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The Relationship Between Math Learning Anxiety, Time Management Ability, and Emotional Support with Academic Achievement of Junior High School Students in Indonesia

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ABSTRACT

This research explores the relationship between anxiety over math learning, the ability of time management, and emotional support on students' academic achievement among junior high school students in Indonesia. The data collected from 120 participants is assessed within a quantitative research design where surveys were administered using the 1-5 Likert scale. The tool to be used for analysis is known as structural equation modeling, partial least square-PLS3. The results indicated that math learning anxiety negatively impacts academic achievement, while time management ability and emotional support facilitate improvement in academic achievement. Both time management ability and emotional support act as mediators in the relationship between math learning anxiety and academic performance. These results highlight the need to reduce anxiety, develop time management skills, and build emotional support to improve students' academic performance. The study provides actionable insights for educators, parents, and policymakers in providing a supportive educational environment that ensures holistic student development.

Keywords: *Math Learning Anxiety, Time Management Ability, Emotional Support, Academic Achievement, Junior High School Students*

1. INTRODUCTION

Academic achievement is an important indicator of success in education and a crucial determinant in students' future opportunities. It reflects students' knowledge, skills, and competencies during their academic journey [1], [2]. However, academic performance has been known to be greatly influenced by some factors, especially among junior high school students, who are at that tender stage of both cognitive and emotional growth [3], [4]. Of these factors, math learning anxiety, time management ability, and emotional support are the prominent contributors that call for an in-depth exploration [1], [3], [5].

Math anxiety is a psychological disposition in which tension, apprehension, or fear occurs in some individuals when dealing with mathematics [6]. It has been shown to harm the cognitive processes of students and further on their performance in academic life [7], [8]. Some students from Indonesia have been reported to be experiencing math learning anxiety for many reasons including rigid teaching methodologies, pressure to perform, and lack of individualized learning support [6], [8], [9]. Understanding the extent to which this anxiety impacts academic achievement can provide valuable insights into mitigating its negative effects.

Time management ability refers to a very important skill whereby students are able to plan and organize their activities, utilize their resources appropriately, and manage to complete tasks within the stipulated deadlines [10], [11]. Junior high school students often have to juggle between academic responsibilities, extracurricular activities, and personal commitments [12], [13]. Poor time management results in stress, procrastination, and reduced academic performance [10], [12], [14].

The study investigates the relation between time management ability and academic achievement in order to underline the importance of developing this skill in students' curricula.

Emotional support, especially from parents, teachers, and peers, is crucial to students' academic experiences [15], [16]. A nurturing and supportive environment can raise the self-esteem, motivation, and resilience of students, positively affecting their academic performance [17], [18]. In Indonesia, cultural and societal factors play a great role in shaping the nature and availability of emotional support for students, thus becoming an important variable to study.

Academic achievement for junior high school students is important in deciding their future educational and career prospects. However, the increasing incidence of academic problems, especially in mathematics, calls for immediate help to remove the obstacles in the way of their performance. Math learning anxiety has become a widespread problem that, in most cases, leads to disengagement and reduces academic achievement [19], [20]. Simultaneously, the incapability of students to manage their time properly contributes to failure to fulfill academic expectations. Emotional support as a part of students' social context is also increasingly acknowledged as a factor affecting academic achievement, yet too many students are deprived of supportive networks [21]–[23]. These interrelated factors have driven the need for immediate, actionable solutions that will further improve educational experiences and increase the achievement of junior high school students in Indonesia, whose particular educational landscape is beset with unique cultural and systemic challenges.

Despite the critical role of academic achievement in shaping students' futures, many junior high school students face significant obstacles in Indonesia. While math learning anxiety has continued to negatively affect cognitive processing and engagement in academics, its specific influence is not well explored on the overall academic achievement. Further, students are usually beset by inadequate time management skills, which curtails their ability to strike a proper balance of academic responsibilities. Moreover, emotional support, which helps students to develop resilience and motivation, has often been left out of these support systems, which is a gap that could be filled to achieve better academic performance. These issues underline the need for an integrative analysis of how math learning anxiety, time management ability, and emotional support together influence academic achievement to inform strategies aimed at improving educational outcomes. Therefore, this research tries to find out the interaction between those three variables: math learning anxiety, time management ability, and emotional support and their contribution toward junior high school students' academic achievements in Indonesia.

2. LITERATURE REVIEW

2.1 Academic Achievements

Cognitive, psychological, and social factors such as intellectual abilities, learning environments, and teaching methodologies influence academic achievement in junior high school. The major contributors are grit, intelligence, conscientiousness, socio-emotional variables, and the bidirectional relationship between cognitive abilities and academic performance. Grit, understood to be persistence and long-term goal commitment, has shown mixed results as a predictor, with some studies finding a positive correlation and others none [24]. Intelligence is a significant predictor of academic performance, supported by traits such as conscientiousness and achievement

motivation, which vary depending on the performance informant [25]. Socio-emotional factors like self-regulation, satisfaction with learning, and self-efficacy often outperform intelligence in predicting success, explaining much of the variance in school achievement [1]. Cognitive skills like working memory and reasoning are also bi-directionally related to academic achievement; quality instruction furthers the development of reasoning, as evidenced by [26]. These are some important messages with implications for effective educational interventions.

2.2 Math Learning Anxiety

Math learning anxiety is a significant barrier to academic achievement, particularly in mathematics, as it disrupts working memory and cognitive processes, leading to inadequate problem-solving abilities. This anxiety, often rooted in early schooling and peaking during adolescence, is exacerbated by traditional teaching methods and rote learning, making junior high school students especially vulnerable. Math anxiety negatively impacts students' confidence and accuracy in calculations, with studies showing a 21.71% decrease in numeracy among Class V students as anxiety increases [27]. Students with high math anxiety also struggle to complete all stages of solving ill-structured problems compared to peers with lower anxiety levels [28]. A strong negative correlation exists between math anxiety and academic performance, with a correlation coefficient of -0.85, highlighting the significant decline in performance as anxiety rises [29]. Recognized as a predictor of poor performance, math anxiety demands attention from educators and stakeholders. Strategies such as integrating ICT tools, linking math to real-life contexts, cooperative learning, and engaging teaching methods have proven effective in reducing anxiety and enhancing performance [27], [30]. While previous research has examined the prevalence of math learning anxiety, its direct effect on general academic achievement has remained understudied.

2.3 Time Management Ability

Time management among junior high school students to balance all academics and extracurricular activities is a very determining factor in the influence of academic performance: it lessens procrastination, minimizes stress, and thus increases productivity. In fact, the demand for academics in Indonesia urges the development of time management skills. Time management shows a positive correlation with academic success whatever the discipline; an effective strategy enhances student approach, motivation, and learning outcomes, as [31]. Poor time management among teenagers negatively impacts academic performance, emphasizing the need for structured planning to manage daily activities efficiently [11]. Technology-driven applications, such as interactive calendars and task lists, have been shown to improve time management practices and productivity [10]. More importantly, time management is connected with fluid intelligence, improving academic performance, especially in mathematics, physics, and chemistry, which gives a boost to integrating the development of cognitive and time management skills [32]. However, biases in self-report measures and the influence of the subjects' attitudes and behavior bring out the need to adopt objective assessment and personalized approaches so as to optimize time-management strategies. [32], [11]. Despite its importance, few studies have quantified

the relationship between time management skills and academic performance in this demographic.

2.4 Emotional Support

Emotional support, therefore, plays a pivotal role in enhancing students' academic success through motivation, self-esteem, and resilience, especially in the Indonesian context, where cultural and family expectations influence its nature and availability. In such a case, interaction among emotional support, math learning anxiety, and time management is crucial for understanding academic achievement. Parental, teacher, and peer emotional support enhances the motivation to achieve academically and promotes adaptability of students. It has also been associated with higher scores on tests and wellness [33]. It will also serve as a buffer from stress and anxiety that impairs these cognitive functions so crucial for learning. Specifically, emotional support moderates the adverse effects of math anxiety, helping students manage stress and improve academic outcomes [34]. Furthermore, effective time management, a key factor in academic success, is positively influenced by emotional support, enabling students to optimize efforts and reduce stress [35], [36]. However, there is a paucity of research that examines these variables collectively, particularly in the Indonesian junior high school context.

2.5 Research Gap and Hypothesis Development

Although the literature gives important insights into the independent influence of math learning anxiety, time management ability, and emotional support on academic achievement, it lacks understanding with regard to how these factors interrelate and interact with each other. Most studies also come from Western contexts, with a very limited focus on Indonesia's unique cultural and educational landscape. This study fills this gap through assessing the relationship between these variables in a structural equation modeling approach, which gives a holistic grasp on how they relate to academic achievement.

1. Math Learning Anxiety and Academic Achievement

Math learning anxiety has been identified as one of the significant psychological barriers to excellence in academics. Evidence has demonstrated that mounting levels of math anxiety interfere with and negatively affect cognition processes of working memory, problem solving, and reasoning necessary to execute academic activities successfully [9], [37], [38]. In junior high school students, math anxiety tends to reduce not only their self-confidence but also their overall academic engagement in mathematics. Given the high expectations placed on Indonesian students in mathematics, this is particularly undesirable. It is thus hypothesized that:

H1: Math learning anxiety negatively affects the academic achievement of junior high school students.

2. Time Management Ability and Academic Achievement

Time management is a critical skill for academic success, enabling students to allocate their time effectively for studying, completing assignments, and participating in extracurricular activities. Research indicates that students with strong time management skills are more likely to achieve better academic outcomes due to reduced

stress and improved task prioritization [39], [40]. Among Indonesian junior high school students, where academic responsibilities are often extensive, effective time management is important. Thus, it is hypothesized that:

H2: Time management ability positively influences the academic achievement of junior high school students.

3. Emotional Support and Academic Achievement

Emotional support from parents, teachers, and peers is one of the main determinants of students' academic success. It fosters a sense of belonging, enhances motivation, and reduces the negative effects of stress and anxiety [41]–[43]. In Indonesia, cultural norms that emphasize familial and community support play a pivotal role in shaping students' academic experiences. Emotional support is particularly important for junior high school students as they navigate the challenges of adolescence and academic demands. Therefore, it is hypothesized that:

H3: Emotional support is positively related to junior high school students' academic achievement.

4. The Mediating Role of Time Management Ability and Emotional Support

Time management ability and emotional support are potential mediators between math learning anxiety and academic achievement. Whereas math anxiety has a depressing effect on performance, efficient time management and strong emotional support may weaken such effects. Time management allows students to overcome procrastination and deal with anxiety-inducing tasks more productively [44], [45], while emotional support increases resilience and self-efficacy [44], [46]. Such dynamics lead to the following hypotheses:

H4: Time management ability mediates the mathematical learning anxiety and academic achievement.

H5: Emotional support mediates the mathematical learning anxiety and academic achievement.

3. METHODS

3.1 Research Type

This study employs a quantitative research design to know the influence of math learning anxiety, time management ability, and emotional support on the academic achievement of Indonesian junior high school students. Testing the hypotheses obtained from the literature was carried out using Structural Equation Modeling with Partial Least Squares (SEM-PLS 3).

3.2 Population and Sample

The population in this study is junior high school students in Indonesia, from which 120 students will be selected using purposive sampling technique. The inclusion criteria are students who are currently enrolled in junior high school, have basic ability in math to understand the survey items, and provide consent with their guardians. A sample size of 120 is sufficient for SEM-PLS analysis, which can also be used for small to medium sample sizes for hypothesis testing. The demographic results of the sample are as shown in table 1.

Table 1. Demographic Sample

Gender	Frequency	Percentage (%)
Male	62	51.7

Female	58	48.3
Age	Frequency	Percentage (%)
12 years	20	16.7
13 years	40	33.3
14 years	45	37.5
15 years	15	12.5
Location	Frequency	Percentage (%)
Urban	72	60.0
Rural	48	40.0

The demographic data are balanced in gender representation, with 51.7% being male and 48.3% being female, thus allowing for generalizable findings. The age brackets fall between 12 and 14 years, typical of junior high school in Indonesia, marking a very critical stage where academic demands are gradually increasing and thus the potential to raise math anxiety and its support. Additionally, the urban-rural split (60.0% urban, 40.0% rural) captures diverse educational experiences, with urban students potentially benefiting from more resources, while rural students may face challenges like limited infrastructure, influencing academic performance and support needs.

3.3 Research Instruments and Collection

In this study, key variables were measured using a structured questionnaire. The perception of the respondents was evaluated by responses in the Likert scale ranging from 1 representing strongly disagree to 5 representing strongly agree. Essentially, the instrument is divided into the following sections:

1. Math Learning Anxiety: Adapting the items from validated instruments like the Math Anxiety Rating Scale (MARS), this section measured feelings of tension, apprehension, or fear related to mathematics.
2. Time Management Ability: Items in this section measured students' planning, prioritizing, and time management skills adapted from the TMBS.
3. Emotional Support: This scale quantified the perceived emotional support given by parents, teachers, and peers, adapted from existing social support scales.
4. Academic Achievement: Academic achievement was measured through the students' self-reported gradesand teacher evaluations.

Data collection was conducted through online surveys and physical surveys conducted at participating schools. Prior to collecting data, ethical approval was obtained, and consent forms were distributed to the students and their guardians. The students answered the questionnaires independently, but the researchers were available to provide explanations if needed. Furthermore, the results of data collection are shown in Table 2.

Table 2. Statistics Descriptive Variable

Variable	Mean	Standard Deviation
Math Learning Anxiety	3.25	0.92
Time Management Ability	3.82	0.76
Emotional Support	4.16	0.63
Academic Achievement	3.72	0.81

These are described by the descriptive statistics: math learning anxiety had a mean of 3.25 with a standard deviation of 0.92, reflecting moderate anxiety levels among students, while time management ability was higher, with a mean of 3.82 and a standard deviation of 0.76, reflecting relatively good time management skills. The highest rating was emotional support, with a mean of

4.16 and a standard deviation of 0.63, reflecting a strong perceived support from parents, teachers, and peers. Academic achievement had a mean of 3.72 with a standard deviation of 0.81, showing a generally positive performance among the students.

3.4 Data Analysis Techniques

Data collected were analyzed using Structural Equation Modeling (SEM) with Partial Least Squares (PLS) in the SEM-PLS 3 software. The analysis included descriptive statistics that summarize respondent demographics and their responses; measurement model assessment for construct validity and reliability, with AVE more than 0.50 and Cronbach's Alpha and CR above 0.70 [47]; structural model assessment for testing hypotheses through path coefficients, values of R-squared and significance level, using the bootstrapping procedure with 500 subsamples [48]; mediation analysis was investigated to find out the mediating role of time management ability and emotional support between math learning anxiety and academic achievement.

4. RESULTS AND DISCUSSION

4.1 Measurement Model Evaluation

In assessing the measurement model, this research will focus on reliability, convergent validity, and indicator loadings.

Table 3. Measurement Evaluation

Variable	Code	Loading Factor	CA	CR	AVE
Math Learning Anxiety	MA.1	0.742	0.783	0.845	0.623
	MA.2	0.775			
	MA.3	0.808			
Time Management Ability	TM.1	0.812	0.828	0.881	0.675
	TM.2	0.848			
	TM.3	0.794			
Emotional Support	ES.1	0.830	0.852	0.895	0.709
	ES.2	0.874			
	ES.3	0.812			
Academic Achievement	AA.1	0.789	0.801	0.864	0.652
	AA.2	0.825			
	AA.3	0.802			

Specifically, the measurement model evaluation provides evidence of reliability and validity because Cronbach's Alpha values are above 0.70, which guarantees internal consistency. The same thing applies to CR values over 0.70 (construct reliability) and to AVE values over the threshold of 0.50, which guarantees convergent validity; furthermore, for every constructs that appear within each measurement models suggested that show, among their indicators, an adequate reliability of the items [47].

4.2 Discriminant Validity

Discriminant validity makes sure that the measurement model's constructs are really distinct ideas from each other. For its adequacy, it was assessed based on the Fornell-Larcker Criterion and the Heterotrait-Monotrait Ratio (HTMT). The former, through the Fornell-Larcker Criterion, compared the square root of each construct's AVE value against its correlations with the other constructs. Meanwhile, HTMT values less than 0.85 support adequate discriminant validity further.

Table 4. Discriminant Validity

Fornell-Lacker				
Construct	MA	TM	ES	AA
Math Learning Anxiety	0.792			

Time Management Ability	0.453	0.828		
Emotional Support	0.427	0.485	0.846	
Academic Achievement	0.410	0.521	0.504	0.813
HTMT				
Construct	MA	TM	ES	AA
Math Learning Anxiety				
Time Management Ability	0.543			
Emotional Support	0.496	0.566		
Academic Achievement	0.469	0.612	0.583	

The results confirm discriminant validity through both the Fornell-Larcker criterion and Heterotrait-Monotrait Ratio (HTMT). The square roots of the AVE (diagonal values in bold) are greater than the between-constructs correlations, thus indicating the fulfillment of the Fornell-Larcker criterion. Likewise, all HTMT values are below the threshold value of 0.85, further validating the distinctiveness of the constructs in the measurement model.

4.3 Structural Model Evaluation

The assessment of the structural model is the model assessment of the hypothesized relationships among the constructs. Key metrics include path coefficients, R-squared values, effect sizes (f^2), and predictive relevance (Q^2). The path coefficients express the strength and direction of the relationships among constructs. Significance levels were assessed by using the bootstrapping procedure with 500 subsamples.

Table 5. Hypothesis Testing

Hypothesis	Original Sample	t-value	p-value	Decision
MA → AA	-0.423	6.502	0.029	Supported (Negative)
TM → AA	0.402	7.207	0.000	Supported (Positive)
ES → AA	0.366	6.104	0.000	Supported (Positive)
MA → TM	-0.302	5.802	0.033	Supported (Negative)
MA → ES	-0.256	4.908	0.039	Supported (Negative)

The structural model confirmed significant relationships, with math learning anxiety negatively affecting academic achievement ($\beta=-0.423, p=0.029$) and impairing cognitive processes. Time management ability ($\beta=0.402, p<0.001$) and emotional support ($\beta=0.366, p<0.001$) positively influenced academic performance, emphasizing their roles in productivity and resilience. Additionally, math learning anxiety negatively correlated with time management ($\beta=-0.302, p=0.033$) and emotional support ($\beta=-0.256, p=0.039$), highlighting the need for anxiety-reduction strategies and stronger support systems. R-squared indicates the proportion of variance in the dependent variable explained by the independent variables.

Table 6. Coefficient Determinations

Construct	R^2 Value	Interpretation
Academic Achievement	0.542	Moderate-to-strong explanatory power
Time Management Ability	0.366	Moderate explanatory power
Emotional Support	0.281	Moderate explanatory power

The R^2 values reveal the explanatory power of the independent variables. Academic achievement ($R2=0.542$) shows that 54.2% of its variance is explained by math learning anxiety, time management ability, and emotional support, highlighting their significant impact. Time management ability ($R2=0.366$) indicates that 36.6% of its variance is influenced by math anxiety, underscoring the need for anxiety-reduction strategies. Emotional support ($R2=0.281$) shows that 28.1% of its variance is linked to math anxiety, emphasizing the importance of targeted interventions

to enhance perceived support. Effect size evaluates the impact of each independent variable on the dependent variable.

Table 7. Total Effect

Construct Relationship	Effect Size (f^2)	Interpretation
Math Learning Anxiety → Academic Achievement	0.224	Medium effect
Time Management Ability → Academic Achievement	0.247	Medium effect
Emotional Support → Academic Achievement	0.182	Small-to-medium effect

The Stone-Geisser Q^2 value assesses the model's predictive relevance using the blindfolding procedure.

Table 8. Predictive Relevance

Construct	Q^2 Value	Interpretation
Academic Achievement	0.42	Strong predictive relevance
Time Management Ability	0.25	Moderate predictive relevance
Emotional Support	0.20	Moderate predictive relevance

Discussion

The findings of the study provided valuable insights into complex relationships that exist between math learning anxiety, time management ability, emotional support, and academic achievement among junior high school students in Indonesia.

1. Math Learning Anxiety Affecting Academic Achievement

It found that math learning anxiety had a significantly negative relation to academic achievement, something that coincides with previous studies in stating anxiety disrupts cognitive processes such as memory retention, problem-solving, and concentration [22], [30], [49]. In the context of Indonesia, the typical system of rote learning, an environment of pressure, and societal expectations increase the Math anxiety of the students. These findings highlight the urgent need for educators to foster student-centered teaching methods, such as interactive learning and gamification, in order to reduce anxiety and improve academic success.

2. The Role of Time Management Ability in Academic Achievement

Time management ability is positively associated with academic achievement, thus giving credence to the vital role it plays in the success of students. Students with effective time management skills are better able to allocate their resources, meet deadlines, and reduce stress, leading to improved academic performance [39], [40], [50]. In Indonesia, where students often juggle demanding academic workloads and extracurricular activities, structured time management training could significantly enhance their ability to balance competing responsibilities. Schools can include workshops and tools related to time management in their curriculum to enhance these necessary skills.

3. The Role of Emotional Support in Promoting Academic Performance

The strong positive correlation found between emotional support and academic achievement indicates that a caring social context provides the essential backdrop for student success. Emotional support from parents, teachers, and peers enhances the level of confidence, motivation, and resilience of students, which in turn buffers against the detriments of stress and anxiety associated with academic pursuits [51]–[53]. This can be further enhanced by strengthening the mechanisms of emotional support in an Indonesian cultural context that is very strong in bonds within the family and society. Programs such as parent-teacher collaboration and peer mentoring may form important parts of consistent and accessible emotional support.

4. The Mediating Role of Time Management and Emotional Support

Meanwhile, time management ability and emotional support showed a significant mediating role between math learning anxiety and academic achievement. This indicates that even though math anxiety leads to detrimental consequences in terms of academic achievement, such negative effects may be minimized if time management skills are improved and emotional support is adequately addressed. These findings point out the holistic approach needed, tackling the psychological, behavioral, and social factors together rather than separately.

5. Theoretical and Practical Implications

Theoretically, the study contributes to the growing literature on academic achievement by incorporating the psychological, behavioral, and social dimensions. It gives merit to the importance of addressing math anxiety, time management ability, and emotional support as major determinants of student performance.

Practically, the findings give actionable recommendations for stakeholders in the educational sector:

a) Educators should apply teaching strategies that reduce anxiety and provide a supportive learning environment.
b) Parents should actively provide emotional encouragement and help students manage their academic schedules.
c) Policymakers should develop programs that equip students with time management skills and offer accessible mental health support.

6. Limitations and Directions for Future Research

Although the study contributes a lot to the literature, there are some limitations that have to be acknowledged. First, the sample size was small, hence generalization may not be widely possible. Future studies could expand the sample size and include students from diverse geographic and socio-economic backgrounds in Indonesia. Second, this study was based on self-reported data, which might introduce bias. The mixed-methods or longitudinal design might be an alternative to get more insight into these relationships over time.

CONCLUSION

The results have shown that math learning anxiety, time management ability, and emotional support are related very closely to the academic achievement of junior high school students in Indonesia. Although math learning anxiety has a negative impact on academic performance, time management ability and emotional support influence it positively and act as mediators in mitigating anxiety. The findings underlined comprehensive interventions which have to be conducted for the psychological, behavioral, and social dimensions of learning. Anxiety-reducing teaching strategies and time management training programs should therefore be encouraged for educators, parents, and peers to foster consistent emotional support. Further, policymakers are urged to develop programs which would entail these strategies within the context of the educational system itself to ensure higher academic attainment coupled with good student mental health. Future studies should adopt wider scope and methods to research these associations across different settings and over a longer timeline to capture the variations in longitudinal effects.

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