***Original Research Article***

**The Relationship Between Growth Mindset and Mathematics Achievement**



**Abstract**

This research examines the correlation between a growth mindset and mathematical performance among seventh-grade students at Tambobong National High School in Davao City. The researchers employed a descriptive-correlational design to evaluate students' beliefs through an adapted Growth Mindset Scale and collected mathematics grades to measure academic achievement. Results revealed a mean mindset score of 2.09, classified as "Growth Mindset with Some Fixed Ideas," suggesting that students tend to think their abilities can be developed, but they also believe there are certain abilities that are fixed. They are open to growth but might struggle with some challenges. Mathematics performance was rated “very satisfactory,” with a mean general average of 85.8. Pearson correlation analysis yielded a moderate but statistically significant positive relationship (r = 0.219) between growth mindset and academic achievement, indicating that students with stronger growth-oriented beliefs tend to perform better in mathematics. These findings support the theory linking mindset, motivation, and performance and highlight the importance of mindset development as part of educational interventions aimed at improving mathematics achievement.

*Keywords: Growth mindset; Fixed mindset; Mathematics Achievement; Philippines*

**Introduction**

The 2018 PISA report revealed that 71.8% of Filipino students failed to meet the minimum basic learning standards, raising serious concerns about education in the Philippines (Alinsunurin, J. 2021). While East Asian countries lead in producing high-performing students, Filipino students are falling far behind their classmates. Additionally, a recent study conducted among junior high school students in East Java, Indonesia, during the 2022 academic year found that while students demonstrated varying levels of mathematical problem-solving ability, many continued to face challenges in applying these skills to real-life and science-related contexts (Nugroho, Sari, & Lestari, 2023). Statistical analyses revealed that there were no significant differences in mathematics achievement based on these demographic factors. Despite the absence of significant relationships, the study emphasized the need to address learning difficulties in mathematics and to improve instruction that fosters students' ability to apply math in practical scenarios (Nugroho, Sari, & Lestari, 2023). Moreover, Repuya (2021) discovered that students underwent significant transformations in their mindsets: some transitioned from a fixed mentality with limited growth-oriented beliefs to a more robust growth mindset, while others who initially possessed a growth mindset exhibited a propensity toward fixed views following the intervention.

In the local context, research by Velez, Dayaganon, Robigid, Demorito, Villegas, & Gomez (2023) at a private college in Tagum City revealed that students encountered considerable difficulties in grasping mathematical concepts. These difficulties included problem analysis, concept comprehension, identifying correct solutions, forming equations, and simplifying expressions (Velez, Dayaganon, Robigid, Demorito, Villegas, & Gomez, 2023). Recently, various factors influencing students' mathematics achievement have been explored; however, comprehensive analyses specific to the Mindanao region have been limited. A meta-analysis by Callaman and Itaas (2020), which reviewed 50 studies, identified key predictors of mathematics success, including proficiency in mathematical skills, positive attitudes toward the subject, and self-efficacy. The analysis also highlighted significant achievement differences between public and private schools, indicating that school type plays a critical role in student outcomes.

Junior high school students begin to face more complex mathematical concepts that require not only cognitive skills but also a strong sense of perseverance and confidence in learning. However, many students at this level struggle with low self-efficacy and fixed beliefs about their abilities, which negatively affect their performance in mathematics. Developing a growth mindset during junior high is, therefore, This concept is essential because it helps students understand that both intelligence and mathematical ability can improve through effort, practice, and the use of effective strategies. The goal of this study is to provide a significant new understanding of how developing a growth mindset can improve mathematical performance. If these problems are not resolved, low achievement rates could continue, students' future academic and professional options could be restricted, and the nation's advancement in scientific and technological fields vital to its development could be impeded.

*Statement of the Problem:*

This quantitative study examines the connection between math proficiency and a growth mindset in seventh-grade students at Tambobong National High School in Davao City during the academic year 2024-2025. In particular, it aims to answer the following research questions:

1. What is the level of growth mindset among Grade 7 students at Tambobong National High School?
2. What is the level of students' academic achievement in mathematics in terms of their general average at Tambobong National High School?
3. Is there a significant correlation between students' growth mindset and mathematics achievement?

*Hypothesis*

There is no significant relationship between students' growth mindset and mathematics achievement.

*Theoretical/Conceptual Framework*

Carol Dweck's Theory of Mindsets (2006) serves as the foundation for this investigation. According to this theory, students who have a strong growth mindset think that they can get better at work. These students are also better equipped to overcome challenges and risks, persevere through setbacks, and achieve higher math scores. It highlights how a student's mindset affects how they approach learning and solving problems.

Growth Mindset

Mathematics Achievement



*Figure 1. Conceptual Framework of the Relationship between Growth Mindset and Mathematics Achievement*

**Method**

A quantitative research design—more precisely, a descriptive-correlational design—was used in this investigation. With no active control or manipulation on the part of the researcher, this design investigates the relationships between variables. The strength and direction of the relationship between two or more variables—which could be either positive or negative—are revealed by correlation (Bhandari, 2023). Using quantifiable information obtained from standardized questionnaires and academic performance metrics, this quantitative approach sought to establish the relationship between the independent variable (growth mindset) and the dependent variable (mathematics achievement).

In Davao City, Philippines, at Tambobong National High School, the study was carried out. Because it offered the required setting and participants to investigate the relationship between a growth mindset and mathematical proficiency among students, the school was selected as the implementation site.

Based on their availability, a total of 100 Tambobong National High School Grade 7 students were chosen as responders using purposive sampling. According to the inclusion criteria, the students had to have been enrolled in the 2024–2025 academic year prior. Purposeful sampling, as defined by Etkan, Musa, and Alkassim (2016), is a non-probability sampling technique in which participants are chosen based on specific characteristics relevant to the objectives of the study.

Students' attitudes toward learning and intelligence were evaluated by the researchers using the Growth Mindset Scale. This scale was an adaptation of Dweck's Growth Mindset Questionnaire (Dweck, 2006), which gauges students' support for a growth mindset as opposed to a fixed mindset using four-point Likert scale items. The twenty (20) questions that make up the growth mindset scale are ten (10) questions about growth mindset and ten (10) questions about fixed mindset. The evaluation criteria supplied by Dweck were employed by the researchers to assign scores and assess the responses of the participants. The researchers gave each scale indicator the following points in this criterion: Strongly Agree (1 point), Agree (2 points), Disagree (3 points), and Strongly Disagree (4 points) are the fixed mindset indicators. The growth mindset indicators, on the other hand, are strongly disagree (1 point), disagree (2 points), agree (3 points), and strongly agree (4 points).

Data for this study were collected after obtaining the required approvals. The researchers obtained informed consent from the parents or guardians of the students and asked for permission to conduct the study through a formal request letter. In order to assess their growth mindset, the students were asked to complete a Google Form. Easy access and effective response collection are guaranteed by this online form. Furthermore, with the appropriate authorization, the students' math grades were gathered from their subject teacher to gauge their academic performance. Strict confidentiality was maintained throughout the collection process, and all data was used only for research.

Both descriptive and inferential statistical tests were employed in this investigation. The average level of students' responses on the Growth Mindset Scale was ascertained by the researchers by computing the mean scores. To investigate the connection between students' growth mindset and their mathematical proficiency, the researchers used Pearson's r correlation coefficient. This statistical tool assisted in determining whether a student's performance in mathematics was significantly correlated with their growth mindset score. The software version 2.3.28 of Jamovi was used for all analyses.

To guarantee the safety, respect, and rights of every participant, this study closely adhered to ethical standards derived from the British Educational Research Association's (2018) guidelines. These ethical guidelines were followed by the researchers.

1. **Results**

**Table 1.** Descriptive Table

|  |  |  |  |
| --- | --- | --- | --- |
| **Independent Variable** | **Standard Deviation** | **Mean** | **Verbal Description** |
| Growth Mindset | 0.224 | 2.09 | High Growth Mindset |
| Mathematics Achievement | 5.68 | 85.8 | Very Satisfactory |

The levels of mathematical proficiency and growth mindset among Tambobong National High School students in Grade 7 are shown in Table 1. With a dispersion of 0.224 and 5.68 from the mean of 2.09 and 85.8, respectively, the standard deviation shows the variability of the growth mindset scores and math proficiency. The average mindset of Tambobong National High School's Grade 7 students is indicated by their mean score of 2.09. Furthermore, Tambobong National High School students in Grade 7 typically receive very satisfactory grades in mathematics, as indicated by their mean mathematics achievement of 85.8.

**Table 2. Test of Relationship**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Independent Variable** | **Academic Achievement** | | | |
| **r-value** | **p-value** | **Decision on Ho** | **Interpretation** |
| Growth Mindset | 0.219 | 0.036 | Reject Ho | Significant |

An r-value of 0.219 and a p-value of 0.036 in Table 2 show a statistically significant positive correlation between growth mindset and mathematical achievement. This implies that students who have a greater growth mindset—the conviction that skills can be acquired via hard work and perseverance—perform better in math. Despite the moderate correlation, it is significant and suggests that encouraging students to adopt a growth mindset could help them achieve better academic results. The observed significant relationship rejects the null hypothesis, as the p-value falls below the 0.05 cutoff.

**Discussions**

The average responses of Grade 7 students to a standardized growth mindset questionnaire were utilized to assess their level of growth mindset in this descriptive-correlational study. The results produced a mean score of 2.09, corresponding to the interpretation, "Growth Mindset with Some Fixed Ideas. While most students are optimistic about the potential for improvement, some maintain rigid perspectives regarding specific skills and may struggle to surmount challenges (Dweck, 2006). While mixed mindsets are prevalent during early adolescence, Dweck's growth mindset theory posits that skills can be cultivated through effort, effective strategies, and external feedback (Yeager & Dweck, 2012). Additionally, the grades from each adviser were aggregated and averaged to assess the students' mathematical proficiency. The analysis reveals that Grade 7 students at Tambobong National High School typically attain a "Very Satisfactory" level in mathematics, with an average grade of 85.8 and a standard deviation of 5.68. Research indicates that students possessing robust growth mindsets exhibit increased resilience when confronted with academic challenges and generally attain superior results in subjects such as mathematics (Claro, Paunesku, & Dweck, 2016).

The relationship between growth mindset and mathematics achievement was analyzed using Pearson’s correlation coefficient, resulting in r = 0.219 and a p-value of 0.036. This signifies a positive and statistically significant correlation at the 0.05 significance threshold. The moderate correlation indicates that students with a stronger growth mindset generally attain superior final grades in mathematics. These findings endorse the notion that cultivating a growth mindset may enhance students' academic performance. This finding responds to our second research question by demonstrating a significant correlation between students' self-efficacy in their mathematical abilities and their actual performance in the subject. Although it does not indicate a direct causal relationship, it reinforces the importance of fostering a growth mindset to enhance students' academic performance.

***Conclusion***

This study emphasizes the significant relationship between mindset and mathematical achievement, indicating that cultivating a growth-oriented perspective may enhance student performance in the classroom. This quantitative correlational study aimed to examine the growth mindset levels of Grade 7 students and assess their relationship with mathematics performance. The analysis reveals that students attained an average growth mindset score of 2.09, classified as "growth mindset with some fixed beliefs." This suggests that although numerous students are confident in their capacity to advance through a growth mindset and effort, some continue to maintain fixed beliefs regarding intelligence.

Recent research among junior high school students corroborates these findings. Dong, Jia, and Fei (2023) examined Grade 7 students in China and discovered that although a growth mindset did not directly forecast mathematics achievement, it significantly affected success indirectly via intrinsic motivation, failure attribution, and mathematics self-efficacy. Mangelsdorf et al. (2023) examined middle school students from socioeconomically disadvantaged backgrounds and found that those possessing a robust growth mindset exhibited superior academic performance and more effective adaptation during school transitions, underscoring its protective function. In a comprehensive longitudinal study conducted in California, Claro and Loeb (2024) discovered that students in Grades 4 to 7 who adopted a growth mindset achieved markedly greater learning gains in mathematics, corresponding to roughly 31 extra days of instruction annually.

***Recommendations***

This study presents several recommendations to foster a growth mindset and improve mathematics achievement in junior high school students. Integrating growth mindset strategies into the curriculum is imperative. Educators ought to deliberately emphasize the value of effort, strategic learning, and perseverance over inherent ability, thereby fostering resilience and a more optimistic perspective toward mathematics in students. To reinforce these principles, schools are urged to implement mindset development activities, including workshops, guided reflection sessions, and storytelling exercises that illustrate instances of personal growth through perseverance and diligence.

Moreover, offering professional development for educators is essential. Educators must be equipped to identify fixed-mindset behaviors and employ evidence-based strategies that promote growth-oriented thinking in students. Providing teachers with these competencies will enhance the classroom environment and directly affect students' attitudes and performance. Parents and guardians are essential in fostering a growth mindset within the home environment. Educational institutions ought to provide orientation seminars or disseminate informative materials to families, advocating for the commendation of effort rather than outcomes and encouraging parental support for children in confronting challenges and deriving lessons from failures.

We recommend conducting additional research to delve deeper into the complex relationship between mindset and academic success. This study employed descriptive and correlational analyses; however, future research may include additional variables such as student motivation, metacognitive strategies, or instructional practices. Employing a mixed-methods or longitudinal design could yield a deeper comprehension of the development of a growth mindset and its interaction with various educational facets to influence learning outcomes.

***References***

Alinsunurin, J. (2021). *Unpacking underperformance: Learning mindsets and the challenge of academic achievement among Filipino students*. SSRN. <https://ssrn.com/abstract=3867956>

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261–271. <https://doi.org/10.1037/0022-0663.84.3.261>

Bhandari, P. (2023, June 22). *Correlational research | When and how to use*. Scribbr. <https://doi.org/10.31234/osf.io/7fk2v>

Callaman, R. A., & Itaas, E. C. (2020). Students’ mathematics achievement in the Mindanao context: A meta-analysis. *JRAMathEdu (Journal of Research and Advances in Mathematics Education), 5*(2), 148–159. <https://doi.org/10.23917/jramathedu.v5i2.10282>

Claro, S., & Loeb, S. (2024). Students with a growth mindset learn more in school: Evidence from a large-scale field experiment. *Educational Researcher*. <https://doi.org/10.3102/0013189X241242393>

Claro, S., Paunesku, D., & Dweck, C. S. (2016). Growth mindset tempers the effects of poverty on academic achievement. *Proceedings of the National Academy of Sciences*, 113(31), 8664–8668. <https://doi.org/10.1073/pnas.1608207113>

Dong, J., Jia, F., & Fei, Y. (2023). How growth mindset influences mathematics achievements: A study of Chinese middle school students. *Frontiers in Psychology, 14*, 1148754. https://doi.org/10.3389/fpsyg.2023.1148754

Dweck, C. S. (2006). *Mindset: The new psychology of success*. Random House. <https://psycnet.apa.org/record/2006-08575-000>

English, L. D. (2016). STEM education K–12: Perspectives on integration. *International Journal of STEM Education, 3*(3). <https://doi.org/10.1186/s40594-016-0036-1>

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1–4. <https://doi.org/10.11648/j.ajtas.20160501.11>

Limeri, L. B., Carter, N. T., Choe, J., Posner, R., Seward, S., Sanders, D., … & Dolan, E. L. (2020). Growing a growth mindset: Characterizing how and why undergraduate students’ mindsets change. *International Journal of STEM Education, 7*(35). <https://doi.org/10.1186/s40594-020-00227-2>

Mangelsdorf, A., Trommsdorff, G., & Cole, P. M. (2023). Growth mindset as a protective factor during school transitions: The role of socioeconomic risk and academic outcomes. *Social Psychology of Education, 26*(1), 45–63. <https://doi.org/10.1007/s11218-023-09863-2>

Mazana, M. Y., Montero, C. S., & Casmir, R. O. (2018). Investigating students’ attitudes towards learning mathematics. *International Electronic Journal of Mathematics Education, 14*(1). <https://doi.org/10.29333/iejme/3997>

Nugroho, M. A., Sari, R. N., & Lestari, I. (2023). *Unveiling mathematics proficiency challenges: A comprehensive needs assessment among junior high school students*. *Journal of Educational Research and Evaluation*, *7*(1), 15–28. <https://www.researchgate.net/publication/380493000_UNVEILING_MATHEMATICS_PROFICIENCY_CHALLENGES>

Repuya, M. A. (2021). Study on students’ mindset shifts after intervention

Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational Psychologist*, 47(4), 302–314. https://doi.org/10.1080/00461520.2012.722805

Velez, A. J. B., Dayaganon, D. G. F., Robigid, J. C., Demorito, J. D., Villegas, J. P., & Gomez, D. O. (2023). Difficulties and coping strategies in understanding mathematical concepts in a private higher education institution in Tagum City, Davao del Norte, Philippines. *Davao Research Journal, 14*(1), 45–54. <https://doi.org/10.59120/drj.v14i1.10>

.