**Journal of Education and Learning (EduLearn)**
Vol. 20, No. 3, August 2026, pp. 1367~1377
ISSN: 2089-9823, DOI: 10.11591/edulearn.v20i3.23427 

# STMP framework in teaching mathematics: its effect on students' anxiety level and mathematics achievement

**Joel C. Arenas[1], John Paul N. Cabotaje[1], Solayha A. Sam[1], Umayma I. Nor[1], Grant Warren Lu[2]**
[1]College of Education, Mindanao State University-Maguindanao, Datu Odin Sinsuat, Philippines
[2]College of Public Affairs and Governance, Mindanao State University-Maguindanao, Datu Odin Sinsuat, Philippines

**Article Info**

***Article history:***

Received Sep 28, 2024
Revised Aug 25, 2025
Accepted Sep 30, 2025

***Keywords:***

Anxiety level
Mathematics strategy
Positive education
STMP model
Students' achievement

**ABSTRACT**

The student, teacher, method, and positive education (STMP) model was developed in this study as a framework to effectively integrate positive education into mathematics instruction and to determine its impact on students' anxiety and mathematics achievement. The effects of incorporating collaborative and active learning activities in mathematics lessons through the STMP model were investigated. This integrated STMP approach focuses on student learning, teaching strategies, collaborative methods, and concepts of positive education, which can be applied with an intervention module designed for teachers. This study utilized a grounded theory approach to develop this framework based on empirical studies, ensuring its relevance and applicability in mathematics performance and anxiety improvement of students. The STMP model synthesizes established educational theories related to student engagement, teaching methods, strategies, and positive education theories to reduce anxiety and enhance mathematical performance. The Beck Anxiety Inventory (BAI) was utilized to measure the anxiety level of 120 students. The results show that improvement was observed between the pre-test and post-test, indicating that students' anxiety levels decreased significantly, and their mathematics achievement increased because of this positive education intervention. This study concludes with a strategy designed to enhance the learning environment by fostering positive behavioral changes among students. In general, the STMP model demonstrates a significant impact in reducing anxiety level and enhancing student outcomes in mathematics.



***Corresponding Author:***

Joel C. Arenas
College of Education, Mindanao State University-Maguindanao
Datu Odin Sinsuat, Maguindanao, Philippines
Email: jcarenas@msumaguindanao.edu.ph

## 1. INTRODUCTION

The Executive Order No. 570, issued by the Philippine Government in 2006, aimed to institutionalize peace and positive education in fundamental education and teacher training, initiating the implementation of peace and positive education specifically in the conflict-affected areas of the country. However, efforts on peace and positive education have not been fully institutionalized due to a lack of accessible and relevant resources. This is why the Commission on Higher Education (CHED) of the country released its Memorandum Order No. 42, series of 2021, suggesting directive rule and practices on peace as well as on positive education.

Peace education promotes the knowledge, skills, and attitudes of the students while positive education gives importance to the study of emotional state and well-being to assist all students, educators,

learning institutions, and communities to thrive. Alam [1] presented that positive education applies positive psychology principles in schools, aiming to enhance both student well-being and academic success, emphasizing that well-being should be a core focus of education. Vital to positive education are 3 prominent models: the positive emotions, engagement, relationships, meaning, and accomplishment (PERMA) model, the broaden-and-build model, and the Geelong Grammar School model. These models teach skills that help students cultivate strong relationships, foster positive emotions, build resiliency, and maintain a thriving lifestyle. The foundation of positive education largely relies on Seligman's PERMA model [2], which aims at improving the quality of life through happiness, peace, and human values.

Benoit and Gabola [3] identify the effectiveness of positive education in significantly enhancing students' well-being. Strengthening instruction by incorporating positive values and well-being is essential, and schools should focus on creating meaningful lessons like in mathematics discipline. Thus, this study explored the effect of incorporating collaborative and active learning activities in mathematics lessons through the STMP model. This integrated approach focuses on student learning, teaching strategies, collaborative methods, and concepts of positive education, which can be applied through an intervention module designed for teachers. Using of cooperative learning strategies can improve academic performance while also creating a supportive classroom environment that helps reduce stress and enhance students' well-being regardless of age, sex or tribe. A study by Kovacevic *et al.* [4] states that interventions should be focused on fostering school belonging along with the development of positive disciplinary practices.

Given this gap of high levels of anxiety and the need for positive emotional support in education, especially in conflict-affected areas of the Philippines. There is a pressing need to address these challenges and provide appropriate guidance for students and teachers through institutionalized learning materials. Therefore, this study has developed a model for mathematics instruction in the country that can be utilized in teaching and learning mathematics effectively using positive education intervention.

## 2. COMPREHENSIVE THEORETICAL BASIS

### 2.1. PERMA model

Positive education emphasizes the exploration of life contentment often portrayed on Seligman's PERMA model [2]. His research incorporates positive psychology into education to help reduce depression among youth and boost overall happiness. It highlights the necessity of teaching that engages both emotional and intellectual aspects in schools. A study by Kovich *et al.* [5] explored the five elements of the PERMA model, confirming its significance for undergraduate students. Therefore, education should focus not only on academic achievement but also on nurturing positive personality traits. A positive psychological intervention based on the PERMA model has been shown to effectively reduce social interaction anxiety among nursing students in vocational colleges and improve their overall well-being [6]. The PERMA model, as depicted in Figure 1, outlines five key components of well-being and happiness that should be incorporated into educational environments: positive emotions (feeling better), engagement (being fully absorbed in activities), relationships (authentic relationship with others), meaning (taking a sense of determination), and achievement (experiencing a sense of accomplishment and satisfaction).

The positive education framework aims to help students cultivate and practice positive skills, enhancing emotional states such as gratitude, joy, resilience, love, and inspiration. Originating from Seligman's work in positive psychology, this approach seeks to understand and improve what contributes to a fulfilling life. Instead of merely defining happiness as the absence of sadness, Seligman's humanistic approach offers a more comprehensive view of individual learning and experiences [2].

Arenas *et al.* [7] described positive education as a learner-centered approach that promotes a positive learning mindset, leveraging students' individual and collective strengths. It encourages learners to take responsibility in their collaboration and interactions with colleagues. Key elements of positive education include relationships, responsibility, gratitude, optimism, strengths, kindness, and engagement.

Modern education increasingly prioritizes not only academic excellence but also well-being. The study of Parcon *et al.* [8] aimed at assessing schools in their compliance of responsibilities to academic excellence and well-being of teachers and students. Positive education provides a practical framework to achieve this, backed by extensive research highlighting the advantages of well-being skills. Norrish [9] underscored that positive well-being is fundamental to the principles of positive psychology and its application in educational settings. Despite increasing interest, positive education has not yet received comprehensive theoretical and empirical attention, especially regarding students in the Asian region, highlighting a significant research gap in this context.

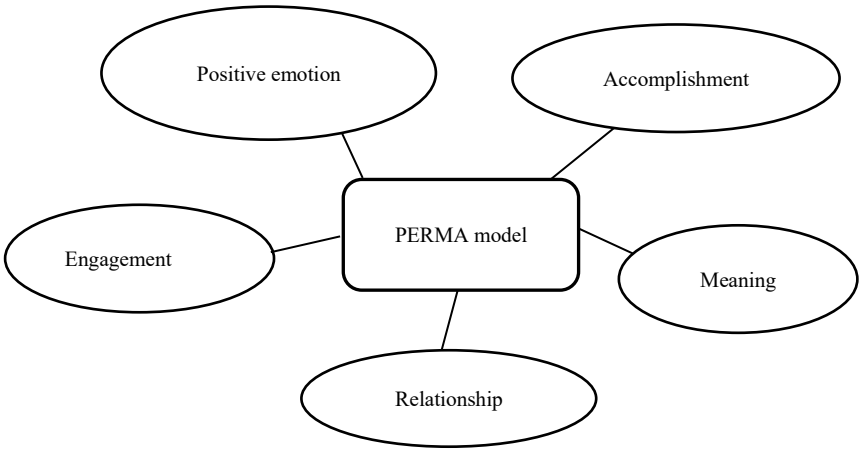


Figure 1. The PERMA model

### 2.2. Broaden-and-build model

The broaden-and-build framework is built on various theories to formulate its model. This framework states that a lack of positive emotions can leave individuals feeling stuck and reduce their behavioral flexibility, making them more predictable. In contrast, when positive emotions are abundant, people flourish, becoming more creative, productive, and resilient. In contrast, negative emotions tend to narrow focus and limit behavioral options. The broaden-and-build theory, illustrated in Figure 2, specifically highlights how certain positive emotions—like joy, interest, contentment, and love—help cultivate enduring personal resources. These expanded resources enable individuals to better adapt to future challenges and promote overall well-being.

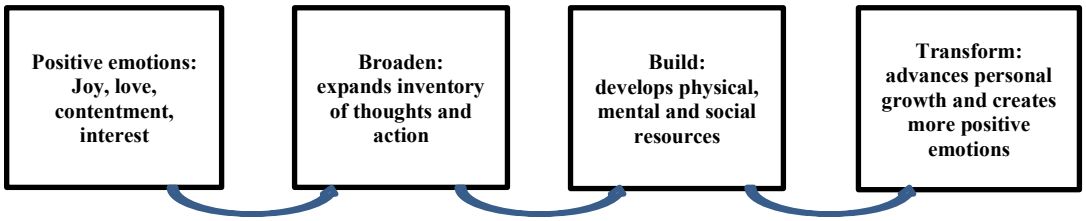


Figure 2. The broaden-and-build theory

### 2.3. Geelong Grammar School model

Geelong Grammar School prioritizes the well-being of both students and staff. The prevalent issue of youth depression, the slight increase in life satisfaction, and the link between learning and positive emotions underscore the importance of teaching well-being skills in schools. Empirical studies demonstrate that teaching resilience, positive emotions, engagement, and meaning significantly enhances these areas for students.

Norrish [9] noted that Seligman [2], a leading figure in positive psychology, has partnered with Geelong Grammar School on a project that has advanced the field of positive education. The Geelong Grammar School model of positive education, illustrated in Figure 3, is based on the scientific foundations of Positive Psychology and is informed by practical experiences and observations from implementing these interventions within the school.

### 2.4. Positive education's impact on mathematics learning and teaching

Mathematics instruction encompasses cognitive processes, but the affective component plays an important part in forming students' perceptions of its value. Alford and White [10] emphasize that growing evidence supports the integration of positive psychology into education, advocating for well-being and happiness as fundamental goals in schools. This approach is seen as essential for enhancing academic strategies, improving school retention rates, and increasing student engagement. Similarly, Jaffe [11] explains

that fostering a growth mindset in mathematics helps students develop resilience and a positive approach to learning, which contributes to their long-term academic success.

Unlike traditional methods that cater to an "average" student and emphasize standardized testing, positive education tailors learning goals to each student's unique needs. Kucuksuleymanoglu [12] argues that integrating well-being principles into education helps students build resilience, stay engaged, and find a greater sense of purpose in their learning. This approach views learning as a collaborative process, where teachers facilitate and value student feedback. Another study by Suldo *et al.* [13] examine the relationship between positive education and anxiety in students. They found that positive education can play a crucial role in helping students manage their anxiety and improve their overall mental health.

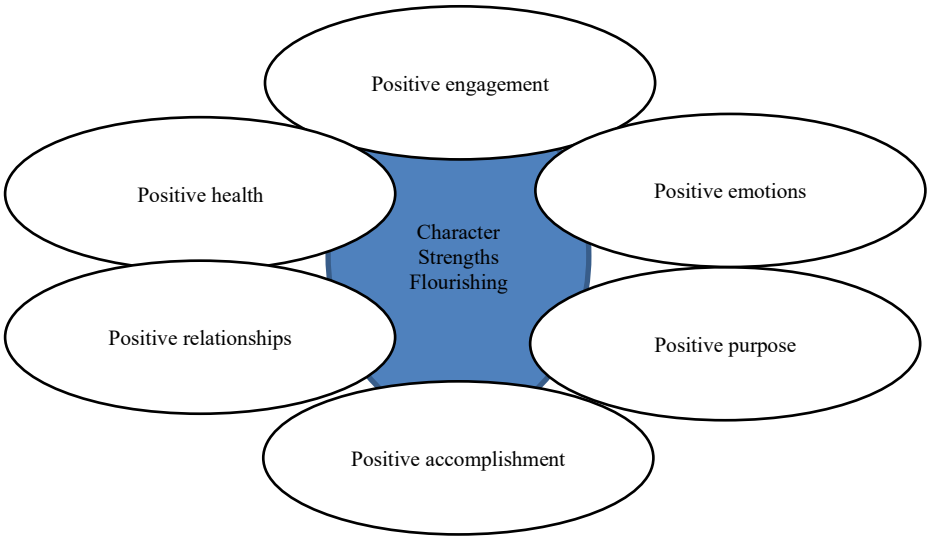


Figure 3. The Geelong Grammar School model

## 3. METHOD

### 3.1. Research design

In this study, several theories were considered which prompted the researcher to develop the STMP theory in integrating positive education in high school curriculum. Library research method was employed in crafting the framework having the grounded theory approach. The STMP framework was used to determine its effectiveness in lowering the anxiety level of students and enhance their academic performance. A dependent sample t-test was used to analyze the results of the pre-test and post-test.

### 3.2. Locale and participants of the study

Two schools were selected to pioneer the use of the STMP framework. Both schools were considered due to its heavy-populated secondary schools (class size of 80 per classroom) in Maguindanao del Sur where students have high anxiety level and very low achievement in Mathematics. The respondents of the study were 120 students selected randomly (60 from each of the two schools, comprising of 30 each experimental or control group). Cohen's d supports this for experimental design where the goal is to observe classroom effects. Mertler [14] on the other hand, emphasizes that in educational research, especially when working with specific classrooms or grades, researchers often have limited access to large numbers of students, and therefore, a sample size of say, 30 participants per group is common to confirm manageability.

### 3.3. Level of anxiety

The "Beck Anxiety Inventory", used by Jackson *et al.* [15] in their research on psychological needs, was utilized in this study to measure the students' anxiety level, with a Cronbach's alpha of 0.92 and a test-retest reliability of 0.75 after one week. This test showed a moderate correlation of 0.51 with the revised Hamilton anxiety rating scale and a mild correlation of 0.25 with the Hamilton depression rating scale. In the current study, a Cronbach's alpha of 0.738 was recorded. The BAI required students to rate the extent to which they were affected by various anxiety symptoms, such as fear of the worst happening, numbness, feeling hot, and difficulty relaxing. The scale and corresponding point system used included:

- 0 point: did not bother me
- 1 point: mildly, but it did not bother much
- 2 points and above: moderately, it was not pleasant at times
- 3 points: severely, it bothered me

The answers to all 21 items were summed up and interpreted as:

- 0-21: low level of anxiety
- 21.5-35: moderate level of anxiety
- 35.5 and above: potentially concerning level of anxiety

### 3.4. Mathematics test

Students' academic achievement was assessed through their performance on a mathematics test designed by the researcher, which included questions based on the STMP framework used by teachers. This test instrument, aimed at measuring academic performance, achieved a Cronbach's alpha of 0.71. To ensure validity, the test was reviewed by two grade 7 mathematics teachers from the school as well as two external math educators. The control group used the standard grade 7 mathematics module, while the experimental group used the positive education learning module developed by the researcher. The pre-test and post-test scores from the 30-item test were scaled and interpreted below:

- 1-6: beginning (70% and below)
- 6.5-12: developing (71%-80%)
- 12.5-18: approaching proficiency (81%-85%)
- 18.5-24: proficient (86%-90%)
- 24.5-30: advanced (90% and higher)

### 3.5. Development of the STMP model

The STMP framework is based on the theories stated in this literature and crafted based on components of students, teachers, methods, and positive education intervention.

#### 3.5.1. Student

The student component involves how learners engage with mathematical knowledge through positive education, drawing on Dewey's progressivism, constructivism, Montessori learning, and ethnomathematics. Norrish [9] describes a flexible, science-informed positive education model designed to support student flourishing. Huang *et al.* [16] also note that teacher improvement in instruction boosts student achievement. Engagement in extra activities has been shown to improve academic performance and non-academic skills such as initiative and social interactions. Research suggests that when students' well-being is prioritized, it leads to better engagement, motivation, and academic outcomes. Podiya *et al.* [17] and Kember and Kwan [18] found that students' emotional well-being and mental health directly affect their ability to concentrate, engage in learning, and perform academically. This is supported by Tus *et al.* [19] stating that students who experience lower levels of stress and greater well-being demonstrate better emotional regulation and social functioning, which leads to more positive academic outcomes.

#### 3.5.2. Teacher

On their well-being, Martin *et al*. [20] demonstrated that teachers who experience greater well-being are more engaged and able to foster a positive learning environment. Teachers' well-being impacts their effectiveness, communication, and relationships with students, all of which are crucial for a productive learning atmosphere. Mealings *et al.* [21] found that teachers who participate in well-being programs show greater satisfaction with their careers, feel more fulfilled, and are more likely to remain in the profession long-term. For teachers, having a supportive environment reduces feelings of isolation and helps maintain a positive professional identity [22].

#### 3.5.3. Method

Method is based on progressivism, collaborative theory, and constructivism. Aragón *et al*. [23] investigate how teaching methodologies influence cognitive processes, demonstrating that instructional strategies have a notable effect on students' mathematical performance. The OECD report in 2014 as cited in Dossey and Funke [24] states that students who embrace problem-solving perform better academically. Collaborative learning strategies, such as games, simulations, problem-solving, and heuristic approaches, can enhance student achievement and support positive education. These methods are crucial for reducing student anxiety and improving the overall learning experience.

### 3.5.4. Positive education

Positive behavioral support (PBS) model effectively manages challenging behaviors in various settings. Integrating positive education strategies encourages the Seligman PERMA model and Fredrickson's theory, enhancing the affective domain in mathematics education. Research of Gilmore *et al.* [25] notes that universities have a social obligation to support student well-being. Positive education plays a crucial part of advancing these initiatives of universities particularly in dealing students who are situated in insecure and challenging communities.

## 4. RESULTS AND DISCUSSION

By integrating the PERMA theory, broaden-and-build model, geelong grammar school theory, Dewey's learning theory, constructivist learning perspectives, the montessori approach, developmental psychology, and the positive behavior support model, a cohesive framework can be created that identifies four essential elements for effectively integrating positive education: student, teacher, the methods, and concept of positive education itself. Figure 4 shows the interrelationships of these four components.

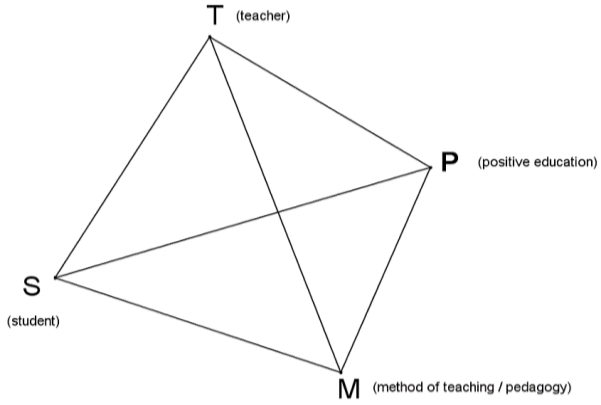


Figure 4. The STMP tetrahedron model and its four components

The STMP tetrahedron model consists of four key components: students (S), teachers (T), method (M), and positive education (P), represented by the vertices of the tetrahedron. Every triangular side of the framework represents the interactions among three components. For instance, the triangular side ΔTSM illustrates the dynamics among the teachers, student, and methods in traditional settings lacking positive education elements. When positive education is integrated, three additional triangular faces—ΔPST, ΔPSM, and ΔPTM—are created, showcasing new interactions. This model assists teachers in systematically planning instructional materials, learning activities, and pedagogical strategies to effectively incorporate positive education.

Teachers will connect each mathematical teaching method to well-being and human values through various collaborative and participatory activities. Initially, they will present the lesson content and then guide students through collaborative tasks and learning activities. After these activities, teachers will relate each task to the principles of positive education outlined in the STMP model. This approach ensures that students acquire both mathematical knowledge and positive education concepts simultaneously. Table 1 provides an example of its application in grade 7 for the second quarter of the national competency framework. In using the STMP model, it is essential for students to understand both mathematical concepts and positive education principles.

The differences in means between the pre-test and post-test levels of anxiety were analyzed for significance using a paired-sample t-test, as detailed in Table 2. Significant differences were found only in the experimental groups from the two schools. In School A, the control group had a t-value of -0.75 and a p-value of 0.46, indicating no significance at 5% level. In contrast, the experimental group showed a t-value of -6.21 with a p-value of less than 0.001, which is significant at 5% and even 1% level. Similarly, the control group in School B had a t-value of -0.67 and a p-value of 0.51, also indicating no significance. However, the experimental group exhibited a t-value of 11.15 with a p-value of less than 0.001, which is significant at 5% and 1% level. Negative t-value implies a decrease in the anxiety level from pre-test to post-test.

Table 1. STMP framework applied in the classroom of grade 7

| Students | Teachers | Methods | Positive education concept |
|---|---|---|---|
| Students differentiate between constants and variables and recognize their relationship to unity and friendship | The teacher introduces the topic then explains that maintaining understanding, respect, and unity among friends is essential for sustaining friendships. Students are also encouraged to have as many friends as they desire, emphasizing that having more quality and trustworthy friends is beneficial. The teacher elaborates this based on his own understanding. | Cooperative learning | Strength in the unity with friends (relationships, positive feelings) |
| Students give contrast between constants and variables and understand their connection to familial love. | The teacher explains that our feelings fluctuate based on our mood, but emphasizes that the pursuit of happiness is a constant goal for everyone, especially finding joy in the love of family. | Cooperative learning | Family love (relationship, positive emotions) |
| Students identify a term and understand how it relates to life satisfaction and familial love. | The teacher might explain that the concepts of variables are akin to the strength derived from family unity. Life satisfaction is assured when there are unity and love within the family, along with active participation in peace initiatives. | Games | Satisfaction in life with the family, values through cooperation (relationship, positive connection with others) |
| Students classify an expression and appreciate its significance for a sense of belonging within the family and serving the community. | The teacher might compare algebraic expression to a term or group of terms implying a family or community with a shared goal, where each member plays a crucial part in achieving success. | Simulation | Belongingness in one's family, Service to the community (broaden-and-build, engagement) |
| Students convert mathematical sentences into algebraic expression and relate this skill to joy and life contentment. | The teacher might draw an analogy between translating algebraic expressions and showing respect and affirmation. For example, just as specific operations such as addition or subtraction are used to translate algebraic expressions, respect (which is added) is given to individuals with significant achievements. | Simulation | Contentment in life (positive feeling) |

Table 2. Dependent sample t-test of the pre-test and post-test level of anxiety

| School | Group | n | Standard error | t-value | p-value | Interpretation |
|---|---|---|---|---|---|---|
| School A | Control | 30 | 2.72 | -0.75 | 0.46 | Not significant |
| | Experimental | 30 | 1.76 | -6.21 | p<0.001** | Significant |
| School B | Control | 30 | 2.43 | -0.67 | 0.51 | Not significant |
| | Experimental | 30 | 1.81 | -11.15 | p<0.001** | Significant |

Note: **correlation is significant at 0.01 level.

Student anxiety can take many forms, such as test anxiety, social anxiety, and generalized anxiety disorder. The American Psychological Association [26] states that anxiety can negatively affect academic performance, resulting in lower grades and reduced participation in classroom activities. Positive education is one that provides a rich vision for education, which emphasizes the student's strengths and tries to minimize his personality deficiencies, this improves the student's subjective well-being and helps to increase his academic engagement and improve achievements [27]. The primary aim of positive education is to foster a positive state of mind among students, teachers, parents, and the entire educational community. The study of

Through the use of the PERMA model in schools, educators and practitioners will look for the enhancement of the positive mental health of both students and teachers. Positive education aims to address such challenges by promoting personal qualities and skills and social contexts that foster resilience and well-being [7]. By integrating principles of peace education, schools can promote a supportive and nurturing environment that prioritizes emotional well-being alongside academic achievement [28]–[30]. STMP Model has brought significant changes to mathematics academic achievement as shown in Table 3.

To effectively enhance educational outcomes and eventually reduce anxiety, it is essential to integrate students, teachers, methods, and principles of positive education. Table 2 shows the result of the dependent samples t-test of the pre-test and post-test level of anxiety.

Differences in the means between the pre-test and post-test scores for academic performance in mathematics was assessed using a paired-sample t-test, as illustrated in Table 3. Significant differences were observed in both the control and experimental groups at the two schools. In School A, the control group had a t-value of 18.91 with a p-value less than 0.001, while the experimental group had a t-value of 20.52, also with a p-value less than 0.001. Similarly, the control group in School B had a t-value of 22.78 and a p-value less than 0.001, and the experimental group had a t-value of 20.86 with a p-value less than 0.001. All results are significant at 5% and even 1% level.

Table 3. Dependent sample t-test of the pre-test and post-test of mathematics academic achievement

| School | Group | n | Standard error | t-value | p-value | Interpretation |
|---|---|---|---|---|---|---|
| School A | Control | 30 | 0.61 | 18.91 | p<0.001** | Significant |
| | Experimental | 30 | 0.60 | 20.52 | p<0.001** | Significant |
| School B | Control | 30 | 0.58 | 22.78 | p<0.001** | Significant |
| | Experimental | 30 | 0.67 | 20.86 | p<0.001** | Significant |

Note: **correlation is significant at 0.01 level.

Research indicates that implementing positive education principles enhances student engagement and motivation, which are vital for academic success. Positive and peace education have a positive impact to those who participate it [7], [27]. The integration of peace education aligns with the goals outlined in the Philippine Constitution, which emphasizes renouncing violence and promoting a peaceful society. Studies indicate significant increases in subjective happiness and encouraging academic outcomes for students participating in such programs. Arenas *et al.* [30] highlights how character strengths like hope, curiosity, perseverance, and love are strongly correlated with life satisfaction and academic success. Incorporating these elements in educational practices enhances student engagement and reduces mental health issues. Positive education strategies, like those integrating elements of the PERMA model (positive emotion, engagement, relationships, meaning, and accomplishment), help foster a positive school environment that supports motivation and academic success [31]. Zewude and Maria [32] highlight that psychological capital, which includes hope, confidence, resilience, and optimism, contributes significantly to student motivation, well-being, and academic success.

## 5. CONCLUSION

This study presents a hands-on and effective framework for integrating positive education, designed to support teachers in regions of the Philippines where high levels of anxiety and low mathematics achievement are common. Utilizing the STMP model can enhance academic performance and decrease anxiety level, making learning more meaningful and rewarding for students. Specifically, the model significantly reduces students' anxiety levels, an important factor in creating a more conducive learning environment. Lower anxiety enables students to focus better on their studies, engage more actively in classroom activities, and approach challenges with a more positive mindset. In addition to reducing anxiety, the STMP model also leads to improved student outcomes in mathematics. By addressing both emotional and behavioral aspects, the model supports students in developing stronger analytical skills, greater perseverance, and a deeper understanding of mathematical concepts. As a result, students' overall performance in mathematics improves, contributing to their academic success and long-term confidence in their capabilities. Thus, this is supporting CHED Philippines' Memorandum Order No. 42, series of 2021 suggesting guiding principles and practices on peace as well as on positive education.

## FUNDING INFORMATION

This study did not receive any specific grant from any funding agency.

## AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

| Name of Author | C | M | So | Va | Fo | I | R | D | O | E | Vi | Su | P | Fu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Joel C. Arenas | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| John Paul N. Cabotaje | ✓ | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | | | |
| Solayha A. Sam | ✓ | | | ✓ | | | | ✓ | | ✓ | ✓ | | ✓ | |
| Umayma I. Nor | | | ✓ | ✓ | | ✓ | | | ✓ | | ✓ | ✓ | | |
| Grant Warren Lu | ✓ | | ✓ | | | | ✓ | | | ✓ | | ✓ | | ✓ |

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

## CONFLICT OF INTEREST STATEMENT

There is no conflict of interest in this study.

## INFORMED CONSENT

We obtained informed consent from all individuals included in this study.

## ETHICAL APPROVAL

This study followed an ethical approval from the Ethics and Research Committee of Mindanao State University-Maguindanao with ERC Code: OVCRE-ERC-2023-102.

## DATA AVAILABILITY

The data that support the findings of this study are openly available in American Psychological Association at https://doi.org/10.1037/0003-066X.56.3.218 and in a systematic review study in Journal of Education and Learning at https://doi.org/10.11591/edulearn.v18i2.21136.

## REFERENCES


[1] A. Alam, "Investigating sustainable education and positive psychology interventions in schools towards achievement of sustainable happiness and wellbeing for 21 st century pedagogy and curriculum," *ECS Transactions*, vol. 107, no. 1, pp. 19481–19494, Apr. 2022, doi: 10.1149/10701.19481ecst.

[2] M. E. P. Seligman, *Flourish: a visionary new understanding of happiness and well-being*. Free Press, 2011.

[3] V. Benoit and P. Gabola, "Effects of positive psychology interventions on the well-being of young children: a systematic literature review," *International Journal of Environmental Research and Public Health*, vol. 18, no. 22, p. 12065, Nov. 2021, doi: 10.3390/ijerph182212065.

[4] L. Kovacevic *et al*., "The relationship between teachers' disciplinary practices and school bullying and students' satisfaction with school: the moderated mediation effects of sex and school belonging," *PLoS ONE*, vol. 19, no. 5, 2024, doi: 10.1371/journal.pone.0303466.

[5] M. K. Kovich, V. L. Simpson, K. J. Foli, Z. Hass, and R. G. Phillips, "Application of the PERMA model of well-being in undergraduate students," *International Journal of Community Well-Being*, vol. 6, no. 1, pp. 1–20, Mar. 2023, doi: 10.1007/s42413-022-00184-4.

[6] J. Yang, Y. Tan, and C. Yao, "Can a PERMA model-based positive psychological intervention affect the SIA and SWB of vocational college students majoring in nursing in China?" *Frontiers in Psychology*, vol. 15, p. 1337064, Feb. 2024, doi: 10.3389/fpsyg.2024.1337064.

[7] J. Arenas, J. P. Cabotaje, R. J. Cheng, S. Maulana, L. Monir, and S. Sam, "Development of STMP model: a basis of integrating positive education in mathematics," *International Journal of Learning, Teaching and Educational Research,* vol. 24, no. 8 pp. 38–55, doi: 10.26803/ijlter.24.8.3.

[8] B. S. Parcon *et al.*, "Teachers' performance and experiences: an explanatory mixed method design in individual performance commitment and review form compliance," *Multidisciplinary Science Journal*, vol. 7, no. 8, p. 2025365, Feb. 2025, doi: 10.31893/multiscience.2025365.

[9] J. M. Norrish, *Positive education: the geelong grammar school journey*. Oxford, UK: Oxford University Press, 2015, doi: 10.1093/acprof:oso/9780198702580.001.0001.

[10] Z. Alford and M. A. White, "Positive school psychology," in *Evidence-Based Approaches in Positive Education: Implementing a Strategic Framework for Well-being in Schools*, M. A. White and A. S. Murray, Eds. Dordrecht: Springer Netherlands, 2015, pp. 93–109, doi: 10.1007/978-94-017-9667-5_5.

[11] E. Jaffe, "Mindset in the classroom: changing the way students see themselves in mathematics and beyond," *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, vol. 93, no. 5, pp. 255–263, Sep. 2020, doi: 10.1080/00098655.2020.1802215.

[12] R. Kucuksuleymanoglu, "Resilience in lifelong learning for individuals," in *Resilience, Adaptability, and Cultural Awareness Within the Educational Landscape*, H. Özen and G. Polat, Eds. 2025, pp. 69–96, doi: 10.4018/979-8-3693-6040-8.ch003.

[13] S. Suldo, A. Thalji, and J. Ferron, "Longitudinal academic outcomes predicted by early adolescents' subjective well-being, psychopathology, and mental health status yielded from a dual factor model," *The Journal of Positive Psychology*, vol. 6, no. 1, pp. 17–30, Jan. 2011, doi: 10.1080/17439760.2010.536774.

[14] C. A. Mertler, *Action research: improving schools and empowering educators, 6th ed.* Thousand Oaks, CA: SAGE Publications, Inc, 2017, doi: 10.4135/9781483396484.

[15] J. L. Jackson, K. R. Fox, and A. H. Kovacs, "Psychological needs, assessment, and treatment in the care of adults with congenital heart disease," vol. 38, no. 3, pp. 305–316, 2020, doi: 10.1016/j.ccl.2020.04.007.

[16] J. Huang, Y. Tang, W. He, and Q. Li, "Singapore's school excellence model and student learning: evidence from PISA 2012 and TALIS 2013," *Asia Pacific Journal of Education*, vol 39, no. 1, pp. 96–112. 2019, doi: 10.1080/02188791.2019.1575185.

[17] J. K. Podiya, J. Navaneetham, and P. Bhola, "Influences of school climate on emotional health and academic achievement of school-going adolescents in India: a systematic review," *BMC Public Health*, vol. 25, no. 1, Jan. 2025, doi: 10.1186/s12889-024-21268-0.

[18] D. Kember and K.-P. Kwan, "Lecturers' approaches to teaching and their relationship to conceptions of good teaching," *Instructional Science*, vol. 28, no. 5, pp. 469–490, Sep. 2000, doi: 10.1023/A:1026569608656.

[19] J. Tus *et al.*, "The psychological well-being and academic performance of Filipino freshmen tertiary students amidst the new normal of education," *International Journal of Psychology and Behavioral Sciences*, vol. 11, no. 4, pp. 43–49, 2021.

[20] A. J. Martin, R. J. Collie, and E. Frydenberg, "Social and emotional learning: lessons learned and opportunities going forward," in *Frydenberg, E., Martin, A., Collie, R. (eds) Social and Emotional Learning in Australia and the Asia-Pacific,* Springer, Singapore., pp. 459–471, 2017, doi: 10.1007/978-981-10-3394-0_24.

[21] K. Mealings, L. Maggs, and J. M. Buchholz, "The effects of classroom acoustic conditions on teachers' health and well-being: a scoping review," *Journal of Speech, Language, and Hearing Research*, vol. 67, no. 1, pp. 346–367, Jan. 2024, doi: 10.1044/2023_JSLHR-23-00256.
[22] M.-T. Wang, J. L. Degol, J. Amemiya, A. Parr, and J. Guo, "Classroom climate and children's academic and psychological wellbeing: A systematic review and meta-analysis," *Developmental Review*, vol. 57, p. 100912, Sep. 2020, doi: 10.1016/j.dr.2020.100912.
[23] E. Aragón, I. Menacho, J. I. Navarro, and M. Aguilar, "Teaching strategies, cognitive factors and mathematics," *Heliyon*, vol. 10, no. 9, p. e29831, May 2024, doi: 10.1016/j.heliyon.2024.e29831.
[24] J. A. Dossey and J. Funke, "Canadian and United States students' performances on the OECD's PISA 2012 problem-solving assessment," *Canadian Journal of Science, Mathematics and Technology Education*, vol. 16, no. 1, pp. 92–108, Jan. 2016, doi: 10.1080/14926156.2015.1119332.
[25] A. H. Gilmore, A. G. McNeilage, and C. E. Ashton-James, "A scoping review of factors associated with Australian university student wellbeing," *International Journal of Wellbeing*, vol. 15, no. 1, pp. 1–45, Jan. 2025, doi: 10.5502/ijw.v15i1.4063.
[26] American Psychiatric Association, *Diagnostic and statistical manual of mental disorders: DSM-5, 5th ed*. Washington, D.C.: 2013, doi: 10.1176/appi.books.9780890425596.
[27] M. A. White, "Why won't it stick? Positive psychology and positive education," *Psychology of Well-Being*, vol. 6, no. 1, Dec. 2016, doi: 10.1186/s13612-016-0039-1.
[28] S. B. Barrett, C. P. Bradshaw, and T. Lewis-Palmer, "Maryland statewide PBIS initiative," *Journal of Positive Behavior Interventions*, vol. 10, no. 2, pp. 105–114, Apr. 2008, doi: 10.1177/1098300707312541.
[29] J. Nario-Galace, "Peace education in the Philippines: measuring impact," *The Journal of Social Encounters*, vol. 4, no. 2, pp. 96–102, Aug. 2020, doi: 10.69755/2995-2212.1057.
[30] J. C. Arenas, J. P. N. Cabotaje, A. M. A. Agao-agao, C. D. Samson, and S. A. Sam, "The moderating role of positive education to the relationship of level of anxiety and academic achievement in mathematics," *Edelweiss Applied Science and Technology*, vol. 8, no. 5, pp. 429–441, Sep. 2024, doi: 10.55214/25768484.v8i5.1698.
[31] Y. Zhao *et al.*, "From growth mindset to grit in Chinese schools: the mediating roles of learning motivations," *Frontiers in Psychology*, vol. 9, p. 2007, Oct. 2018, doi: 10.3389/fpsyg.2018.02007.
[32] G. T. Zewude and M. Hercz, "The role of positive psychological capital in the prediction of teachers' well-being mediated through motivation: a review of literature," *Athens Journal of Health and Medical Sciences*, vol. 9, no. 4, pp. 245–264, Sep. 2022, doi: 10.30958/ajhms.9-4-4.

## BIOGRAPHIES OF AUTHORS

**Joel C. Arenas** is teaching methods of research and statistics, as well as other professional education and major courses. He obtained his Doctor of Philosophy in Mathematics Education at Education University of Hong Kong. He has been designated as the Dean of the College of Education of Mindanao State University-Maguindanao since August 2022. He can be contacted at email: jcarenas@msumaguindanao.edu.ph.

**John Paul N. Cabotaje** is currently the research director of Mindanao State University-Maguindanao. He is a dedicated educator with a strong academic background, currently completing his dissertation for a Doctor of Philosophy in Education major in Mathematics. He has received awards for his presentations including recognition at the Research and Extension Week and the Ministry of Science and Technology-BARMM Research Forum. His research on mathematics teaching strategies has been acknowledged for meeting international academic standards. He can be contacted at email: jcabotaje@msumaguindanao.edu.ph.

**Solayha A. Sam** is an associate professor V at the College of Education, Mindanao State University-Maguindanao. She earned her Doctor of Education in Educational Management from Notre Dame University in Cotabato City (2022) and her Master of Arts in Education major in General Education from Mindanao State University, Maguindanao (1999). Her encompasses research methods, core professional education courses, and home economics. She also has an extensive research background and has authored several publications throughout her career. She can be contacted at email: solayha.ced@gmail.com.

**Umayma I. Nor** is a teaching staff at the College of Education, Mindanao State University-Maguindanao. She earned her Bachelor of Secondary Education Major in Mathematics in the same institution. Currently finishing her Master of Science Education Major in Secondary Mathematics at Institute of Management Mindanao State University-Maguindanao. Her research interests include mathematics pedagogy and instrumentation. She is conducting research related to mathematics curriculum. She can be contacted at email: norumayma52@gmail.com.

**Grant Warren Lu** is an associate professor V at the College of Public Affairs and Governance, Mindanao State University-Maguindanao. He finished his Master of Science in Social Work at Ateneo de Davao University. Currently, he is studying Doctor of Social Development at University of the Philippines in Diliman. He is a former director of Mindanao State University -Maguindanao's Institute of Peace and Development in Mindanao (IPDM) where he engaged students with various community initiatives. He is also an advocate of women, peace and security. His research interests focus on exploring the lives of women, children, and minority groups across various sectors and social contexts. He can be contacted at email: grantlu@msumaguindanao.edu.ph.