Quest: Journal of Geometry, Mathematical and Quantum Physics
e-ISSN: 3064-7282 Vol.2 Issue 6|2025

Self-Efficacy, Self-Regulation, And Their Contribution to Students' Mathematics Success

Charito L. Plantar
Cebu Technological University

Abstract: This study decisively evaluates the self-regulation strategies and self-efficacy of Grade 10 students at Pagsabungan National High School and their impact on academic performance. Employing a descriptive correlational research design, we engaged 168 students who completed rigorously adapted and validated survey questionnaires. The data collected were analyzed using weighted means, standard deviations, and Pearson's r. The findings demonstrate a clear lack of significant correlation between self-efficacy, self-regulation, and mathematics performance. Despite students exhibiting high levels of self-regulation and confidence, these factors do not predict their success in math. To effectively enhance mathematical outcomes, we strongly recommend the implementation of additional support strategies, including individualized tutoring, collaborative group projects, and hands-on problem-solving sessions. It is imperative to establish comprehensive programs that target motivation, stress management, engagement, and self-regulation skills, alongside consistent teacher feedback. Furthermore, more research is essential to investigate other influences on math achievement, including socioeconomic factors and classroom dynamics. Promoting peer learning, integrating educational technology, and increasing parental involvement are crucial steps that can significantly contribute to a positive learning environment and bolster math performance.

Keywords: Self-efficacy, Self-regulation, Mathematics Performance, Descriptive-correlational Design, Cebu City, Philippines.

CHAPTER 1

THE PROBLEM AND ITS SCOPE

INTRODUCTION

Rationale of the Study

Mathematics is often regarded as the language of the universe, essential for understanding and engaging with a wide range of disciplines, from physics and engineering to economics and social sciences. Mathematics is not just a subject but a critical way of thinking which allows for a logical, structured approach to problem-solving that transcends pure arithmetic (Boyer, 1949). Math education promotes critical thinking, analytical reasoning, and problem-solving skills, all foundational competencies for both academic success and real-world applications (National Research Council, 2001).

Mathematics plays a critical role in real-life applications, influencing everything from personal finance to decision-making in professional fields (Devlin, 2000). In daily life, people rely on mathematical concepts when budgeting expenses, calculating interest rates, and assessing financial

risks. Similarly, fields such as engineering, medicine, and social sciences apply math to model complex systems, optimize processes, and interpret data (Steen, 2001). These real-world applications underscore that mathematics is integral to problem-solving and informed decision-making in a range of contexts.

Despite its importance, many students perceive mathematics as a challenging and even intimidating subject. Math anxiety often stems from early experiences with abstract concepts that students find difficult to connect with real life, leading to feelings of frustration and avoidance (Tobias, 1993). Negative experiences with math can result in a cycle of anxiety and poor performance, causing students to view it as a difficult subject to master (Hembree, 1990). Factors such as a lack of confidence, limited encouragement, and rigid instructional methods contribute to the belief that math is inherently difficult (Ashcraft & Krause, 2007), impacting students' willingness to engage with it fully. This perception can create a mental barrier, preventing many from recognizing math's practical value and real-world applications.

In today's digital age, students face numerous distractions that can significantly impede their ability to focus on their studies, including math. Pervasive use of technology and social media can fragment attention and reduce the quality of student engagement in academic tasks (Rosen et al., 2011). Moreover, students who frequently multitask with digital devices often report lower academic performance, as the cognitive load of juggling multiple activities can overwhelm their ability to concentrate (Junco, 2012). This constant barrage of distractions can lead to diminished study habits and decreased motivation, making it even more challenging for students to tackle complex subjects like mathematics effectively (Gonzalez et al., 2016).

To address the challenges of learning mathematics effectively, it is crucial for students to employ self-regulation and self-efficacy strategies. Research shows that self-regulated learners—those who actively manage their learning processes—tend to perform better academically, particularly in subjects perceived as difficult, like math (Zimmerman, 2002). Self-regulation encompasses goal setting, self-monitoring, and self-reflection, which can enhance students' motivation and persistence in overcoming difficulties (Pintrich, 2000). Students who utilize these strategies are better equipped to manage distractions, sustain focus, and improve their performance (Schunk, 2003). In contrast, students who lack self-regulation skills often demonstrate poorer academic outcomes in mathematics, as they struggle to engage with complex concepts and sustain effort in their studies (Boekaerts, 1999). Therefore, cultivating self-regulation strategies is essential for fostering resilience and enhancing overall achievement in math.

Students' self-regulation plays a vital role in enhancing their effectiveness in learning mathematics, particularly given the subject's demanding nature. Self-regulated learning involves setting specific goals, monitoring progress, and adjusting strategies as needed (Zimmerman, 2002). By actively engaging in these processes, students can better direct their attention toward complex mathematical concepts and problem-solving techniques. Monitoring one's understanding is essential in a challenging subject like math, as it allows students to identify areas of confusion and seek clarification before misconceptions solidify. According to Pintrich (2000), effective self-regulation includes strategies such as self-monitoring, which helps students gauge their comprehension and focus their attention on the tasks that require further effort. This heightened awareness enables them to allocate their cognitive resources efficiently and persist through challenging material.

Student's self-efficacy plays a crucial role in various aspects of life. In academic settings, it influences students' motivation, learning, and performance, with high self-efficacy leading to better academic outcomes (Zimmerman, 2000). In the workplace, employees with strong self-efficacy are more likely to take initiative, persist through challenges, and perform better overall (Stajkovic & Luthans, 1998). Furthermore, self-efficacy is linked to health behaviors, as individuals with high self-efficacy are more inclined to adopt healthy habits and effectively manage chronic conditions (Bandura, 2004). It also contributes significantly to emotional regulation, helping individuals manage stress and recover from setbacks more efficiently (Bandura, 1997). Additionally, self-efficacy affects social behaviors and the ability to form and maintain relationships, with those

possessing high self-efficacy being more confident in their social interactions and building stronger social networks (Schwarzer & Knoll, 2007). In the latest Programme for International Student Assessment (PISA) results for 2022, Filipino students continued to rank among the lowest globally in core academic areas. The Philippines scored below the global average in mathematics, reading, and science, with no significant improvement from its performance in the 2018 PISA assessment. This places Filipino 15-year-olds well behind their peers in other participating countries, reflecting persistent challenges within the education system that have been exacerbated by the pandemic and lack of sufficient technological resources during online learning phases.

The OECD's PISA, which tested students from 81 countries, underscored these gaps and highlighted that the Philippines remains among the weakest performers in the ASEAN region, particularly in science and mathematics. The results indicate a need for substantial educational reforms to address deficiencies in these fundamental subjects. Additionally, the country's education officials and advocates have recognized the need for policy changes and focused intervention to build proficiency in these areas and aim for improved rankings in the coming years.

The poor performance of Filipino students in the PISA can be attributed to several factors, including insufficient mastery of foundational skills, lack of resources, and low self-regulation in learning. Self-regulation in education, especially in subjects like math, involves skills like setting personal goals, managing time, and applying specific learning strategies that allow students to monitor and adapt their approach to complex topics (Zimmerman, 2002). Research shows that students who use self-regulation strategies, such as goal setting and self-monitoring, tend to perform better academically as they can identify gaps in their knowledge and seek ways to address them (Pintrich, 2004).

Assessing students' self-regulation and self-efficacy is essential because these factors significantly impact academic performance. Self-regulation enables students to manage their learning through goal-setting, monitoring progress, and adjusting strategies, which enhances their ability to tackle complex tasks (Zimmerman, 2008). Self-efficacy, or the belief in one’s capacity to succeed, directly influences motivation and persistence, particularly in challenging subjects like mathematics (Bandura, 1997). By evaluating these areas, educators can identify strengths and areas for improvement, fostering interventions that boost students' confidence and autonomy in learning, ultimately leading to better academic outcomes (Schunk & Zimmerman, 1994).

It has been observed by teachers in most schools in Cebu City, Philippines that many students lack effective learning strategies, impacting their academic progress. Often, students seem disengaged, showing little concern for their performance by frequently submitting incomplete work, disregarding deadlines, and neglecting to review feedback or study effectively. For example, in math classes, students may attempt assignments without proper planning or goal-setting, leading to rushed or incorrect answers. Teachers also notice a tendency among students to prioritize social activities over study, suggesting they might view academic success as a lower priority. These behaviours indicate a need to address students' learning attitudes and introduce strategies that foster greater accountability and motivation in their academic journey.

Hence, this study aims to assess students' self-regulation strategies and self-efficacy, with the objective of identifying underlying issues that impact academic performance. By understanding these factors, the study seeks to provide actionable insights that can lead to tailored interventions for improving learning outcomes. The findings are expected to benefit multiple stakeholders: educators will gain a clearer picture of students' learning needs, administrators can use data-driven approaches to develop supportive programs, and students will have the opportunity to enhance their learning practices and self-confidence. Ultimately, addressing these areas can foster a more motivated, engaged, and successful student body, enriching the school’s academic environment and contributing to positive educational outcomes. The intended benefit of the study could have a lasting positive effects on students’ engagement in math.

Theoretical Background

This research is anchored on the Social Cognitive Theory, developed by Bandura in 1986, describes how individuals learn and develop behaviors through methods of observation, imitation, and modeling. An integral aspect involves self-efficacy, which comprises an individual's belief in his or her capability to succeed in certain instances. In this study, self-efficacy will be assessed in relation to the performance of students in math, most especially in a modular distance learning setup, where belief in self can be so strong an influence on engagement and persistence.

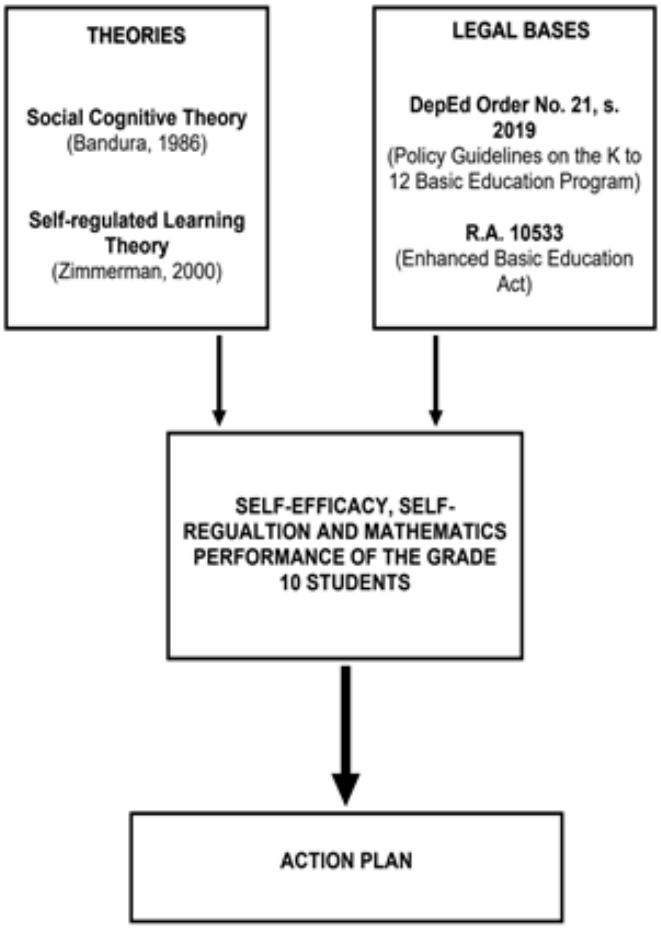

Figure 1

Theoretical/Conceptual Framework

Self-Regulated Learning Theory by Zimmerman (2000) points out that self-regulation lies at the core of learning itself, including goal setting, self-monitoring, and self-reflection. This aspect will be very important in modular distance learning when students have a greater expectation to take responsibilities for their learning without close supervision.

Self-efficacy as one believes in his or her capabilities to organize and execute courses of action required to manage prospective situations (Bandura, 1997). For instance, research has documented that higher levels of self-efficacy are associated with higher levels of mathematical achievement because students are more likely to engage in challenging tasks and persist longer when difficulties arise (Schunk, 1991; Pajares & Miller, 1994). For instance, in a study conducted by Usher and Pajares (2008), the researchers established the fact that self-efficacy beliefs are strong predictors of students' mathematics achievement.

Self-regulation refers to the process of controlling one's thoughts, emotions, and behaviors in pursuit of a long-term goal (Zimmerman, 2002). It has been noted that students who perceived to be

highly self-regulated self-evident in whatever learning undertaking tend to perform better academically hence mathematics inclusive (Pintrich, 2000).

Enhanced Basic Education Act (R.A. 10533). This was enacted to enhance basic education in the Philippines by providing a more relevant and responsive curriculum. It tries to improve the quality through an increased number of years at the basic education level, coupled with reinforcement in regard to learning competencies. The act also details that students should be equipped with skills in critical thinking and problem-solving; skills, as pointed out, that are also important in such subjects as mathematics. Such focus on self-regulation and self-efficacy within your study parallels the intent of the Enhanced Basic Education Act, given that these factors will be needed for students to excel within a learning environment that indeed calls for autonomy and critical thinking.

DepEd Order No. 21, s. 2019 Policy Guidelines on the K to 12 Basic Education Program Implementation: This order provides a framework that supports the development of learner autonomy, critical thinking, and problem-solving skills, all of which are crucial for self-regulation. It aims to create learning environments that foster students' belief in their capabilities (self-efficacy) and promote active engagement, indirectly supporting math performance by encouraging independent study habits and resilience in problem-solving.

According to Negara et al. (2021), self-efficacy is the ability to perform in dealing with various activities. Changes in learning activities due to Covid-19 affect the learning environment which has an impact on self-efficacy. This study aims to obtain an explanation of mathematics self-efficacy and its relationship with mathematics performance in online learning. The sample in this study was the mathematics performance score on trigonometry, and the Mathematics self-efficacy score of 75 students at one of the universities in Mataram. This research is correlational research. The research instruments were in the form of a Mathematics Self-efficacy questionnaire and mathematics performance scores on trigonometry. Data were analyzed using descriptive statistics to measure the mean and standard deviation of mathematical self-efficacy and analysis of the correlation between mathematical self-efficacy and mathematics performance. The results showed that most respondents had a high level of mathematical self-efficacy in online learning. Further analysis shows that there is a positive relationship between mathematics self-efficacy and mathematics performance, with an R coefficient of 14.8%. These results explain that variations in Mathematics performance can be explained by variations in Mathematics self-efficacy of 14.8%.

In a study by Olawale and Hendricks (2022), students' learning contexts are capable of having a significant impact on their learning beliefs and academic performance. As a result, students studying during the COVID-19 pandemic outbreak may be at risk of lower academic self-efficacy and subject grades. These students may also hold specific ideas regarding the impact of COVID-19-related changes on their ability to succeed, which could have a direct impact on their self-efficacy and academic performance. Thus, this study seeks to examine how the COVID-19 pandemic has affected the self-efficacy and academic performance of mathematics students in a South African university. The paper also sought to examine how teaching and learning in a mathematics education classroom can be sustained post-COVID-19 pandemic. As such, the study was underpinned by an interpretivist paradigm. The findings of the study revealed that although students' self-efficacy is adversely impacted by negative emotions like tension, the psychological strain of confinement, academic workload demands, online assessment, and the loss of relatives brought on by the COVID-19 pandemic, these factors have no impact on students' academic performance.

Capinding (2022) investigated the impact of modular distance learning on students' motivation, interest/attitude, anxiety and achievement in mathematics. This was done at the Gabaldon, Nueva Ecija, Philippines during the first and second grading of the academic year 2021-2022. The study included both a descriptive-comparative and descriptive-correlational research design. The 207 high school students were chosen using stratified sampling. According to the findings, students have a very satisfactory rating in mathematics. Students agree that they are motivated, enthusiastic, and have a positive attitude toward mathematics. However, there is a negative association between

mathematics anxiety and mathematics motivation; mathematics anxiety and mathematical interest/attitude; and mathematics anxiety and mathematical performance.

Casinillo (2023) examined the self-efficacy in learning mathematics helps the student to overcome difficulties and challenges in problem-solving during unprecedented times. This article aims to measure the level of students' self-efficacy and its determinants during the COVID-19 pandemic in learning mathematics online. The study considered primary data from 233 students selected in a non-random approach at Visayas State University, Baybay City, Leyte, Philippines through the aid of an online survey. The data were analyzed using some descriptive statistics calculation and regression analysis was used to model the students' self-efficacy and its factors. Results showed that, on average, the students' self-efficacy level is considered "moderate" amidst the pandemic. This means that most of these students are still having mathematical anxiety and experiencing hindrances in achieving good academic performance in mathematics online. The statistical model revealed that the demographic and learning profile of students is not significantly influencing the level of self-efficacy. In addition to that, the mathematics teachers' intervention has shown also an insignificant influence on the students' self-efficacy.

Tantog et al. (2023) explored the student's Learning Efficacy in Mathematics in an Online and Modular Mode of Learning. The establishment of this study is in Pagadian City, school year 2020-2021. It is conducted the study in one of the higher institutional schools in Pagadian City that practices online and modular modes of learning. The research participants were the 136 Grade 10 Junior High School Students, 68 from the modular and 68 as well from online class. It was determined through the Slovin's Sampling technique. The researchers used Descriptive Research Design for this study. In this new normal learning, the researchers gathered data from a Likert Scale Survey Questionnaire. As analysed, the level of learning efficacy of modular mode of learning in terms of the following indicators namely; interest, study habits and module's content were all interpreted as high efficacy with an overall weighted mean of 3.716. On the other hand, the level of learning efficacy of online mode of learning in terms of the following indicators namely; Interest, Study Habits and Online Learning were all interpreted as high efficacy with an overall weighted mean of 3.733. Nevertheless, the result has no significant difference on Student's Learning Efficacy in Mathematics in an Online and Modular Mode of Learning.

The literature has increasingly pointed out student self-regulation as a critical predictor of mathematics success. Self-regulation involves the processes people employ to control their cognitions, emotions, and actions to achieve their goals. The paper is a review of current literature on self-regulation and mathematics performance in general, including issues with knowledge gaps and avenues for future research.

Robson, Allen, and Howard (2020) conducted a meta-analysis demonstrating that childhood self-regulation is a strong and unique predictor of general academic achievement, particularly in mathematics and literacy. This study indicates that more competent children in advanced aspects of self-regulation have greater academic outcomes including aspects like goal-setting, self-monitoring, and also the control of their own emotions. Longitudinal analysis suggests that early self-regulation predicts not only proximal success but also fundamentally influences long-term trajectories relative to general educational outcomes, and in particular with mathematics. Studies suggest the existence of a leverage point through these preschool and early school ages for self-regulation, and this could further influence or enhance long-term math performances.

Structural maturation of the brain has an important role in self-regulation and cognitive control; these are essential to managing complex tasks such as solving math problems effectively (Fjell et al., 2012). A student's ability to concentrate and inhibit impulsive responses is directly correlated with their anterior cingulate cortex, which is involved in cognitive control. The older the children become, the better their cognitive control ability, which helps them in performing mathematical tasks much more effectively. The need to include neuroscience in teaching strategies aimed at enhancing self-regulation and math is brought out by these biological bases.

Teachers play an important role in supporting self-regulated learning in the classroom. Observational studies reveal that teachers can encourage self-regulation directly and indirectly through instructional practices and classroom environments (Dignath & Büttner, 2018). Successful teaching strategies that promote self-regulation enhance student engagement with math content and, therefore, result in improved performance on assessments. Professional development is necessary to provide teachers with the means of assisting students in developing self-regulation.

In a study, interventions directed to children with socio-economic challenging backgrounds for self-regulation enhanced the math performance of their wards (Lytra & Drigas, 2021). These programmes apply positive behavior support which incorporates parental involvement to enable the strengthening of self-regulatory capacities that translate into good grades in mathematics. This would then mean intervention models have a capacity for self-regulation, particularly for children facing socio-economic challenges at schools.

Other studies have also shown that emotional regulation is associated with math performance (Brotman et al., 2013). Students with higher self-efficacy and lower test anxiety tend to perform better in academics. This means that self-regulation, especially in the form of emotion regulation, is critical for approaching math tasks with confidence and resilience. As such, educational programs that include emotional regulation strategies can significantly enhance students' math performance.

There are other strands of concern that involve self-regulation, metacognitive competency, and math strategies. According to reports, in addition to strong basic skills in mathematics, students have a tendency to demonstrate an excellent ability to regulate self and possess strong metacognitive awareness (Sharpee et al., 2016). This suggests the fact that the self-regulation of learning is fundamental but the proper use of mathematical strategies as well is necessary. Instruction that fosters not only self-regulation skills but also metacognitive skills is likely to help students perform better math skills, especially in core mathematical skills.

Self-regulation techniques, including deep breathing, have been shown to alleviate anxiety and enhance mathematical test performance (Throndsen, 2011). Educators can contribute by training the student group to manage their affective states so that they deliver enhanced focus and performances in a pressurized environment that can be replicated in any mathematics test. Such a strategy implemented in the classroom context might provide an appropriate way for improving performances in math.

Despite all the research connecting self-regulation to math performance, knowledge gaps remain. For instance, while biological underpinnings of self-regulation are acknowledged, there is a need for more research on how different types of self-regulation skills are developed and what kind of impact these skills make on different math tasks. Also, there is a need for more studies that assess the long-term effects of classroom interventions on self-regulation and math performance across different demographic groups.

Future studies should engage with the idea of putting these self-regulation strategies into the existing curricula within different educational settings for further insight into how some strategies could be modified into a different kind of suit that would work for people from different student populations bettering education practices.

Overall, the literature supports a positive link between self-regulation and math performance. The cognitive control and the teacher interventions, as well as the emotional regulation, metacognitive skills underscore the complex nature of the self-regulation as the determinant of academic success. Further exploration in this direction is very important in an effort to bridge existing gaps in knowledge and fine-tune education practices aimed at promoting self-regulation leading to enhanced math performance by students.

Malpass et al. (1996) delved into the effects of self-regulated learning, self-efficacy, learning goal orientation, and worry on high-stakes mathematics achievement of a sample of 144 mathematically gifted high school students. The self-report instrument used was the Self-Regulation Questionnaire by O'Neil. Sugrue et al. (1992) found that self-regulation was negatively related to worry, and

surprisingly, not related to either prior or post mathematics achievement. Other results indicated that self-efficacy mediates the relationship between prior and post math achievement, is related to self-regulation, and is highly and negatively related to worry, learning goal orientation is positively related to self-regulation and worry, and is not related to self-efficacy or Advanced Placement mathematics achievement, the Math-Scholastic Achievement Test is related to Advanced Placement math achievement, and worry is negatively related to Advanced Placement mathematics achievement. With respect to sex, boys were less worried and had higher self-efficacy than girls. Given the propensity for "dropping out- of high school in a number of today's youths, implications of this study may provide insight on (a) the effectiveness of training adolescents in self-regulated learning strategies (Zimmerman & Martinez-Pons, 1992), and (b) the training of academic counselors to use cognitive restructuring with the appropriate intervention, targeting these students' poor regulation of effort (Brackney & Karabenick, 1995) and low self-efficacy (Pajares & Kranzler, 1995).

Hodges and Kim (2010) investigated the effects of email to enhance learners' use of self-regulation strategies; examined different effects between email list and individually addressed notes on the enhancement of self-regulation; observed and record changes in self-regulation and self-efficacy; and explored the relationships among self-regulation, self-efficacy, and achievement. For an entire semester, 103 college students from mid-Atlantic state university in the United States enrolled in an online, asynchronous mathematics course participated in this study. Results indicated that there was no statistically significant effect for the email treatments but a statistically significant relationship was observed between self-efficacy and achievement. The findings are discussed with an emphasis on the reciprocal relations between self-efficacy and self-regulation. Additional achievement measures, possibly of various types, may yield useful and interesting results. Researchers should consider adding qualitative components to future, similar studies. The present study assessed self-regulation through self-report only. Follow-up assessments of participants' actual use of self-regulation strategies through the examination of logbooks, interviews, and focus group discussions, may add valuable findings to future research.

Villavicencio and Bernardo (2015) hypothesized that positive emotions are associated with learning and achievement in mathematics, even when mathematics anxiety is considered. Filipino students enrolled in a college trigonometry course in a large state university in the Central Luzon region in the Philippines completed the Academic Emotions Questionnaire-Mathematics and scales assessing their self-efficacy and self-regulation in trigonometry. Hierarchical regression analysis indicated that enjoyment and pride explained a significant amount of variance in the final grades, self-regulation, and self-efficacy, even after accounting for the variance explained by gender and anxiety. Although the results cannot be interpreted as indicating a causal relationship between positive emotions and achievement, the results indicate how positive emotions in mathematics learning can contribute to a more balanced picture of the role of affective states in mathematics learning. The simple implication of these findings is that teachers should value these positive emotions when their students experience them and, whenever possible, create opportunities wherein these emotions can be experienced and sustained. In the context of mathematics classes for example, creating learning activities that are enjoyable to the students is likely to make the students believe that they can engage and manage the learning tasks and also to engender more cognitive flexibility and self-regulation while doing the task.

Ozkal (2019) investigated the self-efficacy beliefs, engagement and disaffection in Math lessons and academic achievement in relation to learning Mathematics and Math performance of 651 sixth, seventh and eighth graders attending nine separate secondary schools in Alanya district of Antalya Province. Research data were collected with the help of 'Engagement and Disaffection Scale', 'Self-Efficacy sub dimension' of 'Motivation Scale' related to learning and performance and students' Math first semester grades. It was identified in the study that students' self-efficacy beliefs in learning and performance in Math significantly and positively predicted their Math achievement. Behavioural and affective disaffection in Math lessons were found to predict Math achievement negatively. It was determined in the study that students' self-efficacy beliefs related to

learning and performance in Math significantly predicted their behavioural and affective engagement in Math positively while predicting their behavioural and affective disaffection negatively. Based on study results, it can be suggested to create learning environments that will support student self-efficacy in Math classes. In order to prevent disaffection in Math classes, teachers and teacher candidates (before and during service) can be taught effective learning methods and techniques that will allow students to experience positive achievement experiences and feelings. In addition, it would be effective to provide teachers and teacher candidates with information on the effects of self-efficacy beliefs on engagement.

Lavasani et al. (2011) examined a predicting model of high school students' math anxiety based on classroom goal structure, self-regulation and math self-efficacy. For this reason 436 Tehran's male high school students were selected through multiple cluster sampling. They completed a questionnaire consisting of perceived classroom goal structure (Midgley et al. 2000), Math anxiety (Bai et al. 2009) and researcher-made math self-efficacy scale. Results indicated that mastery and performance-approach structures negatively influence math anxiety, directly and indirectly. All goal structures have a positive effect on self-regulation and performance-approach structure affects math self-efficacy positively, performance-avoidance structure affects it negatively, however. Math self-efficacy affects math anxiety directly and negatively, while the negative effect of self-regulation is indirect through math self-efficacy. The mediating role of self-regulation and math self-efficacy in the relationship between classroom goal structure and math anxiety was confirmed. The implication is that, excluding the role of the environment, any action that can increase the person's sense of efficacy is the most powerful action in avoiding math anxiety.

Jain and Dowson (2009) tested the veracity of a model of Mathematics Anxiety as the end-point of related self-regulatory and self-efficacy processes. Data were collected in three cities located in the Uttar Pradesh province of India. from 232, eighth grade students on the Motivated Strategies for Learning Questionnaire and the Mathematics Anxiety Scale. Psychological variables that may lessen MA have not been widely explored. In this study it demonstrates that MA can be accurately modeled as a function of both multidimensional self-regulation and self-efficacy. This modeling suggests that both self-regulation and self-efficacy are key variables in students' anxious reactions to mathematics. Moreover, the study demonstrates a broadly similar pattern of relationships between MA and its antecedent variables to that identified in Western.

Cera et al. (2013) investigated the relationship between metacognition, self-efficacy and self-regulation in learning of 130 students at 3 vocational training schools and 2 technical schools located in the city of Milan using Metacognitive Awareness Inventory (MAI), Adaptive Self-Efficacy Scale, Questionnaire About the Popular Conceptions of Learning (QAPCOL), Awareness of Independent Learning Inventory (AILI), Learning and Study Strategies Inventory (LASSI). Results revealed that self-regulated learning is linked to metacognitive skills such as planning, monitoring, evaluation and concentration. In addition, the knowledge and the proper use of learning strategies-such as the selection of the main ideas in the text - constitutes a related set of metacognitive skills. Finally, it was found that the acquisition of metacognitive knowledge, skills and attitudes is linked to autonomy in the study and to self-efficacy.

Lee et al. (2021) evaluated the relationships between self-efficacy and self-regulated learning (SRL) strategies of English language learners (ELLs) in a college setting from a social cognitive perspective in order to understand how to better support international students. Participants in this study were 117 ELL college students who enrolled in an English language course at a Midwestern university using the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich et al. (1991) was adapted to measure ELL college students' self-efficacy and the use of SRL strategies. The findings indicated that ELL college students' self-efficacy significantly predicted their use of SRL strategy. Specifically, ELL college students' self-efficacy significantly predicted the following sub-SRL strategies: rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, and time management. In addition, there was a statistically significant difference in the use of SRL strategies between ELL college students with high self-

efficacy beliefs and those with low self-efficacy beliefs. Specifically, there was a statistically significant difference in the following sub-SRL strategies between the two groups: rehearsal, metacognitive self-regulation, and time management. This study provides empirical evidence of the relationship between self-efficacy and SRL strategies in L2 settings and the key role of ELL college students' self-efficacy in self-regulation processes. Therefore, future research is strongly suggested to explore this topic in other university settings. Lastly, all SRL strategies could not be examined in this study due to the violations of assumptions. Future research should investigate differences in the use of other SRL strategies such as help seeking between ELL college students with high self-efficacy and those with low self-efficacy.

Adesola and Li (2018) studied the relationship between self-efficacy, self-regulation, test anxiety and motivation as well as the relationship between test anxiety and academic performance. Twenty-four students of the Department of Computer Science, Federal College of Education (Special), Oyo, Nigeria were examined in this study using Items from the Motivated Strategies for Learning Questionnaire (MSLQ). Self-efficacy was found to be highly correlated with cognitive strategy use and self-regulation indicating that students who report high in self-regulation also applied cognitive strategy and self-efficacy in achieving their goals. The results also revealed that students that report high in self-regulation are more likely to report high in cognitive strategy use. Furthermore, the result of the study revealed that there is high correlation between test anxiety and academic outcomes.

Musa (2020) analyzed the relationship between academic self-efficacy and academic performance among 293 university undergraduate students from the two universities (public and private) in Uganda. A modified academic self-efficacy self-administered closed ended questionnaire was used to collect data from the participants. The results obtained revealed that there is a statistically significant relationship between academic self - efficacy and academic performance among university undergraduate students. There were differences noted as regards gender in the students' academic self - efficacy and academic performance. From the results of this study it is recommended that universities institute measures to enhance students' academic self - efficacy as it has been noted that it is related to their academic performance.

Formina and Morosanova (2017) reported the relationships between self-regulation (SR), math self-efficacy, math interest, and three types of pupils' mathematics achievement. The sample included 14–16-year-old students in the 9th grade (out of 11) educated in seven standard and enhanced curriculum schools in Russia (N = 318). A version of the Self-Regulation Profile Questionnaire – Self-Regulation Profile of Learning Activity Questionnaire (SRPLAQ) was used to assess the regulatory features. The results of the studies suggest that SR acts as a meta-process that facilitates mobilisation and actualisation of both cognitive and intrapersonal resources in achieving the optimal activity result. As we suppose, there exist an individual, age related and situational specifics of the SR role in determining the educational achievements of school children. Further research may be focused on the study of SR in the system of cognitive and intrapersonal predictors in these specific contexts.

Alijuaid (2021) investigated the role of self-regulation and self-efficacy in academic motivation among the sample consisting of 349 undergraduate students enrolled in U.S. universities completed the Academic Motivation Scale (AMS) and Motivated Strategies for Learning Questionnaire (MSLQ) online providing input about their academic motivation, self-regulation, and self-efficacy. A significant correlation between self-regulation and self-efficacy was found. The adjusted model explained 41% of the variance in academic motivation. Although both exogenous variables were statistically significant predictors 82 of academic motivation, self-efficacy was the better predictor compared to self-regulation. The university curriculum committees should consider the role of self-regulation and self-efficacy in students' academic motivation. Curriculum should be designed in a way that allows students to practice self-reflection and that has instructions for explicit metacognitive strategies. For instance, lessons' activities may build to teach students planning, selecting effective strategies, and assessing their performance to enhance their metacognitive

abilities. The curriculum committee may include real stories about successful people with inspired language to enhance students' self-efficacy. The objective and content of the curriculum should be wellstated and organized. The activities should vary to cover self-regulation skills such as group discussion, thoughtful reflection, and application of one's worldview.

Tian et al. (2018) scrutinized the relationship between metacognitive knowledge (MK) and mathematics performance can be mediated by self-efficacy and motivation. The sample comprised 569 students of Grade 10 in China.The MK in mathematics questionnaire, the self-efficacy questionnaire, the academic motivation scale, Raven advanced progressive matrix, and mathematics tests were used for data collection. The results suggested that the mathematics performance could be predicted by MK, self-efficacy and intrinsic motivation. Moreover, the association between MK and mathematics performance was mediated by self-efficacy and intrinsic motivation, as revealed by a multiple mediation analysis. Additionally, there were sex differences in MK, self-efficacy and intrinsic motivation. The findings highlight the psychological mechanism in the mathematics of Chinese students and will help teachers to improve students' mathematical learning in the SRL framework more effectively. Implications for education and further studies are discussed.

Peteros (2023) investigated the pre-service teachers' self-regulation, self-efficacy, and mathematics performance in blended learning during the post Coronavirus disease 2019 (COVID-19) pandemic in a state university using a descriptive correlational design. There were 201 pre-service teachers who were identified using simple random sampling. The results revealed that they had high self-regulation while they had a very high level of self-efficacy. At the same time, they had a very satisfactory performance in mathematics. Moreover, their self-regulation in terms of planning, monitoring, and adjusting was significantly correlated with their math performance while reflecting is not. However, no significant relationship was found between their self-efficacy and mathematics performance. Thus, instructors are encouraged to conduct monitoring during blended learning to encourage pre-service teachers to maintain their high level of self-regulation and self-efficacy in learning mathematics. In addition, future researchers may explore the same variables to validate the findings of the study because these findings are limited only to pre-service teachers and were conducted during the post COVID-19 pandemic.

Hayat et al. (2020) assessed the relationships between academic self-efficacy, learning-related emotions, and metacognitive learning strategies in predicting academic performance among 279 students of medicine studying at Shiraz University of Medical Science using three questionnaires: academic emotions (AEQ), metacognitive learning strategies, and academic self-efficacy questionnaires.Results indicate that higher academic self-efficacy and positive learning emotions are associated with increased use of metacognitive strategies, leading to better academic performance. This suggests that interventions enhancing self-efficacy and managing emotions could benefit academic outcomes in medical education.

These studies explored self-regulation and self-efficacy as highly instrumental factors in students' math performance in relation to the COVID-19 pandemic. As educational institutions are still facing the challenge of distance learning, developing the self-regulation and self-efficacy of students should be priority number one. Goal-setting workshops, self-monitoring tools, and confidence-building activities may enhance students' learning experiences and outcomes in mathematics.

THE PROBLEM

Statement of the Problem

This research assessed the self-efficacy, self-regulation, and mathematics performance of the Grade 10 students at the identified public high schools in (name of the division) for school year 2024-2025 as basis for an action plan.

Specifically, this study seeks to answer the following queries:

1. What is the level of self-efficacy of the respondents in learning Mathematics?
2. What is the level of self-regulation of the respondents in terms of:

a. planning,

b. monitoring,

c. adjusting, and

d. reflecting?

3. What is the level of mathematics performance of the respondents?
4. Is there a significant relationship between the:

a. self-efficacy and the respondents' mathematics performance,

b. self-regulation and the respondents' mathematics performance?

5. Based on the findings, what action plans may be proposed?

Statement of the Null Hypotheses

Based on the objectives of the study, the following null hypotheses will be tested at 0.05 level of significance:

Ho_1: There is no significant relationship between the self-efficacy and the respondents' mathematics performance.

Ho_2: There is no significant relationship between the self-regulation and the respondents' mathematics performance.

Significance of the Study

This study is significant for several stakeholders:

DepEd Officials. This study will serve as a foundational resource for DepEd officials to develop policies and programs that foster self-efficacy and self-regulation among students, especially in mathematics. By understanding the impact of these factors on performance, officials can implement targeted interventions that address learning gaps, enhance teacher training, and improve overall student outcomes in mathematics, aligning with national goals for academic excellence.

School Administrators. This study will serve as a guide for school administrators in creating an environment that supports the development of self-efficacy and self-regulation among students. Administrators can use these findings to implement school-wide programs and allocate resources that encourage students to set goals, monitor their progress, and build confidence in their mathematical abilities, contributing to improved academic performance and a more supportive learning atmosphere.

Teachers. This study will serve as a valuable reference for teachers, helping them understand how students' beliefs in their abilities and their capacity for self-management influence mathematics performance. Teachers can apply these insights by integrating strategies into their lessons that boost self-efficacy and self-regulation, such as personalized feedback, goal-setting exercises, and self-assessment tools. This approach empowers teachers to better support students in developing skills essential for math success.

Students. This study will serve as an eye-opener for students, making them aware of the importance of self-belief and effective study habits in achieving high mathematics performance. By understanding the role of self-efficacy and self-regulation, students can take more control over their learning processes, setting realistic goals, and using self-monitoring strategies to improve their mathematics outcomes and boost their confidence in their academic abilities.

Researcher. This study will serve as a reference point for researchers in educational psychology, providing insights into the dynamics of self-efficacy, self-regulation, and academic performance in mathematics. The findings add to the literature on motivational and cognitive influences in academic achievement, encouraging further studies that explore similar relationships in other subjects, grade levels, and learning environments.

Future Researchers. This study will serve as a baseline for future researchers who are interested in exploring similar topics or conducting longitudinal studies on the development of self-efficacy and self-regulation over time. Future researchers can use this study as a foundation to investigate additional factors that influence mathematics performance or to test new interventions aimed at enhancing self-efficacy and self-regulation among students in different educational contexts.

RESEARCH METHODOLOGY

In this section, we provided a comprehensive overview of the research methodology, including the research design, the data collection procedure, and the data analysis techniques used in this study.

Design

A descriptive correlational research design was used to analyze self-regulation, self-efficacy, and math performance. This design, as defined by Creswell (2014)**,** was used to describe variables and to explore the relationships between these variables. The researcher measured self-regulation, self-efficacy, and Math performance of Grade 10 students in Pagsabungan National High School.

A descriptive correlational design is particularly suitable for studying self-efficacy, self-regulation, and math performance due to its ability to explore and quantify relationships between these variables without manipulating them. This design allows researchers to understand natural variations in self-efficacy and self-regulation and how these relate to math performance in real-world settings. Additionally, by collecting data from a diverse sample, the findings can be generalized to a broader population, providing insights into how these constructs interact across different groups of students. Furthermore, a descriptive correlational study can handle multiple variables simultaneously, revealing complex interactions, such as how self-regulation might mediate the relationship between self-efficacy and math performance.

Flow of the Study

Input. The research will involve gathering of demographic information from participants, including age, gender, education, and socioeconomic status, to analyze potential demographic differences in the results. Additionally, the study will assess participants' self-efficacy, or their belief in their ability to complete math tasks, as well as their self-regulation, or their ability to manage their emotions, thoughts, and behaviors. Finally, the study will measure participants' mathematics performance through standardized tests or other performance assessments.

Process. The research process will begin with a formal transmittal letter sent to potential participants to inform them about the study, its purpose, and procedures, and to seek their consent. The study will use a descriptive correlational design to describe variables and explore the relationships between self-efficacy, self-regulation, and math performance. Data will be gathered through various methods, such as surveys or interviews, and then cleaned, organized, and analyzed using statistical techniques like descriptive and inferential statistics. The analysis and interpretation of these statistical results will lead to the identification of patterns and the drawing of conclusions. Finally, the researchers will summarize their findings and provide recommendations based on the results.

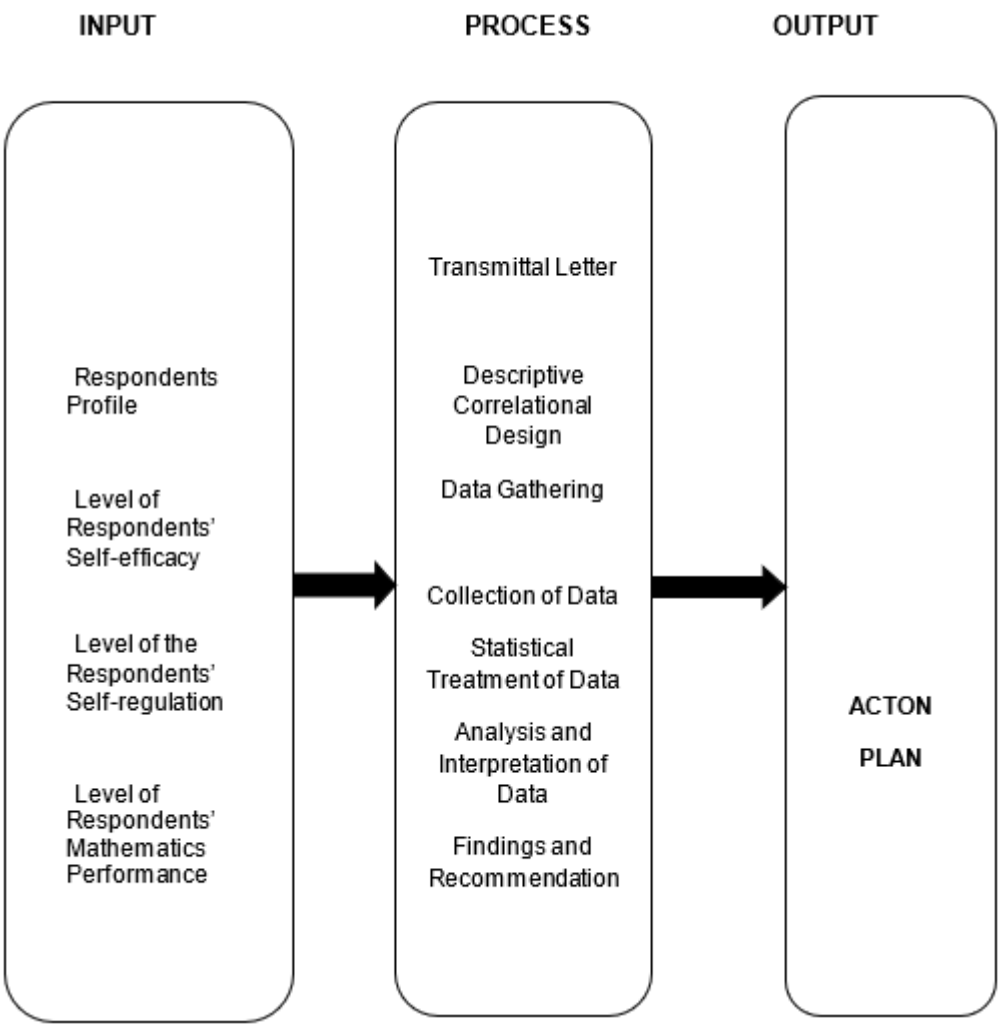

Figure 2 -Flow of the Study

Output. The ultimate goal of the research is to inform practical applications and interventions. The findings and recommendations can be used to develop action plans to improve students' self-regulation, self-efficacy, and math performance.

Environment

This study was conducted in Pagsabungan National High School**.** Pagsabungan National High School is located in one of the metro cities of Cebu, Mandaue. It started its operation way back 2000 through the efforts of the Barangay Council to address the growing need for a public secondary school. With the backing of the Mandaue City government, Barangay Captain Hon. Cirilo S. Congson enacted a resolution establishing Pagsabungan National High School. While nine more classrooms were still being built, the school started out with three for the 2000–2001 academic year. Ninety-one freshmen registered, and the two sections, Justice and Compassionate, were advised by Ms. Catherine A. Conde and Mrs. Felicitas C. Magno. As an extension of Canduman National High School, Mrs. Rosario F. Casilagan served as the supervising principal. Despite the construction causing some disruptions, classes continued with the limited teaching staff handling 8 subjects, and support from Canduman teachers for just one month. By 2001-2002 school year, the 3-storey building with 12 classrooms was fully constructed and operational.

Figure 3-Location Map of the Research Environment

Respondents

The respondents for this research were the Grade 10 students at Pagsabungan National High School. Choosing Grade 10 as a focus for educational studies is significant due to its pivotal role in student development. This year often marks a critical transition from lower to higher secondary education, where students start to specialize in subjects that align with their future academic and career aspirations (Smith & Craig, 2019). Additionally, the curriculum in Grade 10 typically introduces more challenging and specialized subjects, laying a strong foundation for further education (Johnson et al., 2020). The developmental stage of adolescents at this age—around 15-16 years old—also makes it a crucial period for understanding how educational practices can support cognitive and social growth (Brown & Larson, 2009).

Table 1. Distribution of Respondents

Section	N	n	%
10 – Optimistic	52	41	20.40
10 – Willing	52	42	25.00
10 – Noble	52	45	26.79
10 – Diligent	51	40	23.81
Total	**207**	**168**	**100.00**

The respondents were selected by simple random sampling. Table 1 presented the distribution of the respondents of this study who are the Grade 10 Junior High School students of Pagsabungan National High School. A total of 168 respondents will be selected randomly to answer the survey

questionnaires from the different sections. Among the 168 respondents were 41 for Grade 10 – Optimistic, 42 for Grade 10 – Willing, 45 for Grade 10 – Noble and 40 for Grade 10 – Diligent.

Instrument

In this study, the survey instrument was adapted from a previously validated questionnaire to ensure reliability and validity. The original questionnaire was designed to measure self-efficacy and self-regulation and it was modified to better suit the context of this research. This research utilized a three-part survey questionnaire to assess the variables investigated in this study.

Part I. The first part is designed to gather information on the profile of the respondents as to their name, age and gender.

Part II. The second part of the study will employ a survey instrument based on the Self-Efficacy Questionnaire developed by Gaumer Erickson, Soukup, Noonan, and McGurn (2016) to assess participants' levels of self-efficacy. The questionnaire was on a five (5) – point Likert scale: 5-Very much like me, 4- Somewhat like me, 3- Neutral, 2- Not much like me, and 1-Not at all like me that correspond to their perceptions towards the statement that best describe their level of self-efficacy.

Part III. The third part of the study will employ a survey instrument based on the Self-Regulation Questionnaire developed by Gaumer Erickson and Noonan (2021), which assesses self-regulation across four domains: planning, monitoring, adjusting, and reflecting. The questionnaire was on a five (5) – point Likert scale: 5-Very much like me, 4- Somewhat like me, 3- Neutral, 2- Not much like me, and 1-Not at all like me that correspond to their perceptions towards the statement that best describe their level of self-regulation.

This research will also utilize the first quarter grade in Mathematics of school year 2024-2025 of the respondents to assess their performance in Mathematics. The rating scale was on a five (5) point scale: 5-Outstanding, 4-Very Satisfactory, 3- Satisfactory, 2- Fairly Satisfactory, and 1- Did not meet the expectations that correspond to their first quarter grade.

Data Gathering Procedure

Preliminary Stage. The researcher will send a letter to the Office of the Schools Division Superintendent and the Principal of the School to ask permission to conduct the study. Once approved, the researcher will arrange the three (3) seminaries to schedule when to meet the respondents and conduct the study.

Data Gathering Stage. The researcher will facilitate an orientation regarding the research on the scheduled day. Salient issues like the purpose of the study, its procedure, and how the confidentiality of the respondents was protected will be discussed. Administration of the survey questionnaires followed right after the orientation. Instructions were given on how to answer the survey questionnaires. Assistance was also provided while the respondents were answering the survey questionnaires, and enough time was given to answer the said questionnaires. Retrieval of the questionnaires followed. To gather data on respondents' academic performance in mathematics, the researchers will ask for the assistance of their class advisers.

Post Data Gathering Stage. The researcher will tally, organize, summarize, interpret, and analyze the results. Appropriate statistical tools will be used in the treatment of data. An intervention plan will be proposed to address the needs of the Grade 10 junior high school students studying at the identified public high school.

Statistical Treatment

After data collection, the data will undergo different statistical treatments with the aid of the statistician. To arrive at reliable results, the following statistical tools were used:

Weighted Mean. This tool will be used to determine the level of self-efficacy and level of self-regulation of the respondents and its interpretation based on the descriptive rating.

Standard Deviation. This tool will be used to describe the spread of the answers of the respondents on the questionnaire assessing their self-efficacy and self-regulation.

Pearson's r. This tool will be utilized to test the significance of the relationship between self-efficacy and self-regulation to the mathematics performance of the respondents.

Scoring Procedure

Data that were collected through survey questionnaires will be calculated and interpreted according to the following procedures:

Scoring procedure for Self-efficacy

To determine the respondents' level of self-efficacy, the following numerical and descriptive ratings will be used:

Scale	Numerical Rating	Descriptive Rating	Verbal Interpretation
5	4.21-5.00	Very High	The respondents strongly agree on the statements describing their efficacy in learning Mathematics.
4	3.41-4.20	High	The respondents agree on the statements describing their efficacy in learning Mathematics.
3	2.61-3.40	Moderate	The respondents are undecided on the statements describing their efficacy in learning Mathematics.
2	1.81-2.60	Low	The respondents disagree on the statements describing their efficacy in learning Mathematics.
1	1.00-1.80	Very Low	The respondents strongly disagree on the statements describing their efficacy in learning Mathematics.

Scoring procedure for Self-regulation

To determine the respondents' level of self-regulation, the following numerical and descriptive ratings will be used:

Scale	Numerical Rating	Descriptive Rating	Verbal Interpretation
5	4.21-5.00	Very High	The respondents strongly agree on the statements describing their self-regulation in learning Mathematics.
4	3.41-4.20	High	The respondents agree on the statements describing their self-regulation in learning Mathematics.
3	2.61-3.40	Moderate	The respondents are undecided on the statements describing their self-regulation in learning Mathematics.
2	1.81-2.60	Low	The respondents disagree on the statements describing their self-regulation in learning Mathematics.
1	1.00-1.80	Very Low	The respondents strongly disagree on the statements describing their self-regulation in learning Mathematics.

Mathematics Performance Rating Scale

To determine the respondent's mathematics performance in terms to their first quarter Mathematics Grade of school year 2024-2025, the following descriptive rating and interpretation will be used:

Scoring Range	Descriptive Rating	Verbal Interpretation
90-100	Outstanding	The respondents' performance in mathematics is excellent
85-89	Very Satisfactory	The respondents' performance in mathematics is good
80-84		The respondents' performance in mathematics is

	Satisfactory	average
75-79	Fairly Satisfactory	The respondents' performance in mathematics is below average
below 75	Did not meet the expectations	The respondents' performance in mathematics is poor

DEFINITION OF TERMS

To provide clarity on the terms used in this study, the following terms are operationally defined:

Action Plan. This term refers to a strategic outline created by students to identify specific goals, necessary actions, resources, timelines, and evaluation methods to enhance their mathematics performance. The action plan serves as a roadmap for students to follow in order to achieve their academic objectives.

Adjusting. This term refers to the process of modifying strategies, study habits, or approaches based on feedback, performance evaluations, or changing circumstances. In the context of this study, adjusting involves students making necessary changes to their learning techniques to better meet their mathematical learning goals.

Mathematics Performance. This term refers to the grades of the Grade 10 students in mathematics as measured by assessments, quizzes, projects, and final examinations throughout the academic year. It reflects the students' understanding, application, and mastery of mathematical concepts and skills.

Monitoring. This term refers to the continuous process of tracking and evaluating one's progress toward achieving academic goals. In this study, monitoring involves students regularly assessing their performance, identifying areas for improvement, and making necessary adjustments to their study practices.

Planning. This term refers to the systematic process of setting specific academic goals, outlining the steps needed to achieve those goals, and determining the resources required. In this context, planning involves students creating a structured approach to their mathematics studies to ensure effective learning and performance.

Reflecting. This term refers to the process of thoughtfully considering one's learning experiences, strategies used, and outcomes achieved in mathematics. In this study, reflecting involves students evaluating their own performance and learning processes to identify strengths, weaknesses, and areas for further improvement.

Self-efficacy. This term refers to a student's belief in their ability to successfully perform tasks and achieve goals in mathematics. It encompasses their confidence in handling mathematical problems, overcoming challenges, and persisting in the face of difficulties, significantly influencing their motivation and performance.

Self-regulation. This term refers to the ability of students to manage their own learning processes through goal-setting, time management, self-monitoring, and self-reflection. In this study, self-regulation involves the strategies students employ to plan, execute, and evaluate their mathematical learning, allowing them to take control of their academic success.

CHAPTER 2

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter presented the results of the data gathered from the respondents in terms of their self-regulation, self-efficacy, and math performance. This also includes the test of hypotheses of these variables. It aimed to understand the contribution of self-efficacy and self-regulation to students' mathematical success. With the help of the respondents' answers to the survey questionnaire, the following results and findings are hereby presented and discussed as follows:

LEVEL OF SELF – EFFICACY OF THE RESPONDENTS

This section provided an examination of our respondents' self-efficacy levels, emphasizing their confidence in their capacity to carry out tasks and accomplish objectives. Self-efficacy, a crucial factor in determining how people face and overcome obstacles, offers information on their tenacity and general psychological fortitude. We seek to comprehend the respondents' potential for success, motivation, and well-being in diverse circumstances by looking at these self-efficacy levels.

Table 2. Level of self-efficacy of the respondents in learning Mathematics

S/N	Indicators	WM	SD	Verbal Description
1	I can learn what is being taught in class this year.	3.73	0.85	High
2	I can figure out anything if I try hard enough.	3.86	0.86	High
3	If I practiced every day, I could develop just about any skill.	4.05	0.92	High
4	Once I've decided to accomplish something that's important to me, I keep trying to accomplish it, even if it is harder than I thought.	3.85	1.00	High
5	I am confident that I will achieve the goals that I set for myself.	3.93	1.03	High
6	When I'm struggling to accomplish something difficult, I focus on my progress instead of feeling discouraged.	3.74	1.02	High
7	I will succeed in whatever career path I choose.	3.79	0.99	High
8	I will succeed in whatever college major I choose.	3.78	1.07	High
9	I believe hard work pays off.	4.31	0.91	Very High
10	My ability grows with effort.	4.15	0.95	High
11	I believe that the brain can be developed like a muscle.	3.83	0.98	High
12	I think that no matter who you are, you can significantly change your level of talent.	4.17	0.96	High
13	I can change my basic level of ability considerably.	3.64	0.97	High
Aggregate Weighted Mean		**3.91**		**High**
Aggregate Standard Deviation			**0.96**	
Legend: 4.21-5.00-Very High; 3.41-4.20-High; 2.61-3.40-Moderate; 1.81-2.60-Low; 1.00-1.80-Very Low				

Table 2 presented the level of self-efficacy of the students while learning mathematics which has a weighted mean of 3.91 indicating that they have a high level of self-efficacy in learning. This meant that the students have the capacity to carry out tasks and accomplish objectives however it will not assure the high level of learning for the students. Students with high levels of self-efficacy tend to set more ambitious academic goals compared to those with lower self-efficacy. According to Saks (2024), self-efficacy significantly influences goal-setting behavior, with higher self-efficacy predicting stronger commitment to challenging academic targets. Moreover, students with elevated self-efficacy are more likely to employ effective learning strategies and persist through academic difficulties (Vilppu et al., 2023; Freire et al., 2020). Bandura's foundational theory remains relevant, as recent research continues to affirm that self-efficacy enhances task performance and resilience in the face of setbacks (Tus, 2021).

LEVEL OF SELF-REGULATION OF THE RESPONDENTS (PLANNING)

This section displayed the respondents' degree of self-regulation, with an emphasis on their capacity for planning. Effective learning and individual success depend heavily on self-regulation, which includes goal-setting, progress tracking, and behavior modification. As a fundamental component

of self-control, planning enables people to coordinate their activities in order to accomplish particular goals. Through analyzing the planning techniques used by our participants, we hoped to get insight into their capacity to establish reasonable objectives, create workable plans, and stay focused on their assignments. This knowledge ultimately aid in their overall development and success by assisting us in identifying their self-regulatory practices' strong points and potential areas for progress.

Table 3. Level of self-regulation of the respondents in terms of planning

S/N	Indicators	WM	SD	Verbal Description
1	I plan out projects that I want to complete.	3.91	0.89	High
2	If an important test is coming up, I create a study plan.	3.60	1.03	High
3	Before I do something fun, I consider all the things that I need to get done.	3.82	1.05	High
4	I can usually estimate how much time my homework will take to complete.	3.47	1.05	High
5*	I have trouble making plans to help me reach my goals.	3.56	1.06	High
Aggregate Weighted Mean		**3.67**		**High**
Aggregate Standard Deviation			**1.02**	
Legend: 4.21-5.00-Very High; 3.41-4.20-High; 2.61-3.40-Moderate; 1.81-2.60-Low; 1.00-1.80-Very Low				

Table 3 showed the student's level of self-regulation in terms of planning with a weighted mean of 3.67. This indicated that they highly plan towards positively stated indicators while they have a low - level self-regulation in the negatively stated indicators. This implied that respondents highly plan on the accomplishment of their tasks. Recent research shows that personalized goal setting and structured study planning significantly enhance students' continuous engagement with learning, focus on academic goals, and overall academic performance (Schippers et al., 2020). Self-regulation involves a range of processes where individuals exert control over their thoughts, behaviors, and emotions to achieve specific goals. A person can take control of goal completion by creating if-then designs (i.e., from achievement goals) that identify a potential critical condition and relate it to a goal – directed instrumental response. Since planning is essential to completing a task on time, students create plans to aid in the completion of their assignments. They plan their actions to ensure they don't waste time and can finish their tasks on time. This is an example of how responsible the students were in organizing the steps necessary to complete the assignments they were given.

LEVEL OF SELF-REGULATION OF THE RESPONDENTS (MONITORING)

This section demonstrated the respondents' degree of self-regulation, with an emphasis on their capacity for monitoring. The continuous evaluation of one's progress toward these objectives, the identification of any roadblocks, and the making of the required corrections to continue on course constitute monitoring, which is an essential part of self-regulation. Our goal was to gain insight into our respondents' capacity to assess their actions, identify deviations from their plans, and take corrective action by looking at how they track their performance.

Table 4. Level of self-regulation of the respondents in terms of monitoring

S/N	Indicators	WM	SD	Verbal Description
1	I kept track of how my projects are going.	3.63	1.02	High
2	I know when I'm behind on project.	3.61	1.02	High
3	I track my progress for reaching my goal.	3.71	0.98	High
4	I know what my grades are at any given time.	3.19	1.02	Moderate
5	Daily, I identify things I need to get done and track what	3.64	1.02	High

	gets done.			
6*	I have trouble remembering all the things I need to accomplish.	3.71	1.06	High
Aggregate Weighted Mean		**3.58**		**High**
Aggregate Standard Deviation			**1.02**	

Table 4 showed that the students' level of self-regulation in terms of monitoring with a weighted mean of 3.58 indicating that they moderately tracked their progress. This suggested that the respondents were responsible enough in terms of tracking the progress towards accomplishing their goals. The students were sufficiently trustworthy as far as observing the advancement towards accomplishing their goals. Recent studies affirm that self-monitoring interventions are effective in enhancing students' academic engagement, productivity, and accuracy, particularly among those with learning disabilities (Young, 2022).

LEVEL OF SELF – REGULATION OF THE RESPONDENTS (ADJUSTING)

This section described the respondents' level of self-regulation, with a special emphasis on their ability to adapt their tactics and actions in response to changing situations. Self-regulation is a dynamic process in which individuals must constantly change their activities to meet their goals. Adjusting, a critical component of self-regulation, comprises recognizing when initial plans or techniques are ineffective and making the required changes to keep on track. We hoped to gain insight into our respondents' adaptability, resilience, and problem-solving abilities by examining how they change their strategies. These insights assisted respondents in identifying areas where they shine and where they may require additional development in order to improve their overall self-regulatory capabilities and attain their desired results.

Table 5. Leve of self-regulation of the respondents in terms of adjusting

S/N	Indicators	WM	SD	Verbal Description
1	I do what it takes to get my homework done on time.	3.97	0.97	High
2	I make choices to help me succeed, even when they aren't the most fun right now.	3.63	0.93	High
3	As soon as I see things aren't going right, I want to do something about it.	3.96	0.94	High
4	I keep trying as many different possibilities as necessary to succeed.	4.01	0.96	High
5*	I have difficulty maintaining my focus on projects that take long time to complete.	3.63	1.01	High
6*	When I get behind on my work, I often give up.	2.88	1.23	Moderate
Aggregate Weighted Mean		**3.68**		**High**
Aggregate Standard Deviation			**1.01**	

Table 5 presented the students' level of self-regulation in terms of adjusting have a weighted mean of 3.68 which denotes that they have a high level of self – regulation in terms of adjusting to the new strategies and ways. Recent research highlights students' capacity to adapt effectively to changes, especially in the context of academic responsibilities. This adaptability plays a vital role in academic success, as students' ability to navigate shifting educational demands significantly influences their performance (Feraco, Casali, & Meneghetti, 2023). Maintaining focus enables students to confront challenges with resilience, utilizing adaptive strategies to manage difficulties in their learning environments (Arquero et al., 2024). Furthermore, engaging in thoughtful planning and adjusting study habits can promote a sense of autonomy and consistency, which in turn enhances sustained academic engagement and achievement (David, Biwer, Crutzen, & de Bruin, 2024).

LEVEL OF SELF – REGULATION OF THE RESPONDENTS (REFLECTING)

This section described the respondents' level of self-regulation, with a particular emphasis on their reflective activities. Individuals can use reflection to review their previous actions, learn what worked and what didn't, and gather insights that will help them develop future plans. We hoped to expose our respondents' ability to learn from events, change their techniques, and improve their general self-regulation skills by evaluating how they reflect. These insights highlighted areas of strength and provide suggestions on how to encourage respondents to engage in more effective reflective practices in order to support their ongoing development.

Table 6. Level of self-regulation of the respondents in terms of reflecting

S/N	Indicators	WM	SD	Verbal Description
1	I think about how well I'm doing on my assignments.	3.73	0.95	High
2	I feel a sense of accomplishment when I get everything done on time.	3.95	0.99	High
3	I think about how well I've done in the past when I set new goals.	3.89	0.96	High
4	When I fail at something, I try to learn from my mistake.	4.24	0.94	Very High
5*	keep making the same mistake over and over again.	3.15	1.35	Moderate
Aggregate Weighted Mean		**3.79**		**High**
Aggregate Standard Deviation			**1.04**	

Table 6 showed that the students manifested a high level of self – regulation in terms of reflecting with a weighted mean of 3.79. Reflection helped students enhance their comprehension, which supports them in solving more complicated mathematics problems along the way. The students were able to reflect on the importance of finishing their assignment and how it impacted their personal development. Through reflective practices, students develop metacognitive awareness that enables them to think critically about their own thinking, identify effective strategies for solving complex mathematical problems, and recognize common pitfalls to avoid (William & Maat, 2020).

SUMMARY ON THE LEVEL OF SELF –REGULATION OF THE RESPONDENTS

Understanding the level of self-regulation among students is essential in evaluating their capacity to manage learning tasks, adapt to academic challenges, and sustain motivation. Self-regulation encompasses metacognitive awareness, goal-setting, time management, and emotional control—skills that are critical for academic success and personal growth (Rodríguez et al., 2022). Recent studies have shown that students with higher levels of self-regulation demonstrate greater persistence, improved learning outcomes, and enhanced well-being (Valenzuela et al., 2020; Duterte & Importante, 2023). Moreover, self-regulation has been identified as a significant predictor of academic achievement across diverse learning environments, including online platforms and STEM disciplines (Konabe et al., 2021). This section presents a summary of the respondents' self-regulation levels, providing insights into their readiness to engage in autonomous and effective learning.

Table 7. Summary on the level of self-regulation of the respondents

Components	WM	SD	Verbal Description
Planning	3.67	1.02	High
Monitoring	3.58	1.02	High
Adjusting	3.68	1.01	High
Reflecting	3.79	1.04	High
Grand Mean	**3.68**		**High**
Grand Standard Deviation		**1.02**	

As presented in table 7, the students had a high level of self-regulation towards accomplishing their goals in terms of the four sub-indicators with an average weighted mean of 3.68. Students have a high level of planning, monitoring, adjusting, and reflecting on accomplishing their goals. It could be noted that the students were able to do the task without the guidance of their teachers. Students who believe in their ability to exert effort, apply strategies, and pursue academic intentions are more likely to attain meaningful scholastic goals (Saks, 2024). In general, students were often responsible enough to complete the task at hand using a variety of approaches and techniques.

LEVEL OF MATHEMATICS ACHIEVEMENT OF THE RESPONDENTS

Mathematics achievement remains a critical indicator of students' academic performance and cognitive development. It reflects not only mastery of mathematical concepts but also the ability to apply logical reasoning and problem-solving skills in diverse contexts. Recent studies emphasize that mathematics proficiency is strongly correlated with overall academic success, particularly in science, reading comprehension, and other core subjects (Cabuquin & Abocejo, 2023). Moreover, factors such as instructional strategies, assessment practices, and students' attitudes toward mathematics significantly influence achievement levels (Silangan et al., 2023; Largo & Adanza, 2025). This section presented a summary of the respondents' mathematics achievement, offering insights into their academic strengths and areas for improvement.

Table 8. Level of Mathematics Achievement of the Respondents

Level	Numerical Range	f	%
Outstanding	90-100	39	23.21
Very Satisfactory	85-89	55	32.74
Satisfactory	80-84	54	32.14
Fairly Satisfactory	75-79	20	11.90
Did not Meet Expectations	Below 75	0	0.00
Total		**168**	**100.00**
Mean		**85.20**	
St. Dev.		**4.99**	

As presented in Table 8, the data suggested that majority of the students have good academic performance in Mathematics while learning independently. Academic performance is commonly defined as a student's ability to demonstrate achievement in relation to planned learning outcomes and educational goals (Almerino et al., 2020). However, some students show struggles in accomplishing the tasks as reflected in their grades. The students who have fairly satisfactory performance should be looked into because they are at risk of failing the subject (Peteros et al., 2022).

TEST OF SIGNIFICANT RELATIONSHIP BETWEEN THE SELF-EFFICACY AND THE RESPONDENTS' MATHEMATICS PERFORMANCE

This section presented the statistical test of the relationship between the respondents' self-efficacy and their mathematics performance, offering insights into how psychological factors shape learning outcomes in quantitative domains. Exploring the relationship between students' self-efficacy and their mathematics performance is essential in understanding how beliefs about personal capability influence academic outcomes. Self-efficacy, defined as the confidence in one's ability to execute tasks and achieve goals, has been consistently linked to motivation, persistence, and achievement in mathematics (Street et al., 2024). Recent empirical studies have demonstrated that mathematics self-efficacy is a robust predictor of performance across various educational levels, often accounting for significant variance in achievement scores (Yang, Maeda, & Gentry, 2024). Moreover, causal analyses suggest that self-efficacy not only correlates with performance but also mediates the effects of prior knowledge and learning strategies on academic success (Zakariya, 2021).

Table 9. Test of significant relationship between the self – efficacy and the respondents' mathematical performance

Variables	r-value	Strength of Correlation	p - value	Decision	Result
Self-efficacy and Mathematics Performance	-0.066	Negligible Negative	0.394	Do not reject Ho	Not Significant
*significant at p<0.05 (two-tailed)					

Table 9 illustrated the significant relationship between the students' self-efficacy and academic performance in mathematics which yielded the following statistics (r = - 0.066, P = 0.394). In this case, -0.066 indicated a negligible negative correlation between self-efficacy and mathematics performance. This means that as self-efficacy slightly decreases, mathematics performance also slightly decreases, but the relationship is extremely weak.

The strength of the correlation is described as negligible negative, confirming that there is very little to no linear relationship between the two variables. A p-value of 0.394 is significantly higher than the common threshold of 0.05, suggesting that the relationship between self-efficacy and mathematics performance is not statistically significant. Based on the p-value, we do not reject the null hypothesis (Ho), which states that there is no significant relationship between self-efficacy and mathematics performance. The overall result indicates that there is no significant relationship between self-efficacy and mathematics performance among the respondents.

The analysis revealed a negligible negative correlation between self-efficacy and mathematics performance, and this relationship was not statistically significant. These findings suggested that variations in students' self-efficacy levels are not meaningfully associated with changes in their mathematics achievement within this group. Similar results had been reported in recent studies, indicating that self-efficacy may not always serve as a reliable predictor of mathematics performance, particularly in online or modular learning contexts (Poquita & Doronio, 2023; Mijares III, 2022). These outcomes highlighted the complexity of psychological factors in academic achievement and suggested that other variables such as motivation, anxiety, or instructional quality may play more substantial roles.

TEST OF SIGNIFICANT RELATIONSHIP BETWEEN THE SELF-REGULATION AND THE RESPONDENTS' MATHEMATICS PERFORMANCE

Self-regulation plays a pivotal role in shaping students' academic success, particularly in mathematics, where sustained effort, strategic planning, and adaptive learning behaviors are essential. Defined as the ability to manage one's thoughts, emotions, and actions toward achieving learning goals, self-regulation has been consistently linked to improved academic outcomes. Recent studies have demonstrated a significant positive relationship between self-regulated learning and mathematics performance, especially in blended and online learning environments (Lumoto et al., 2024). Students who exhibit strong self-regulatory skills—such as goal-setting, time management, and resource-seeking—tend to perform better in mathematics due to their ability to monitor progress and adjust strategies as needed (Tee, Leong, & Abdul Rahim, 2021). This section presents the statistical analysis of the relationship between the respondents' level of self-regulation and their mathematics performance, offering insights into how cognitive and behavioral regulation contribute to academic achievement.

Table 10. Test of significant relationship between the self-regulation and the respondents' mathematics performance

Variables	r-value	Strength of Correlation	p - value	Decision	Result
Planning and Mathematics Performance	0.042	Negligible Positive	0.593	Do not reject Ho	Not Significant
Monitoring and	-0.034	Negligible	0.662	Do not reject	Not

Mathematics Performance		Negative		Ho	Significant
Adjusting and Mathematics Performance	-0.012	Negligible Negative	0.882	Do not reject Ho	Not Significant
Reflecting and Mathematics Performance	-0.075	Negligible Negative	0.337	Do not reject Ho	Not Significant
*significant at p<0.05 (two-tailed)					

As presented in table 10, the analysis showed that there are negligible correlations between the different dimensions of self-regulation (planning, monitoring, adjusting, and reflecting) and mathematics performance, none of which are statistically significant. This implied that self-regulation practices, as measured in this study, do not have a significant impact on mathematics performance among the respondents. Self-regulation is commonly defined as the ability to generate and manage one's own thoughts, emotions, and behaviors in a planned and adaptive manner to achieve personal goals (Abdolrezapour & Ghanbari, 2021).

In educational contexts, self-regulated learning refers to the proactive process by which students take responsibility for their learning by setting goals, employing strategies, monitoring progress, and reflecting on outcomes (Sinkkonen & Tapani, 2024). These processes were cyclical and dynamic, enabling learners to adjust their approaches based on feedback and evolving academic demands. The result was supported by self-regulation theory of Vygotsky that self-regulation are not innate or biologically determined but acquired through participation in culturally meaningful activities with others. This implied that self-regulation cannot be fully acquired without the help of social interaction and stimulus. This active engagement ensured that learners don't simply replicate the expert's actions but develop a deeper understanding of the underlying principles and strategies.

CHAPTER 3

SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATION

This chapter presented the summary, findings and conclusion of the study. This also contained the recommendations which are based on the results and findings of the study which aimed to improve the performance of Grade 10 students in math.

SUMMARY

This study aimed to determine the attitudes and performance of Grade 10 students in math at Pagsabungan National High School in Mandaue, Cebu as bases for a proposed action plan. Respondents were asked to answer the survey questionnaire describing their self-efficacy and self-regulation. To describe their performance, their first quarter grade in math was utilized. Data gathered were treated statistically using weighted mean, standard deviation, and Pearson r to describe the characteristics inherent to the respondents. A test on the significance of the self-efficacy, self-regulation, and math performance of the respondents was conducted using Pearson r in order to arrive an inference based on the evidence presented by the data.

FINDINGS

The following conclusions were drawn from the data that was collected and statistically analyzed. Students had a high degree of self-regulation, according to the study, which includes goal setting, monitoring, modifying, and reflection. Notably, students demonstrated their responsibility and the variety of their methods by completing assignments without the assistance of their teachers. Nevertheless, the investigation found no connection between respondents' self-efficacy and their performance in mathematics. Self-efficacy and arithmetic performance had a weak, negative, and non-statistically significant association, indicating that there is no substantial relationship between self-efficacy changes and math performance changes in this group. Similarly, the several aspects of self-regulation (planning, monitoring, adapting, and reflecting) and math ability were found to have weak relationships, none of which were statistically significant. According to the study's measurements, self-regulation techniques appear to have little effect on respondents' performance in mathematics. As stated by Zimmerman (2000), students' ability to self-regulate their learning

processes and their belief in their ability to use pertinent efforts, notions, desires, and actions to accomplish worthwhile academic goals did not significantly affect their performance in mathematics.

CONCLUSION

According to the study, students' levels of self-regulation and confidence in their ability to succeed academically were high, but they have no bearing on how well they perform in mathematics. There was no statistically significant correlation between self-efficacy and math performance, according to the analysis, and there were also no statistically significant correlations between math performance and the various aspects of self-regulation (planning, monitoring, adjusting, and reflecting). Therefore, it can be said that there is no significant correlation between the respondents' performance in mathematics and changes in their self-efficacy and self-regulation behaviors. This showed that although self-efficacy and self-regulation were critical for overall academic success, they might not have a direct effect on this study group's performance in mathematics.

RECOMMENDATION

In order to directly address mathematical difficulties, it is recommended that educational institutions and instructors incorporate extra assistance techniques including individualized tutoring, group projects, and hands-on problem-solving sessions. Furthermore, creating comprehensive programs that emphasize motivation, stress management, engagement, and self-regulation skills might result in a more well-rounded strategy for raising student achievement. Frequent teacher participation and comments are essential because they can offer focused interventions to solve particular mathematics challenges.

Additional research is required to examine additional elements that impact math achievement, including socioeconomic affects, classroom dynamics, instructional strategies, and cognitive capacities. Building a friendly learning environment and promoting peer learning and mentorship programs can both enhance academic achievement. Interactive and captivating experiences that accommodate various learning styles can be achieved through the incorporation of educational technology tools, such as adaptive learning platforms and math games. Finally, having more parents involved in their children's education can help them learn at home by creating a comfortable study space and helping them practice math. Putting these suggestions into practice can address a number of problems affecting math performance and contribute to the development of a positive and productive learning environment.

CHAPTER 4

OUTPUT OF THE STUDY

This chapter presented the action plan which aimed to enhance the performance of the learners in math in Pagsabungan National High School.

ACTION PLAN

Rationale

The action plan is rooted in the findings of the study, which indicate that self-regulation and self-efficacy, while present in students, do not significantly impact their mathematics performance. Encouraging a community-based learning environment and addressing mathematical difficulties with a multifaceted approach that includes technology use, individualized support, holistic student development, and active teacher involvement will result in a helpful and successful educational framework. This all-encompassing strategy guarantees that different aspects impacting math proficiency are taken into consideration, improving overall student results.

Objectives

With the implementation of this action plan, it is expected that the following objectives are achieved:

- Shall have increased students' performance in Mathematics
- Shall have a student-centered classroom environment that foster students' participation and engagement
- Shall have improved the attitudes of the students towards Mathematics
- Shall have developed self – confidence in engaging with math-related activities
- Shall have developed a sense of importance of math in real-life situations

Scheme of Implementation

In order that the proposal will be known to all the teachers of Pagsabungan National High School, it is planned that this proposal will be presented to the principals, guidance coordinators and all the teachers of the school. It is planned that the topic of this study will be disseminated to the teachers prior to the acceptance of the students in school. The teachers will be given copies of the suggested activities and matrix of the proposal. Evaluation will follow.

ACTION PLAN

Areas of Concern	Objectives	Strategies	Persons Involved	Budget	Source of Budget	Time Frame	Expected Outcome	Actual Accomplishment	Remarks
A. Enhancing Self-efficacy	To assess the efficacy of current self-regulation strategies in increasing mathematical performance To improve students' awareness and adjustment of their learning processes through better monitoring and feedback mechanisms	• Participate in or create workshops focused on setting realistic and achievable goals using the SMART criteria (Specific, Measurable, Achievable, Relevant, Time-bound). • Participate in problem-solving challenges or competitions that are relevant to your field of interest. For example, math competitions or coding hackathons	Administration and Teachers	20 000	School MOOE	one year	Increased students' confidence through direct application of skills and experiencing success in challenging scenarios		
B. Improving Self-regulation	To enhance self- awareness and emotional regulation To equip educators with the knowledge and skills to support	• Conduct surveys or interviews with students to get feedback on their existing self-regulation strategies • Develop a more robust monitoring system where	Administration and Teachers	30 000	School MOOE	one year	Increased student engagement Increased opportunities for constructive dialogue between teachers and students about		
	students' self-regulation and overall learning To create support programs to assist students in developing effective learning habits and self-regulation skills.	students regularly track their progress and set specific goals. • Provide frequent and constructive feedback from teachers to help students understand their strengths and areas for improvement. • Organize workshops and training sessions focused on effective self-regulation strategies and their integration into the classroom					academic performance and self-regulation strategies		
C. Boosting Math Performance	To enhance math performance of the students	• Encourage collaboration among teachers to share best practices and successful techniques • Establish peer mentoring programs where students can learn from each other's experiences	Administration, Parents or Guardians and Teachers	40 000	School MOOE	one year	Increased math performance of the students		

BIBLIOGRAPHY

1. Adesola, S. A., & Li, Y. (2018). The relationship between self-regulation, self-efficacy, test anxiety and motivation. International Journal of Information and Education Technology, 8(10), 759-763.

   https://www.ijiet.org/vol8/1135-T13.pdf.

2. Aljuaid, Fatimah, "Self-Efficacy and Self-Regulation as Predictors of Academic Motivation among Undergraduate Students in the United States" (2021). Dissertations. 1744. https://dx.doi.org/10.32597/dissertations/1744

3. Brotman, L., Dawson-McClure, Spring R.., Calzada, E.., Huang, K.., Kamboukos, D.., Palamar, J.., & Petkova, E.. (2013). Cluster (School) RCT of Parent Corps: Impact on Kindergarten Academic Achievement. Pediatrics , 131 , e1521 - e1529.

   https://publications.aap.org/pediatrics/article-abstract/131/5/e1521/31184

4. Casinillo, Leomarich. (2023). Modeling Students' Self-efficacy in Mathematics during the COVID-19 Pandemic. Canadian Journal of Family and Youth / Le Journal Canadien de Famille et de la Jeunesse. https://www.researchgate.net/publication/366789907

5. Cera, R., Mancini, M., & Antonietti, A. (2013). Relationships between metacognition, self-efficacy and self-regulation in learning. Journal of Educational, Cultural and Psychological Studies (ECPS Journal), 4(7), 115-141. https://doi.org/10.7358/ecps-2013-007-cera

6. Chan, Julia Y. K.., & Bauer, C. (2014). Identifying At-Risk Students in General Chemistry via Cluster Analysis of Affective Characteristics. Journal of Chemical Education, 91, 1417-1425. https://pubs.acs.org/doi/10.1021/ed500170x

7. DepEd Order No. 21, s. 2019. Policy Guidelines on the K to 12 Basic Education Program Implementation. https://www.deped.gov.ph/wp-content/uploads/2019/08/DO_s2019_021.pdf

8. Gaumer Erickson, A.S. & Noonan, P.M. (2021). Self-regulation assessment suite: Technical report. College & Career Competency Framework. http://cccframework.org

9. Hayat, A. A., Shateri, K., Amini, M., & Shokrpour, N. (2020). Relationships between academic self-efficacy, learning-related emotions, and metacognitive learning strategies with academic performance in medical students: a structural equation model. BMC medical education, 20, 1-11. https://doi.org/10.1186/s12909-020-01995-9

10. Lee, D., Allen, M., Cheng, L., Watson, S., & Watson, W. (2021). Exploring relationships between self-efficacy and self-regulated learning strategies of English language learners in a college setting. Journal of international students, 11(3), 567-585. https://doi.org/10.32674/jis.v11i3.2145

11. Loksa, Dastyni., Margulieux, Lauren E.., Becker, Brett A.., Craig, Michelle., Denny, Paul., Pettit, Raymond., & Prather, J.. (2022). Metacognition and Self-Regulation in Programming Education: Theories and Exemplars of Use. ACM Transactions on Computing Education (TOCE) , 22 , 1 - 31. https://doi.org/10.1145/3487050

12. Lytra, Niki., & Drigas, A.. (2021). STEAM education- metacognition – Specific Learning Disabilities. Scientific Electronic Archives. https://www.researchgate.net/publication/354950594

13. Matovu, M. (2020). Academic self-efficacy and academic performance among university undergraduate students. https://zenodo.org/records/3756004

14. Negara, Habibi & Nurlaelah, Elah & Wahyudin, Wahyudin & Herman, T & Tamur, Maximus. (2021). Mathematics self efficacy and mathematics performance in online learning. Journal of Physics. https://www.researchgate.net/publication/351569304

15. Peteros, E. D. (2024). Impact of pre-service teachers' self-regulation and self-efficacy on their mathematics performance in blended learning. Journal of Education and Learning (EduLearn), 18(2), 526-534. https://doi.org/10.11591/edulearn.v18i2.21074

16. Robson, Davina A.., Allen, Mark S.., & Howard, S.. (2020). Self-regulation in childhood as a predictor of future outcomes: A meta-analytic review.. Psychological bulletin. https://psycnet.apa.org/doi/10.1037/bul0000227

17. Tantog, Alfer & Sudaria, Ellin Grace & Eslawan, Rose & Toma, Amana. (2023). Students' Learning Efficacy in Mathematics in an Online and Modular Mode of Learning. https://www.researchgate.net/publication/374198394

18. Truncgil Technology. (2024). Impact of Modular Distance Learning on High School Students Mathematics Motivation, Interest/Attitude, Anxiety and Achievement during the COVID-19 Pandemic.

    https://www.eu-jer.com/impact-of-modular-distance-learning-on-high-school-students-mathematics-motivation-interestattitude-anxiety-and-achievement-during-the-covid-19-pandemic

19. Freire, C., Ferradás, M. D. M., Regueiro, B., Rodríguez, S., Valle, A., & Núñez, J. C. (2020). Coping strategies and self-efficacy in university students: A person-centered approach. *Frontiers in Psychology, 11*, 841. https://doi.org/10.3389/fpsyg.2020.00841

20. Saks, K. (2024). The effect of self-efficacy and self-set grade goals on academic outcomes. *Frontiers in Psychology, 15*. https://doi.org/10.3389/fpsyg.2024.1324007

21. Tus, J. (2021). The self-efficacy and academic motivation of the senior high school students from private schools amidst online learning in the Philippines. *International Journal of Advance Research and Innovative Ideas in Education, 7*(1), 2814–2816.

    https://studylib.net/doc/26049268/self-efficacy---tus--2020-

22. Vilppu, H., Laakkonen, E., Laine, A., Lähteenmäki, M., Metsäpelto, R.-L., Mikkilä-Erdmann, M., & Warinowski, A. (2023). Learning strategies, self-efficacy beliefs and academic achievement of first-year preservice teachers: A person-centred approach. *European Journal of Psychology of Education, 39*, 1161–1186. https://doi.org/10.1007/s10212-023-00729-x

23. Schippers, M. C., Morisano, D., Locke, E. A., Scheepers, A. W. A., Latham, G. P., & de Jong, E. M. (2020). Writing about personal goals and plans regardless of goal type boosts academic performance. *Contemporary Educational Psychology, 60*, 101823. https://doi.org/10.1016/j.cedpsych.2019.101823

24. Young, Q. (2022). *Effects of a self-monitoring intervention on academic productivity of students with specific learning disabilities* [Master's thesis, California State University, Dominguez Hills]. CSU ScholarWorks. https://scholarworks.calstate.edu/downloads/bc386t66m

25. Arquero, J. D. M., Reine, F., Soriano, A. C. B., Belmonte, A. K. A. R., Romero, J. M. N., & Villarama, J. A. (2024). Coping through the unforeseen: Comparison of adaptive strategies on learning modalities of students in public and private educational institutions. *Journal of Interdisciplinary Perspectives, 2*(8). https://ejournals.ph/article.php?id=24137

26. David, L., Biwer, F., Crutzen, R., & de Bruin, A. (2024). The challenge of change: Understanding the role of habits in university students' self-regulated learning. *Higher Education*. https://doi.org/10.1007/s10734-024-01199-w

27. Feraco, T., Casali, N., & Meneghetti, C. (2023). Adaptability favors positive academic responses and posttraumatic growth under COVID-19: A longitudinal study with adolescents. *European Journal of Psychology of Education, 38*, 1771–1789. https://doi.org/10.1007/s10212-022-00667-0

28. Duterte, J. P., & Importante, G. (2023). Self-regulation and learning outputs of Filipino MOOC learners. In W. R. Murhadi et al. (Eds.), *Proceedings of the 19th International Symposium on Management (INSYMA)* (pp. 399–408). Atlantis Press. https://doi.org/10.2991/978-94-6463-008-4_50

29. Konabe, B., Lapina, A., Birida, A., Ekore, J. O., & Adan, S. (2021). A comparative study of self-regulation levels and academic performance among STEM and non-STEM university students using multivariate analysis of variance. *Turkish Journal of Education*, *10*(2), 76–89. https://files.eric.ed.gov/fulltext/EJ1325557.pdf

30. Rodríguez, S., González-Suárez, R., Vieites, T., Piñeiro, I., & Díaz-Freire, F. M. (2022). Self-regulation and students' well-being: A systematic review 2010–2020. *Sustainability, 14*(4), 2346. https://doi.org/10.3390/su14042346

31. Valenzuela, R., Codina, N., Castillo, I., & Pestana, J. V. (2020). Young university students' academic self-regulation profiles and their associated procrastination: Autonomous functioning requires self-regulated operations. *Frontiers in Psychology, 11*, 354. https://doi.org/10.3389/fpsyg.2020.00354

32. Cabuquin, J. C., & Abocejo, F. T. (2023). Mathematics learners' performance and academic achievement at a public high school institution in Leyte, Philippines. *Formatif: Jurnal Ilmiah Pendidikan MIPA, 13*(2), 123–136. https://doi.org/10.30998/formatif.v13i2.17235

33. Largo, M. T., & Adanza, J. G. (2025). Mathematics assessment practices and the students' academic achievement. *Journal of Interdisciplinary Perspectives, 3*(7),183–194. https://www.jippublication.com/index.php/jip/article/download/40/36/65

34. Silangan, C. S., Mocsir, R. M., Regner, R. M., & Peteros, E. D. (2023). Predictive analysis on students' academic performance in mathematics. *Global Journal of Educational Studies, 9*(1), 1–15. https://doi.org/10.5296/gjes.v9i1.21040

35. Almerino, P. M., Ocampo, L. A., Abellana, D. P. M., Almerino, J. G. F., Mamites, I. O., Pinili, L. C., Tenerife, J. J. L., Sitoy, R. E., Abelgas, L. J., & Peteros, E. D. (2020). Evaluating the academic performance of K–12 students in the Philippines: A standardized evaluation approach. *Education Research International, 2020*, Article 8877712. https://doi.org/10.1155/2020/8877712

36. Street, K. E. S., Malmberg, L.-E., & Schukajlow, S. (2024). Students' mathematics self-efficacy: A scoping review. *ZDM – Mathematics Education, 56*, 265–280. https://doi.org/10.1007/s11858-024-01548-0

37. Yang, Y., Maeda, Y., & Gentry, M. (2024). The relationship between mathematics self-efficacy and mathematics achievement: Multilevel analysis with NAEP 2019. *Large-scale Assessments in Education, 12*(16). https://doi.org/10.1186/s40536-024-00204-z

38. Zakariya, Y. F. (2021). Self-efficacy between previous and current mathematics performance of undergraduate students: An instrumental variable approach to exposing a causal relationship. *Frontiers in Psychology, 11*, Article 556607. https://doi.org/10.3389/fpsyg.2020.556607

39. Mijares III, B. F. (2022). Factors affecting the academic performance of learners in mathematics amidst pandemic.

40. *Psychology and Education: A MultidisciplinaryJournal,5*,624–637. https://doi.org/10.5281/zenodo.7337795

41. Poquita, J. K. C., & Doronio, R. G. (2023). Self-efficacy and motivation as predictors to mathematics performance in online learning. [Master's thesis, Assumption College of Nabunturan]. IJISRT. https://ijisrt.com/assets/upload/files/IJISRT23JUL1538.pdf

42. Lumoto, H. Q. A., Decolas, C. C., Cabalquinto, K. E., & Miranda, A. T. (2024). Exploring students' mathematics performance through self-regulated learning. *Asian Journal of Education and Social Studies, 50*(8), 240–250. https://doi.org/10.9734/ajess/2024/v50i81525

43. Tee, K. N., Leong, K. E., & Abdul Rahim, S. S. (2021). A self-regulation model of mathematics achievement for eleventh-grade students. *International Journal of Science and Mathematics Education, 19*, 619–637. https://doi.org/10.1007/s10763-020-10076-8

44. Abdolrezapour, P., & Ghanbari, N. (2021). Self-regulation in education: Theoretical foundations and practical implications. In A. Jahitha Begum (Ed.), *Cognitive control skills for educational success* (pp. 193–234). Springer. https://doi.org/10.1007/978-981-96-6455-9_6

45. Sinkkonen, M., & Tapani, A. (2024). Review of the concept "self-regulated learning": Defined and used in different educational contexts. *International Journal on Social and Education Sciences, 6*(1), 130–151. https://doi.org/10.46328/ijonses.640