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EFFICACY AND ANXIETY ON MATHEMATICAL UNDERSTANDING OF HIGH SCHOOL LEARNERS: AN APLLICATION OF BANDURA'S SOCIAL COGNITIVE THEORY

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ABSTRACT

This study examined the influence of efficacy and math anxiety on math performance among 250 students. Self-efficacy, general self-efficacy, and mathematics self-efficacy and anxiety were measured using adapted questionnaires, while performance was measured using examination scores. The results were analyzed descriptively, correlationally, and regressively. The findings indicated that the students exhibited high self-efficacy (M=3.84), high anxiety (M=3.41), and low average performance (M=22.10). A correlation done among the performance and the psychological variables (SSE; r=-0.009,p=0.883, GSE; r=0.019,p=0.883, MSEA; r=-0.009,p=0.883) showed there was no significant relationship in mathematics performance. However, a strong positive correlation existed among the efficacy and anxiety measures. Moreover, efficacy and anxiety did not significantly predict performance (R^2=0.001, p=0.954) though confidence and anxiety coexist, they do not directly predict achievement.

Keyword: efficacy, mathematics anxiety, mathematics performance, learners

1. INTRODUCTION

Mathematics is widely recognized as one of the most challenging yet essential academic disciplines, forming the foundation of logical reasoning, problem-solving, and critical thinking. Despite its importance, many high school learners struggle with the subject, often developing low confidence, poor performance, and negative attitudes. Central to this issue is mathematics self-efficacy—students' belief in their ability to learn and perform mathematical tasks. According to Bandura (1997), self-efficacy reflects individuals' judgments of their capability to execute actions necessary to achieve specific outcomes, a factor strongly linked to motivation, engagement, and academic persistence (Pajares & Graham, 2016; Usher & Pajares, 2017).

Self-efficacy, grounded in Bandura's Social Cognitive Theory (SCT), emphasizes the dynamic interaction of personal beliefs, behaviors, and environmental influences. Its relevance has become more pronounced in the post-pandemic setting, where disrupted schooling, limited social interaction, and prolonged online learning have created gaps in learners' confidence, emotional stability, and mathematical competency. Emerging studies report increased anxiety, reduced engagement, and learning regression among students transitioning from home-based modalities—conditions that highlight the growing importance of understanding self-efficacy and anxiety in mathematics learning.

In response to these concerns, this study investigated the relationship between efficacy and anxiety of high school learners' mathematics performance grounded by Bandura's Social Cognitive Theory. Guided by Bandura's SCT, it aims to assess students' levels of Student's Self-Efficacy (SSE), General Self-Efficacy (GSE), and Mathematics Self-Efficacy and Anxiety (MSEA); analyze the relationship of SSE, GSE, and MSEA with learners' mathematics performance; and determine the variable that best predicts learners' mathematics performance.

2. STATEMENT OF THE PROBLEM

This research explores how Bandura's Social Cognitive Theory accounts for the connection between self-efficacy, anxiety, and mathematical performance in high school learners.

Specifically, it sought to answer the following questions:

1. What is the degree of efficacy among high school learners in terms of:

a. student's self-efficacy (ASE);

b. general self-efficacy (GSE); and

c. mathematics self-efficacy and anxiety (MSEA)?

2. Is there a significant relationship among learners' academic self-efficacy (ASE), general self-efficacy (GSE); and mathematics self-efficacy and anxiety (MSEA) on mathematical understanding?

3. What variable best predicts learners' understanding in mathematics?

3. METHODOLOGY

3.1 Research Design

This study employed a quantitative research design in order to systematically measure how learners' confidence links to their math performance. It aims to gather clear statistical results showing how sure learners' feel and see if self-efficacy actually helps them do better in math class.

3.2 Locale of the Study

The study was conducted at Kibawe National High School–Población Campus, Bukidnon, during the Academic Year 2025–2026, which was selected for its accessibility, availability of junior and senior high learners, and the researcher's familiarity with the school context.

3.3 Participants of the Study

The respondents consisted of 250 high school students enrolled in mathematics-related subjects, who were selected through stratified random sampling to ensure relevant data on self-efficacy and mathematics performance. Participation was voluntary, and the objectives of the study were explained prior to data collection.

3.4 Data Gathering Procedure

Data were gathered using three adapted questionnaires: Students Self-Efficacy Scale (SSE; Rowbotham, M. & Schmitz, G.S. (2013), measuring course-related confidence, General Self-Efficacy (GSE; Chen et al., 2001) assessing learners' overall perceived capability, and Mathematics Self-Efficacy and Anxiety Questionnaire (MSEAQ; May, 2009), which evaluated efficacy and anxiety related to mathematics.

This systematic approach ensured that the study is carried out ethically and with rigor, focusing on gathering meaningful data to address the research objectives.

3.5 Statistical Techniques

The data have been analysed using appropriate statistical techniques to ensure accurate interpretation. using descriptive, correlation, and regression to examine the relationships between high school learners' efficacy (SSE, GSE, MSEA) and their mathematics performance. Descriptive assessed the levels of efficacy of the learners', correlational analysis analyzed the strength and direction of relationships among variables, while multiple regression determined the most influential predictor of the learners' mathematics performance.

4. RESULTS AND DISCUSSION

Table 1. Degree of Efficacy Among High School Learners

What is the degree of efficacy among high school learners in terms of:	Mean	Discretion	Qualitative Interpretation
Student's Self-Efficacy (SSE)	3.84	High	Strong Academic Abilities
New General Self-Efficacy (NGSE)	3.67	High	Confident in Their Ability to Succeed
Mathematics Self-Efficacy and Anxiety (MSEA)	3.41	High	Above average self-efficacy/ high anxiety

The findings show that student's self-efficacy (SSE) obtained the highest mean average of 3.84, which is interpreted as High. This indicates that learners possess strong academic abilities and confidence in managing academic tasks and challenges. The general self-efficacy (GSE) recorded a mean of 3.67, also interpreted as High, suggesting that learners are generally confident in their ability to succeed and can effectively handle different learning

situations and pressures. Meanwhile, mathematics self-efficacy and anxiety (MSEA) yielded a mean of 3.41, still within the High range. This implies that although learners demonstrate above-average self-efficacy, they may also experience high anxiety levels when engaging in mathematical tasks. Overall, the results indicate that high school learners possess a high level of self-efficacy in both general and academic contexts. However, the presence of anxiety in mathematics-related tasks suggests that emotional factors may influence their confidence and performance in this specific subject area.

Table 2. Relationship Among Learners' Academic Self-Efficacy (ASE), General Self-Efficacy (GSE); and Mathematics Self-Efficacy and Anxiety (MSEA) on Mathematical Understanding

		Student Self-Efficacy	General Self-Efficacy	Mathematics Self-Efficacy and Anxiety	Math Exam
Student Self-Efficacy	Pearson Correlation	1	.623**	.362**	-.009
	Sig. (2-tailed)		.000	.000	.885
	N	250	250	250	250
General Self-Efficacy	Pearson Correlation	.623**	1	.429**	.019
	Sig. (2-tailed)	.000		.000	.763
	N	250	250	250	250
Mathematics Self-Efficacy and Anxiety	Pearson Correlation	.362**	.429**	1	-.009
	Sig. (2-tailed)	.000	.000		.883
	N	250	250	250	250
Math Exam	Pearson Correlation	-.009	.019	-.009	1
	Sig. (2-tailed)	.885	.763	.883	
	N	250	250	250	250

The table shows the correlation among student self-efficacy, general self-efficacy, mathematics self-efficacy and anxiety, and mathematics exam performance.

Results reveal that student self-efficacy is positively and significantly correlated with general self-efficacy ($r = .623, p < .01$), indicating that learners who have high confidence in their general capabilities also tend to exhibit strong academic self-belief. Likewise, student self-efficacy shows a moderate positive correlation with mathematics self-efficacy and anxiety ($r = .362, p < .01$), suggesting that students with higher self-efficacy also maintain confidence in mathematics despite possible anxiety. Additionally, general self-efficacy and mathematics self-efficacy/anxiety are significantly correlated ($r = .429, p < .01$), showing that general confidence in one's abilities extends to confidence in mathematics-related tasks. However, no significant correlation was found between mathematics exam performance and any of the self-efficacy or anxiety variables, as indicated by correlation coefficients close to zero (e.g., $r = –.009, p = .885$ for student self-efficacy and math exam). This suggests that self-efficacy and anxiety, while related to one another, did not directly influence learners' mathematics test scores in this study. Overall, the findings imply that self-efficacy dimensions are interrelated, but their impact on actual math performance may be mediated by other factors, such as motivation, study habits, or test anxiety.

	Mean	Std. Deviation	N	Interpretation
MATHEXAM	22.1008	6.86022	250	Average math performance was moderate.
STDTSELFEFF	3.8383	.45930	250	Respondents had high self-efficacy in mathematics.

GENSELFEFF	3.6746	.43513	250	Respondents generally perceived themselves as capable in handling tasks.
MATHEFFANXTY	3.4101	.34662	250	Students showed a moderate level of anxiety toward mathematics.

Table 3. Descriptive Statistics

Table 4. Correlations for Best Predictor on Learners' Mathematical Understanding

Variables	Pearson r	Sig. (1-tailed)	Interpretation
Math Exam & Student Self-Efficacy	-0.009	0.443	No significant relationship.
Math Exam & General Self-Efficacy	0.019	0.382	No significant relationship.
Math Exam & Math Anxiety	-0.009	0.441	No significant relationship.
Student Self-Efficacy & General Self-Efficacy	0.623	0.000	Significant positive correlation — students with higher student self-efficacy also tend to have higher general self-efficacy.
Student Self-Efficacy & Math Anxiety	0.362	0.000	Significant positive relationship — higher self-efficacy is associated with higher reported anxiety.
General Self-Efficacy & Math Anxiety	0.429	0.000	Significant positive relationship — those confident in general tasks may still experience math-related anxiety.

Table 5. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.037(a)	.001	-.011	6.89757	.001	.111	3	244	.954

a Predictors: (Constant), MATHEFFANXTY, STDTSELFEFF, GENSELFEFF

b Dependent Variable: MATHEXAM

Table 6. ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.813	3	5.271	.111	.954(a)

Residual	11608.667	244	47.577
Total	11624.480	247	

a Predictors: (Constant), MATHEFFANXTY, STDTSELFEFF, GENSELFEFF

b Dependent Variable: MATHEXAM

Table 7. Coefficients Summary

Predictor	B	β	Sig.	Interpretation
Student Self-Efficacy	-0.475	-0.032	0.700	No significant effect.
General Self-Efficacy	0.737	0.047	0.584	No significant effect.
Math Anxiety	-0.355	-0.018	0.802	No significant effect.

Tables 3-7 presents the correlation and regression analysis between students' self-efficacy, mathematics anxiety, and their mathematics examination performance. The findings reveal that there is no significant relationship between math exam performance and any of the psychological variables considered—student self-efficacy ($r = –0.009$, $p = 0.443$), general self-efficacy ($r = 0.019$, $p = 0.382$), and mathematics anxiety ($r = –0.009$, $p = 0.441$). This suggests that students' level of confidence and anxiety toward mathematics does not directly influence their actual test performance. However, a significant positive correlation was found between student self-efficacy and general self-efficacy ($r = 0.623$, $p < 0.001$), indicating that those who believe in their capability to accomplish mathematics-related tasks also tend to exhibit confidence in handling general challenges. Additionally, student self-efficacy was positively correlated with mathematics anxiety ($r = 0.362$, $p < 0.001$), and general self-efficacy was positively correlated with mathematics anxiety ($r = 0.429$, $p < 0.001$). These findings suggest that while students may generally feel confident, they can still experience anxiety specific to mathematics, reflecting a complex emotional interplay between confidence and performance pressure.

The multiple regression analysis further supports the correlation results. The overall model yielded $R = 0.037$, $R^2 = 0.001$, and $p = 0.954$, showing that the combined influence of student self-efficacy, general self-efficacy, and mathematics anxiety explains only 0.1% of the variance in mathematics exam performance. This indicates that these psychological variables do not significantly predict students' test outcomes. Furthermore, individual coefficients for each predictor were not statistically significant: student self-efficacy ($\beta = –0.032$, $p = 0.700$), general self-efficacy ($\beta = 0.047$, $p = 0.584$), and mathematics anxiety ($\beta = –0.018$, $p = 0.802$). These results imply that while students' beliefs and feelings toward mathematics are important affective factors, they are not direct determinants of achievement in this particular group of respondents.

In summary, the results suggest that the respondents' mathematics performance is not significantly influenced by their self-efficacy or anxiety levels. Nonetheless, the significant interrelationships among the psychological variables highlight that students' confidence and anxiety coexist and may interact in more nuanced ways that do not necessarily translate into differences in academic outcomes. Other external factors—such as learning environment, study habits, or instructional methods—may have a stronger impact on students' mathematics achievement.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the results of the study, it can be concluded that self-efficacy and mathematics anxiety have no significant influence on students' mathematics performance. Although respondents generally demonstrated high self-efficacy and moderate levels of anxiety, these psychological factors were not sufficient predictors of academic

achievement in mathematics. The weak and statistically insignificant correlations between mathematics exam scores and the three psychological variables—student self-efficacy, general self-efficacy, and mathematics anxiety—suggest that confidence and anxiety do not necessarily translate into improved or diminished performance.

This outcome implies that mathematics performance is shaped by a broader interplay of variables beyond internal beliefs and emotions. While students may feel confident in their academic ability, performance outcomes may still depend heavily on factors such as the quality of instruction, learning environment, cognitive strategies, motivation, socio-economic conditions, and prior academic preparation. These external and behavioral components may serve as stronger determinants of success in mathematics than psychological traits alone.

The significant positive correlations among self-efficacy and mathematics anxiety reveal a noteworthy psychological dynamic among students. The finding that higher self-efficacy is associated with higher anxiety suggests that confidence and anxiety can coexist, especially in academic contexts that are perceived as challenging. Students who are highly motivated to succeed in mathematics might also experience greater pressure to perform well, leading to elevated anxiety levels despite their self-assurance. This complexity highlights that emotions in learning are not purely oppositional but can function simultaneously, influencing the way students engage with academic tasks.

The regression analysis further supports the conclusion that self-efficacy and anxiety, though interrelated, do not significantly predict actual performance outcomes. The minimal explained variance (R^2 = 0.001) indicates that these variables contribute very little to explaining differences in test scores among students. In practical terms, this means that having high self-belief or low anxiety does not guarantee high performance in mathematics examinations. Students' outcomes may depend more on consistent practice, effective time management, and familiarity with mathematical concepts.

Moreover, the findings reinforce the notion that academic performance is a multifaceted construct. Psychological factors such as self-efficacy and anxiety influence how students perceive and approach tasks, but their impact must be understood in relation to other variables such as effort, study behaviours, and external support systems. This study thus underscores the importance of viewing learning outcomes as the product of multiple dimensions—cognitive, emotional, behavioural, and environmental—rather than attributing them to internal states alone.

In conclusion, the results provide valuable insight into the emotional and cognitive profiles of learners. The high self-efficacy levels observed indicate that students possess a sense of control and confidence in their abilities, while the moderate anxiety levels suggest that they remain emotionally engaged in the learning process. Although these factors did not significantly predict performance, their presence reflects a balanced psychological state conducive to learning. The findings ultimately suggest that self-efficacy and anxiety should be nurtured not as direct performance determinants but as supportive conditions that enhance motivation, resilience, and engagement in mathematical learning.

5.2 Recommendations

Teachers should use strategies that build self-confidence and reduce anxiety in mathematics, such as interactive lessons, collaborative problem-solving, differentiated instruction, and brief mindfulness activities. Students are encouraged to develop self-regulated learning habits, coping mechanisms for anxiety, and a growth mindset, while engaging in peer study and tutoring. School administrators and guidance counsellors should provide academic and emotional support programs, including counselling, remedial classes, and teacher development on affective pedagogy. Curriculum planners and policymakers are advised to integrate emotional intelligence and self-efficacy skills into lessons and use varied assessments to reduce performance pressure. Future research may explore other factors affecting mathematics performance, employ qualitative or longitudinal methods, and expand samples for broader applicability.

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