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BEHAVIORAL ANALYSIS OF STUDENTS' CREATIVE THINKING ABILITY IN LEARNING MATHEMATICS

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Abstract. The purpose of this research is to explain the ability of students' creative thinking in learning mathematics regarding their behavior. This research is quantitative research to describe the students' creative thinking students at the VIII class level of Junior High School. The research population was all junior high schools of Riau Province. Samples were part of junior high school students of Riau Province. The research procedure was started by writing tests and questionnaires to get information data in the field. The data analysis was quantitative research by checking the mean, median, modus, sum, standard deviation, and percentage of responses to the questionnaire. The research results showed the creative thinking ability of grade VIII students with an average percentage of 63.75%. The attitude of grade VIII pupils is regarded as good, with an average percentage of 73.10%. In the creative thinking ability, students with a positive attitude have a creative thinking rate of 63.19%. Overall, students with very good and good attitudes have creative thinking abilities.

Keywords: *Creative Thinking Ability, Student Attitude, Junior High School*

1. INTRODUCTION

In education, there are various sciences, one of which is mathematics. Mathematics is a science that has different qualities compared to other disciplines. In reality, many students think that mathematics is a subject that is very difficult to solve [1]. Mathematics is a field of study that covers topics such as symbols and some deals with abstract concepts [2], [3]. The more often a learner gets direct experience in learning mathematics, the more concepts and understanding of mathematics itself will be well-formed [4].

Based on Ministerial Regulation Number 22 of 2006, the content standards for mathematics subjects frame that mathematics must be given to all students starting from Elementary School to equip students with the ability to think logically, critically, analytically, systematically, creatively, and the capacity to work together. Mathematics learning is not only centered on the teacher and the delivery of material but must also be able to cultivate the abilities or potential that exists in each student. Every individual has creative potential, it's just that the problem is how to develop this potential during the learning process in class [5].

In the 21st century, it is realized that it is important to prepare young people who are creative, flexible, capable of critical thinking, able to make the right decisions, and able to solve problems. The process of revolution in humans has the greatest impact on success and improvement in their lives, is a broad curiosity, because they can make their lives in the future have meaning, especially in terms of the development of thinking skills and knowledge, which increases widely [6]–[8]. Ability is the skill or ability of a person to complete a job [9]–[12]. The ability to think creatively is the ability to understand a problem from a better perspective and solve it in another way. The ability to think creatively is also characterized as the ability to consider different possible outcomes in solving a problem. Therefore, it is important to look at the solution in more depth related to students' creative thinking abilities.

The ability to think creatively is very important in achieving student achievement in learning mathematics at school [13], [14]. Students who have high creative thinking skills tend to use different or unique ways of solving math problems. Students must be able to think creatively to help develop their creative thinking abilities [15]–[17]. One of the things that must be instilled in students is attitude. Attitude stems from feelings of like or dislike associated with a person's tendency to respond to something or object [18], [19]. Attitude is also an expression of the values or outlook on life that is owned by a person. Attitude refers to one's actions or behaviour [20], [21]. Attitudes can be formed so that the desired behaviour or action occurs.

If the student's attitude is not good in learning mathematics, the student will stay away, avoid, and even dislike mathematics. The attitude of giving up easily when faced with problems, because they are not trained to face challenges [22]. Feelings of boredom and laziness will stick to students during the learning process, this is natural if it affects their learning outcomes [23]. Conversely, assuming that students behave well, these students will like and need to know and learn about concepts in mathematics. In any learning situation, students will truly achieve their best [24], [25]. Attitude determines the progress or success of one's learning. Individuals who have no interest in certain subjects will find it difficult to make optimal learning progress or success [26]–[29]. Someone conscientious about something that is expected to achieve ideal learning outcomes.

Based on the explanation described above, information is obtained that students' creative thinking skills in thinking are still low. So, research will be carried out with the title "Analysis of Students' Creative Thinking Ability in Mathematics Learning Given Classroom Students' Attitude".

2. RESEARCH METHOD

The type of research to be carried out is qualitative research with a qualitative descriptive approach. Qualitative research is an examination strategy that produces information that describes words composed or expressed by individuals and visible ways of behaving.

Data on the ability to think creatively, this data was collected using a test technique in the form of math questions and to determine the ability to think creatively using a rubric.

The instrument for collecting data on creative thinking skills is by using test questions. The test questions referred to here are questions related to indicators of creative thinking ability, where the questions depend on problems that exist in everyday life, as an illustration, to make it easier for researchers to find out students' creative thinking abilities through the way students answer questions.

In connection with obtaining information about creative thinking abilities, the assessment is carried out based on the student's answers to each item. The rules for scoring the creative thinking ability test used in this study refer to the rubric scores in Table 1 below:

Table 1. Guidelines for Assessment (Rubric) of Creative Thinking Ability

Aspect	Score	Criteria
fluency	4	Give more than one correct answer and complete reasons
	3	Gives more than one correct answer, but the reasons are not quite right
	2	Gives one correct answer, but incorrect reasons
	1	Gives one answer, but doesn't give a reason
	0	No answer
Flexibility	4	Give various/different answers accompanied by complete reasons
	3	Give various/different answers, but the reasons are not quite right
	2	Gave one answer, but the reason is not correct
	1	Gives one answer, but doesn't give a reason
	0	No answer
Originality	4	Give answers in their way according to the intended concept completely and precisely
	3	Give answers in their way according to the intended concept, but not complete and precise
	2	Give answers in their way, but not by the intended concept and not quite right
	1	Answers in their way but can't be understood
	0	No answer
Elaboration	4	Describe the solution to the problem given in detail and correctly
	3	Describe the solution to the problem given in detail, but incomplete
	2	Describes the solution to the given problem, but lacks detail
	1	Describes the solution to the given problem, but not detailed
	0	No answer

Data about attitudes, this data was collected by a questionnaire technique using a Likert scale. The questionnaire is a data collection technique that is used through various

written questions arranged to obtain data from respondents. The form of the questionnaire used in this study was a Likert scale with four categories, namely SB (Very Good), B (Good), CB (Fair enough), and KB (Not good).

The instrument for collecting data about attitudes is by using a questionnaire sheet. Questionnaire sheets are used to collect data on student attitudes which are arranged based on attitude indicators. The data analysis technique used is a Likert scale. Likert scale is a measuring tool that is used as an indicator of certain behaviors such as knowledge or attitudes [30]. The Likert scale aims to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena. Likert scale tables and attitude categories can be seen in Table 2 and Table 3.

Table 2. Likert Scale

Category	Score
Less Good (KB)	1
Good Enough (CB)	2
Good (B)	3
Very Good (SB)	4

Table 3. Attitude Categories

Earned Percentage	Category
0% - 25,9%	Less Good
26% - 50,9%	Good Enough
51% - 75,9%	Good
76% - 100%	Very Good

Data analysis techniques in this study used descriptive qualitative analysis techniques. Data analysis was carried out in stages starting from data collection, data reduction, data presentation, and conclusion [31]. Data analysis is the process of compiling, categorizing data, classifying, and grouping data to know its meaning [31]. Analysis of the data used to describe the ability to think creatively in learning mathematics in terms of student attitudes.

Table 4. Categories of Creative Thinking Skills

No	Earned Percentage	Category
1	81% - 100%	Very creative
2	61% - 80,9%	Creative
3	41% - 60,9%	Creative Enough
4	21% - 40,9%	Less Creative
5	0% - 20,9%	Not Creative

The technique of collecting student attitude questionnaire data uses a percentage formula, the percentage formula is [32]

$$P = \frac{F}{N} \times 100\%$$

Information: P = Answer Percentage

F = Frequency sought / Total score answers

N = Total maximum score of students

3. RESULTS AND DISCUSSION

3.1 Results

Students' creative thinking in Junior high school at the VIII class level is described by checking the students' responses. Students' responses can be seen in Table 5.

Table 5. Description of Creative Thinking Ability Indicators

Student Code	Creative Thinking Ability Level				Total score	Images	Percent (%)
	1 (FI)	2 (Fx)	3 (Or)	4 (EI)			
AE	3	4	3	3	13	16	81,25%
AA	4	3	2	3	12	16	75,00%
WAP	3	3	3	1	10	16	62,50%
DTW	3	3	2	4	12	16	75,00%
NOA	2	3	4	0	9	16	56,25%
DNL	3	4	3	3	13	16	81,25%
FKD	1	3	4	2	10	16	62,50%
AQ	3	3	2	3	11	16	68,75%
Y	4	3	2	3	12	16	75,00%
W	4	3	1	2	10	16	62,50%
GE	2	1	4	1	8	16	50,00%
MFA	4	2	2	1	9	16	56,25%
K	1	3	2	3	9	16	56,25%
IA	1	3	2	3	9	16	56,25%
D	4	2	1	2	9	16	56,25%
PR	2	2	3	4	11	16	68,75%
FN	3	2	1	3	9	16	56,25%
MA	2	1	4	1	8	16	50,00%
SR	2	3	2	3	10	16	62,50%
EO	3	2	3	2	10	16	62,50%
CD	2	3	2	3	10	16	62,50%
DA	3	1	2	3	9	16	56,25%
PB	4	3	2	1	10	16	62,50%
YES	3	3	3	1	10	16	62,50%
RA	3	3	3	3	12	16	75,00%
Percentage	69%	66%	62%	58%	Average		63,75%

Based on Table 4 above it shows that the ability to think creatively in fluency in question number 1 with a percentage of 69%. The ability to think creatively in flexibility in question number 2 with a percentage of 66%. The ability to think creatively in originality in question number 3 with a percentage of 62%. The ability to think creatively in elaboration on question number 4 with a percentage of 58%. Thus, the average percentage of students' creative thinking ability is 63.75% in the creative category.

Table 6. Description of Student Attitude Questionnaire Results

Student Code	Attitude Score				Amount	IMS	(%)	Attitude Category
	VG (4)	G (3)	GE (2)	LG (1)				
AE	-	33	18	-	51	80	63,75%	Good
AA	56	18	-	-	74	80	92,50%	Very Good
WAP	40	24	4	-	68	80	85,00%	Very Good
DTW	20	30	8	1	59	80	73,75%	Good
NOA	48	24	-	-	72	80	90,00%	Very Good
DNL	-	51	6	-	57	80	71,25%	Good
FKD	4	39	12	-	55	80	68,75%	Good
AQ	64	12	-	-	76	80	95,00%	Very Good
Y	24	27	8	1	60	80	75,00%	Good
W	20	33	8	-	61	80	76,25%	Very Good
GE	8	39	10	-	57	80	71,25%	Good
MFA	8	24	20	-	52	80	65,00%	Good
K	-	30	20	-	50	80	62,50%	Good
IA	-	33	18	-	51	80	63,75%	Good
D	20	15	10	5	50	80	62,50%	Good
PR	36	21	6	1	64	80	80,00%	Very Good
FN	-	30	12	4	46	80	57,50%	Good
MA	8	30	14	1	53	80	66,25%	Good
SR	-	36	16	-	52	80	65,00%	Good
EO	8	42	8	-	58	80	72,50%	Good
CD	28	18	12	1	59	80	73,75%	Good
DA	8	36	12	-	56	80	70,00%	Good
PB	32	33	2	-	67	80	83,75%	Very Good
YC	20	30	10	-	60	80	75,00%	Good
RA	-	42	12	-	54	80	67,50%	Good
The number of students who have a very good attitude								(28%)
The number of students who have a good attitude								(72%)
Average Percentage								73,10%

Based on the table above, it was obtained that students in the very good category totaled 7 students with a percentage of 28%. While students in the good category totaled 18 students with a percentage of 72%. There are no students who have a good enough category and not good enough. This shows that students with very good attitudes are fewer than students with good attitudes. The average percentage of the attitude of class VIII students with a percentage of 73.10% is in the good category.

Table 7. Recapitulation of the average results of the analysis of students' creative thinking abilities in terms of students' attitudes

Attitude Category	Student Code	Creative Thinking Ability Score	Percentage (%)
Very good	AA	12	75,00%
	WAP	10	62,50%
	NOA	9	56,25%
	AQ	11	68,75%
	PR	10	62,50%
	W	11	68,75%
	PB	10	62,50%
Average		10,42857	65,18%
Good	Category	Creative/Good	
	AE	13	81,25%
	DTW	12	75,00%
	DNL	13	81,25%
	FKD	10	62,50%
	YC	12	75,00%
	GE	8	50,00%
	MFA	9	56,25%
	K	9	56,25%
	IA	9	56,25%
	D	9	56,25%
	FN	9	56,25%
	MA	8	50,00%
	SR	10	62,50%
	EO	10	62,50%
	CD	10	62,50%
	DA	9	56,25%
	YC	10	62,50%
	RA	12	75,00%
Average		10,11111	63,19%
Category		Creative/Good	

Based on the table above, the creative thinking ability of students in the very good attitude category is 65.18% in the creative/good category. The creative thinking ability of students in the good attitude category is 63.19% in the creative/good category. Overall, the creative thinking abilities of students who have very good and good attitudes are creative/good.

3.2 Discussion

Currently, teachers have a very important role in enriching students' creative thinking abilities in learning mathematics because this skill is essential in facing the complexity of the modern world [33], [34]. In the context of mathematics learning, teachers are not only teachers but also shapers of students' thinking patterns related to problem-solving, pattern recognition, and deep understanding of mathematical concepts[35], [36]. The ability to think creatively provides the foundation for innovation and unconventional solutions, and teachers play a crucial role in forming this foundation in their students.

The results of the research show that class VIII students have creative thinking abilities which are overall included in the creative category with an average percentage of 63.75%. The students' attitudes in this class also showed a good level, reaching an average percentage of 73.10%. Focusing on good creative thinking skills shows that students with a positive attitude have a creative thinking level of 63.19%. From the results of this research, it appears that there is a correlation between students' attitudes and their creative thinking abilities in the learning context [37], [38]. Although students' creative thinking abilities are generally quite good, there is a clear relationship between a positive attitude and higher levels of creative thinking [39], [40].

The important role of students' attitudes towards learning in improving creative thinking abilities is the emphasis of these results. With the visible correlation, efforts to strengthen positive attitudes towards learning become an important strategy in improving the creative thinking abilities of class VIII students more broadly. This shows that the formation of attitudes that support the learning process can have a significant influence on the development of student's creative thinking abilities in the context of mathematics learning.

4. CONCLUSION

Based on the results of data analysis in Chapter 4 it can be concluded that The creative thinking ability of class VIII students is classified as creative with a percentage of 63.75%. Students who have very good attitudes are 7 people (28%) and students who have good attitudes are 18 people (72%). The attitude of class VIII students with an average percentage of 73.10% is in the good category. The creative thinking ability of students in the very good attitude category is 65.18% in the creative/good category. The creative

thinking ability of students in the good attitude category is 63.19% in the creative/good category. Overall, the creative thinking abilities of students who have very good and good attitudes are creative/good.

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