access to museum labs and collections, enabling students to work in groups and design their own research projects, thereby enriching their scientific journey.

Theme 1: The Quest for Personal Fulfillment and Transcedence towards Scientific Pursuit

The theme " The Quest for Personal Fulfillment and Transcedence towards Scientific Pursuit" derived from the common patterns identified in the responses, which highlight the importance of communication and collaboration within the scientific community. It became evident that individuals who embarked on a quest for personal fulfillment and transcendence in their scientific pursuits often shared similar experiences and aspirations, reinforcing the significance of effective communication and collaboration that they may apply in scientific journey. The respondents emphasized the effectiveness of

setting clear goals and cultivating a deep sense of curiosity as it will contribute to the advancement of scientific learning and understanding. This theme captures the potential growth and self-discovery as it will increase positive motivations for students that will be worth as time goes by. However, they are also challenge and take a lot of time, hardships, and hardworks but in the end it will be mark as a memorable experience.

The researcher achieved a complete comprehension or understanding of the major theme "The Quest for Personal Fulfillment and Transcedence towards Scientific Pursuit" by analyzing the common patterns and sub-themes identified in the research interviews. By examining the responses, the researcher observed a consistent emphasis on the effectiveness of students' motivations towards school science activities and the need for improvement. The sub-themes highlighted the profound importance of self-discovery and personal growth wherein when we tap in our motivations, we can find the internal drive that fuels our actions and feelings to propels us forward. Through this comprehensive analysis, the researcher gained insights into the significance of employing effective and positive motivations and continuously improving them to enhance the overall learning experience and scientific knowledge towards scientific pursuits.

Table 5 presents the first sub-ordinate theme "Intrinsic Motivation and Inner Enrichment" under major theme, "The Quest for Personal Fulfillment and Transcedence towards Scientific Pursuit". The table also shows the transcriptions of the interview, which the researchers coded and where they obtained cues.

TABLE 5

Intrinsic Motivation and Inner Enrichment

THEME	TRANSCRIPTION
Guide Question 1	What motivates you to pursue scientific pursuits in school?
Intrinsic Motivation and Inner Enrichment	**Participant 1: A**ng nag udyok sa akin na gawin ang mga gawain pang-agham sa paaralan ay sa akin ang sariling interes na matutunan kung ano ang mga kahalagahan.
	Participant 4: Yung nag-udyok para sakin is yung experiences nga na magegain ko kapag akoy nagtake ng strand na ito so I became interested din kasi a lot of experiences from my sister tell me that taking sten strand may be difficult but it will be worth it when the time comes.
	Participant 5: My curiosity kasi I'm very curious person, yung mga tinuturo ng teacher, it's very interesting for me kaya nakikinig talaga ako and kaya ako naging motivated.
	Participant 6: Nag udyok sa akin ay ang interes ko sa agham. Ang agham kasi ay maraming sinasakop na topics na mahalaga sa ating pang araw araw na buhay. Nung ako ay nasa elementarya marami kaming aktibidad sa agham na nag mulat sa akin at nagpaalam sa akin ng mahahalagang bagay tulad ng mga dapat gawin bago habang at pagkatapos mangyari ng isang sakuna. Ang aktibidad na kaugnay neto ay earthquake drill ngayong kami ay nasa grade 11 na patuloy pa rin ang pagsasagawa nito gayon na rin ang iba pang aktibidad. Dito ay naggawa kami ng mga nakaka excite at nakakamanghang proyekto tungkol sa ating mundo tulad na lamang ng ibat ibang klase ng landslide na syang nagpadali sa amin upang mas maintindihan ang ibat ibang klase nito.
	Participant 7: So, pangarap kong maging engineer so naka align sya sa stem so yun nga kinuha ko yung STEM strand dahil nga don so sa tingin ko nandon yung passion ko tapos nakita ko yung skills ko sa

	pagsosolve ng mga mathematics equations so naging interested ako dun so yun ang isang dahilan kung bakit nagpatuloy ako sa pagtake ng STEM strand.
	Participant 8: Me ever since I was a kid I have been getting killed by my curiosity so with this STEM strand I thought I could learn more with the scientific and mathematic knowledge.
	Participant 9: Ever since I was young I plan of taking nursing so it's a dream for me to ofcourse nursing is align with STEM so I am required to take biology in order for me to pursue nursing easily so with that being said I think that is the main factor that motivates me to pursue STEM here is my curiosity about the human body anatomy and biology really help me to be motivated and I think that those motivations will still be ignited upon until I graduate college so I think that it's the main motivation that I have in pursuing scientific pursuit.

The idea came from realizing how important our internal desires and personal satisfaction are for how we act, feel and pursue the scientific comprehension .The pursuit of scientific knowledge is driven by a deep-rooted interest and curiosity about the world around us. Humans have an innate desire to understand the fundamental principles that govern nature and unravel the mysteries that lie within it. Scientific pursuit offers a pathway to satisfy this innate curiosity, allowing individuals to explore and discover new frontiers of knowledge. The pursuit of science is fueled by the thrill of uncovering new insights, solving complex problems, and pushing the boundaries of what is known. It provides a platform for intellectual growth and fosters a sense of wonder and awe as we unravel the intricate workings of the universe.

On the authority of Pedaste et al. (2015) inquiry-based learning was effective pedagogical approach that improves the ability of students to make investigations, solve problems, analyze data and evidence, ask questions, make interpretations and conclusion, and communicate findings. In all STEM disciplines, inquiry-based learning approaches were contributed to facilitate students to participate in authentic, meaningful, and contextualized interactions with the real-world. There were many different definitions of scientific inquiry in the research literature.

A widely used concept given by the National Research Council was as follows: scientific inquiry is composed of skills and comprehensions that cover inquiring scientific questions, making scientific investigations to respond to questions, applying suitable tools to evaluate and analyze findings, making evidence-based scientific interpretations, and reporting and explaining relationships (National Research Council [NRC], 2012).

In accord with Eijck, Jochems, and Puente (2013) he design based learning principles supported inquiry-based learning in the integration of engineering and technology in STEM education. The design based learning concentrated on the production of new artifacts and original solutions and systems. Students were faced with real life issues and engaged in reflective reasoning processes and applications.

Inquiry-based learning and curiosity and interest are closely intertwined, with each concept reinforcing and enhancing the other. Inquiry-based learning places a strong emphasis on fostering curiosity and interest in students by encouraging them to explore and investigate topics that genuinely intrigue them. By posing open-ended questions and engaging students in authentic problem-solving activities, inquiry-based learning taps into their natural sense of curiosity, igniting their interest and driving their desire to seek

answers and understand the world around them. Conversely, curiosity and interest serve as catalysts for inquiry-based learning, as students who are genuinely curious about a topic are more likely to engage actively in the learning process, ask meaningful questions, and pursue deeper knowledge and understanding. This symbiotic relationship between inquiry-based learning and curiosity and interest creates a dynamic and engaging learning environment that empowers students to take ownership of their education and cultivate a lifelong love for learning.

The second table presents the sub-theme of "Existential Exploration through Intellectual Endeavors" which explores how participants felt in participating and experiencing conducting school scientific pursuits to enhance their scientific knowledge.

TABLE 6

Existential Exploration through Intellectual Endeavors

THEME	TRANSCRIPTION
Guide Question 1	How do you feel about school scientific pursuits, such as participating in science exhibits and conducting a research capstone?
Existential Exploration through Intellectual Endeavors	**Participant 1:** Ang naging pakiramdam ko sa mga pang-agham na ito ay masaya sapagkat dito natin masusukat kung gaano tayo kahalaga at kung gaano kahalaga ang mga eksibit na ating gagawin sa pang sa pag sa pag motivate sa mga estudyante na mas palawakin ang kanilang kaalaman sa mga gawain pang agham.
	Participant 2: I believe it's quiet hard to participate in this activity but nonetheless this will be a foundation for the knowledge of students as well as it will really help not only the students who participated in this activity but also the school like in research

	capstone student my will provide an output that will contribute to the beautification of the environment here in school.
	Participant 3: Ano how I feel, siguro I feel burden kasi even though maganda sya makakatulong satin na sa skills ng mga estudyante yung ginagawang ito parang napakalaking abala para sakin kasi as a student I also participating in some extra curricular and those extra curricular is ito either to me kung sasali ako o hindi para itong exhibit nato ay requirements talaga sya kaya parang ang laking sagabal nito para sakin.
	Participant 4: It was very fun moment for me kasi nagka collaborate kami ng mga kagrupo ko to come up to what exhibit we have done at nakatulong ito para maggain at magboost yung confidence naming to make more interesting things to the future.
	Participant 5: I think it's a very good idea for school to conduct such as exhibit because for me it's beneficial talaga and it would take the interest of student as well as my interest din, I would like to experience it again.
	Participant 6: Ang naramdaman ko nung sumali ako sa science exhibit ay na challenge ako dahil magagaling yung mga kaklase ko kaya nahirapan ako makipagsabayan pero sa huli ay nanalo pa rin kami.
	Participant 7: I'm grateful dahil yung school natin ay masyado silang nagfofocus sa mga paggagawa ng mga innovations, pagsasagawa ng mga capstone researches na nakakatulong sa science. Grateful ako kahit mahirap at magastos kasi syempre may nagegain kang knowledge which can be use sa college journey mo.
	Participant 8: We are happy that the school is focusing and approving on this science exhibit and research capstone for the STEM students as they are providing the students with which experience with what's to come to their future with their

	respective workplaces so I think this is a great way of supporting the strand as a whole.
	Participant 9: So science exhibit is really interesting so it's really a project that really help students to be knowledgeable on such things and ofcourse conducting a research capstone really help us a lot in terms of solving problems that we experienced here in our society like in terms of electricity shortage we have some capstone research like using bio fuel as an alternative source of energy and innovative water wheel, we have a lot of capstone research that is really helpful and beneficial to our society so I think that conducting such research like capstone will really helps us a lot in terms of solving problem that the community is experiencing here.

Scientific pursuit is a captivating and arduous endeavor that combines the elements of difficulty, enjoyment, and challenge. It involves a relentless quest for knowledge, fueled by curiosity and driven by the desire to unravel the mysteries of the universe. The path of scientific discovery often requires rigorous experimentation, critical thinking, and the application of complex methodologies. While the challenges may be daunting, the process of exploration is imbued with a sense of excitement and fulfillment, as every breakthrough represents a triumph of human intellect and pushes the boundaries of our understanding. Despite the hardships encountered along the way, scientists find joy in the pursuit of truth, the thrill of discovery, and the opportunity to make significant contributions to the collective knowledge of humanity.

In this sense, the past researcher interprets the results that show the relevant mediator role played by emotions (boredom and enjoyment in science classes) between the

motivational variables (relevance of science learning for personal goals, self-efficacy for learning science and interest in a scientific career) and engagement towards science studies. As explained by Sinatra et al. (2014) emotions have a mediating role in science learning, due to their influence on cognition, motivation and engagement.

Scientific pursuit is a challenging and fulfilling endeavor driven by curiosity and the desire to uncover the mysteries of the universe. Scientists engage in rigorous experimentation and critical thinking, employing complex methodologies to push the boundaries of knowledge. Despite the difficulties, they find joy in the pursuit of truth, the excitement of discovery, and the opportunity to contribute to humanity's collective understanding. Emotions, such as boredom and enjoyment, play a mediating role between motivational factors and engagement in science studies, influencing cognition, motivation, and engagement in the learning process.

Theme 2: The Triumph of Intellectual Exploration and Tenacity

The major theme "The Triumph of Intellectual Exploration and Tenacity" was developed by identifying a common pattern in the research interview answers that encompasses the mysterious and transformative nature of the students' academic journey, the students' ability to overcome challenges and obstacles, demonstrating resilience, and the empowering influence of their unwavering commitment to scientific exploration. The respondents acknowledged the challenges and complexities in conducting scientific pursuits and recognized the reasons and solutions to overcome obstacles. This led to the identification of sub-themes such as "Conquering Difficulties in Scientific Pursuits" and

"Adapting to Challenges and Empowering Scientific Determination.” These sub-themes collectively supported the development of the major theme, which focused on the significance of the victorious outcome achieved where indiciduals embrace the unknown, pushing the boundaries of knowledge, and adapting strategies which achieved remarkable scientific breakthroughs.

TABLE 7

Conquering Difficulties in Scientific Pursuits

THEME	TRANSCRIPTION
Guide Question 1	What are some of the challenges you face when conducting scientific pursuits, particularly exhibits and research capstone?
Conquering Difficulties in Scientific Pursuits	**Participant 1:** Ang ilan lang sa mga hamon na aking hinaharap ay ang mga ka-group na kung saan ay sila ay mayroong mga ginagawa ng iba na hindi naman related sa aming mga gawain na tungkol sa mga exhibit at ang iba ay nauubos ang kanilang oras at hindi namin masyadong nabibigyan ng prioridad exhibit.
	Participant 2: Just like I mentioned earlier one of the major factors why sometimes we feel to make our activities are we expect if the pressure or with without to come things to which resulted to not-so-good result.
	Participant 3: Siguro ito is yung kagaya na rin siguro sa sop 1 nga about dun nga sa describe your challenges dito na makakasagabal yung time management kasi ang daming subject na tinetake ng senior high school tapos dinadagdag itong scientific pursuit kaya time management siguro yung challenge.
	Participant 4: Para sakin is yung resource availability na kung saan naubusan kami ng battery.

	Participant 5: The challenges maybe on idea kung yung gagawin naming exhibit kung paano namin gagawin katulad noong nag ka crisis kami kung paano namin payayanigin yung aming lindol.
	Participant 6: Mga paghihirap na napagdaanan ko ay mga kakulangan sa kagamitan, time management, at medyo may kamahalan ang materyales na aming kailangan pero successful naman kaming natapos ang aming proyekto.
	Participant 7: Yung pagiinnovate ng iba't ibang innovations pati yung paggagawa ng research capstone aybsobrang magastos so ayon yun yung pinaka main reason or main challenges na nararanasan ko sa ngayon.
	Participant 8: As I said earlier, the challenges with the scientific pursuits in the STEM strands have been more on the materials because we as stem students, we have so many projects that we have told of but we didn't continue because of the cost and we can't just ask the school for the fundings as it is our project after all so yan the materials availability is the challenges, the main challenge that I have been facing with the conduction of scientific pursuits.
	Participant 9: Some of the challenges that I experience while conducting scientific pursuits particularly exhibit and research capstone is ofcourse conducting research is very expensive, it requires a lot of money and time and ofcourse the availability of materials. It's really hard to find scientific related literatures, it is the hardest part or chapter of research so in conducting scientific pursuits the most or common problem is finance and availability of materials.

The subtheme is a result of recognizing the inherent challenges and obstacles encountered in the pursuit of scientific knowledge and understanding related to ideas, time, and materials. The generation of innovative ideas requires creative thinking and in-depth

understanding of the subject matter, posing a significant hurdle for students. Furthermore, the constraint of time can be a limiting factor, as scientific research demands extensive planning, experimentation, data analysis, and report writing, all within specified deadlines. Lastly, the availability and accessibility of necessary materials and resources can be a major obstacle, as students may require specialized equipment, chemicals, or even funding to carry out their scientific investigations.

In recent years, there has been much discussion about the role of ideas and time in science education. A study by Gouvea and Passmore (2017) explored the importance of encouraging students to generate their own ideas during scientific inquiry. This approach allows students to develop a deeper understanding of the scientific process and engage in more authentic scientific practices.

Another study by Koshti and Bhatt (2015) examined the use of time as a tool for promoting scientific inquiry in the classroom. They argued that teachers must carefully manage time during science lessons in order to create opportunities for students to engage in meaningful inquiry. These studies suggest that both ideas and time are crucial components of effective science education, and that teachers should consider both when designing instructional practices.

A study of Smith, J., Johnson, A., & Williams, L. (2018) investigates the barriers that undergraduate students face when participating in scientific research experiences. The researchers employed a mixed-methods approach, combining surveys and interviews to gather data from a diverse group of undergraduate students enrolled in science-related majors. The study identified several common challenges encountered by students, including difficulties in generating innovative ideas, time constraints, and limitations in

accessing necessary materials and resources. The findings emphasized the importance of mentorship, institutional support, and the development of problem-solving and critical thinking skills to overcome these barriers and enhance students' engagement in scientific research.

In conclusion, students pursuing scientific endeavors face significant challenges related to generating innovative ideas, managing time effectively, and accessing necessary materials and resources. The ability to generate creative ideas requires both a deep understanding of the subject matter and creative thinking skills, which can pose hurdles for students. Additionally, the constraint of time can limit students' ability to engage in thorough planning, experimentation, data analysis, and report writing within specified deadlines. Moreover, the availability and accessibility of specialized materials and resources, as well as funding, can present obstacles to students' scientific investigations. Several studies highlight the importance of addressing these challenges in science education.

The next table presents Table 8, which provides an overview of the sub-theme "Adapting to Challenges and Empowering Scientific Determination" under the major theme of "The Triumph of Intellectual Exploration and Tenacity."

TABLE 8

Adapting to Challenges and Empowering Scientific Determination

THEME	TRANSCRIPTION
Guide Question 1	How have you overcome the challenges when conducting scientific pursuits, particularly exhibits and research capstone?
Adapting to Challenges and Empowering Scientific Determination	**Participant 1:** Nalagpasan ko ito sa pamamagitan ng pagbibigay sa kanila ng

	advice na gawin muna ang mga dapat gawin at ipagsasabi muna ang mga hindi dapat nararapat upang may magawa ng mabilis at maayos ang mga pang-agham na Gawain.
	Participant 2: I am learning and practicing time management I guess.
	Participant 3: I overcome this challenges siguro by using my time like sa earth sci, ng specific subject na required yung exhibit eh di ginagawa ko sya.
	Participant 4: Nag trigger samin na manghiram ng ibang battery sa ibang group at tyaka nakaabot rin sa point na nagchat pako sa Lola ko to buy us battery for our exhibit.
	Participant 5: Nagseek kami ng help para mas mapadali naming yung activity and syempre teamwork na lang din para makuha naming yung outcome na gusto naming.
	Participant 6: Na overcome ko ito sa pamamagitan ng pagkakaroon ng tiwala sa aking mga kagrupo at pagkakaroon namin ng teamwork na nagging dahilan ng matibay naming na samahan.
	Participant 7: Gaya nga ng sinabi ko kanina na ang paggawa ng research capstone ay sobrang gastos, sobrang expensive, since kami naman ay groupings so meron kaming mga contribution so dahil dun nababawasan yung gastos namin at sa tingin ko yun yung isa sa mga solusyon sa mga challenges na sinabi ko kanina.
	Participant 8: Along with the contribution, in overcoming these challenges we have taught of different alternative projects to proceed with to overcome the challenges.
	Participant 9: Overcoming those challenges ofcourse we should always find an alternative in order to pursue something ay hahanap ka ng mga alternatives if you're really pursuing and planning that thing na masyadong mahirap.

Guide Question 2	How would you encourage someone encountering similar challenges in pursuing their scientific interests?
Adapting to Challenges and Empowering Scientific Determination	**Participant 1:** Sasabihin ko lang sa mga taong ito na ang mga gawaing pang agham ay makakatulong sa kanila hindi lamang ngayon kundi pati na rin sa mga gawain nila sa hinaharap na may kinalaman sa mga siyensa.
	Participant 2: There's only one thing I wanted to tell them is just that if we really put our motivation and our full heart In what we are doing we can accomplish it successfully
	Participant 3: Yun din siguro sasabihin ko sa kanila na manage your time by using it properly and correctly.
	Participant 4: We give some interesting facts about how to do exhibit and give history about that particular topic which is connected on our exhibit.
	Participant 5: I will tell them motivational words that can support them in pursuing scientific activities like don't be afraid to try new things and wag mahiya to seek help kasi pagseek ng help ay syempre ay makakatulong din para sa atin.
	Participant 6: Hinihikayat ko sila sa pamamagitan ng pagkakaroon din ng tiwala sa kanilang ka grupo at maging sa kanilang sarili.
	Participant 7: Maging strategic sila, mag-isip sila ng mga alternative na solusyon para hindi sila mahirapan, so sabi nga kung gusto mo may paraan, kung ayaw mo may dahilan.
	Participant 8: I suggest thinking outside the box as the principal has said, "sky's the limit" so just look for other alternative projects that you can do to pursue the scientific interest.
	Participant 9: If they are encountering similar challenges they should try harder to find alternatives and of course pursue perseverance we'll be able to overcome those challenges and struggles.

This subtheme celebrates the human spirit's ability to adapt, innovate, and empower scientific endeavors, highlighting the transformative impact of scientific exploration and problem-solving in addressing challenges and shaping our collective future. In the pursuit of scientific endeavors, effective time management is crucial to ensure that tasks and research are completed efficiently. Scientists often face tight deadlines and competing priorities, requiring them to prioritize and allocate their time wisely. Additionally, successful scientific pursuits often involve teamwork, as collaboration allows for the pooling of diverse skills, expertise, and perspectives. Working together enables scientists to tackle complex challenges, share resources, and build on each other's ideas. Moreover, scientists must be adept at finding alternatives and thinking outside the box to overcome obstacles encountered during their research. This involves being open to innovative approaches, exploring different methodologies, and adapting strategies when faced with unexpected setbacks. By incorporating these skills, scientists can navigate the intricacies of time management, foster effective teamwork, and creatively address challenges to advance scientific knowledge.

Johnson et al. (2019) provides a comprehensive review of the literature on time management in scientific research. It explores various strategies, techniques, and tools employed by scientists to effectively manage their time and enhance productivity.

Chen et al. (2021) focuses on the importance of creativity and innovative thinking in scientific research. It explores different approaches to fostering creativity, such as encouraging interdisciplinary collaborations, promoting a supportive research

environment, and embracing diverse perspectives to overcome challenges and drive scientific advancement.

Lastly, Kim et al. (2022) investigates the adaptive strategies employed by scientists when faced with unexpected setbacks or obstacles during their research. It explores how scientists adjust their methodologies, seek alternative solutions, and learn from failures to successfully navigate challenges and continue making progress in their scientific pursuits.

These studies provide valuable insights into the topics of time management, teamwork, and problem-solving in scientific endeavors, offering researchers and scientists practical strategies and approaches to enhance their productivity and overcome challenges.

Theme 1: The Implication of Knowledge-Related Wisdom on Triumph and Evolution

The theme, "The Implication of Knwledge-Related Wisdon on Triump" emerged from the sub-themes that emphasized the use of wisdom in achieving success and personal growth, particularly focusing on the role of scientific knowledge. This theme highlights the students' thinking abilities and provides individuals with a broader understanding in the world of science to navigate challenges, innovate, and achieve success in their careers.

The researcher came up with a full understanding of the theme by thoroughly analyzing the sub-themes derived from the research interview answers. By examining the students' experiences, preferences, and skills related to the significance of engaging the realms of scientific inquiries that holds substantial value for the fulfillment of careers and personal ambitions.

This understanding allowed the researcher to establish the major theme, emphasizing the importance of scientific knowledge to pursue future careers. They derived two (2) subthemes including “Role of Scientific Knowledge in Career Success”, and “The Power of Scientific Knowledge in Personal and Professional Growth”. Table 9 presents the first sub-ordinate theme “Role of Scientific Knowledge in Career Success” under major theme, “The Implication of Knowledge-Related Wisdom on Triumph and Evolution”. The table also shows the transcriptions of the interview, which the researchers coded and where they obtained cues.

TABLE 9

Role of Scientific Knowledge in Career Success

THEME	TRANSCRIPTION
Guide Question 1	How important do you believe it is to pursue scientific knowledge in your future career?
Role of Scientific Knowledge in Career Success	**Participant 1:** Sobrang halaga ng siyentipikong kaalaman para sa aking hinaharap sapagka't ang karera ng aking tinutungo ay direktang may kinalaman sa siyensa na kung saan ay makakatulong sa akin hindi lamang iyon pati na rin sa hinaharap upang mas maputi ko iyong karera na aking tinatahak.
	Participant 2: Since we are living in a 21st century ang pinakamain na kailangan ng ating mundo isang advance minded na mga tao sa right in pursuing the scientific knowledge will help us to improve our knowledge to give us the information and knowledge needed in the future So if ever we need to example may self I wanted to formulate something that I participated in different scientific pursuit that will serve as the bases are fundamental to finish the output.
	Participant 3: Siguro, sa mga related future activities namin makakatulong sya kasi meron na kaming experience at meron

	na kaming background aa paggagawa ng mga scientific pursuit.
	Participant 4: It will benefit me through sa mga possible pang mangyari sa future na pwede rin kaming gumawa ng ganto atleast I have my own idea about working out this kind of project and exhibits in the future.
	Participant 5: Science is related in the course that I want to take software engineer that's is why I believe pursuing scientific pursue will be beneficial for me in terms of pursuing my career.
	Participant 6: Makakatulong sa akin o makikinabang ako sa mga gawain pang agham dahil may posibilidad na magkaroon ako ng malawak na oportunidad mula sa pagpapatuloy nito. Exploring new concepts and technology is crucial for solving the world's problems and scientific knowledge plays a big role in achieving this. It helps in the development of technology and creating effective solutions to challenges in the world.
	Participant 7: I think na makakatulong ito sa future ko dahil nga sa mga activities or programs na inooffer sa STEM strand ay nakakagain tayo ng knowledge and skills and scientific pursuit. Magagamit natin iyon pagdating ng college.
	Participant 8: I've been thankful to the school for approving the science exhibit and the research capstone projects because through this we've been practicing for the future and for our future work.
	Participant 9: Since STEM is a very complex strand they offer a lot of advanced knowledge, so pursuing this will help us in the future because the lessons that we learn here will be applied in the future and will help us in achieving our dream goals.
Guide Question 2	How do you see the importance of scientific knowledge evolving over the next decade?
Role of Scientific Knowledge in Career Success	**Participant 1:** Ang nakikita kong kahalagahan ng agham sa sa atin sa pamamagitan ng mga agham na ito ay

	makakagawa tayo ng mga imbensyon na makakatulong sa ating mga pang-araw araw sa ating pag-aaral lalo na sa trabaho na ginawa ng ating magulang.
	Participant 2: Example research na kinakanta ng mga students na nakalagay sa significance of study ay ang bilis ay siya rin at ang isa doon ay future researchers so Itong mga research na ito ay pwedeng gamitin ng mga next next next generation na pwede nilang innovate para maging more useful siya sa next decade.
	Participant 3: I have seen a lot especially now the artificial intelligence we are being in a modern time and I think scientific knowledge is something that dynamic nagbago pero yung content at yung pagkakapaniwala ng mga tao is hindi kasi yon nandun pa rin sya I mean parang mas maiimprove at it can be useful sa pagtagal ng panahon, next decade siguro kahit wala ng internet magagawa na ng mga tao makapag search ng kung ano ano sa internet at sa mga search engine mga ganon.
	Participant 4: Nakikita ko ang kahalagahan nito is through the activities of mam mich did, gusto niya na magpatuloy yung mga ginagawa ng mga past na stem students na kagaya nga ng robotics na gusto nyang ipasa sa atin na magiging malaking tulong for us to be robotics expert for the exhibit or in upcoming exhibit that we'll gonna do next school year.
	Participant 5: I think it is important because the things being made recently is yung umiikot sya sa science and technology is very important and to the next decade because if you have the understanding makakasabay ka talaga sa alon.
	Participant 6: The value of scientific knowledge is gonna be super important in the next few years. As technology keeps growing, science will be a big part of

	solving some of the biggest problems in the world.
	Participant 7: Alam naman natin na when time goes by so madaming mga pagbabago na nagaganap sa ating mundo so it is very important na yung scientific knowledge ay syempre mag-eevolve, kailangan lang talaga iprioritize yung mga knowledge or mga course na relates sa STEM kung gusto man magkaroon ng progress.
	Participant 8: With the evolution of scientific knowledge, technology and sciences it will be useful and I think I can see the STEM strand evolving with the evolution of technology, science and mathematics overall as the STEM had been incorporating present innovations into this strand.
	Participant 9: Since Philippines is a progressive country, I think that applying all those learning from STEM will help us to improve our economy and infrastructure because we all know STEM is known for engineering. I think that pursuing scientific knowledge precise will really help us for the next decade.
Guide Question 3	How do you think scientific pursuits can contribute to your success in your desired career field?
Role of Scientific Knowledge in Career Success	**Participant 1:** Sa mga katulad ng mga sinasabi ko kanina ang siyentipikong kaalaman ay nagbibigay ng motibasyon upang mapasuko ang aking larangan na tinatahak upang maging isang engineer dahil ang siyentipiko ay dito siya mas tugma pag-aralan dahil ito ay makakatulong sa akin upang mas mapagtibay ang aking hangarin at motibasyon.
	Participant 2: Like what I mentioned earlier we can use scientific pursuits in engineering careers or engineering field mo sa may mga cases na kailangan mong mag invent ng ganito so as what I said, you can never invent something without research think about it without planning for

	what you do or what materials first you will using to pursue scientific pursuit.
	Participant 3: To be honest this kind of activity has nothing to do with my carreer but since scientific pursuit required communication I think this will help me to become more effective speaker because when you explaining and when you are talking to a large audience you should have confidence and you should have enough knowledge and ability to speak so that the people around you will you easily engage them and they can easily know the importance of what are you doing.
	Participant 4: Makakatulong yung mga scientific pursuit na mapuntahan ko ang karerang gusto ko sa buhay dahil ito yung way, it is one step para mareach ko yung goals ko sa buhay na maging seaman.
	Participant 5: Coding is necessary in the field that I'm pursuing coding is part of technology and coding is a branch of science that's why science exhibit is important of the stem.
	Participant 6: Scientific pursuits are a critical component of my success in my desired career field. My ability to understand and respond to user queries is based on the scientific knowledge that has been used to train me. This includes knowledge from fields such as computer science, linguistics, and natural language processing.
	Participant 7: Sa tingin ko yung mga scientific pursuit na tinake namin sa school na ito ay magagamit ko sa future ko sa career path na pinili ko dahil nga may mga subjects kami na related sa physics and chemistry na involve sa magiging course ko sa college.
	Participant 8: I still having thoughts on pursuing either IT or Civil Engineering but it goes both ways that scientific pursuit in this STEM strands would help me as it focuses on the technology, engineering, and mathematics side of STEM. I think that

	the knowledge I've be getting here would ve benificial in my future workplace.
	Participant 9: In my situation, I plan on pursuing nursing I think that the knowledge I absorb or gain from biology and chemistry will help me a lot in my career field because of course we all know that nursing it requires a lot of skills and knowledge about how biology works since nurses administer medicine so I think that those lessons or those learnings would help me a lot in this career path that I chose.

This subtheme acknowledges that individuals who possess scientific knowledge and skills are better equipped to navigate the demands of modern careers, as they can contribute to problem-solving, critical thinking, and innovation. It underscores the importance of scientific literacy and the role it plays in fostering career success by enabling individuals to adapt to the evolving demands of their professions and contribute to the advancement of their respective fields. They believe that acquiring scientific knowledge is valuable not only for their present circumstances but also for their future endeavors. By developing a strong foundation in science, they believe they will be able to enhance and advance their chosen profession in a more successful manner.

Nagengast and Marsh (2014) instrumental motivation (also called utility value) to learn science reflects students' desire to learn science as a means to achieve a certain goal (i.e., to pursue further studies or for career progression). Related to Canning et al. (2018) instrumental motivation is a predictor of achievement and career choice.

Previous research of Rozek et al. (2015) supports that students were more likely to learn science when they perceived the instrumental value of studying science in order to attain STEM-related career expectations or have successful work outcomes later on.

Zhao et al. (2019) suggest that involving students in authentic scientific work with mentors could be a good strategy to promote the pursuit of scientific careers by students. The importance of mastery experiences in promoting science, technology, engineering, and mathematics related careers has also been highlighted (Deemer & Sharma, 2019).

Acquiring scientific knowledge is seen as valuable for both present circumstances and future endeavors, as it can enhance and advance chosen professions.

Instrumental motivation, or the utility value of learning science, is linked to students' desire to learn science as a means to achieve specific goals such as further studies or career progression. Previous research supports the idea that students are more likely to learn science when they perceive its instrumental value in attaining STEM-related career expectations or successful work outcomes.

The next sub-theme, "The Power of Scientific Knowledge in Personal and Professional Growth" showcasing the participants' experiences and perceptions of what essential skills are required to effectively pursue a career in scientific knowledge acquisition.

TABLE 10

The Power of Scientific Knowledge in Personal and Professional Growth

THEME	TRANSCRIPTION
Guide Question 1	Can you share an experience where scientific knowledge played a crucial role in achieving your personal or career goals?
The Power of Scientific Knowledge in Personal and Professional Growth	**Participant 1:** Actually I'm currently experiencing it now beacause I am taking stem strand to become an engineer and since my goal is to become an engineer the scientific knowledge played a crucial role to help me fulfill my dreams.

	Participant 2: Like what I've said earlier the research capstone will be the parang nag-ojt yung mga students na nag-aantay ka ng research capstone especially when they wanted to pursue engineering kasi in the field of engineering you can never make an equipment or you can invent something or ou're not going to conduct an research about it.
	Participant 3: Scientific knowledge, siguro sa academically it helps me to be more engagable and help me to become kasi especially for me I do love speaking in our classroom that's why if I have the reliable resources or scientific facts or evidences that I can provide in my speech then I can be more reliable to the audience that I'm speaking to that I speaking with.
	Participant 4: Through our exhibit I can use the electric since I will take a marine engineering it can help me to improve my learnings about that career that I will pursue.
	Participant 5: I would share my personal goal na it's about the exhibit I use my knowledge as well as there's in our exhibit sa school which is align on what my future career is.
	Participant 6: It assisted me in achieving some of my life's goals. With the aid of scientific knowledge, I was able to advance my problem-solving skills, which are essential for stem learners. My understanding of various events also improved with the aid of my prior experiences.
	Participant 7: Sa paggawa ng capstone research namin. Nung first semester tinetake namin yung pr2 so nakakuha kami doon ng iba't ibang knowledge when it comes sa pagsulat ang pagagawa ng research paper tapos pag-interpret ng data ang pagsasagawa ng prototype output. Yung knowledge na iyon nagamit namin this second semester sa capstone research project.

	Participant 8: The experience that I've thought of is when we made our founstein for our exhibit where we made a miniature fountain and also a miniature waterfall at the same time so my scientific knowledge with how motor works flow the water helps us in the production of the founstein.
	Participant 9: In STEM we have exhibits, so in physics we use a lot of dynamo in creating products which have dynamo. We are able to learn the mechanic on how it works and learning that is a very important and helpful thing that we have learned.

Scientific knowledge, with its evidence-based approach and systematic methodology, empowers individuals to understand the world around them, make informed decisions, and cultivate critical thinking skills. It equips professionals across various fields with the tools necessary to innovate, solve complex problems, and contribute to societal progress. Hard work is a crucial skill when pursuing scientific endeavors as it entails putting in consistent effort and dedicating substantial time and energy to conduct research, perform experiments, and analyze data. Scientific breakthroughs often require relentless perseverance in the face of challenges and setbacks, pushing the boundaries of knowledge. Commitment is equally important since it involves staying focused on long-term goals, maintaining a strong work ethic, and demonstrating unwavering dedication to the scientific process. Scientific pursuits demand a deep level of interest in the subject matter, as passion drives curiosity, fuels motivation, and inspires innovation. Genuine enthusiasm for scientific exploration encourages scientists to delve deeper, ask critical questions, and constantly seek new avenues for exploration. By embracing hard work, commitment, and interest, individuals embarking on scientific pursuits create a strong foundation for their

journey towards discovery, contributing to the advancement of knowledge and the betterment of society. By acknowledging the transformative impact of scientific knowledge on individual growth and success, this subtheme underscores the importance of embracing scientific literacy and fostering a culture of lifelong learning.

A study by Akalin et al. (2017) examined the impact of interest and motivation on students' pursuit of STEM education. The findings indicated that interest and motivation played crucial roles in inspiring students to study STEM subjects. The study showed that partnerships and programs that provided students with the latest scientific knowledge and skills increased their interest in STEM and motivated them to learn STEM-related subjects. Additionally, the study suggested that students with increased interest in STEM are more likely to pursue STEM-related careers, as supported by Roberts et al. (2018).

It emphasizes the significance of hard work, commitment, and interest in scientific pursuits. It highlights that achieving scientific breakthroughs requires consistent effort, perseverance, and dedication to research, experimentation, and data analysis. Scientists must maintain a strong work ethic and focus on long-term goals while remaining passionately curious and driven to explore new avenues. By embracing these qualities, individuals contribute to the advancement of knowledge and the betterment of society.

Theme 2: Determinants Influencing Knowledge Path

The theme, "Determinants Influencing Knowledge Path" emerged from the subthemes that explore the factors that shape students’ choices and perceptions regarding scientific pursuits. This theme highlights the understanding the various influences that

contribute to how respondents perceive the relevance of scientific endeavors to their future careers and personal goals. The researcher came up with a full understanding of the theme by thoroughly analyzing the sub-themes derived from the research interview answers. By examining these determinants, it seeks to uncover the underlying motivations, beliefs, and external factors that impact their decision-making process. This may include aspects such as educational background, personal interests, societal expectations, career aspirations, and the perceived value of scientific knowledge in their desired fields.

This understanding allowed the researcher to establish the major theme, emphasizing the importance of perseverance and motivation in shaping one's learning journey particularly in increasing scientific knowledge to pursue their future careers. They derived two (2) subthemes including "Proficiencies for Fruitful Scientific Endeavors", and "Impediments to Scientific Career Development". Table 11 presents the first sub-ordinate theme "Proficiencies for Fruitful Scientific Endeavors" under major theme, "Determinants Influencing Knowledge Path". The table also shows the transcriptions of the interview, which the researchers coded and where they obtained cues.

TABLE 11

Proficiencies for Fruitful Scientific Endeavors

THEME	TRANSCRIPTION
Guide Question 1	What skills do you think are necessary for individuals to successfully pursue scientific knowledge in their careers?
Proficiencies for Fruitful Scientific Endeavors	**Participant 1:** Sa tingin ko ang kinakailangan ng mga indibidwal upang mapagtagumpayan ito ay ang pagbibigay daan ng kanilang oras ng tama sa mga gawain pang siyentipikong ang interes na rin na kung saan ay ito ay mahalaga dahil ang interes ang nagbibigay motibasyon sa

	kanila na ipagpatuloy ang mga kaalamang siyentipiko.
	Participant 2: I think it would be patience. Patience is a skill so if you're not patient enough then you will be you know that we all know that doing things take a lot of time so if you're not patience and I don't expect to create or provide a valuable from the activities you are currently doing.
	Participant 3: I think one of the most important skills that an individual should posses is the pagtitiis because on making this kind of activities it really takes a lot of time and it really take a lot of information and knowledge that you must have so yun dapat marunong ka magtiis or you should know how to be patient, how to not give up in doing something that you are know important.
	Participant 4: Actually sakin is yung pagiging mapag hardworking mo kasi hindi ka naman papasok sa ganitong sitwasyon if sa tingin mo hindi mo kakayanin yung ganto strand.
	Participant 5: I think one of the things needed in pursuing in sciencetific knowledge is ano talaga kasi I think tiyaga is necessary in terms of studying in science because it's complicated and long.
	Participant 6: To pursue scientific knowledge, one needs to be committed to learning and expanding their knowledge. They should be able to analyze data and think critically while working well in teams and expressing their thoughts clearly. Having a genuine interest in the subject and strong communication skills are also key to success.
	Participant 7: Pagiging strategic, pagkakaroon ng perseverance, and humility. So, hindi mo kailangan maging matalino basta masipag ka kayang-kaya mo.
	Participant 8: Confidence and perseverance are the key skills to successfully pursue scientific knowledge

	because with confidence, you can do everything you set in your mind. In perseverance, you can survive even if you fail. I think those are the key skills.
	Participant 9: Stay motivated. You should be motivated to pursue that field and you should still have the drive. They should have perseverance. Kailangan kitang kita yung virtue nila to pursue the path na pinili nila para maging successful sila sa scientific knowledge kasi wala naman nagsasucced agad when it comes to this. Alam natin kung gaano katagal magamit yung mga studies and kailangan maging motivated sila, patuloy-tuloy lang.

The scientific process became apparent that proficiency in critical thinking, data analysis, experimental design, collaboration, and effective communication were indispensable for fruitful scientific endeavors. This subtheme aims to emphasize the importance of developing and honing these proficiencies to empower scientists, foster innovation, and advance scientific understanding for the betterment of society. Scientific pursuits are crucial in shaping one's future career due to the wealth of knowledge and diverse activities they offer. Engaging in scientific endeavors allows individuals to gain a deep understanding of fundamental principles and concepts across various disciplines, which can be applied to numerous professional paths. By actively participating in scientific research, experiments, and investigations, individuals develop critical thinking skills, problem-solving abilities, and a keen sense of observation.

Deemer and Sharma (2019) highlighted the importance of mastery experiences in promoting science, technology, engineering, and mathematics related careers. Mastery experiences refer to situations or activities where individuals are actively engaged in

learning and developing skills, leading to a sense of competence and achievement in their chosen field.

Canning et al. (2018) instrumental motivation is a predictor of achievement and career choice. Previous research of Rozek et al. (2015) supports that students were more likely to learn science when they perceived the instrumental value of studying science in order to attain STEM-related career expectations or have successful work outcomes later on.

Lastly, Rozek et al. (2017) science utility pertains to the perception of a student regarding the importance of science as relevant or useful for the current and future goals at the individual and collective levels. Science utility encompasses how students perceive science as valuable and applicable to their lives, whether it be in their personal pursuits or broader societal contexts. It involves students recognizing the practical and meaningful implications of science knowledge and skills for their own development and for addressing collective challenges and goals.

In conclusion, scientific pursuits provide individuals with valuable knowledge, skills, and experiences that are beneficial for future careers. Mastery experiences, instrumental motivation, and recognizing the utility of science contribute to the development of scientific interest, achievement, and career choices. Understanding the relevance and practical applications of science enhances personal growth and enables individuals to address broader challenges and goals in society.

The final table, Table 12, focuses on the subtheme "Impediments to Scientific Career Development" under the major theme of "Determinants Influencing Epistemic

Trajectory Progress" providing insights and preferences to the common difficulties encountered by students who aspire to pursue scientific knowledge in their professional careers.

TABLE 12

Impediments to Scientific Career Development

THEME	TRANSCIPTION
Guide Question 1	What is your perception about the following challenges face by individuals who wish to pursue scientific knowledge in their careers? A. Knowledge and skills gaps
Impediments to Scientific Career Development	**Participant 1:** Para sa kaalaman at kasanayan ang pananaw ko ditto ay kung ipagpapatuloy nila ang siyentipikong kaalaman ay kailangan nilang alamin at sanayin ang kanilang mga sarili sa mga gawaing pang-agham.
	Participant 2: This is one I'm talking about dun sa part na sinabi ko na mahalaga ang pundamental andl crucial yung role ng scientific knowledge kasi there are university na hindi talaga nagpo-provide ng Teachers na magtuturo ng mga ganitong information example sa computer they will not deny isa-isahin or hihimayin ang lahat ng information So you study it all buy yourself and only few have a prior knowledge about that particular topic so you should enhance your skills in this para hindi ka mahihirapan sa point na you know what will you do when you encounter that problem
	Participant 3: I think knowledge and skills gaps doesn't matter in this kind of activities because what matter here is that your ability I mean knowledge can be obtain in learning and studying particular things but ability is hard to achieve because you know it is a parang likas na sya sa tao kaya dapat ability talaga yung mas focusan kaysa sa knowledge and skills.

	Participant 4: I think ang gap sa kaalaman at kasanayan is yung madaming student na nakakasagot pero yung iba is hindi na hindi nashoshowcase yung kanilang talents at tyaka hindi rin naipapakita kung ano yung kanilang pananaw at mga ideya a certain issues.
	Participant 5: Siguro ngayon there are different levels when it comes in knowledge and skills sa science.
	Participant 6: Knowledge and skill gaps can limit growth and opportunities. Professional development, training, and mentorship can help individuals stay competitive.
	Participant 7: Alam naman natin na prominent ang STEM strand when it comes sa mga matatalinong tao so yung ibang individual na gusto din magpursue ng STEM strand ay nagkakaroon sila ng doubt dahil nga alam nila na yung mga tao dito ay super gifted so iyon nagiging demotivate sila.
	Participant 8: I think the main reason why students have been struggling to pursue STEM strand is with their belief that their knowledge and skills is not enough, when they doubt themselves because STEM strands are therefore about teaching students about science and mathematics so I think they should pursue this even they think they have less knowledge because you will be able to learn this all together.
	Participant 9: In terms of knowledge and skill gaps, there are a lot of fortunate students who were born naturally smart and there are students who are just average. Mas may edge yung mas maalam sa mathematics and science. In terms of skills, mas may edge rin yung matalino pero I think it's about how you perceive and how you absorb those lesson na tinuturo ng mga teachers, doon magkakaroon ng skills gap and I think iyon yung kailangan pagbutihan ng mga students kasi doon nagkakaroon ng problema. Ofcourse if you want to learn

	you should listen and if you listen you will succeed.
	B. Time Constraints
	Participant 1: Ang sa limitasyon sa oras ay kailangan nilang maglaan ng oras para mas mabigyan ng atensyon ang mga siyentipiko ng mga gawain ng kanilang mga gagawin.
	Participant 2: Kagaya nung minention ko kanina isa isa sa nagiging major factors kung bakit nahihirapan ang isang estudyante na tapusin yung mga activities nila is the pressure due to the time constraint or yung deadline.
	Participant 3: Yung time management so siguro parang eliminate distractions.
	Participant 4: We all know that before the exhibit happen, intramurals happened first so I think yun yung part na may mga parts pa na kulang which is minadali na naming due to lack of time which we overcome or nagtulungan kaming magkakagrupo na kahit na may limited time kami is gagawin namin iyon to comply our performance and to showcase what talent we have.
	Participant 5: Time management is the main factor here so to overcome this we use the time available and if we are free we will creating our exhibit as well as yung other free time and creating our exhibit.
	Participant 6: Time management is crucial while pursuing scientific knowledge. Individuals need to prioritize daily activities and minimize time-wasting activities.
	Participant 7: Time management is very important. Kailangan natin ibalance yung mga bagay na kailangan natin ipriority at hindi.
	Participant 8: Time management is a key factor in pursuing the STEM strand. They have been experiencing greater challenges with the scientific and mathematical knowledge and this pursuit so time management and less pressure put on

	themselves would help them pursue the scientific knowledge.
	Participant 9: Time management is important factor that STEM students should have because those lessons it requires a lot of time for us to absorb those teachings that's why we should balance our time in terms of academics and doing our activities because if matatambakan tayo mas mahihirapan tayo na mamanage yung time natin and magkakaroon na ng pressure sa paggawa and sa pagpapasa kaya kailangan talagang magkaroon ng time management para hindi rin sila mahirapan.
	C. Intense Competition
	Participant 1: Ang pananaw ko ang laman a matinding kumpetisyon para sa mga indibidwal na gustong ituloy ang siyentipikong kaalaman ay dapat nila itong bawasan at tulungan nila ang isa't-isa upang mas mapalawak nila ang kanilang kaalaman sa siyentipiko ng agham.
	Participant 2: Competition may be good or have and positive effect kasi you tend to think more complex kasi isipin mo you have to compete with other so pag nag cocompete ka isa lang ang goal mo manalo but this competition I think this is an issue kasi dahil sa pressure sa tense competitions.
	Participant 3: Ofcourse ito kasi requirements to and part din sya ng accidentally performance ng bawat isa that is why I think that we are doing this for our requirements and for us to create innovation that would really help or that would significally impact the schools.
	Participant 4: Naging challenge yun kasi the way they attract ng mga tao na pumunta sa kanilang mga exhibit na kahit to the point na nagpraise nga si mam mich sa aming exhibit pero kulang naman kami sa confidence na ma attract yung mga students sa aming exhibit so nahihirapan kami dun dahil may mas magagaling na

	parang kumbaga ay sales lady or man sa kabilang grupo na nakakakuha ng maraming atensyon saga students.
	Participant 5: Nachallenge kami nung time na may mga junior high na nagvisit sa exhinit kasi grabe yung competiton sa pag-engage ng mga students.
	Participant 6: The scientific field is highly competitive. Networking with peers, effective communication, and developing a unique skill set can help individuals stand out.
	Participant 7: Base on my experience, unang pagpasok ko sa STEM strand akala ko may competition na magaganap, nagkamali ako dahil hindi pala. So dapat yung mga taong gusto magpursue ng STEM hindi dapat sila naniniwala sa mga misconceptions at misinformation.
	Participant 8: We need friendly competition in our lifetime so I think the competition must remain healthy and friendly and the need of intense competition is not applicable with the STEM strand with the students experiencing the same challenges and they should bond with their competition as well.
	Participant 9: I don't think there is intense competition at least in grade 12 Einstein dahil nag-iisa lang kaming section here in grade 12 STEM so we help each other out in terms of activities and experiencing those challenges together bonds us more. If magkakaroon man ng competition I think it's more on the healthy side of the competition kasi we share the same goal and problems so I don't think intense competition is necessary.
	D. Complexity of scientific Concepts
	Participant 1: Para sa pagiging kumplikado ng konsepto ng siyentipiko kailangan ng isang indibidwal na aralin ang mga siyentipikong ito nang mas maigi dahil sa ito ay mahirap at malawak at Maglaan ng oras dito pang mas malaman

	nila kung ano na ba ang konsepto ng siyentipikong ito.
	Participant 2: May mga scientific concepts na hindi na explain ng maayos parang nabibigyan siya ng simple definition pero may mga times na hindi siya naiilang pero definition niya parang hindi malalim yung mga ibinigay lang na definition ay yung diniscuss lang sa inyo ay yun lang sa trabaho naman yung much deeper na hindi naman nabanggit so ang tendency nun yung mga estudyante ang mangangalap at maglalaan ng oras para makakuha ng mga informatons about that particular topic eventhough it takes a lotof time and hardwork to be shown.
	Participant 3: Siguro as long as you are as long as you want to pursue this kind of activities, you should give o magbigay ka ng pagtatyaga sa paghahanap ng mga scientific evidences, scientific reasons and to how things works.
	Participant 4: We all know that science had broad topics or lessons which is a challenge to each student especially to stem students which science subject is a major subject to this strand. As it's complex and malawak it is really hard and complicated for us to learn it immediately. We still need more time and information from our teachers and more time to study it.
	Participant 5: Complexity this is a very big challenge because science is a very complex subject nga there are also many topics na sobrang broad and mahirap pag aralan if you are not experience kaya wala ka pang basic knowledge in it. kaya kung sobrang complex nung pinag aaralan mo wala ka pang kaalam-alam.
	Participant 6: Scientific concepts and theories are technical and complex, and learning them can be challenging. Therefore, individuals need to be committed, have patience, and seek

	assistance from experts to clarify complex ideas.
	Participant 7: Alam naman natin na sa STEM strand ay maraming ganito na maeencounter which is really hard nga pero basta may prior knowledge ka hindi ka magkakaroon ng conflict.
	Participant 8: I think the challenges face by the students is rooted back to their elementary and junior years where the knowledge must not be thought that much and must not be focused enough for the students to learnand when it comes to STEM strand it is really complex and hard to learn but enough background knowledge you can understand pretty much easily.
	Participant 9: STEM is a very complex strand so it's really hard to manage and absorb all those knowledge so of course need din ng perseverance and dedication. I think students will be able to learn and comply on their activities that are necessary for them to be able to pass. I think that all comes down in understanding and motivated to learn.
	E. Communication barriers
	Participant 2: Communication barrier is the main root why we have misunderstanding communication barrier could be a disconnection for the students in pursuing an activity.
	Participant 3: Communication barriers something that really cannot be eliminate or cannot be yung parang ano communication barriers is something that cannot be removed in doing this kind kasi you need to explain your exhibit hindi lang sya ididisplay for like that you should also know how to explain it how this things work and how actually it will help you or benefit your school or particularly your classroom siguro even though it will be hard for the students to understand us easily.

	Participant 4: This is a challenge because sometimes communication can be a hindrance for us to encourage more students to go and see our exhibit when we conduct this. However, we just go in the flow of our exhibit na hindi kami masyado na kung sino na lang yung pumunta or maattract saming ginawa is we will give them time to explain our exhibit na makakapagbigay sa kanila ng idea about certain informations about our topic that we choose to conduct or make.
	Participant 5: In terms of communication mahirap siya lalo na kapag maghihikayat ng student para sa exhibit. Sa dami kasi minsan nagsasabay sabay ang nagssalita and hindi na nagkakaintindihan. In terms of studying minsan ang ingay sa paligid nakakadistract.
	Participant 6: The scientific field can present language and cultural barriers that can impair communication. An effective communication strategy that includes simplifying technical jargon, active listening, and cultural awareness can help individuals overcome communication barriers.
	Participant 7: Naranasan ko yung seating arrangement noong chemistry, it's like there is a hindrance between me and the teacher, napalipat ako sa may likod tunay na talaga na di ko naabsorb mga tinuturo and noong napalipat ako sa harap nanibago.
	Participant 8: Communication barrier is a very relevant issue in the STEM department and can really be a hindrance. I don't think the instructor have problem with their teachings but the students and how they perceive the knowledge that the instructor have been teaching them is the problem with the communication barrier.
	Participant 9: It is somehow related sa seating arrangement, yung mga students na nakaupo sa unahan mas naabsorb nila yung tinuturo while sa likod naman mas

	distracted sila sa maraming bagay. Kagaya na lang sa naexperience ko noong nakaupo ako sa unahan mas focus sa nagtuturo at noong nasa likod naman ako dumaan talaga sa time na wala na talaga akong maintindihan. So, I think seating arrangement affects communication.

The subtheme emerged from a thorough examination of the challenges and barriers faced by aspiring scientists in their career progression. By closely observing the scientific community, it became evident that issues towards development in scientific career can hinder the growth and success of individuals pursuing scientific careers. This subtheme aims to shed light on these impediments, raise awareness, and encourage discussions on how to overcome them, ultimately fostering a more inclusive and supportive environment for aspiring scientists to thrive and contribute to the advancement of scientific knowledge. Motivation and perception are two key factors that influence students' decisions to pursue STEM education.

As stated by Adams et al. (2014) Lang Science Program was developed to have middle school participants focus on the areas of science involving earth and space, anthropology, biodiversity, and conservation science. When the participants enter high school, the curriculum then shifts to focus more on electives within those areas of science but relate to specific exhibits at the museum the program takes place.

They have gained the latest scientific knowledge and skills through the STSP program. The partnership enhanced their interests and they became more motivated to learn STEM-related subjects. Moreover, students who have an increased interest in STEM are more likely to pursue that interest resulting in a STEM- related career, as suggested by Roberts et al. (2018).

These types of activities also influence engagement in science (Grabau & Ma, 2017). Thus, some activities that use models, and other applied activities are associated withenjoyment of science and personal appraisal of science, while others such as practical activities are associated with self-efficacy and general interest in learning science.

Scientific inquiry is composed of skills and comprehensions that cover inquiring scientific questions, making scientific investigations to respond to questions, applying suitable tools to evaluate and analyze findings, making evidence-based scientific interpretations, and reporting and explaining relationships (National Research Council [NRC], 2012).

In conclusion, the research indicates, then, that the enjoyment of science and strong support from adults are influential in determining if a student will opt to pursue a STEM career. Students who experience success in their scientific pursuits may be more likely to find science enjoyable.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter contains the summary and the findings of the study. More so, this provided the conclusions and recommendations drawn by the researchers after thorough analysis of the gathered data.

Summary

The existing state of STEM students whose pursuing activities in science learning and the researcher's belief that their insights and perspectives should be given attention prompted them to seek answer to the following research question:

1. How do students perceive the scientific pursuits that are implemented in the STEM strand?
2. What are the motivations of STEM students toward school scientific pursuits?
3. How do the respondents perceive the relevance of scientific pursuits to their future career and personal goals?

This study made use of interpretative phenomenological analysis in investigating and explaining phenomena and their relationships. It involved nine students from the selected Grade 11 and 12 STEM Department in Padre Garcia Integrated National High School, who were selected via purposive and convenience sampling. One-on-one interviews using a self-constructed semi structured interview schedule and observation were used to gather the necessary data. These obtained data were thoroughly interpreted and analyzed to identify the emerging major and subordinate themes

Findings

Students' Perception

Two major or super-ordinate themes emerged that constituted the perceptions employed by STEM students when pursuing science activities that are implemented in the STEM strand. These include "Enlightening Intellects towards Scientific Engagement and Development", and "Fostering Innovation and Surmounting Obstacles for Scientific Advancement".

Theme 1: Enlightening Intellects towards Scientific Engagement and Development

The theme, "Enlightening Intellects towards Scientific Engagement and Development" developed from the sub-themes that emphasized the expansion of intellectual capacities of STEM students, particularly the importance of evolving perceptions, interests, and involvement to promote scientific inquiry and invests in the empowerment of individuals through the enhancement of STEM education. This theme highlights the students' journey towards cognitive growth and maturation and their active participation and involvement in scientific exploration progress. With a full understanding of the theme, the researchers derived two (2) subthemes including "Curiosity in Science and Changing Views", and "Simplifying Scientific Participation and Strengthening STEM Education".

1.1 Curiosity in Science and Changing Views. The most notable part of the perceptions that employed by the STEM students is that their interest in a specific subject, highlighting its aligment with their career goals and aspirations. They believe that as the world progresses and becomes more modern, people naturally exhibit curiosity and

actively seek ways to enhance development within their communities. This curiosity leads them to develop an interest in scientific pursuits and explore new technologies that contribute to overall progress. Students acknowledges the critical role that innovation plays in advancing society and improving quality of life. By immersing themselves in scientific endeavors, they hope to uncover groundbreaking solutions and generate innovative ideas that address various challenges, ultimately promoting development within their communities.

1.2 Simplifying Scientific Participation and Strengthening STEM Education. One noteworthy aspect is the development of students' genuine interest and having access to resources, students can adopt a proactive and resilient approach to challenges. This involves seeking guidance from experts, collaborating with peers, and continuously learning. Embracing an open mindset and acknowledging the iterative nature of scientific inquiry enables the improvement of ideas and methods, resulting in breakthroughs and effective problem-solving.

Theme 2: Fostering Innovation and Surmounting Obstacles for Scientific Advancement

The main theme discovered is students' awareness of challenges and barriers in conducting science projects. They recognize the significance of incorporating effective scientific pursuits to improve their scientific knowledge. Sub-themes highlight the benefits of overcoming obstacles in fostering profound scientific endeavors that enhance intellectual thoughts and ideas. Students emphasize the need for promoting innovation to advance science and address hurdles. This theme emphasizes the importance of providing students with opportunities for transformative exploration and developing skills to drive

innovation. With a full understanding of the theme, the researchers derived two (2) subthemes including “Exploring the Obstacles in Sustaining Scientific Progress”, and “Integration of Advanced Scientific Pursuits in STEM Education”.

2.1 Exploring the Obstacles in Sustaining Scientific Progress. The participants face various challenges due to the inherent difficulties, pressures, and constantly evolving nature of scientific pursuits. To overcome these challenges, they need determination, imagination, and a willingness to adjust when faced with obstacles. This mindset drives scientific advancement and enhances our knowledge of the world. It is through perseverance, creativity, and adaptability that researchers make significant strides in their field, contributing to the overall progress of science and our understanding of the world around us.

2.2 Integration of Advanced Scientific Pursuit in STEM Education. The participants’ engagement in robotics, science exhibits, and research capstone projects which can inspire their interest in science. Through robotics, they gain practical experience, improve problem-solving skills, and foster creativity. Science exhibits offer interactive exploration, sparking curiosity and passion for discovery. Research capstone projects allow students to delve deeper into scientific topics, enhancing critical thinking and contributing to knowledge. These activities provide hands-on experiences that connect theoretical concepts to real-world applications, making science more tangible and exciting for students.

Students' Motivation

Two major or super-ordinate themes emerged that constituted the motivations employed by STEM students towards school scientific pursuits. These include "The Quest for Personal Fulfillment and Transcedence towards Scientific Pursuit", and "The Triumph of Intellectual Exploration and Tenacity".

Theme 1: The Quest for Personal Fulfillment and Transcedence towards Scientific Pursuit

The main theme identifies the pursuit of personal fulfillment and transcendence through scientific exploration. The students showed that effective communication and collaboration within the scientific community are crucial. Clear goals and curiosity were seen as important for advancement in scientific learning. While the journey may be challenging and time-consuming, it leads to growth, self-discovery, and memorable experiences. With a full understanding of the theme, the researchers derived two (2) subthemes including "Intrinsic Mootivation and Inner Enrichment", and "Existential Exploration through Intellectual Endeavors".

1.1 Intrinsic Motivation and Inner Enrichment. The participants' scientific knowledge is motivated by a strong curiosity and interest in the world of science. Students engagement in scientific exploration allows them to satisfy their curiosity, enabling them to investigate and make new discoveries. Additionally, they are driven by the excitement of revealing fresh insights, solving challenging problems, and expanding the limits of existing knowledge. Through this, they facilitate intellectual development and inspires a sense of marvel and fascination as they unravel the complex mechanisms of the science world.

1.2 Existential Exploration through Intelectuall Endeavors. The participants emphasized scientific endeavors as it combines the elements of difficulty, enjoyment, and challenge. It involves a seek for long lasting knowledge, fueled by curiosity and driven by the desire to unravel the mysteries of the innovations. The students' path towards scientific discovery often requires rigorous experimentation, critical thinking, and the application of complex methodologies. While the challenges may be daunting, the process of exploration is imbued with a sense of excitement and fulfillment, as every breakthrough represents a triumph of human intellect and pushes the boundaries of our understanding. Despite the hardships encountered along the way, students find joy in the pursuit of truth, the thrill of discovery, and the opportunity to make significant contributions to the collective knowledge of humanity.

Theme 2: The Triumph of Intellectual Exploration and Tenacity

The major theme encompasses the transformative nature of students' academic journeys, their resilience in overcoming challenges, and the empowering influence of their unwavering commitment to scientific exploration. The respondents acknowledged and addressed the complexities of scientific pursuits, identifying reasons and solutions to overcome obstacles**.** They also emphasized that the transformative power of scientific exploration lies not only in the acquisition of knowledge but also in the personal growth and empowerment of each students. With a full understanding of the theme, the researchers derived two (2) subthemes including "Conquering Difficulties in Scientific Pursuits", and "Adapting to Challenges and Empowering Scientific Determination".

2.1 Conquering Difficulties in Scientific Pursuits. Students pursuing scientific endeavors often face various challenges related to generating innovative ideas, managing time

effectively, and accessing necessary materials and resources. Coming up with creative ideas requires a deep understanding of the subject matter and strong creative thinking skills, which can be difficult for them. Additionally, the limited time available for scientific research, which involves planning, experimentation, data analysis, and report writing, can impede students' progress. Finally, the availability and accessibility of specialized materials, equipment, chemicals, and funding can pose significant obstacles to students' scientific investigations. Addressing these challenges is crucial for improving science education and supporting students in their scientific pursuits.

2.2 Adapting to Challenges and Empowering Scientific Determination. Efficient time management is crucial for studentss engaged in scientific endeavors, as they often encounter tight deadlines and competing priorities. prioritizing tasks and allocating time wisely is essential for completing their activitiies efficiently. collaboration and teamwork play a significant role in successful scientific pursuits, as the students to combine diverse skills, expertise, and perspectives. by working together, students can address complex challenges, share resources, and build on each other's ideas. Additionally, students must possess the ability to think innovatively and find alternative solutions when faced with obstacles during their science exploration. This involves being open to new approaches, exploring different methodologies, and adapting strategies in response to unexpected setbacks. by incorporating effective time management, fostering teamwork, and embracing creative problem-solving, scientists can navigate the demands of their work and make meaningful contributions to advancing scientific knowledge.

Relevance to Future Career and Personal Goals

Two major or super-ordinate themes emerged that constituted the relevance of the preferences employed by STEM students towards school scientific pursuits to their future careers and personal goals. These include “The Implication of Knowledge-Related Wisdom on Triumph and Evolution”, and “Determinants Influencing Knowledge Path”.

Theme 1: The Implication of Knowledge-Related Wisdom on Triumph and Evolution

The major theme emphasized the use of wisdom to achieve success and personal growth, specifically focusing on the role of scientific knowledge. This theme highlights the students' thinking abilities and provides them with a broader understanding of science to overcome challenges, innovate, and succeed in their careers. Through examining the students' experiences, insights, and skills related to the importance of engaging in scientific inquiries, the study revealed the significant value it holds for fulfilling careers and personal aspirations. With a full understanding of the theme, the researchers derived two (2) subthemes including “Role of Scientific Knowledge to Career Success”, and “The Power of Scientific Knowledge in Personal and Professional Growth”.

1.1 Role of Scientific Knowledge to Career Success. The students strongly believe that gaining scientific knowledge is valuable for both their present circumstances and future endeavors. They understand that by establishing a strong base in science, they can enhance and advance their chosen careers more successfully. They see scientific knowledge as a crucial instrument that will allow them to excel and make significant contributions in their fields. They are motivated to improve their scientific skills and understanding, knowing it

will empower them to overcome challenges, come up with new ideas, and achieve outstanding accomplishments in their professional paths.

1.2 The Power of Scientific Knowledge in Personal and Professional Growth. The participants underscored the value of working hard, being dedicated, and having a genuine interest in scientific endeavors. They emphasized that making scientific discoveries requires ongoing effort, perseverance, and a willingness to conduct research, experiment, and analyze data. They believe that students must maintain a strong commitment to their work, stay focused on long-term goals, and cultivate a deep curiosity and drive to explore new ideas. By embracing these qualities, individuals play a vital role in advancing knowledge and making positive contributions to society.

Theme 2: Determinants Influencing Knowledge Path

The main theme focuses on exploring the factors that shape students' choices and perceptions regarding scientific pursuits. The researchers gains a comprehensive understanding of how motivations, beliefs, and external factors impact individuals' decision-making processes. These determinants include educational background, personal interests, societal expectations, career aspirations, and the perceived value of scientific knowledge in their desired fields. With a full understanding of the theme, the researchers derived two (2) subthemes including “Proficiencies for Fruitful Scientific Endeavors”, and “Impediments to Scientific Career Development”.

2.1 Proficiencies for Fruitful Scientific Endeavors. The participants engagement in scientific pursuits offers individuals valuable knowledge, skills, and experiences that benefit their future careers. Mastery experiences, instrumental motivation, and recognizing

the practical value of science contribute to the development of scientific interest, achievement, and career decisions. Their active participation in scientific research, experiments, and investigations cultivates critical thinking, problem-solving, and observation skills. Recognizing the relevance and real-world applications of science fosters their personal growth and equips them to tackle broader challenges and goals in society.

2.2 Impediments to Scientific Career Development. STEM education has gained significant attention as countries recognize its importance in driving innovation, economic growth, and overall societal progress. Students' motivation and perception play vital roles in their decision to pursue STEM fields. The students conclude that enjoying science and receiving support from adults greatly influence students' choice to pursue a STEM career. When students experience success in their scientific endeavors, they are more likely to find science enjoyable.

Conclusion

The following conclusions about the motivations and perceptions employed by Grade 11 STEM students use when conducting scientific pursuits and how they perceive the relevance of scientific pursuit to their future career and personal goals they use in science learning were drawn based on the findings of the study:

1. Students in STEM strand view scientific pursuits as crucial for personal and societal growth, as they believe curiosity and innovation drive societal progress. They recognize challenges and demonstrate determination, creativity, and adaptability. Advanced scientific activities, like robotics and science exhibits, enhance students' interest and connect theoretical concepts to real-world applications.

2. STEM students are motivated to pursue scientific studies for intrinsic reasons such as curiosity, passion, and the desire to make discoveries because they are driven by the excitement of overcoming challenges and pushing the boundaries of knowledge. However, they also face difficulties related to generating ideas, managing time, and accessing resources. To support their scientific pursuits, it is essential to address these challenges and provide a supportive environment that empowers their determination.
3. The respondents view scientific pursuits as integral to their future career aspirations and personal goals because they believe that acquiring scientific knowledge and skills empowers them to overcome challenges, generate new ideas, and achieve outstanding accomplishments in their respective fields. It highlights the significance of fostering a strong commitment to scientific pursuits and recognizing the practical value of science in driving personal growth and contributing to broader societal challenges.

Recommendation

Based on the conclusions drawn from the study on the motivations and perceptions employed by Grade 11 STEM students and their preferences to the relevance of tscientific pusrsuit to their future career and personal goals the in science learning, the following recommendations were made:

1. The school may establish mentorship programs and partnerships with industry professionals to guide and support students in their scientific endeavors. Mentors may share their experiences, provide valuable insights, and inspire students to overcome challenges and excel in their scientific journeys. This collaboration

enhances students' understanding of how scientific knowledge applies to real-world situations, builds professional networks, and creates opportunities for internships or research collaborations.

2. Science teachers may introduce interdisciplinary approaches in STEM education to nurture curiosity and problem-solving skills. By integrating elements from different disciplines like art, design, and entrepreneurship, students are encouraged to explore the intersection of diverse fields and apply innovative thinking to scientific challenges. This interdisciplinary approach fosters creativity, improves critical thinking, and equips students to tackle complex problems from various perspectives.
3. Students may explore the use of technology to enhance scientific learning experiences. Virtual reality, simulations, and online platforms can create immersive and interactive environments for students. These technological tools offer opportunities for hands-on experimentation, visualizing complex concepts, and collaborating globally. By harnessing technology, educators can create engaging and accessible platforms that inspire students and broaden their access to scientific resources and expertise.
4. Future researchers may conduct longitudinal studies to assess the long-term impact of scientific engagement on students' personal and professional growth. Tracking students' progress over an extended period allows researchers to understand how scientific exploration influences their career choices, academic achievements, and contributions to society. Longitudinal studies provide valuable insights into the

transformative effects of scientific pursuits and inform strategies to optimize educational interventions.

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APPENDICES

APPENDIX A

APPENDIX B

SCIENTIST IN THE MAKING: AN IN-DEPTH UNDERSTANDING OF STEM STUDENTS' MOTIVATION AND PERCEPTION IN PADRE GARCIA INTEGRATED NATIONAL HIGH SCHOOL TOWARDS SCHOOL SCIENTIFIC PURSUIT

Interview Schedule

I. Personal Journey

1. How did you become interested in scientific pursuits in this field?

2. What motivates you to pursue scientific pursuits in school? Was there a particular event or experience that ignited your interest in science?

II. Perception and Engagement

1. How has the perception of scientific pursuits within the STEM strand evolved over time?

2. How do you think schools can better support and motivate students to pursue science activities?

3. What are some of the most innovative or successful examples of scientific pursuits being incorporated into the STEM strand that you have seen, and what made these examples effective?

4. How do you think the scientific pursuits in the STEM strand can be improved to better engage students?

5. What are some of the most exciting or promising emerging scientific pursuits that you think should be incorporated into the STEM strand curriculum?

III. Student Experience

1. How do you feel about school scientific pursuits, such as participating in science exhibits and conducting a research capstone?

2. What are some of the challenges you face when conducting scientific pursuits, particularly exhibits and research capstone? How have you overcome these challenges?

3. How would you encourage someone encountering similar challenges in pursuing their scientific interests?

4. How do you think pursuing scientific pursuits will benefit you in the future?

IV. Future Prospects

1. How important do you believe it is to pursue scientific knowledge in your future career?

2. What skills do you think are necessary for individuals to successfully pursue scientific knowledge in their careers?

3. Can you share an experience where scientific knowledge played a crucial role in achieving your personal or career goals?

4. How do you see the importance of scientific knowledge evolving over the next decade?

5. How do you think scientific pursuits can contribute to your success in your desired career field?

V. Challenges and Improvements

1. How do you describe your challenges in implementing scientific pursuits in the STEM strand in the following:

a. Resource Availability

b. Educator-related challenges

c. Inclusivity and diversity

d. Students' engagement and motivation

e. Collaboration and partnership

2. What is your perception about the following challenges faced by individuals who wish to pursue scientific knowledge in their careers:

a. Knowledge and skills gaps

b. Time Constraints

c. Intense Competition

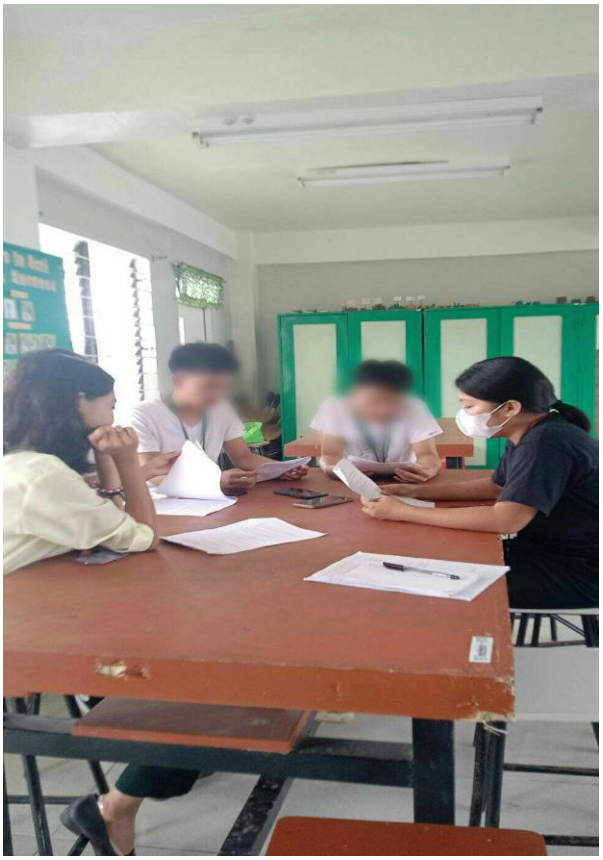
d. Complexity of scientific Concepts

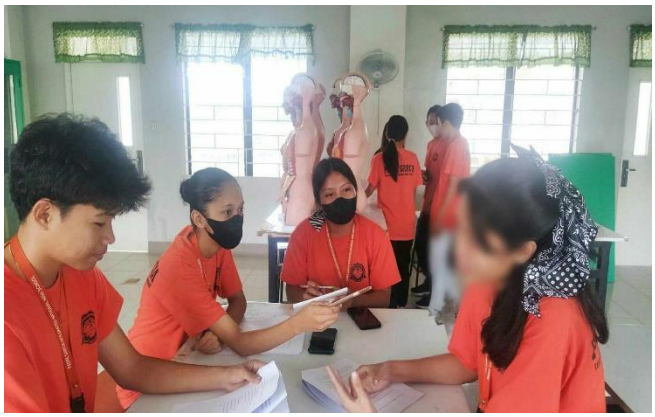
e. Communication barriers

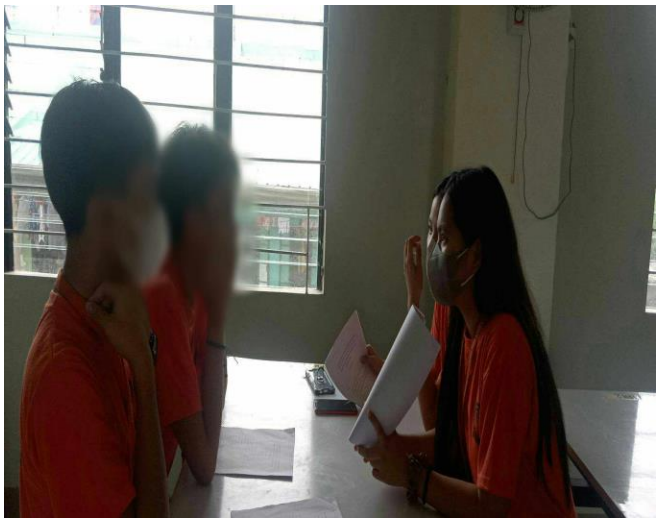
3. How do you think these challenges can be improved?

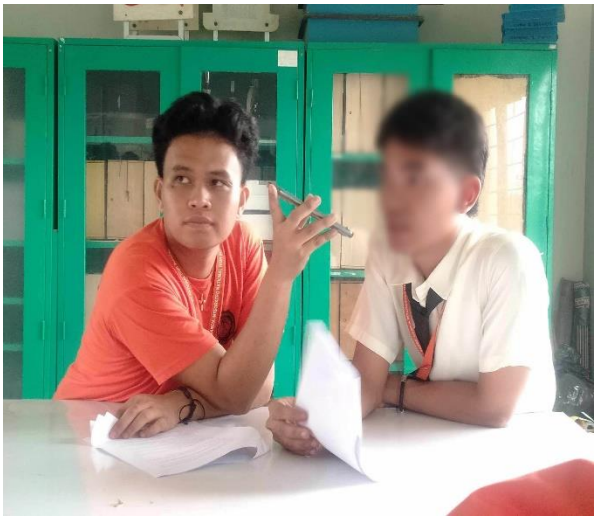
APPENDIX C

Interview pictures with our participants. It was sunny afternoon when we approached them and start asking questions and they willingly answered all of it. Their motivations, perceptions, and experiences in scientific endeavors were really inspiring, just by seeing them putting a lot of effort and happily sharing their preferences that will surely help all of the STEM students to their future career and personal goals.









CURRICULUM VITAE

CAMILLE M. ANTIQUERRA

Sta. Cruz Rosario Batangas

Contact No.:09197299519

E-mail Address: antiquerracamille05@gmail.com

PERSONAL DATA

Age	:	17 yrs. old
Birth Date	:	May 7, 2006
Birth Place	:	Rosario, Batangas
Sex: Female	:	Female
Civil Status	:	Single
Height	:	144 cm
Weight	:	36.6 kgs
Father's Name	:	Richard Antiquerra
Mother's Name	:	Maricel Antiquerra

EDUCATIONAL ATTAINMENT

Primary	:	**JULIAN D. LUNA ELEMENTARY SCHOOL** Sta. Cruz, Rosario, Batangas 2017-2018
Secondary	:	**PADRE GARCIA INTEGRATED NATIONAL HIGH SCHOOL** Poblacion, Padre Garcia, Batngas 2021-2022

CAMILLE M. ANTIQUERRA

Signature

DOMINIC P. ARGAO

Maugat West, Padre Garcia, Batangas

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PERSONAL DATA

Age	:	16 yrs. old
Birth Date	:	July 1, 2006
Birth Place	:	Lipa City
Sex: Female	:	Male
Civil Status	:	Single
Height	:	165 cm
Weight	:	57 kgs
Father's Name	:	Domingo Argao
Mother's Name	:	Ester Argao

EDUCATIONAL ATTAINMENT

Primary	:	**MAUGAT EAST ELEMENTARY SCHOOL** Maugat East, Padre Garcia Batangas 2017-2018
Secondary	:	**BUKAL INTEGRATED NATIONAL HIGH SCHOOL** Bukal, Padre Garcia, Batngas 2021-2022

DOMINIC P. ARGAO

Signature

CHLOE DENISE A. CASTILLO

Cawongan, Padre Garcia, Batangas

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PERSONAL DATA

Age	:	17 yrs. old
Birth Date	:	May 17, 2006
Birth Place	:	Quilib, Rosario, Batangas
Sex: Female	:	Female
Civil Status	:	Single
Height	:	150 cm
Weight	:	33 kgs
Father's Name	:	Ariel Bryan Catillo
Mother's Name	:	Rea Castillo

EDUCATIONAL ATTAINMENT

Primary : **CAWONGAN ELEMENTARY SCHOOL**

Cawongan, Padre Garcia Batangas

2017-2018

Secondary : **PADRE GARCIA INTEGRATED NATIONAL HIGH SCHOOL**

Pobalcion, Padre Garcia, Batngas

2021-2022

CHLOE DENISE CASTILLO

Signature

PRINCESS CORTES

Sitio Niogan, Brgy. San Felipe, Padre Garcia, Batangas

Contact No.: 09701347005

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PERSONAL DATA

Age	:	16 yrs. old
Birth Date	:	July 9, 2006
Birth Place	:	Tanay, Rizal
Sex	:	Female
Civil Status	:	Single
Height	:	154 cm
Weight	:	53.5 kgs
Father's Name	:	Alan Cortes
Mother's Name	:	Eleserda Sayat

EDUCATIONAL ATTAINMENT

Primary	:	**QUISAO ELEMENTARY SCHOOL** Tanay, Rizal 2017-2018
Secondary	:	**PADRE GARCIA INTEGRATED NATIONAL HIGH SCHOOL** Poblacion, Padre Garcia, Batangas 2021-2022

PRINCESS CORTES

Signature

SEAN KYLE P. DE CASTRO

Maugat West, Padre Garcia, Batangas

Contact No.: 09936893002

E-mail Address: seankyledecastro2@gmail.com

PERSONAL DATA

Age	:	17 yrs. old
Birth Date	:	November 22, 2005
Birth Place	:	Namunga, Rosario
Sex: Female	:	Male
Civil Status	:	Single
Height	:	169 cm
Weight	:	65kgs
Father's Name	:	Philip De Castro
Mother's Name	:	Marilyn De Castro

EDUCATIONAL ATTAINMENT

Primary	:	**MAUGAT EAST ELEMENTARY SCHOOL** Maugat East, Padre Garcia Batangas 2017-2018
Secondary	:	**BUKAL INTEGRATED NATIONAL HIGH SCHOOL** Bukal, Padre Garcia, Batngas 2021-2022

SEAN KYLE DE CASTRO

Signature

KATE SHANEL N. JAVIER

Maugat West, Padre Garcia, Batangas

Contact No.: 09395920554

E-mail Address: kateshaneljavier@gmail.com

PERSONAL DATA

Age	:	16 yrs. old
Birth Date	:	August 8, 2006
Birth Place	:	Madapdap, Mabalacat, Pampanga
Sex	:	Female
Civil Status	:	Single
Height	:	154 cm
Weight	:	46 kgs
Father's Name	:	Allan Javier
Mother's Name	:	Melba Javier

EDUCATIONAL ATTAINMENT

Primary	:	**MAUGAT EAST ELEMENTARY SCHOOL** Maugat East, Padre Garcia, Batangas 2017-2018
Secondary	:	**BUKAL INTEGRATED NATIONAL HIGH SCHOOL** Bukal, Padre Garcia, Batangas 2021-2022

KATE SHANEL JAVIER

Signature

FRANCHESKA MARIE L. SAMO

Maugat East, Padre Garcia, Batangas

Contact No.: 09351558193

E-mail Address: francheskamariesamo@gmail.com

PERSONAL DATA

Age	:	16 yrs. old
Birth Date	:	November 03, 2006
Birth Place	:	Rizal, Nueva Ecija
Sex	:	Female
Civil Status	:	Single
Height	:	157 cm
Weight	:	41 kgs
Father's Name	:	Fidel Samo
Mother's Name	:	Myra Samo

EDUCATIONAL ATTAINMENT

Primary	:	**MAUGAT EAST ELEMENTARY SCHOOL** Maugat East, Padre Garcia, Batangas 2017-2018
Secondary	:	**BUKAL INTEGRATED NATIONAL HIGH SCHOOL** Bukal, Padre Garcia, Batangas 2021-2022

FRANCHESKA MARIE L. SAMO

Signature

YSHEY ANJOLETH M. VALENZUELA

San Roque, Rosario, Batangas

Contact No.: 09507739846

E-mail Address: ysheyanjolethvalenzuela@gmail.com

PERSONAL DATA

Age	:	16 yrs. old
Birth Date	:	July 11, 2006
Birth Place	:	Quilib, Rosario, Batangas
Sex	:	Female
Civil Status	:	Single
Height	:	163 cm
Weight	:	41 kgs
Father's Name	:	Jerome Valenzuela
Mother's Name	:	Leny Valenzuela

EDUCATIONAL ATTAINMENT

Primary	:	**PADRE GARCIA CENTRAL SCHOOL** Poblacion, Padre Garcia, Batangas 2017-2018
Secondary	:	**PADRE GARCIA INTEGRATED NATIONAL HIGH SCHOOL** Poblacion, Padre Garcia, Batangas 2021-2022

YSHEY ANJOLETH VALENZUELA

Signature