STUDENTS' ATTITUDE ANALYSIS TOWARD THE MATHEMATICS LEARNING OF JUNIOR HIGH SCHOOL

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Abstract. This study aims to describe the attitudes of junior high school students toward learning Mathematics. Disclosure of students' attitudes toward learning mathematics is based on low mathematics learning outcomes at the junior high school level in Riau Province. The type of research used is evaluation. The sample for this research was students in Siak and Rokan Hulu Regencies, Riau Province. The sampling technique was random sampling and the data collection technique was surveyed. The instrument used in this study was a questionnaire, to measure students' attitudes toward learning mathematics. Before the instrument was used, the instrument was validated in terms of content and construct. In terms of content, validity analysis used the Aiken formula while construct validity used the second order of CFA. Statistical descriptive analysis of the data by calculating the average and standard deviation and consulting the assessment guide table to assess individual student attitudes. The evaluation results show that the attitude towards learning mathematics is in the category of good students. To further improve the good attitude of junior high schools towards learning mathematics by changing learning methods, mathematics learning media as well as applications that discuss mathematics lessons, interactive videos, and image demonstrations.
Keywords: *Attitude analysis, mathematics learning, junior high school.*

1. INTRODUCTION

According to Aikeln, conceptually, attitude is an individual's tendency to respond positively or negatively to certain objects, situations, concepts, or people [1]. Attitudes have cognitive (belief or knowledge), affective (emotional, motivational), and performance (behavior or behavioral tendencies) dimensions. Attitude is the mental state of a person who brings a person to the object he faces [2]. Berkowitz, three frameworks of thinking define attitudes. First, psychologists such as Louis Thurstonel, Relensis Likelrt, and Charles Osgood state that attitude is a form of evaluation or feeling relation. The attitude of a person towards an object is a feeling of support or disapproval of that object. Specifically, Thurstonel himself formulates attitudes as 'degrees of positive or negative affect toward a psychological object'. [3]. Second, is the thought by Chavel, Bogardus, LaPielrel, Melad, and Gordon Allport stating that attitude is a kind of readiness to react to an object in certain ways. [4]. Allen, Guy, and Elglely define attitude as a pattern of behavior, intellect, or anticipatory readiness, predisposition to adapt to social behavior, or in a simple way, attitude

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as a response to conditioned social stimuli. A third thinking group is a group that is oriented towards the triadic scheme (triadic scheme) [5]. Selcord and Backman, for example, define attitude as a 'certain arrangement in terms of feeling (affection), thinking (cognition), and predisposition to action (conation) of a person's cell towards an aspect in the surrounding environment. [6]. In carrying out the attitude of the individual/individual is influenced by two factors in general, namely local factors and global factors in the individual. Local factors originate from within the individual; emotional relaxation, and anxiety, while the global factors themselves are those that come from outside the individual's personality such as the social context in which he is [7]. The factors that affect the individual's personality will form a character. Characteristics related to attitude are affective characteristics. The essence of this slogan is that affective abilities are very important, affective abilities themselves are abilities characterized by emotions and feelings such as interests, attitudes, self-concept, and values. [8].

Several experts provide views about the importance of affective abilities in individual cells, including Phopam considers affective variables to have a significant relationship to cognitive variables. Cell effectiveness is at least very important in learning in schools. Besides that, motivation and desire are the foundation of learning [9]. If students don't want to learn, then they won't be taught. If they feel they can't learn, then they won't learn. Willingness and motivation are not characteristics of academic achievement, but affective characteristics [10]. Knowledge is a power but character is the better. Mathematical learning should be able to stimulate students to be active and think critically in understanding various problems [11]. Marimah by learning mathematics, students can think critically and be skilled at arithmetic as well as can apply the basic concepts of mathematics in other subjects as well as in mathematics itself and daily life [12]. However, learning mathematics is a learning that is considered difficult by most individuals (students) so in general, students show a negative attitude. According to Sidiq, these negative characteristics arise as a result of 1) general perceptions about the difficulty of mathematics based on other people's opinions; 2) learning experience in the classroom resulting from learning processes that are less attractive to students; 3) experience in the classroom as a result of the teacher's treatment (for example, ridiculing); 4) the reflection formed by the inability to successfully study mathematics [13]. If students have a negative attitude towards mathematics, it can be said that their affective conditions are free for mathematics learning activities to be disrupted. The condition of the cell is at least different in each individual (student), especially in school mathematics learning [14].

For classes that are self-respondents, the abilities of students vary greatly based on their cognitive aspects, there are upper groups, medium groups, and low groups. The high, medium, and low groupings are based on the mathematics learning achievements achieved at the end of each lesson, in the form of daily tests, mid-range exams, and final mid-range exams. [7]. Then, the characteristics of responsiveness in this research are also reviewed based on psychological aspects. The teenager's response is in the adolescent phase, the phase where a teenager experiences a high emotional development, the development of the ability

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to understand others. Teenagers have also been able to learn behaviors that not only learn physical abilities but also increase in the psychological order [15].

2. RESEARCH METHOD

This research has the type of evaluation research, namely research that uses a systematic way to find out student effectiveness. The population of this research was Riau Middle School students totaling 108 students, while the research sample was a portion of students in Riau Province. The sampling technique uses the cluster random sampling approach and the data collection technique is a survey. Each sample totaled 51 students from Rokan Hulu Regency and 57 students from Siak Sri Indrapura Regency. The data was obtained by distributing the attitude questionnaire to each student once, which was validated by 4 experts who were analyzed using the Aiken formula. Data were analyzed using a quantitative descriptive technique by calculating the total student score, the average value, and the standard deviation. Furthermore, construct validity is used to measure student attitudes whether valid or invalid.

Instrumental development of student attitudes in mathematics lessons is in the form of questionnaires in which all of the statement items are included in the aspect of student attitudes in mathematics lessons presented by Robbins and Timothy [16], which states that attitude consists of three components, namely: cognitive component, affective component, and conative component. Cognitive components include awareness indicators for achievement in mathematics subjects and awareness of the benefits of mathematics subjects. The affective component includes active indicators of learning mathematics and actively doing mathematics learning assignments. The conative component concerns students' readiness to react/exchange ideas [17].

In this research, there are as many as 3 dimensions of student attitudes toward learning mathematics and are divided into 5 attitude indicators that are measured. The following is a table of dimensions and attitude indicators that are measured in students' mathematics learning.

Table 1. Dimensions of students' attitudes in learning mathematics

Dimensions	Indicators	Items
Cognitive	Understanding of the material presented	6
	The goals to be achieved in learning	5
Affective	Enthusiasm when learning begins	11
Conative	Compete	3
	Exchange Thoughts / Discuss	4
Total		29

These three dimensions are the core of the preparation of the data collection instrument items. The data collection instrument is in the form of a scale which consists of 4 answer choices for each item. Choose an answer in the form of “Strongly Agree (Very Positive) = 4”, “Agree (Positive) = 3”, “Disagree (Negative) = 2”, and “Strongly Disagree (Very

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Negative) = 1". Of the 29 instrument items, there were 14 instrument items which were negative statements, while 15 items were positive statements. Analysis of the results of student assessments using the criteria guideline for assessing the attitude scale of students.

3. RESULTS AND DISCUSSION

3.1 Results

The results of the study describe some information such as Aiken validity, second-order CFA validity. This result can be seen in Figure 1,

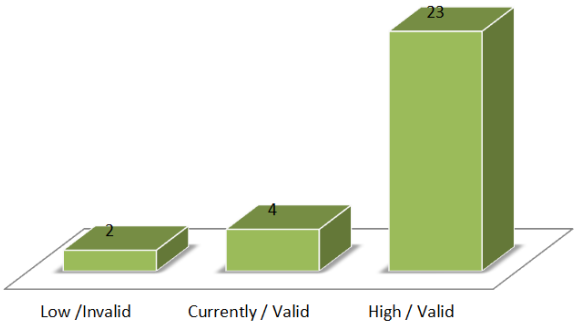

Figure 1. Aiken's validity regarding student attitudes

Based on Figure 1 above, the validity of the results (Instrument variable regarding the attitudes of junior high school students towards mathematics learning) shows that out of the 29 items, 2 items show low/invalid data, 4 items show currently /valid, and 23 items that show high /valid. Construct validity is described in Figure 5.

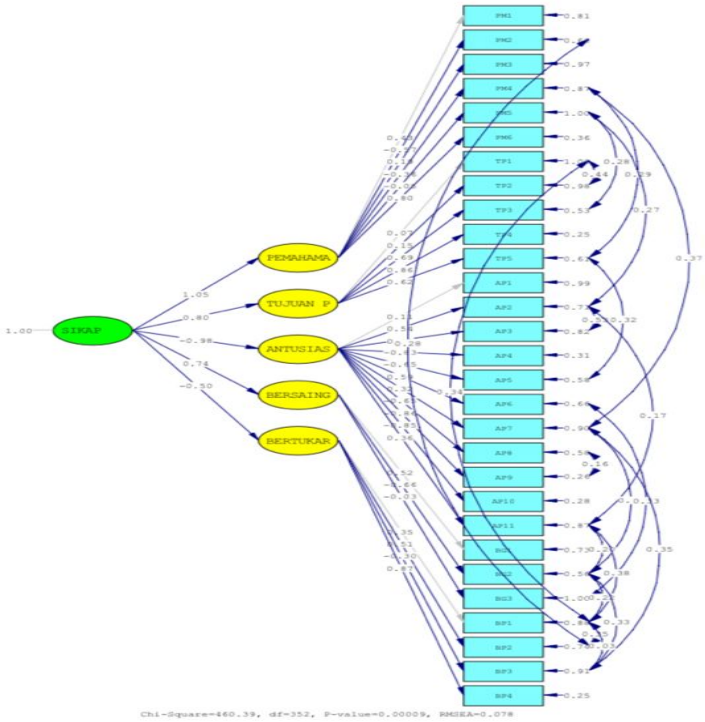

Figure 2. Second Order of CFA

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Table 2. Second Order Summary

Indicators	Standardized	T-value	Criteria
Understanding	1.05	3.26	Valid
Learning Objectives	0.80	0.50	Valid
Enthusiastic	-0.98	-0.76	Invalid
Compete	0.74	2.75	Valid
Exchange Ideas	-0.50	-1.85	Invalid

Conclusion: to ensure the reliability of the questionnaire based on the calculation results show that the value of P-Value = 0.00009, RMSEA = 0.078 (≤0.08), and Chi-square = 160.39 > 0.5 which means the instruments are invalid because P -Value <0.05 and the data obtained by the component that makes the greatest contribution to student attitudes is an understanding indicator that is equal to 1.05 while the smallest is an indicator of brainstorming that is equal to -0.50, the results of the study show that the instrument of student attitudes in learning mathematics has good reliability, the indicators that make up the attitude variable consist of 3 valid indicators because the loading is >0.4 and 2 indicators are invalid because the loading is <0.4 (estimate).

Based on the data obtained from the results of the validity of the test results, not all indicators of the criteria are valid. Of the 5 indicators, only 3 indicators are valid, including indicators of students' understanding of learning, indicators of learning objectives, and indicators of students' enthusiasm for learning mathematics. The other 2 indicators with invalid criteria include indicators of competing and brainstorming in mathematics learning. So for each of the indicators that affect the attitude variable, there are valid and invalid ones, because the loading is more than 0.3 (Estimate). The next step is to find reliability of instrument. This result can be seen in Table 3.

Table 3. Reliability statistics

Cronbach's Alpha	N of items
0,618	29

Thus it can be concluded that in the test the attitude assessment instrument has good constructive reliability. Based on the results of the construct reliability analysis, it can be said that the statement items contained in the student attitude assessment instrument significantly contribute to the indicators.

Attitudes of students in learning Mathematics

The results of the research show that the percentage of students who have a "very positive" and positive attitude in learning mathematics is 61.11%, while the rest have a "negative" and "very negative" attitude in learning mathematics as shown in the table below.

Table 4. Integration of students' attitudes in learning mathematics

Attitude Criteria	Frequency	(%)	(%)
Strongly Agree	1	0,93	61,11
Agree	65	60,19	

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Attitude Criteria	Frequency	(%)	(%)
Don't Agree	42	38,89	38,89
Disagree	0	0	
Total	108	100	100

The students in the table above show that the positive attitudes of students in learning mathematics are more numerous than the students who have a negative attitude, even though with a difference in students' attitudes of 22.22%. This fact shows that overall students can be categorized as having an attitude that agrees with learning mathematics, but not a few who have negative attitudes or do not agree with learning mathematics. In general, students tend to say that mathematics is difficult, difficult, lots of formulas, the teacher is fierce, scary, and so on. Therefore, the percentage of students' negative attitudes is in the high category, which is 38.89%. There is still a large number of negative attitudes towards students in learning mathematics.

The attitude of students in learning mathematics as a whole

The overall attitude of junior high school students in learning mathematics as a whole is 60.19% who have a "very positive" and "positive" attitude. Self-aware students are greater than students who have "negative" and "very negative" attitudes, namely 38.89%. This means that students tend to have an attitude that agrees with mathematics learning even though they have not yet met the expected minimum competence. Visually, a diagram of students' attitudes towards mathematics learning can be described as follows:

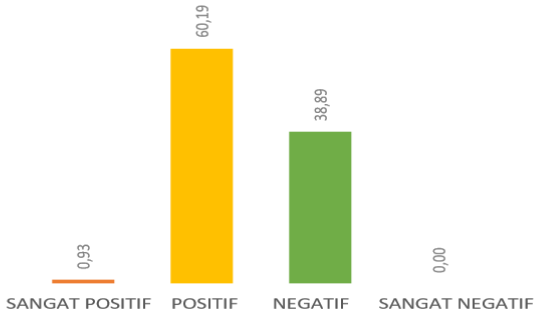

Figure 3. Overall student attitudes in mathematics learning

When viewed from the overall attitudes measured, the attitudes of junior high school students toward learning mathematics fall into the positive (good) category. The greatest concentration in the category of students' positive attitudes toward mathematics learning, namely 60.19%, and the category of students' negative attitudes is 38.89%. So a difference was obtained between positive attitudes and negative attitudes of students, namely 21.3% in learning mathematics.

Attitudes of students in learning mathematics per dimension

If you look at the learning dimensions of junior high school students' attitudes among the three dimensions, it has the highest student positive attitude, namely the affective

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dimension with a wide range of 86.11%. Self-aware students are greater than students who have negative attitudes, namely as much as 13.89%. This means that students tend to have an attitude that agrees with learning mathematics in an affective dimension that relates to the enthusiasm of students when learning is about to begin which indicates a feeling of release towards learning mathematics, namely by involving students in learning mathematics. Visually, a diagram of student attitudes in learning mathematics in full dimensions can be described as follows:

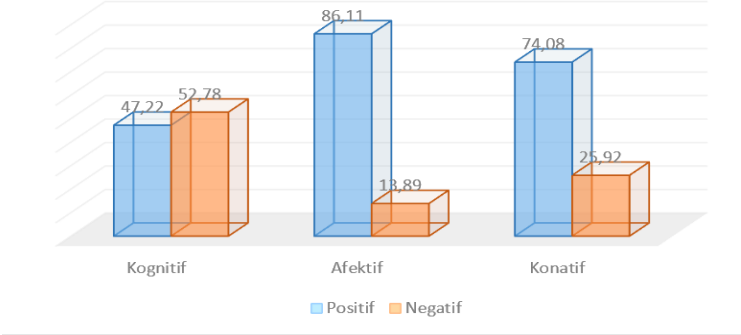

Figure 4. Student Attitude Cells need Dimensions

When viewed from the three dimensions of attitude measured, namely "Cognitive", "Affective", and "Conative", students tend to have a lot of affective attitudes in learning mathematics compared to having cognitive and conative attitudes in learning mathematics.

Table 5. Student Attitude Cells need Dimensions

Dimension	**Indicator**	**Number of items**	**% Positive**	**% Negatif**	**% Number's**	
					Positive	**Negative**
Cognitive	PM	6	89,91	10,19	47,22	52,78
	TP	5	4,63	95,37		
Affective	AP	11	86,11	13,89	86,11	13,89
Conative	BG	3	65,74	34,26	74,08	25,92
	BP	4	82,41	17,59		

Attitudes of students in learning mathematics per Indicator

If you look at the various indicators, students tend to have a more positive attitude towards the indicator of material understanding with a concentration of 89.91%. Visually, a diagram of students' attitudes towards mathematics learning with indicators can be described as follows:

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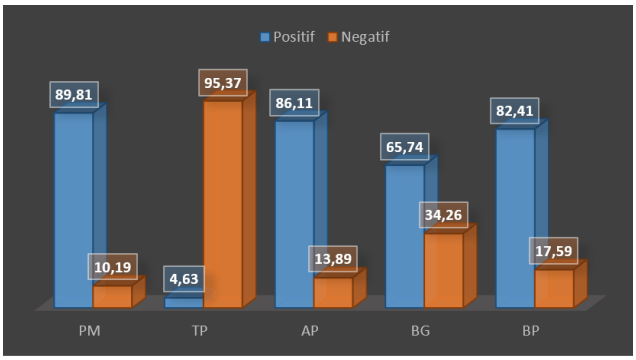

Figure 5. Student attitude assessment requires indicators

Table 6. Calculation of multi-indicator turnover

Dimensions	**Indicator**	**Numbers of items**
Cognitive	Understanding of material presented (PM)	6
	The goals to be achieved in learning (TP)	5
Effective	Enthusiasm when learning begins (AP)	11
Conative	Compete (BG)	3
	Exchange Thoughts / Discuss (BP)	4
Total		29

Formula : R = $\frac{Maksimum\ value - Minimum\ value}{4}$

Maximum value = Number of items x 4

Minimum value = Number of items x 1

This means that students have more attitudes towards the cognitive dimension, namely the indicators regarding understanding of the material presented in mathematics learning compared to the affective and conative dimensions. The complete statement can be seen in Table 7 below:

Table 7. Student attitude assessment indicators in learning mathematics

Criteria	**Overall attitude**		**Attitudes in each dimension**									
			Cognitive				**Affective**		**Conative**			
			PM		**TP**		**AP**		**BG**		**BP**	
	%	% Jlh	%	% Jlh	%	% Jlh	%	% Jlh	%	% Jlh	%	% Jlh
Strongly Agree	0,9	61,1	7,4	89,8	0	4,6	2,8	86,1	12,1	65,7	18,5	82,4
Agree	60,2		82,4		4,6		83,3		53,7		63,9	
Don't Agree	38,9	38,9	10,2	10,2	57,4	95,4	13,9	13,9	30,6	34,3	16,7	17,6
Disagree	0		0		37,9		0		3,7		0,9	

From the table above, it can be explained that in general students have a positive attitude (agree) in learning mathematics. Based on the table above, several things can be described, namely: 1) For the cognitive dimension of the indicators that relate to

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understanding the material presented (PM), students tend to have a "very positive" and "positive" attitude, namely 89.81%, the cell percentage is greater than students who have a "negative" and "very negative" attitude, namely 10.19%. 2) For the cognitive dimension of the indicators that address the goals to be achieved in learning (TP), students tend to have "negative" and "very negative" attitudes, namely 95.37%, so students have a "very positive" attitude. " and "positive" which is as low as 4.63%. 3) For the affective dimension of the indicator which is full of enthusiasm when learning begins (AP), students tend to have a "very positive" and "positive" attitude, which is about 86.11%, the students have a "very positive" and "very positive" attitude. negative" that is 13.39%. 4) For the conative dimension of indicators that are competitive (BG), students tend to have a "very positive" and positive attitude, which is about 65.74%, the students have a "very positive" and "very negative" attitude, that is, about 34, 26%. 5) For the conative dimension of the indicator that involves brainstorming/discussion (BP), students tend to have a "very positive" and positive attitude, which is about 82.41%, the students have a "very positive" and "very negative" attitude, namely 17.59%.

3.2 Discussion

The results of the research show that the attitude of junior high school students towards learning mathematics in the Riau Province area is positive/good. Positive or negative student attitudes towards mathematics learning can affect student assessment and achievement[18]. According to Gunarti, students' positive attitudes towards mathematics have a relationship with the results of student achievement, namely if students' attitudes towards mathematics are getting better (positive) then students' learning achievements towards mathematical abilities will increase. According to Praseltyawan, students who have positive attitudes toward mathematics can build high curiosity and can achieve learning achievements [19]. However, if we look at the PISA results, Indonesian students have below-average mathematical ability achievements and when seen at the formal school level regarding students' attitudes towards mathematics, some students show a negative attitude towards students with the assumption that mathematics is difficult, boring and also thinks too much [20]. One of the factors that influence the low mathematics learning outcomes of students in schools is the negative attitude of students toward mathematics. [21]. This is in line with the causes of low student learning outcomes, namely the negative attitude of students who perceive mathematics as a difficult and feared lesson [22].

According to Poerwadarminta, attitude is an action based on opinion (opinion or belief). The attitude of a person towards something (for example towards mathematics) is very closely related to interest [9]. Some of the attitudes can result from interest, so that students are interested or interested in mathematics, at least students must be able to see its usefulness, see its beauty, or because mathematics is challenging [23]. It is also possible that students are interested in mathematics because of their passion, the arguments are clear, the questions are challenging, the teacher makes them easy, and so on [14]. Everyone's interest in mathematics will lead to a positive attitude towards mathematics. For example, because

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students are interested in mathematics, they like to do homework. This is a sign that students have a positive attitude towards mathematics [24].

Attitudes towards mathematics learning can be seen from the way students react to mathematics learning, so students will appear who have positive or negative attitudes towards mathematics learning [25]. The implication is that students who have a positive attitude towards mathematics will be enthusiastic about learning mathematics because they think that mathematics is a useful lesson, while students who have a negative attitude towards mathematics will perceive mathematics as an uninteresting and unhelpful lesson. Students' attitudes toward mathematics learning will determine whether students have positive or negative reactions to mathematics learning [26]. This attitude will also complement the learning of mathematics with other learning. If students have a positive attitude towards mathematics lessons, they will categorize mathematics as an interesting and useful lesson to learn. On the other hand, if students react negatively to mathematics lessons, they will categorize mathematics lessons as uninteresting and less useful lessons to learn [27].

If analyzed, students at the low school level experienced a higher increase in the ability to reflect and solve mathematical problems than students at the middle school level. However, the attitude of students at the high school level was better than students at the low school level. Students at the lower school level also give a lot of negative responses, so it is only natural that the increase in the ability to reflect and solve mathematical problems is the lowest compared to students at other school levels [28]–[31]. Students at the high school level showed the most positive responses. This condition naturally occurs because students at the high school level do have higher initial abilities. Therefore, the implementation of any learning will show good results and not have a significant impact on students' mathematical abilities [32]. Students at the secondary school level showed a positive response to several main components. This indicates that students like the implementation of contextual learning so that they have the motivation to improve their reflection and mathematical problem-solving abilities, even though the increase is not as great as the increase at the low-school level. This is in line with the results of research on secondary school-level students on increasing the ability to reflect and solve mathematical problems [33]. Students at the lower school level showed dominant results in giving negative responses to the main components. This indicates that even though students at the low school level have negative responses, the improvement in the ability to reflect and solve mathematical problems of students can be better than students at the medium school level. [16]. The example given above only took several samples of students who gave the most positive and most negative responses. If analyzed more deeply on how students respond, it is hoped that it will show results that are in line with the results of increasing the ability to reflect and solve mathematical problems. However, in this discussion, researchers have not been able to analyze it in depth [34].

The results of this study show that attitudes toward mathematics lessons have a positive effect on mathematics learning outcomes. This finding is supported by research results [35] which state that attitudes towards learning mathematics have a positive and significant impact on students' mathematics learning outcomes, and are strengthened by research results

[18] which reveal that the mathematics learning outcomes of students who have positive attitudes towards mathematics learning are higher than students who have negative attitudes towards mathematics learning.

4. CONCLUSION

Overall, the attitude of junior high school students in learning mathematics can be categorized as positive even with a small percentage difference. The results of the data from the two junior high schools show that the attitudes of students who both have positive results in the attitudes of junior high school students toward learning mathematics. This measurement consists of 3 dimensions of attitude, namely cognitive, affective, and conative. Also, based on the data above, the affective dimension has very positive results compared to the negative. So it can be concluded that the attitude of junior high school students towards Mathematics Learning is still quite good, but the difference between the two is quite large. It is hoped that the teacher can pay more attention to both the attitudes and motivation of students towards learning mathematics as a foundation that can stimulate students to think critically and attitudes in solving a problem

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