

The Mediating Effect of Emotional Stability on the Relationship of the Perceived Learning Stress and Mathematical Performance of Grade 11 Students

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Abstract

This study investigates the mediating effect of students Emotional Stability on the relationship between Perceived Learning Stress and Mathematics Performance among senior high school students in Don Marcelino District during the school year 2022-2023. The research employs a descriptive-correlation research design, utilizing a quantitative approach through the administration of a survey questionnaire. The result showed that a big percentage of the respondents display moderate levels of Emotional Stability, moderate levels of Perceived Learning Stress, and an approaching proficiency level in Mathematics Performance. Furthermore, the study revealed a negative correlation between perceived learning stress and emotional stability, and between perceived learning stress and mathematics performance. However, the research findings indicated that there is a positive correlation between the students' levels of emotional stability and mathematics performance. Finally, the study identified a significant mediation effect of students' emotional stability on the relationship between perceived learning stress and mathematics performance. These results addressed the research objective, highlighting the importance of emotional stability as a mediating factor in the relationship between students perceived learning stress and mathematics performance. It sheds light on the complex interplay between the variables, emphasizing the need for interventions and support systems that promote emotional well-being to enhance academic outcomes.

Keywords: Emotional Stability; perceived learning stress; mathematics performance; mediation; grade 11 students.

1. Introduction

Mathematics is a vital subject that everyone should know about. It is a fundamental subject that is present in every field (Jones, 2022). Schuster (2023) emphasized that everyone utilizes mathematics in their daily lives. Naturally, it should be taught to every student in school (Sokolowski & Ansari, 2017). However, even though this subject is absolutely necessary, a lot of people try to avoid it because they find it stressful and very hard to learn (Abina, 2021). With this, poor mathematics performance has remained a world problem over the years.

For instance, in the Trend in International Mathematics and Science (TIMMS) 2019, most countries were shown to have only 10% of their Grade 4 pupils escaping the low benchmark which means 90% are at a minimum level of proficiency (Mullis et al., 2020). Additionally, low achievement in mathematics is an evident problem in the Philippines as well. The National Achievement Test (NAT) result for SY 2012-2013

revealed that students are in fact weak in Mathematics with a general Mean Percentage Score (MPS) of 46.73 which is far off versus the standard level of 75% (Dela Cruz, 2017).

Moreover, a world-wide pandemic happened in 2020, and everyone was shaken. According to Pokhrel & Chhetri (2021), the COVID-19 outbreak set off schools to unexpectedly close in 2020 which interrupted the academic journey of over 1.6 billion pupils in not less than 180 nations. With this implementation, students faced many challenges, not just academically, but also socially, emotionally and psychologically (Camacho-Zuñiga et al., 2021; Shatla et al., 2021; Al-Maskari et al., 2022). In the past two years, a lot of changes have happened: students became stressed, a lot of people emotionally struggled, and students' academic performance, especially mathematic performance, with schools adopting the modular distance learning model for two years straight, has turned out to be lower than ever. As Pope (2021) and Johnson (2020) emphasized that, since the beginning of the COVID-19 pandemic, high school students have been experiencing increased stress and decreased interest in learning. In addition, emotional stability, a personality factor which was proven by Kalita (2016) to affect academic performance. Now, due to the new normal, this factor is now lower than ever (Fischer et al., 2021).

The pandemic in 2020 made mathematics performance around the world even worse (Contini et al., 2022). A certain study supports this and claims that other alternative delivery modes that will be utilized instead of face-to-face, have negatively affected mathematical achievement (Moliner et al., 2022). There are studies that have shown that learning math through distance learning in the pandemic has been effective and positively engaging (Aksan, 2021; Kalogeropoulos et al., 2020). However, there are also reports that show that math performance during the first school year of the pandemic got worse. Arundel and Modan (2021) asserted that the average mathematical performances have become significantly lower now in the new normal than the prior system that the world once had, which ranges from 8 to 12 percentile points lower. Truly, during this health crisis, children are falling behind in mathematics (Sawchuk & Sparks, 2020).

With all of these, a lot can be said about the current situation regarding students' mathematics performance, especially given how emotionally and stressful this decade had started. Thus, the researcher, as a math major, is curious and has come to the conclusion that there is really a need to evaluate the mediating role of students' emotional stability towards the relationship between their perceived learning stress and mathematical performance, especially in these trying times.

1.1. Objectives of the Study

This study aimed to determine the mediating effect of students' Emotional Stability towards the relationship between Perceived Learning Stress and Mathematics Performance in senior high schools of Don Marcelino District.

Specifically, it sought to:

1. Determine the level of students' Emotional Stability.
2. Determine the level of students' Perceived Learning Stress.
3. Determine the level of students' Mathematics Performance.
4. Determine the significant relationship between students' Perceived Learning Stress and Emotional Stability.
5. Determine the significant relationship between students' Emotional Stability and Mathematical Performance.
6. Determine the significant relationship between students' Perceived Learning Stress and Mathematical Performance.
7. Determine the Mediating effect of Emotional Stability on the relationship of the Perceived Learning Stress and Mathematical Performance of grade 11 students in Don Marcelino District, Davao Occidental.

1.2. Conceptual Framework of the Study

The conceptual framework of the study is presented in Figure 1. The schematic diagram shows the dependent variable, the mathematics performance of grade 11 students which could be influenced by the independent variable, perceived learning stress and mediating variable, emotional stability.

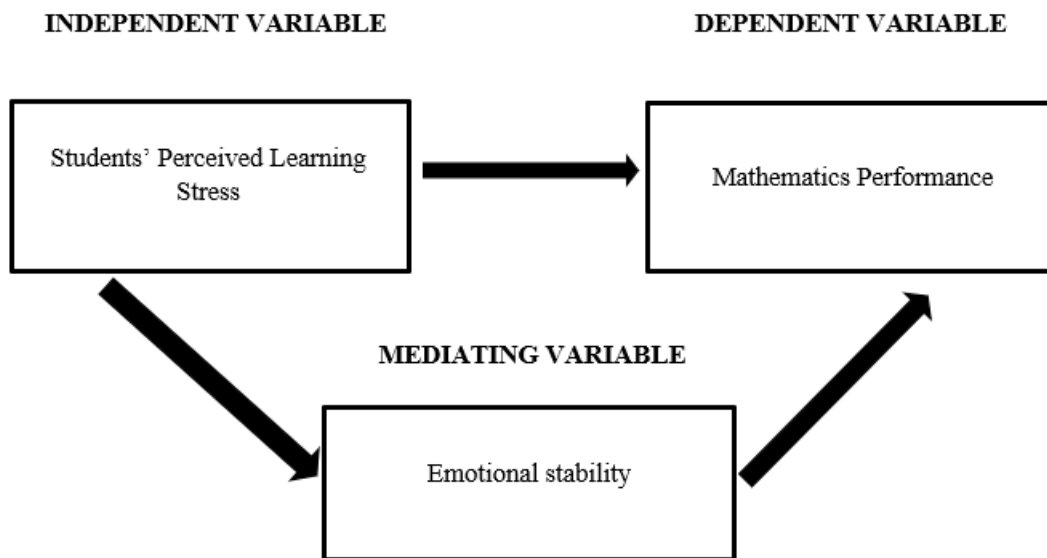


Figure 1. The Schematic diagram showing the relationship of the independent, dependent and mediating variables of the study.

1.3. Hypotheses

The null hypotheses were tested and were verified in this study at 0.05 level of significance.

Ho₁: There is no significant relationship between students' emotional stability and perceived learning stress.

Ho₂: There is no significant relationship between students' emotional stability and mathematics performance.

Ho₃: There is no significant relationship between students' perceived learning stress and mathematics performance.

Ho₄: There is no mediating effect of students' emotional stability to the relationship between perceived learning stress and mathematics performance.

2. Methodology

This study followed quantitative research design using the descriptive-correlation method. The descriptive method was used to determine and describe the level of emotional stability, perceived learning stress, and mathematics performance of the students. The correlation method utilized a survey method which aimed to find the significant relationship between perceived learning stress and mathematics performance of grade 11 students as mediated by emotional stability. The grade 11 students enrolled in secondary schools that offer senior high school in Don Marcelino District for School Year 2022-2023 were the respondents of the study. The researcher adopted the survey – questionnaires formulated by the established researchers in the fields of education and psychology. One of the adopted questionnaires was the Perceived Learning Stress Scale by Lazarevic and Bentz (2021), which is a transformed adaptation of the Perceived Stress Scale by Cohen et al. (1983), and this was employed to find out the level of perceived learning stress of students. Another part of the instrument would be the Big Five Inventory by Goldberg (1993), specifically items on neuroticism vs. emotional stability which was recently tested for reliability and validity by Satow (2021). This scale was put to use to ascertain students' emotional stability. Lastly, the grade 11 students' grades from their General Mathematics Subject were collected from the registrar offices of the respective schools. This represented the students' mathematical performance. The researcher secured institutional permission, including a letter of endorsement from the dean of the institute of professional and graduate studies of SPAMAST, and obtained consent from the superintendent of the schools division office of Davao Occidental and principals of the secondary schools involved before the survey questionnaires were administered to the respondents. The gathered data were treated with different statistical tools including mean, correlation analysis, multiple regression analysis, mediation analysis and Sobel test.

3. Results and Discussion

3.1. Students' Emotional Stability

Table 1. The Level of Students' Emotional Stability

Range	Descriptive Rating	Frequency (F)	Percentage (%)
36-50	High	75	27.88
25-35	Moderate	128	47.58
10-24	Low	66	24.54

n=269; %=100; Mean=30.34; SD=7.97

The level of students' emotional stability is depicted in Table 1, which shows that the mean emotional stability score is 30.34. This indicated that on normal standard, the respondents in the study displayed moderate emotional stability with some variation in their scores. A significant portion of the respondents, accounting 47.58% of the total sample population, exhibited a moderate level of emotional stability. This suggests that most students possess an average level of emotional stability enabling them to remain calm in certain situations. However, they may encounter challenges in managing their emotions effectively. While they may display confidence at times, they also have a tendency to experience mood swings. Additionally, the data revealed that 27.88% have high Level, meaning, some of the students in the study have very strong level of emotional stability, and they lean to be collective, quiet, and resistant to emotional stress. Also, they are more likely to be sure of themselves and are not easily angered or demoralized by losses. Additionally, 24.54% are in low level of the total sample population. This insinuates that a few of the students in the study have a

weak level of emotional stability, and these learners are more expected to be sensitive, be easily anxious, and be more susceptible to feeling gloomy and might appear irritable if they are stressed or strained in their current situations. The result is in line with the study of Muntean et al. (2022) when they found out that the level of Emotional Stability among their respondents in Romania was medium or moderate even with the COVID-19 at hand. The same goes with the results of the study of Saad and Ahmed (2020) which pointed out that their respondents in Arab Republic of Egypt have moderate level of emotional stability. This shows that the same with other countries, moderate levels of emotional stability is also observed in the Philippines, specifically here in Don Marcelino. However, the results are contrary to Kalita (2016) whose results showed that many of the students in Assam, India have high levels of Emotional Stability. The results of Tat'yana et al. (2016) differs with the current results as well with the study's result being 50% of the respondents have high levels of emotional stability, whereas 50% have low levels of emotional stability.

3.2. Students' Perceived Learning Stress

Table 2. The Level of Students' Perceived Learning Stress

Range	Descriptive Rating	Frequency (F)	Percentage (%)
27-40	High	108	40.15
14-26	Moderate	140	52.05
0-13	Low	21	7.80

n=269; %=100; Mean=24.01; SD=6.43

In table 2, the level of students' perceived learning stress is displayed. According to the mean perceived learning stress score of 24.01, the students in the research displayed moderate perceived learning stress on average is being presented. The data shows some variation in their perceived learning stress scores, 6.43. A majority of respondents, 52.05% of the overall sample group, reported moderate levels of perceived learning stress which indicates that for the respondents' point of view, learning throughout the first half of the school year 2022-2023 was a normal day to day activity in which everything was ordinary and at times, a hassle. It is followed by High Level, with 40.15 % of the students thinking that learning is stressful, unpredictable, and uncontrollable. Lastly, 7.80% of the total sample population is low level, meaning, only few students have a weak level of perceived learning stress and view learning as stress-free, comfortable, and peaceful. Additionally, the result is parallel to the study done by Emmanuel et al. (2014), showed that the most of the students reported moderate levels of stress, whereas none of them reported severe levels. Malik and Javed (2021), also had similar results with the current study since 82.5% of the 966 students in Oman that they had surveyed had moderate stress in the new normal learning. Another study in Palestine by Radwan (2021) also had results of a larger percentage of the students having moderate stress.

3.3 Students' Mathematics Performance

Table 3. The Level of Students' Mathematics Performance

Range	Descriptive Rating	Frequency (F)	Percentage (%)
27-40	High	108	40.15
14-26	Moderate	140	52.05
0-13	Low	21	7.80

n=269; %=100; Mean=24.01; SD=6.43

Table 3 shows the level of Mathematics performance of the students. Most of the respondents displayed approaching proficiency Level of mathematics performance with 39.78% of the total sample population. This means that Most students, having gained fundamental knowledge, skills, and guidance from their math teacher or peers, can effortlessly and flexibly apply them in authentic tasks. It is followed by 28.25% of students having Proficient Level who have acquired essential knowledge, skills, and comprehension, and can seamlessly and adaptably apply them in real-world tasks. Moreover, 18. 96% are still in the Developing Level, and these are students who have a basic level of knowledge, skills, and understanding, but require assistance throughout the execution of authentic tasks. Additionally, few of the respondents are in Advanced Level, and the students in this level surpass the essential prerequisites in terms of knowledge, skills, and understanding, and are capable of seamlessly and adaptably applying them in authentic tasks. However, 0% of the total sample population was at the Beginning Level, meaning, there were no students that were surveyed that face challenges in meeting the understanding prerequisite, and they have not acquired or developed the essential fundamental knowledge or skills. Furthermore, the average Mathematics grades of the respondents for the School Year 2022 – 2023 is 83.51 with qualitative description “Approaching Proficiency” and a standard deviation of 6.70. This suggests that the respondents still need a strong foundation in mathematics cultivates critical thinking, logical reasoning, and problem-solving abilities that are applicable beyond the realm of mathematics itself. The outcome agrees to the research done by Contini et al. (2022), wherein during the COVID-19 pandemic, it was stated that Mathematics Performance around the world became even worse. Comparable results were observed in the study of Ducay and Alava (2021) whose mean mathematical performance of the respondents is 80.38 which is approaching proficiency as well. Dissimilar results was discovered by Agtarap and Miranda (2022), with 48.56% of the total sample population, having a proficient level in their Mathematics performance, followed by only 29.14% having approaching proficiency level. Studies by Peteros et al. (2019) and Capuno et al. (2019) also differ with the current results as to a great number of their respondents are in the developing level whose Mathematics grade only ranges from 75-79.

3.4 Relationship between Students’ Perceived Learning Stress and Emotional Stability

Table 4. The relationship between Students’ Perceived Learning Stress and Emotional Stability

Variables	R-Value	Description	P-Value	Interpretation
Students’ perceived learning stress and Students’ emotional stability	-0.479*	moderate	<0.001	significant

* Correlation is significant at 0.05 level (2-tailed)

The relationship between students’ perceived learning stress and emotional stability is presented in Table 4. The study acquired a significant negative correlation result between students' perceived learning stress and emotional stability. The correlation coefficient of -0.479 indicates the strength and direction of the relationship between perceived learning stress and emotional stability. The negative sign indicates that as the level of perceived learning stress increases, the level of emotional stability decreases. The magnitude of -0.479 suggests that there is a moderate negative correlation between the two variables. The p-value of less than 0.05 suggests that this negative correlation is statistically significant, meaning that it is unlikely to have occurred by chance. This provides strong evidence to support the conclusion that perceived learning stress affects students' emotional stability. The result is the same with the discoveries of Ali Ahmed and Cerkez

(2020), which stated that there is a significant relationship between anxiety, depression, stress, and emotional stability, indicating that higher levels of depression, anxiety, and stress are associated with lower levels of emotional stability. The studies of Strizhitskaya et al. (2018) and Dillon (2019), had parallel results with the current study as well in which their results states that emotional instability could lead to high perceived stress, and that lower levels of stress will indicate higher emotional stability. Negative relationship between these two variables have really been observed by researchers.

3.5 Relationship between students' Emotional Stability and Mathematical Performance

Table 5. The relationship between students' Emotional Stability and Mathematical Performance

Variables	R-Value	Description	P-Value	Interpretation
Students' emotional stability and students' mathematical performance	0.282*	Low	<0.001	significant

* Correlation is significant at 0.05 level (2-tailed)

The relationship between students' emotional stability and students' mathematical performance is presented in Table 5. According to the study results, there is a significant positive correlation between students' emotional stability and their mathematical performance. The correlation coefficient of 0.282 shows the direction and degree of the relationship between mathematical performance and emotional stability. The positive sign implies that as emotional stability increases, so does mathematical performance. The value of 0.282 shows that the two variables have a low positive correlation. The p-value of less than 0.05 suggests that this positive correlation is statistically significant, meaning that it is not likely that it happened by coincidence. The notion that emotional stability influences students' mathematics performance can be strongly supported by this substantial data. The result is the same with the findings of Kalita (2016) which stated academic accomplishment rises when emotional stability is high, whereas academic achievement falls when emotional stability is poor. Success decreases with a low level of emotional stability. The same goes with the study done by Zhang and Zeigler (2016) which stated that emotional stability affects or influence mathematics grades.

3.6 Relationship between students' Perceived Learning Stress and Mathematical Performance

Table 6. The relationship between students' Perceived Learning Stress and Mathematical Performance

Variables	R-Value	Description	P-Value	Interpretation
Students' emotional stability and students' mathematical performance	0.282*	Low	<0.001	significant

* Correlation is significant at 0.05 level (2-tailed)

The relationship between students' perceived learning stress and students' mathematical performance is presented in Table 6. The findings show a significant negative relationship between students' levels of

perceived learning stress and their mathematical performance. The perceived learning stress and mathematical performance are negatively correlated, as indicated by the correlation value of -0.238. This implies that the level of mathematical performance tends to decline as perceived learning stress rises. This negative correlation is statistically significant, with a p-value of less than 0.05 suggesting that the relationship is unlikely to have occurred by chance. The findings in Table 7 thus give substantial evidence for the claim that students' mathematical performance is influenced by their perceived learning stress. The result is parallel to the study conducted by Taha et al. (2017), stated that low final grades and poor academic performance are linked to pupils' high stress levels. Another study with closely similar results is the study of Spivey et al. (2020), which disclosed that perceived stress and academic performance are inversely correlated. Additionally, Talib (2012), also found out that perceived learning stress and academic performance are significantly negatively correlated. On the contrary, studies such as Emmanuel et al. (2014) and Mohsen (2017) showed that there is no significant relationship involving academic performance and perceived stress levels unlike the this study's results.

3.7 Mediating effect of Emotional Stability on the relationship of the Perceived Learning Stress and Mathematical Performance

Table 7. Mediating effect of Emotional Stability on the relationship of the Perceived Learning Stress and Mathematical Performance

Effect	Estimates	SE	Lower CI	Upper CI
Indirect Effect	-0.1075*	0.0267	-0.1627	-0.0578
Perceived learning stress → Emotional stability	-0.5845*	0.0669	-0.7162	-0.4527
Emotional stability → Mathematics performance	0.1834*	0.0556	0.0744	0.2934
Direct Effect				
Perceived learning stress → Mathematics performance	-0.1402 *	0.0689	-0.2759	-0.0045
Total Effect	-0.2477 *	0.0619	-0.3696	-0.1258

* Regression coefficient is significant at 0.05 level

Mediating effect of emotional stability on the relationship of the perceived learning stress and mathematical performance is presented in Table 7. It was found that the level of students' perceived learning stress significantly affects the level of students' emotional stability with the regression coefficient of -0.5845 and p-value of less than 0.05. Further, results also showed that students' emotional stability had a significant effect on their Mathematics Performance with regression coefficient of 0.1834 with p-value of less than 0.05. These results conform to the study of Solomon (2013) indicating that perceived stress significantly affect academic achievement , and Zhang and Zeigler (2016), stating that there is a positive relationship between emotional stability and mathematic achievement. It was also established that perceived stress and emotional stability together predicts academic achievement (Talib, 2012; Kalita, 2016).

The overall indirect effect is -0.1075, which is the product of the effects of students' perceived learning stress to students' emotional stability and students' emotional stability to the Mathematics Performance with p-value of less than 0.05. The results of which is proven by Strizhitskaya et al. (2018) whose study results stated that if the emotional stability increases, the levels of students' perceived learning stress decreases.

On the other hand, the direct effect of students' perceived learning stress to the Mathematics Performance of the Students has a regression coefficient of -0.1402 with p-value of less than 0.05. This implies that students' perceived learning stress had a significant effect on the Mathematics Performance of the Students. The result supported with the findings of Chandelkar and Shetty (2019), revealed a significant effect of students' perceived learning stress on their mathematics performance. Students who that have higher levels of perceived learning stress consistently exhibited lower performance in mathematics compared to their peers who reported lower levels of stress. The relationship between perceived learning stress and mathematics performance was found to be negative, indicating that when stress levels increases, academic performance decreases with it (Spivey et al., 2020).

Moreover, the Total Effect has a regression coefficient of -0.2477 which is the sum of the indirect and the direct effect. The Indirect Effect is -0.1075 which means that mediation of students' perceived learning stress and students' emotional stability and mathematics performance of the students is about 43.39%, while direct effect of students perceived learning stress to mathematics performance is 56.61%. Since, the direct effect of students perceived learning stress to Mathematics performance is nonzero and is significant, it could imply that the mediation exhibited is partial mediation.

3.8 Significance of Mediation

Table 8. Summary of the Sobel Mediation Test

Indirect Effect	Estimates	SE	P-Value
Perceived Learning Stress → Emotional Stability	-0.5845	0.0669	0.002
Emotional Stability → Mathematics Performance	0.1839	0.0556	

Finally, to check whether the mediation existing is significant, a Sobel Test was employed and the result is presented in Table 8. Since the p-value is less than 0.05 level of significance, then we reject the null hypothesis and conclude that the mediation effect of students' emotional stability to the relationship between Students' Perceived Learning stress and their Mathematics Performance is significant.

The result of the study was somehow related to the previous study of Ayesha et al. (2020), explored the mediating role of emotional stability as well which concluded that the variable was statistically significant to academic performance. The same goes with Nehra et al. (2023), who investigated the mediating role of emotional stability with other variables in their study. It is truly evident that the mediating role of Emotional stability towards other variables has been studied for quite some time now. However, none has yet to discover its mediating role towards the relationship of perceived learning stress and mathematics performance. Finally, it has been sought out.

4. Conclusion

Conclusions have been drawn from the results of this study's data. First, a large percentage of the respondents displayed moderate level of students' emotional stability with a mean percentage score of 30.34.

Moreover, majority of the respondents displayed a moderate level of students' perceived learning stress with an average of 24.01. Furthermore, many of the respondents displayed approaching proficiency level of mathematics performance wherein their average mathematics grades for the School Year 2022-2023 are 83.51 with qualitative description "approaching proficiency". Also, the level of students' perceived learning stress significantly affects their emotional stability negatively, implying that as the students' perceived learning stress increases, their emotional stability decreases. Additionally, the level of students' emotional stability significantly affects the level of their mathematical performance positively, indicating that as the students' emotional stability rises, their mathematical performance also rises. Further, the level of students' perceived learning stress significantly affects the level of their mathematical performance negatively, denoting that as the students' perceived learning stress raises, their mathematical performance drops. Lastly, the students' emotional stability significantly mediates the relationship between their perceived learning stress and mathematics performance. This means nurturing students' emotional stability would significantly progress the effect of their perceived learning stress on their mathematics performance.

5. Recommendations

The following are suggested in the light of the above outcomes and conclusions:

1. Parents, schools and educators shall create an environment that promotes emotional stability and equips students with the necessary tools to manage stress effectively. Ultimately, this will positively impact students' mathematics performance and contribute to their overall academic success.
2. School administrators shall provide a raise awareness to integrate stress management techniques into the curriculum, such as relaxation exercises, mindfulness practices, and time management strategies. Teach students effective ways to manage and reduce stress levels, both during study sessions and before assessments.
3. Department of Education shall provide professional development opportunities for mathematics teachers to enhance their pedagogical knowledge and instructional strategies because even if respondents' mathematic grades in this new normal show an approaching proficiency level, many students still have difficulty understanding the subject and perform terribly. Thus, for all students to attain proficiency level or better, it is recommended to create and implement intervention programs that will target their learning requirements.
4. School shall create a supportive and stress-aware environment that helps students manage their perceived learning stress effectively and enhance their emotional stability. By fostering emotional well-being, students will be better equipped to cope with academic challenges, leading to improved overall performance and a positive learning experience.
5. School shall involve parents/guardians and teachers in dealing with students' emotional needs and provide support when necessary. Offer guidance on stress management, emotional regulation, and effective coping strategies. Create opportunities for students to discuss their emotions, seek advice, and develop resilience in the face of academic challenges.
6. Teacher shall create a supportive and inclusive classroom environment where students feel comfortable expressing their concerns and seeking help. Encourage open communication and provide opportunities for students to share their stress-related experiences and support one another.
7. Educators shall create a supportive and emotionally healthy learning environment that indirectly improves students' perceived learning stress levels and enhances their mathematics performance. By fostering emotional stability, developing coping skills, and promoting well-being, students will be better equipped to navigate academic challenges and reach their full potential in mathematics.

8. Future researchers should further explore on the interaction of students' emotional stability, perceived learning stress, and mathematics performance, and should try to conduct this study on other municipalities or provinces in the Philippines.

References

- Abina, I. (2021). The mediating effect of students' attitude to student career aspiration and mathematics achievement. *Journal of Research and Advances in Mathematics Education*, 6(3), 158-173.
- Agtarap, R., & Miranda, A. T. (2022). The mediating effect of students' resiliency on the relationship of self-concept and mathematics performance. *Asian Journal of Education and Social Studies*, 36(2), 1-10.
- Ali Ahmed, T., & Cerkez, Y. (2020). The impact of anxiety, depression, and stress on emotional stability among the university students from the view of educational aspects. *Journal of Educational Psychology-Propósitos y Representaciones*, 8(3), e520.
- Al-Maskari, A., Al-Riyami, T., & Kunjumuhammed, S. (2022). Students academic and social concerns during COVID-19 pandemic. *Education and information technologies*, 27(1), 1-21.
- Arundel, K. & Modan, N. (2021). Reports: Math, reading progress slowed during first full school year of pandemic. Retrieved from <https://www.k12dive.com/news/progress-slowed-in-math-and-reading-during-pandemic/604025/>.
- Asplund, K. (2023). Alva guide to the big five: Emotional stability explained. Retrieved from <https://www.alvalabs.io/blog/alva-guide-to-the-big-five-emotional-stability-explained#:~:text=Emotional%20stability%20defined,-At%20its%20core&text=This%20trait%20influences%20our%20ability,provoked%20or%20disheartened%20by%20setbacks.>
- Camacho-Zuñiga, C., Pego, L., Escamilla, J., & Hosseini, S. (2021). The impact of the COVID-19 pandemic on students' feelings at high school, undergraduate, and postgraduate levels. *Heliyon*, 7(3), e06465.
- Capuno, R., Necesario, R., Etcuban, J. O., Espina, R., Padillo, G., & Manguilimotan, R. (2019). Attitudes, Study Habits, and Academic Performance of Junior High School Students in Mathematics. *International Electronic Journal of Mathematics Education*, 14(3), 547-561.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24(4), 385-396. <https://doi.org/10.2307/2136404>
- Contini, D., Di Tommaso, M., Muratori, C., Piazzalunga, D., & Schiavon, L. (2022). The COVID-19 pandemic and school closure: learning loss in mathematics in primary education.
- Creswell J. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Sage Publications, Inc.
- Dela Cruz, M. (2017). Science education and a thinking society. Retrieved from <https://opinion.inquirer.net/102324/science-ed-thinking-society>
- Deped Order NO. 31, S. 2012
- Deped Order NO. 8, S. 2015
- Deped Regional Memorandum NO 076, S. 2013
- Dillon, A. (2019). Autism and families: Perceived stress, emotional stability & coping in parents of children with ASD.
- Ducay, J., & Alava, A. (2021). Self-efficacy, anxiety, and academic performance in mathematics of junior high school students. *Globus Journal of Progressive Education*, 11(1), 41-46.
- Emmanuel, A., Adom, A., & Solomon, F. (2014). Perceived stress and academic performance of senior high school students in Western region, Ghana. *European journal of business and social sciences*, 2(11), 88-101.
- Fischer, R., Bortoloni, T., Pilati, R., Porto, J., & Moll, J. (2021). Values and COVID-19 worries: The importance of emotional stability traits. *Personality and individual differences*, 182, 111079.
- Griga, W., & Griga, W. (2017). *Quantitative Research Design and Methodology. Managing Inpatriation: Making Assignments More Effective*, 73-91.
- Goldberg, L. (1993). The structure of phenotypic personality traits. *American Psychologist*, 48(1), 26-34. <https://doi.org/10.1037/0003-066X.48.1.26>
- Johnson, R. (2020). Students stressed out due to coronavirus, new survey finds.
- Jones, W. (2022). What if math is a fundamental part of nature, not something humans came up with?. Retrieved from <https://www.tntech.edu/cas/math/what-is-mathematics.php>
- Kalita, S. (2016). Academic achievement of high school students in relation to their emotional stability. *Journal of Process Management – New Technologies, International*. doi:10.5937/jouproman4-11932
- Kalogeropoulos, P., Roche, A., Russo, J., Vats, S. & Ruso, T. (2020). Learning mathematics from home during covid-19: Insights from two inquiry-focussed primary schools. *EURASIA Journal of Mathematics, Science and Technology Education*. <https://doi.org/10.29333/ejmste/10830>.
- Lazarevic, B., & Bentz, D. (2021). Student perception of stress in online and face-to-face learning: the exploration of stress determinants. *American Journal of Distance Education*, 35(1), 2-15.
- Malik, M., & Javed, S. (2021). Perceived stress among university students in Oman during COVID-19-induced e-learning. *Middle East Current Psychiatry*, 28(1), 49.

- Mohsen, A. S. (2017). The impact of self-esteem, academic self-efficacy and perceived stress on academic performance: A cross-sectional study of Saudi psychology students. *European Journal of Educational Sciences*, 4(3), 51-63.
- Moliner, L., Alegre, F., & Lorenzo-Valentin, G. (2022). The COVID-19 Pandemic's Impact on 9th Grade Students' Mathematics Achievement. *The COVID-19 Pandemic's Impact on 9th Grade Students' Mathematics Achievement*, 11(2), 835-845.
- Mullis, I. V. S., Martin, M. O., Foy, P., Kelly, D. L., & Fishbein, B. (2020). TIMSS 2019 International Results in Mathematics and Science. Retrieved from Boston College, TIMSS & PIRLS International Study Center website: <https://timssandpirls.bc.edu/timss2019/international-results/>
- Muntean, L., Nirestean, A., Popa, C., Strete, E., Ghiga, D., Sima-Comaniciu, A., & Lukacs, E. (2022). The Relationship between Emotional Stability, Psychological Well-Being and Life Satisfaction of Romanian Medical Doctors during COVID-19 Period: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health*, 19(5), 2937.
- Parisi, S., & Shetty, S. (2020). Alive, Provocative, Surprising: Emotional Dimensions of Bio-Synergistic Materials for Socially Meaningful Design. *Diseña*, 1(7), 128-159.
- Peteros, E., Gamboa, A., Etcuban, J. O., Dinauanao, A., Sitoy, R., & Arcadio, R. (2019). Factors affecting mathematics performance of junior high school students. *International Electronic Journal of Mathematics Education*, 15(1), em0556.
- Phillips, A. C. (2016). Perceived stress. In *Encyclopedia of behavioral medicine* (pp. 1-1). Springer.
- Pokhrel, S., & Chhetri, R. (2021). A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. *Higher Education for the Future*, 8(1), 133-141. <https://doi.org/10.1177/2347631120983481>
- Pope, D. (2021). Student stress during the pandemic. Retrieved from <https://ed.stanford.edu/news/student-stress-during-pandemic>
- Radwan, E., Radwan, A., Radwan, W., & Pandey, D. (2021). Perceived stress among school students in distance learning during the COVID-19 pandemic in the Gaza Strip, Palestine. *Augmented Human Research*, 6, 1-13.
- Saad, E. S., & Ahmed, F. M. (2020). Emotional stability of nurses and its relation to their job crafting. *Evidence-Based Nursing Research*, 2(1), 50-59.
- Satow, L. (2021). Reliability and Validity of the Enhanced Big Five Personality Test (B5T). <https://doi.org/10.31234/osf.io/wsugv>
- Sawchuk, S. & Sparks S. (2020). Kids Are Behind in Math Because of COVID-19. Here's What Research Says Could Help. Retrieved from <https://www.edweek.org/teaching-learning/kids-are-behind-in-math-because-of-covid-19-heres-what-research-says-could-help/2020/12>
- Schuster, B. (2023). The importance of math in our lives. Retrieved from <https://slicernewsroom.com/3544/academics/the-importance-of-math-in-our-lives/>
- Shatla, M., Alotaibi, N., Munshi, S., Yaseen, E., Qanadely, E., Abdulaziz, W. & Ali, I. (2021). Covid-19 and its impact on education, social life, and mental health among medical students in Saudi Arabia. *Medical Science*, 25(116), 2708-2717.
- Solomon, O. (2013). Exploring the relationship between resilience, perceived stress and academic achievement.
- Spivey, C. A., Havrda, D., Stallworth, S., Renfro, C., & Chisholm-Burns, M. A. (2020). Longitudinal examination of perceived stress and academic performance of first-year student pharmacists. *Currents in Pharmacy Teaching and Learning*, 12(9), 1116-1122.
- Strizhitskaya, O., Petrash, M., Savenysheva, S., Muratzina, I., & Golovey, L. (2018). Perceived stress and psychological well-being: the role of the emotional stability. In *7th icCSBs 2018 The Annual International Conference on Cognitive-Social, and Behavioural Sciences* (pp. 155-162).
- Talib, N., & Zia-Ur-Rehman, M. (2012). Academic performance and perceived stress among university students. *Educational Research and Reviews*, 7(5), 127.
- Tat'yana, A. S., Morozovaa, L. B., Elena, M., Kochnevaa, D. V. Z., Kostylevab, E. A., & Oxana, G. (2016). Emotional Stability as a Condition of Students' Adaptation to Studying in a Higher Educational. *INTERNATIONAL JOURNAL OF ENVIRONMENTAL & SCIENCE EDUCATION*, 11(15), 7486-7494.
- Zhang, J., & Ziegler, M. (2016). How do the big five influence scholastic performance? A big five-narrow traits model or a double mediation model. *Learning and Individual Differences*, 50, 93-102.