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ANALYSIS OF THE LEVEL OF MATHEMATICS LEARNING PERSEVERANCE OF UPPER GRADE STUDENTS IN ELEMENTARY SCHOOL

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Abstract

Mathematics is often perceived as a difficult, anxiety-inducing, and challenging subject by many students, which in turn affects their learning achievement. Several studies have shown that students frequently experience mathematics anxiety and low self-confidence when engaging with mathematical tasks, leading to decreased performance and motivation to learn. The purpose of this study was to examine and provide evidence on the level of students' perseverance in learning mathematics. The findings are expected to help teachers and schools develop strategies that foster students' perseverance, enhance engagement, and ultimately improve mathematics achievement. This research is descriptive quantitative with a survey approach. This research was conducted in March 2025. The population in this study were all students in grades IV, V and VI at SD Negeri 23 Jeppe'e, Bone Regency with a total of 60 students. The sample was selected by random sampling with a sample size of 30 students. The research instrumentused was the Mathematics Learning Persistence Scale, which consists of 28 valid statements with a Cronbach's alpha coefficient of 0.78. Data collection was done by distributing math learning perseverance scale and data analysis technique was descriptive statistics. The results of the study show that the perseverance of students in learning mathematics at SD Negeri 23 Jeppe, Bone Regency, is in the moderate category with an average score of 85.8. This shows that most students have a fairly good endurance in dealing with math learning difficulties, but there is still a tendency to give up easily when encountering challenging math problems. Teachers are advised to design learning activities that encourage students' perseverance, for example by using the Problem-Based Learning or Project-Based Learning approaches, which require students to repeatedly solve problems until they succeed.

Keywords: Analysis; Elementary School; High Grade; Learning Perseverance, Math

1. INTRODUCTION

Education is a key pillar in shaping students' character and academic abilities. In Indonesia, elementary school (SD) is the primary education level that places significant emphasis on developing basic skills such as reading, writing, and arithmetic. Mathematics is a crucial and difficulties in learning mathematics in order to solve difficult mathematical problems or concepts [1]. This concept is closely related to an attitude of never giving up, the ability to deal with frustration, and continuous effort in achieving certain academic goals. In the context of learning mathematics, perseverance is very important because mathematical material tends to be tiered and requires intensive practice to understand complex concepts A student who is not persistent tends to perform poorly in various academic fields, especially in mathematics, which is considered by many to be an abstract subject [2].

Learning persistence is not a static, innate trait, but rather a psychological aspect that can be developed through a supportive learning environment, appropriate learning strategies, and emotional support from teachers and parents [3]. Unfortunately, in practice, many elementary school students, especially in the upper grades (grades IV–VI), tend to give up easily when faced with math problems that require more thought or complex steps. This phenomenon is often caused by negative perceptions of mathematics, a lack of intrinsic motivation, and minimal recognition for the effort expended during the learning process [4].

Several studies have shown that learning persistence has a positive relationship with academic achievement, including in mathematics. [4] stated that persistence directly influences mathematics learning outcomes. Furthermore, a study conducted

by [3] in the UK found that learning persistence significantly contributed to improving elementary school students' mathematics test scores. These studies indicate that learning persistence is an important variable worthy of further research, particularly in the context of mathematics learning in Indonesia [5].

However, research on persistence in mathematics learning in Indonesia, particularly at the elementary school level, remains very limited [6]. Most studies focus on intellectual factors such as cognitive ability and academic achievement, while non-intellectual aspects such as persistence in learning have not been explored in depth. Yet, increasing persistence in learning is expected to improve the quality of mathematics learning and overall student learning outcomes [7].

Based on these problems, this study examines students' persistence in learning mathematics as seen from four indicators, namely: a) persistence in working on mathematics practice questions in class; b) persistence in working on individual assignments; c) persistence in working on group assignments; d) persistence in working on mathematics exam questions. The purpose of this study is to provide information on the level of persistence in learning mathematics of high-class students in learning mathematics.

2. RESEARCH METHODS

This research is a quantitative descriptive study using a survey approach. This research was conducted in March 2025. The population in this study were all fourth, fifth, and sixth grade students at SD Negeri 23 Jeppe'e, Bone Regency, with a total of 60 students. The sample was selected using *random sampling* with a total of 30 students.

The research instrument used was the Mathematics Learning Persistence Scale adopted from [8], which consisted of 28 items in the form of a Likert scale with 4 rating scales, namely VS (very much agree), A (agree), DA (disagree), and STS (strongly disagree). It has been validated and tested previously with a Cronbach's alpha coefficient of 0.78, which is considered valid and reliable. The indicators of the learning persistence scale are: a) Classroom Practice perseverance; b) Individual assignment perseverance; c) Group assignment perseverance; d) Exam perseverance. The distribution of indicators from 28 statement items can be seen in the following table:

Table 1. Indicators of Persistence in Learning Mathematics

No	Indicator	Statement Items
1	Classroom Practice perseverance	1,2,3,4,5,6,7,8,9,10,11,12,13
2	Individual assignment perseverance	14,15,16,17,18
3	Group assignment perseverance	19,20,21,22
4	Exam perseverance	23,24,25,26,27,28

Data collection was conducted by distributing a scale of mathematics learning persistence. The data analysis technique used descriptive statistics to describe the research data, including maximum, minimum, average, and standard deviation values. Furthermore, the research data was categorized, namely the categorization of mathematics learning persistence by finding the lowest and highest values, finding the ideal mean (M), and finding the standard deviation (SD) [9].

After obtaining the required values, the next step is to determine the categorization of students' mathematics learning persistence scores with the following provisions:

a) $X < M - SD$, then the category of persistence in learning mathematics is low

b) M – SD ≤X <M + SD, then the category of persistence in learning mathematics is moderate
c) X ≥ M + SD, then the theory of persistence in learning mathematics is high

Table 2. Categorization of Students' Persistence in Learning Mathematics

No	Range Score	Category
1	X ≥ M + SD	High
2	M – SD ≤X <M + SD	Moderate
3	X <M – SD	Low

3. RESULTS AND DISCUSSION

The research results in Table 3 describe the level of persistence in learning mathematics of upper-class students as follows:

Table 3. Categorization of Mathematics Learning Persistence of Upper Elementary School Students

No	Range Score	Category	Frequency (%)	Mean	Standard Deviation	Min	Max
1	X ≥ 96.1	High	5 (16.7%)				
2	75.5 ≤X < 96.1	Moderate	21 (70%)	85.8	10.3	57	102
3	X <75.5	Low	4 (13.3%)				

Table 3 shows that the highest score for mathematics learning persistence of senior high school students at Jeppe 23 Elementary School, Bone Regency, is mostly in the moderate category, with 21 students (70%). Meanwhile, the high category is 5 students (16.7%) and the low category is 4 students (13.3%). Furthermore, the research data on mathematics learning persistence was analyzed against four indicators with the following results:

a. Classroom Practice perseverance

The results of the data analysis are shown in table 4, as follows:

Table 4. Persistence in Working on Mathematics Practice in Classroom

No	Range Score	Category	Frequency (%)
1	X ≥ 44.4	High	5 (16.7%)
2	35 ≤X <44.4	Moderate	21 (70%)
3	X <35	Low	4 (13.3%)

Table 4 shows that the highest score for students' diligence in completing math exercises at Elementary School 23 Jeppe, Bone Regency, was in the moderate category, with 21 students (70%). Meanwhile, the high category was 5 students (16.7%) and the low category was 4 students (13.3%).

b. Individual assignment perseverance

The results of the data analysis are shown in table 5, as follows:

Table 5. Individual assignment perseverance

No	Range Score	Category	Frequency (%)
1	X ≥ 17.5	High	7 (23.3%)
2	12.2 ≤X <17.5	Moderate	17 (56.7%)
3	X <12.2	Low	6 (20%)

Table 5 shows that the highest scores for Individual assignment perseverance of senior high school students at SD Negeri 23 Jeppe, Bone Regency, were mostly in the moderate category, namely 17 students (56.7%). Meanwhile, the high category was 7 students (23.3%) and the low category was 6 students (20%).

c. Group assignment perseverance

The results of the data analysis are shown in table 6, as follows:

Table 6. Group assignment perseverance

No	Range Score	Category	Frequency (%)
1	X ≥ 14.6	High	4 (13.3%)
2	10 ≤X <14.6	Moderate	23 (76.7%)

3	X <10	Low	3 (10%)

Table 6 shows that the highest scores for Group assignment perseverance among senior high school students at SD Negeri 23 Jeppe, Bone Regency, were in the moderate category, with 23 students (76.7%). Meanwhile, the high category was 4 students (13.3%) and the low category was 3 students (10%).

d. Exam perseverance

The results of the data analysis are shown in table 7, as follows:

Table 7. Exam perseverance

No	Range Score	Category	Frequency (%)
1	X ≥ 21.3	High	3 (10%)
2	16.5 ≤X <21.3	Moderate	23 (76.7%)
3	X <16.5	Low	4 (13.3%)

Table 7 shows that the highest scores for students in the high school mathematics exam at SD Negeri 23 Jeppe, Bone Regency, were in the moderate category, with 23 students (76.7%), while the highest scores were 3 students (10%), and the lowest scores were 4 students (13.3%).

DISCUSSION

The results of this study indicate that the level of persistence in learning mathematics among upper grade students at SD Negeri 23 Jeppe Bone Regency is in the moderate category. This means that students have made an effort to complete math assignments and haven't given up easily, but this persistence isn't consistent [10–12]. Students still tend to give up when faced with more difficult problems, are reluctant to repeat exercises that require a long time, and lack patience when solving complex problems [13].

This finding aligns with Duckworth et al.'s (2007) perspective, which explains that grit *encompasses* consistent effort and resilience in the face of adversity to achieve long-term goals. With

grit in the moderate category, it can be said that students have the potential to persevere but require more stimulation to increase their fighting spirit [14].

In the context of mathematics education, Middleton et al. (2015) emphasized that students with high levels of persistence are more actively engaged in the learning process, able to overcome frustration, and tend to use a wider variety of strategies when solving problems [15, 16]. However, the students in this study did not demonstrate optimal persistence. This indicates the need for teachers to develop learning strategies that can foster persistence, for example through providing gradual challenges, providing positive feedback, and emphasizing the thinking process rather than just the end result [17, 18].

In line with this, Ramirez et al. (2013) added that low student persistence can also be related to math anxiety [19]. Students with high levels of anxiety tend to give up quickly when faced with difficulties. Therefore, elementary school mathematics instruction should be designed to focus not only on mastering concepts but also on creating an atmosphere that supports the growth of students' self-confidence and courage in facing difficulties

4. CONCLUSIONS AND RECOMMENDATION

The perseverance of students in learning mathematics at SD Negeri 23 Jeppe, Bone Regency, is in the moderate category. Based on the results of descriptive analysis, the average score for the learning perseverance questionnaire is 85.8, with a standard deviation of 10.7. Most of the students' perseverance in learning mathematics is in the moderate category, with 21 students (70%), 4 students (13.3%) in the low category, and 5 students (16.7%) in the high category. This shows that most students have sufficient

resilience in facing difficulties in learning mathematics, but there is still a tendency to give up easily when encountering challenging problems. Students have shown effort in completing mathematics assignments, but their consistency, patience, and ability to persevere in solving more complex problems are not yet optimal. Teachers are advised to design learning activities that encourage students' perseverance, for example, by using the Problem-Based Learning or Project-Based Learning approaches, which require students to solve problems repeatedly until they succeed.

The researchers felt that there were limitations, including the fact that the sample in the study only consisted of upper grade students, namely grades 4, 5, and 6, with a sample size of 30, and used instruments adapted from other researchers and did not describe the factors causing students' moderate perseverance in learning mathematics. Therefore, it is recommended that future researchers identify the factors that influence students' persistence in learning mathematics and expand or increase the sample size of the study.

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