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A qualitative study on anxiety level, life satisfaction and students' mathematics performance in positive education

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Abstract

Positive education, often referred to as the science of happiness, focuses on enhancing the quality of life by fostering happiness, peace, and adherence to human values. This research is a crucial part of initiatives aimed at advancing positive education in schools situated in insecure and challenging communities. The students' experiences related to their anxiety levels, life satisfaction, and mathematics performance were categorized and analyzed. Additionally, the experiences of the teachers who used the researcher-developed positive education module were also examined. Before the intervention, themes such as fear, anxiety, irritation, palpitations, loneliness, feelings of being unloved or unlucky, and low academic performance were identified and coded. These experiences were confirmed through interviews with teachers. After the intervention, new themes emerged, including increased calmness, satisfaction, contentment, motivation, security, and happiness. Students appeared more relaxed, enthusiastic about attending school, and visibly more cheerful. The students also demonstrated a heightened interest in learning mathematics.

Keywords: Level of Anxiety; Life Satisfaction; Mathematics Performance; Positive Education

1. Introduction

Students from conflict-affected areas often perform poorly in school due to lack of social and emotional skills. Exposure to conflict affects children in several ways, ranging from direct killings and injuries, to more subtle, yet persistent and irreversible effects on schooling, health, nutrition, future opportunities and well-being [1]. This can also lead to depression and anxiety, causing students to fear leaving their homes and losing interest in school. To help these students recover and build resilience, it is crucial to create real-life connections that make schooling meaningful. Teachers face the challenge of integrating this supportive approach into their lessons to bring hope and resilience inside the classroom. Despite the difficulties, teachers have the important role of guiding students to find happiness and life satisfaction, and become agents of change.

Mathematics, as D'Ambrocio [2] points out, is essential for promoting human values such as justice and dignity, regardless of gender, nationality, or culture. It plays a significant role in our daily lives and in advancing various fields through innovation. Therefore, schools should emphasize making math education more meaningful. This is one reason why teachers undergo training and professional development—because they are key to student success. Such training often includes strategies for participatory teaching, collaborative group work, and effective group discussions. These methods are vital in basic education as they help reduce students' anxiety and depression, enhance their life satisfaction, and maximize learning. Participatory teaching and cooperative learning strategies also encourage student engagement and foster a positive attitude [3].

This study is anchored on the previous research, particularly the Seligman PERMA Model which includes Positive emotions, Engagement, Relationships, Meaning, and Accomplishment. These five key elements for well-being should be

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embedded in lessons to help students achieve quality education. Additionally, it draws on Fredrickson [4] Broad-and-Build Theory in 2001, which asserts that positive emotions develop people's perspectives and gradually promote more positive changes in their characters. These frameworks shape the positive education interventions and significantly influence the development of the positive education inside the classroom.

Positive education, commonly known as the science of happiness, aims to improve quality of life by promoting resiliency in the anxiety experienced, life satisfaction and motivation to learn. This study plays a key role in efforts to advance positive education in schools located in unstable and difficult environments to deal with these aim of positive education.

This study, therefore, determined what the experiences of these displaced students are using the positive education intervention particularly in their Mathematics class and how these affected to their level of anxiety, life satisfaction and mathematics learning. The teachers' experiences in teaching Mathematics using positive education intervention were also determined to support these claims of the students. These qualitative research intends to understand the experiences of the teacher and students in the teaching and learning of positive education.

2. Methodology

2.1. Research Design

This study employs a qualitative research design, featuring closed group interviews with students to explore both teachers' and students' perceptions and experiences regarding the use of positive education in Math lessons. Teachers were interviewed about their experiences with teaching positive education. The research utilized a case study approach, focusing on students from a province in the Philippines who face challenging conditions, including tribal conflicts and a chaotic environment.

According to Lincoln and Guba [5], as cited by Creswell [6], a case study framework includes a problem, context, issues, and lessons learned. In this study, the positive education intervention was examined to determine its effectiveness in addressing the identified issues, with the aim of drawing valid conclusions and deriving meaningful lessons from the results.

The study utilized a semi-structured interview approach to gather data from students and teachers. Students, who were instructed in Mathematics using positive education techniques, and their teachers, who were briefed on implementing the intervention, were both involved. The diverse responses from the group interviews were coded and analyzed to support the theoretical framework of the study.

While interviews were the primary method of data collection, the study also included several classroom observations to reinforce the findings. Prior to conducting the interviews and observations, the researcher obtained permission from the Schools Division Superintendent and School Principals. Mathematics teachers were informed about the intervention process through their respective principals. The research took place in two schools (School A and School B), each with one Mathematics teacher and one teaching assistant. Typically, a class in a Philippine public secondary school consists of 60 students, but 5 students from each school were selected and interviewed, totaling 20 Grade 8 students from the first sections of two secondary schools in Maguindanao, Philippines, in the school year 2023-2024. Both students and teachers were interviewed before and after the intervention to assess their mathematics performance, anxiety levels, and life satisfaction.

2.2. Data Analysis

Data analysis for the study was performed using NVivo as a software tool to organize and examine qualitative and unstructured data. An expert external coder was also consulted to assist with the analysis. The data were analyzed according to an initial coding scheme and marginal remarks.

Although the choice of methods and procedures does not guarantee validity, they are crucial for minimizing validity threats and enhancing the quality of the conclusions. Maxwell [7] identifies two major threats to the validity and quality of qualitative research: researcher bias and reactivity, which are relevant to this study as well. Researcher bias involves the impact of the researcher's theories and beliefs on the selection and analysis of data. Murphy and Aguinis [8] highlight that research bias can lead to a selective choice of methods and outcomes, potentially affecting the study's validity if respondent selection is influenced by personal preference. To address this, the study's respondent selection was based on Schwind et al. [9], which examined mindfulness practices as a teaching strategy and involved a similar intervention

approach. Additionally, determining an appropriate sample size in qualitative research depends on judgment and experience in assessing the quality of the data relative to its intended use.

Reactivity, another threat identified by Maxwell [7], refers to changes in respondents' behavior or performance due to their awareness of being studied. To mitigate this, the study allowed teachers to continue their usual teaching methods, apart from the intervention.

The 4-week Intervention Timeframe and flow Chart is shown in Figure 1.

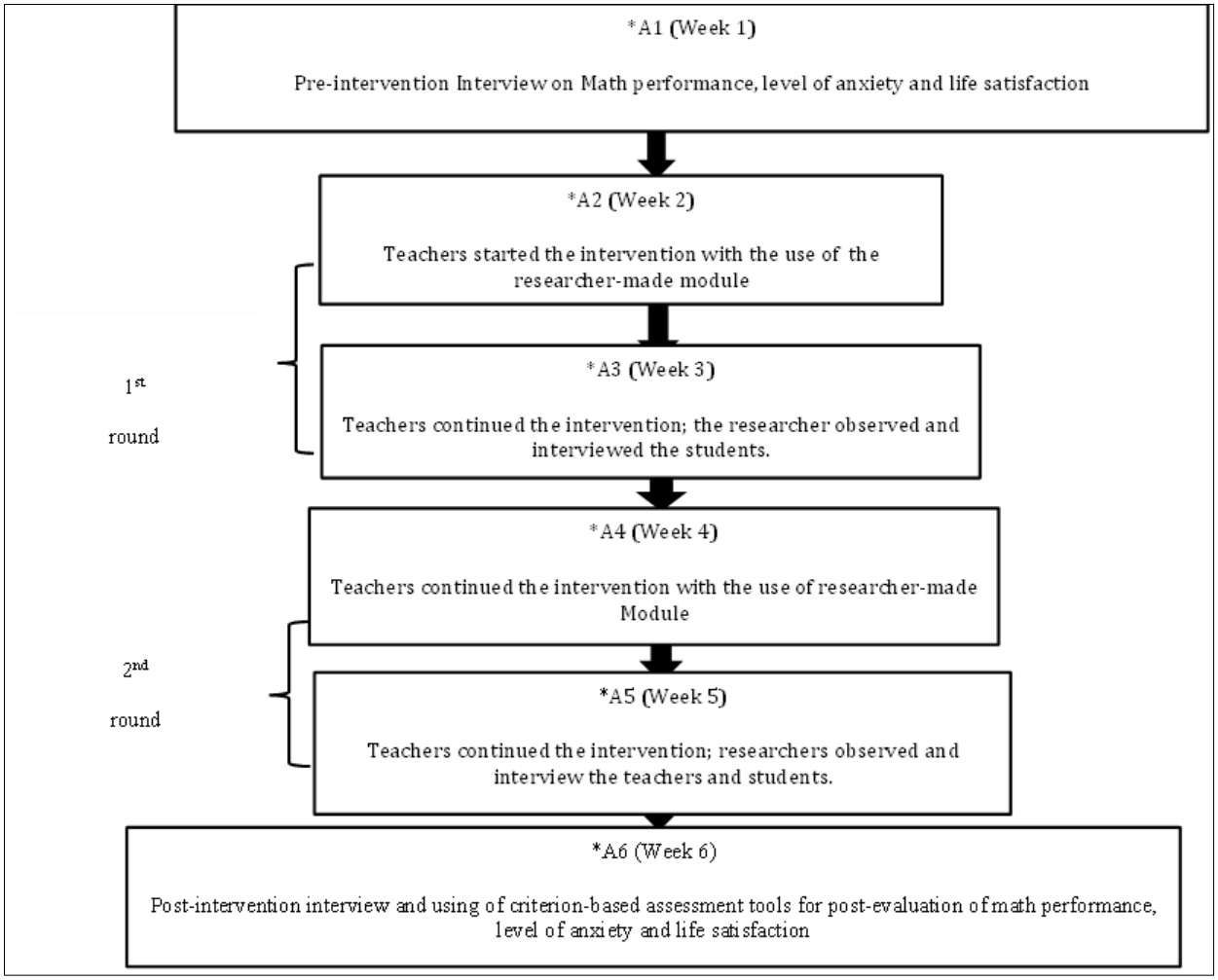

Figure 1 The 4-week Intervention Timeframe Flow Chart

Figure 1 illustrates the schedule of the 4-week intervention. According to the framework, interviews were conducted during the first and final weeks, while lessons incorporating the intervention took place during the second, third, fourth and fifth weeks. Table 1 supports this framework by detailing the weekly observations conducted during the lessons. These observations included descriptions of the classroom atmosphere, noting aspects such as active learning, student participation, academic noise, and engaging activities. The coding of these themes was applied in both schools, as recorded in the researcher's weekly observations presented in Table 1.

Table 1 Weekly observation of the Researcher in the two schools

	Observation	
Observation Week	School A	School B
First Week of Intervention	The teacher assessed students' levels of anxiety, life satisfaction, and math performance through focus group discussion.	The teacher assessed students' levels of anxiety, life satisfaction, and math performance through focus group discussion.
Second Week of Intervention	During the lesson on Numerical Expressions, the teacher engaged students in various learning activities and introduced the concept of peace through unity, cooperation, and community service.	In the lesson on Numerical Expressions, students were highly engaged and enjoyed translating verbal phrases into algebraic expressions. The teacher used this opportunity to discuss the concepts of contentment and happiness in life.
Third Week of Intervention	In another lesson on Numerical Expressions, students were actively involved in the activities, and the teacher emphasized the importance of accepting responsibility.	During the lesson on evaluating algebraic expressions, students had fun with the activities while the teacher introduced the importance of environmental care.
Fourth Week of Intervention	While teaching addition and subtraction of polynomials, the students were quite noisy during their activities. The teacher used this opportunity to discuss the positive education principle of respecting others.	In the lesson on Multiplication of Polynomials, students actively participated in the "Promote It" activity. The teacher also addressed and processed the concept of gender equality.
Fifth Week of Intervention	In a lesson on solving inequalities, students enjoyed fun activities, and the teacher highlighted the concepts of sportsmanship and teamwork.	In the lesson on solving inequalities, students enjoyed activities related to helping those in need, reflecting the positive education concept.
Last Week of Intervention	The teacher assessed students' levels of anxiety, life satisfaction, and math performance through focus group discussion.	The teacher assessed students' levels of anxiety, life satisfaction, and math performance through focus group discussion.

Table 1 displays the researcher's observations from the two schools during the teacher's instruction of positive education. Interviews about the students' experiences were conducted during the first and last weeks, while the teacher implemented the intervention in the classroom during the second through fifth weeks. The teachers were also interviewed as to their experiences in the last week of intervention.

2.3. Researcher-Made Module Used by the Teacher

The module developed for the study addressed topics from the second half of the Second Quarter Period, including Constants, Variables, Algebraic Expressions, Verbal and Mathematical Phrases, Polynomials, the Law of Exponents, and Fundamental Operations on Polynomials. It was reviewed and validated by ten experts in mathematics education. Designed to incorporate principles of positive education, the module aligns with the Geelong Grammar School (GGS) Model, which offers a structured approach to integrating positive education into the curriculum. This model emphasizes six key domains of wellbeing: Positive Emotion, Positive Engagement, Positive Accomplishment, Positive Purpose, Positive Relationship, and Positive Health. The module was provided to teachers as a resource for implementing positive education in their lessons.

3. Results and discussion

Before the positive education intervention, students discussed their anxiety, life satisfaction, and Mathematics performance in a closed group discussion. They all shared a common sense of fear due to their experiences with airstrikes and bomb explosions. They described living with a constant sense of threat, feeling as if danger could appear at any moment. Students reported experiencing hunger, palpitations, a sense of bad luck, and general distress. They

sometimes felt afraid to leave their homes or attend school, with heightened worries about being caught in conflicts or being shot. At night, they suffered from disturbing dreams and occasional sleeplessness. The presence of soldiers in their area made them wary of speaking to strangers. Despite these negative emotions, students expressed a sense of life satisfaction, largely due to their strong family bonds. Their close family relationships provided happiness and stability amidst fear and uncertainty. They maintained a positive outlook on life, believing in resilience despite challenges. Regarding Mathematics, most students expressed dislike for the subject and frequently struggled with exams, though quizzes and assignments helped improve their grades.

3.1. Pre-intervention responses of the students

Before the intervention, students participated in a closed group discussion where they shared their experiences and feelings related to anxiety, life satisfaction, and their performance in Mathematics. They collectively expressed similar fears and worries, largely stemming from their experiences with airstrikes and bomb explosions. They reported feeling that each day posed a threat of imminent danger. The frequent presence of military personnel often heightened their sense of impending trouble.

Before the positive education intervention, students participated in a closed group discussion where they shared their experiences and feelings related to anxiety, life satisfaction, and their performance in Mathematics. They collectively expressed similar fears and worries, largely stemming from their experiences with airstrikes and bomb explosions. They reported feeling that each day posed a threat of imminent danger. The frequent presence of military personnel often heightened their sense of impending trouble.

Before the positive education intervention, students took part in a closed group discussion to express their experiences and feelings about anxiety, life satisfaction, and their performance in Mathematics. They shared similar fears and concerns, primarily related to their exposure to airstrikes and bomb explosions. They felt that each day presented a real threat of danger, and the frequent presence of military personnel increased their sense of impending trouble.

Students remarked,

> *"We were sometimes afraid because of ongoing conflicts and fights, always fearing that something bad could happen at any moment."*
>
> *"We were often abruptly awakened by gunshots and screams near our homes, so we tried to hide as much as possible."*
>
> *"We constantly worry about gunshots and airstrikes whenever military personnel are nearby."*

The students reported feelings of anxiety, insecurity, bad luck, and sleeplessness. They were hesitant to leave their homes or go to school due to fears of getting caught in conflicts or being shot. At night, they experienced nightmares and struggled with sleep. The presence of soldiers also made them fearful of interacting with strangers, a concern evident in the researcher's observations. One student described,

> *"My heart races whenever I see them with high-powered weapons." Another added, "There were nights when we couldn't sleep and even had to run for our lives because of gunshots."*

These qualitative responses align with the quantitative findings on the students' anxiety levels before the intervention, linking their moderate anxiety to their distressing experiences. The researcher's observations also confirmed the students' anxiety in interactions with unfamiliar people.

Despite these negative emotions, the students reported a relatively high level of life satisfaction, attributing their happiness to strong family ties and faith. They found comfort in their family support and their belief in resilience, maintaining that life must continue despite the challenges they face.

> "*Life is beautiful. As long as I have my parents with me, I am truly happy, and life feels worthwhile."*
>
> *"Yes, this is what Allah has given us, so we must accept it."*
>
> *"Yes, even though we have aspirations, we continue to live and remain resilient despite the conflicts."*

These statements reflect the quantitative findings regarding the students' life satisfaction prior to the intervention. Their moderate contentment with life seems to be largely due to the support and love they receive from their families, which helps them persevere.

When discussing their views on mathematics and their performance, most students expressed a dislike for the subject and felt insufficiently motivated. They reported low grades in mathematics, which aligns with the initial and developing levels of their pre-test results in academic achievement.

"*I dislike mathematics because the teachers don't explain it well, so we find the subject very difficult."*

"They try to motivate us, but it doesn't seem to be enough to keep us engaged."
"We dislike discussing our grades because they are very low."

3.2. Post-intervention responses of students

After the intervention, students participated in a closed group discussion where they shared their experiences and feelings related to anxiety, life satisfaction, and their performance in Mathematics.

"Life is beautiful. With my parents by my side, I am genuinely happy, and life feels meaningful."

"Yes, this is what Allah has bestowed upon us, and we must accept it."

"Yes, despite our dreams and ambitions, we persist and remain resilient in the face of challenges."

These remarks are consistent with the quantitative data on the students' life satisfaction before the intervention. Their moderate level of contentment appears to stem from the support and affection they receive from their families, which aids them in enduring difficulties.

Regarding their perspectives on mathematics and their academic performance, most students expressed a dislike for the subject and felt inadequately motivated. They noted having low grades in mathematics, which corresponds with their initial and developing levels as seen in their pre-test results.

"I dislike mathematics because the teachers don't explain it well, making the subject seem very difficult."

"They offer motivation, but it isn't enough to keep us engaged."

"We're reluctant to discuss our grades because they are quite low."

"My grades are improving now. I'm hopeful that I'll do even better on the exams because I'm enjoying the math activities."

"I'm motivated by the encouragement and the activities."

"The activities help us achieve better grades. We're optimistic about continuing to improve as we progress with our math lessons."

The post-test results in mathematics show a generally proficient level of achievement. This improvement reflects the students' feedback that they are performing better and achieving higher results due to the engaging activities.

3.3. Teachers Experiences on Teaching Positive Education

To support students' experiences, teachers from both schools were interviewed twice about their experiences in teaching positive education and its impact on students' anxiety, life satisfaction, and mathematics performance. Their feedback was consistently positive. They reported that the intervention has led to favourable outcomes and that they are motivated to continue providing the activities to students. While changing students' perceptions of mathematics is challenging, learning can still be effective if students find the subject engaging and relevant.

"*Most students initially disliked the subject, resulting in very low grades last term. However, with the integration of positive education and the engaging activities, they now enjoy and appreciate these activities. I hope they will gradually develop a fondness for learning mathematics.*"

"The concepts are relatively easy to grasp, and students appreciate the friendly approach of the module."

"It's beneficial to teach positive education because students perform well in class, in their activities, and in assessments. Their values are gradually improving, and they have become more positive."

Regarding student anxiety, teachers acknowledge that students experience fear due to their challenging environment, but they are accustomed to it. The conflicts students face, including peer conflicts, are viewed as typical for their age and contribute to their resilience. While students may be hesitant to interact with strangers, they are more communicative with familiar individuals.

"There is a persistent sense of fear that we can't easily eliminate. Although military personnel and police here are quite friendly."

"Conflicts with classmates are common, but such peer interactions are normal and reflect their unique behaviors."

"Peer conflicts sometimes make students irritable, but this is a typical part of their development." "Occasionally, students yawn in class, but this doesn't necessarily mean they're struggling with the material. They seem to appreciate the positive education approach."

"Sometimes students are reluctant to speak up due to fear, but generally, they are quite talkative and active, especially with people they know."

On the topic of life satisfaction, teachers confirmed that students are content despite lacking material possessions. Teachers themselves are pleased to contribute to students' happiness and satisfaction.

"They continue to smile and appear happy despite facing challenges at home. Conflicts with classmates are part of adolescence."

"I'm able to inspire them through the concepts of positive education. They seem to value life, which makes me happy."

"Despite their poverty, material things aren't essential for happiness. True happiness goes beyond material possessions."

"Even though they face problems, their adherence to Islamic teachings encourages them to respect and fully embrace their lives."

Regarding academic performance, teachers noted that student participation increased during cooperative learning activities, and overall class performance improved.

"*It's expected that their performance would improve with a new strategy. Positive education activities help them appreciate the importance of family and motivate them. The class has become more lively, and students are very engaged."*

"There has been a noticeable increase in student activity and quiz scores, with some improvement among slower learners."

4. Conclusion and Implication

Before the intervention, themes such as fear, anxiety, irritation, palpitations, loneliness, feelings of being unloved and unlucky, and low academic performance were identified and coded. These experiences were confirmed through

interviews with the teachers. Following the intervention, new themes emerged, including calmness, satisfaction, contentment, motivation, security, and happiness. Students displayed increased calmness, enthusiasm for attending school, and visible signs of joy, such as frequent smiling. The study of Ahmetovic et al. [10] offers instructors guidelines for creating a classroom environment that fosters greater motivation and reduces anxiety, with the goal of enhancing student performance. Teachers should, therefore, create a plan to integrate this for a positive classroom environment.

The interview results indicate that elements of positive education—such as fostering connections, responsibility, strength, kindness, and meaning—are being effectively integrated into the STMP model. This integration aligns with the objectives of Seligman's PERMA Model (Positive Emotion, Engagement, Relationship, Meaning, Accomplishment) and other positive education frameworks. Norrish et al. [11] emphasized that the primary goal of positive education is to promote flourishing and positive mental health within the classroom, which this study aims to achieve. Arenas and Man [12] highlight that positive education interventions are effective in boosting academic performance. They also note that life satisfaction in Mathematics is experienced subjectively and varies among different learners. The study theoretically supports Hebb's theory of arousal and the cognitive interference model, demonstrating that higher anxiety levels are generally associated with poorer academic performance. However, positive education interventions can significantly moderate this relationship. Bond et al. [13] suggest that schools should offer secure environments where interventions can enhance well-being and positivity among adolescents. Such interventions are vital for effective learning, as highlighted by the World Health Organization, which notes that students who are physically and emotionally well are also more likely to excel academically. This aligns with the United Nations International Children's Emergency Fund's goal of providing equal opportunities for all children, especially those who are most vulnerable.

Additionally, the findings of this study are particularly relevant for ongoing curriculum reforms in the Philippines. The Department of Education might consider incorporating the STMP model into local communities to support the well-being of disadvantaged students, especially those experiencing high anxiety and low academic performance, particularly in mathematics. In regions with unstable conditions and significant student distress, positive education is especially crucial. The study highlights the need to enhance the K-12 curriculum with positive education to better address the needs of students and communities, particularly in Maguindanao province.

Finally, the results underscore the potential for positive education to be adopted as a pedagogical approach by international schools. This approach could benefit diverse and challenging student populations globally, improving student well-being and strengthening positive education within international curricula.

Compliance with ethical standards

Disclosure of Conflict of interest

There is no conflict of interest in this study.

Statement of ethical approval

This study followed an ethical approval.

Statement of informed consent

Informed consent was obtained from all individual participants included in this study.

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