

IDENTIFICATION OF MATHEMATICAL RESILIENCE BASED STUDENT BRAIN DOMINANCE

Bayu Sukmaangara¹

¹UIN Siber Syekh Nurjati Cirebon, Jln. Perjuangan Kota Cirebon 45132, West Java, Indonesia

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ABSTRACT

Differences in students' resilience levels are very important, especially when facing difficulties in solving problems. The relationship between brain dominance and mathematical resilience, as well as the different ways of thinking of the two hemispheres of the brain, requires research on mathematical resilience based on brain dominance. In addition, research on mathematical resilience based on brain dominance has not been conducted. The purpose of this study was to obtain a picture of mathematical resilience in terms of brain dominance. The research method used was qualitative with a descriptive exploratory approach. The instruments used were a mathematical resilience questionnaire, a brain dominance test, and an unstructured interview. The subject of this study were 3 subjects who met the criteria consisting of 1 subject with left brain dominance, 1 subject with balanced brain dominance, and 1 subject with right brain dominance. The results of the mathematical resilience study based on brain dominance were that left brain dominance students met all the measured indicators, balanced brain dominance students met 4 measured aspects and 2 aspects were not met, and right brain dominance students met all measured indicators.

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Correspondence Author:

Bayu Sukmaangara

UIN Siber Syekh Nurjati Cirebon, Indonesia

bayusukmaangara@uinssc.ac.id

1. INTRODUCTION

There are several affective factors that influence students' success in problem solving, one of which is students' mathematical resilience. Sugandi (in Cahyani et al., 2018) argues that mathematical resilience is an internal factor that influences learning, especially in the field of mathematics. The definition of resilience is explained by Grotberg (1995) argues that resilience is the human ability to face, overcome and be strengthened by adversity.

Resilience describes the ability of self-quality that drives the process of successful adaptation and transformation even in times of risk and difficulty. These difficulties make students feel afraid and avoid the challenges of activities related to problem solving. Grotberg (1995) argues that resilience is the human ability to face, overcome and be strengthened by or even changed by life's difficulties. Master (2001) states that resilience is a process in the capacity or result of efforts to adapt

to challenging or frightening conditions as well as difficulties. Luthar et al. (2000) also stated that resilience is the ability to respond positively in the face of difficulties. Resilience can overcome difficulties by training students to be persistent, persistent, and confident.

Waxman et al. (2003) argues that resilience allows a person to face difficult situations, situations that may affect them negatively or make them give up, thus allowing them to find and use their ability to adapt. A person experiencing difficulties tends to be depressed and in a critical period. The concept of resilience can be seen in the following image:

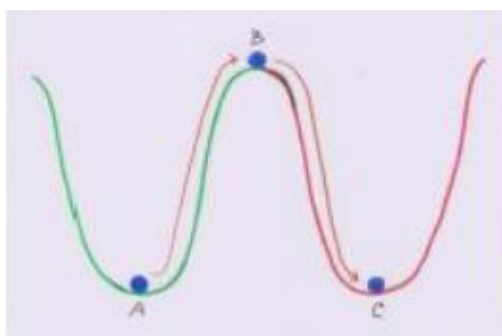


Figure 1 Sustainable, critical and unsustainable situations (Sugiri, *et.al.*(in Ariviyanti & Pradoto, 2014))

The concept of resilience can be explained in Figure 1, Condition point A shows a normal situation. A pressure in the form of difficulty, challenging conditions or frightening conditions can bring conditions to point B, which shows a situation of a person's lack of self-confidence. If the pressure condition continues, it can result in a shift to the worst situation at point C, namely a situation of a loss of self-confidence to face difficulties or challenges. Resilience is needed to face conditions like this. The condition of resilience is depicted in the condition from point A to point B.

The next steps must be able to create efforts to return to a sustainable situation at point A. The efforts made are intended to avoid being at a critical point continuously. These efforts can be illustrated by the blue line and can be seen in the following image:



Figure 2. Repairing damage, increasing resilience (Sugiri, *et.al.*(in Ariviyanti & Pradoto, 2014))

Kooken et al. (2013) conceptualize mathematical resilience as a positive attitude or response to mathematics that gives students the opportunity to continue learning mathematics despite facing difficulties or challenges. Several experts interpret the term mathematical resilience in almost the same sense. In the context of mathematics, according to Newman (2004) defines mathematical resilience as a quality attitude towards learning mathematics which includes: confidence in one's success through hard work, showing a persistent attitude in the face of difficulties, wanting to discuss, reflect, and research. Wilder & Lee (2010) mathematical resilience includes a persistent or persistent attitude in the face of difficulties, working or learning collaboratively with peers, having language skills to express mathematical understanding, and mastering mathematical learning theories. Difficulties or challenges can be feelings of tension, anxiety, or fear that interfere with mathematical performance including student boredom, shame due to poor performance and lack of confidence in

working on solving mathematical problems. Mathematical resilience is the ability to survive these difficulties that are related to learning, especially in solving mathematical problems.

A person achieves success or success when he is able to adapt even in challenging or difficult situations that are high risk and frightening situations. The difference in students' resilience levels is very important especially when facing difficulties in solving problems. This has been studied by Afriyanti *et al.* (2018) that the research results show that students with high, medium, and low mathematical resilience have different levels of ability to master aspects of their literacy skills. In Addition, in the process of learning mathematics, each student has different characteristics and attitudes in dealing with difficulties, which is called mathematical resilienci (Attami et al., 2020). There are student who give up easily when faced with difficult problems, while others are motivated to keep trying until they succeed. The ability to persist, stay positive, and keep trying to face obstacles is known as mathematical resilience. This resilience is one of the important aspects in supporting students' succes in understanding and mistering mathematical concepts in a sustainable manner.

Resilience is the ability to maintain psychological stability in the face of stress (Keye & Pidgeon, 2013). Psychology views resilience as an individual's ability to adapt well when faced with difficulties, whethers in the form of failure, academic pressure, social conflict, or other emotional crises (Masten, 2001; Luthar et al., 2000). This shows that resilience is part of the study of psychology. Jensen (2008) explains that the brain is one of the 7 things that influence learning. Based on the explanation, the fields of education, psychology, and neuroscience are related to each other. Mathematical resilience is part of the study of psychology, while brain dominance is part of the study of neuroscience in the form of the brain. Mathematical resilience and brain dominance can be applied in the field of education. This is reinforced from Ozdogru (2014) illustrates the relationship between the brain, education, and psychology which can be seen in the following image:

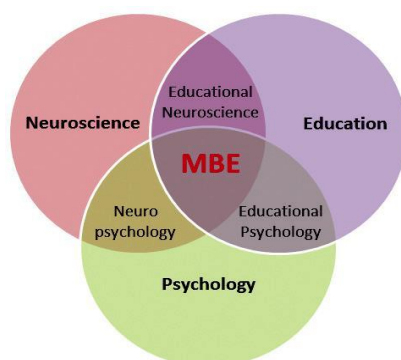


Figure 3. *Transdisciplinary Field of Mind, Brain, and Education (MBE)* (Ozdogru, 2014)

Further research is still needed to develop brain-related research in education. The development of neuroscience, one of which is the brain, has given rise to a push for further research (Ozdogru, 2014). The connection between the brain and education and the encouragement of further research in the field of neuroscience have made researchers interested in researching based on brain dominance.

The human brain consists of the left and right hemispheres. The use of both hemispheres of the human brain is used in cooperation and alternately. The same functional role is important for both hemispheres of the brain in the learning process, but each person has a tendency or dominance in the use of both hemispheres of the brain. The dominance of a person's brain that is used can affect the learning process. This is because brain dominance is an important factor in a person's performance. The results of the study conducted Kordjazi & Ghonsooly (2015) shows that brain dominance is one of the important factors in a person's performance.

Mathematical resilience research has been studied by Maryam et al. (2018), Zanthly (2018), And Ariyanto et al. (2018). Apart from that, it has also been researched by analyzing mathematical resilience, including research by Sirri et al. (2024), Sari & Abadi (2024), Sukaryo & Marlina (2022), Nurhayati & Nimah (2023), Harsela & Asih (2020), Salsabila (2021), dan Ulhasna et al. (2024). All of these studies examine mathematical resilience, but they look at it from different perspectives.

From previous research, most of them analyzed the level of mathematical resilience in mathematics learning in a particular school, but there were also some who researched it based on learning outcomes. The studies conducted by several researchers show that no one has examined mathematical resilience based on students' brain dominance.

Based on the the description above, resilience is very important in facing difficulties in solving problems, students have different characteristics and attitude in facing difficulties, the relationship between resilience and the brain makes this research necessary. This research is expected to be used as a description for teachers to know how the level of mathematical resilience is in the learning the process more specifically regarding brain dominance so that this research can be used as a reference in the diversity of learning process. The description above and so that this study is more focused, the author conducted a review of Mathematical Resilience reviewed from the dominance of the student's brain. This study was conducted on students at the Junior High School (SMP) level. In this study, the author describes the results of the study on students' mathematical resilience based on the dominance of the student's brain.

2. METHOD

The method used is a qualitative method with an exploratory approach. This method is used because the researcher describes in writing and explores more deeply related to Mathematical Resilience based on Brain Dominance.

This study began by giving a brain dominance test to 30 subject who were grade IX student of SMPN Kota Tasikmalaya. The brain dominance test was carried out 3 times with the aim of strengthening the results of the brain dominance test. The selected subject had consistency in answering the brain dominance test. In addition, the subject were selected by considering the students' potential in providing information verbally. The potential in question in the students' ability to convey or express information through speech or verbal communication. The selected results contained 3 subject who met the criteria, namely 1 subject with left brain dominance, 1 subject with balanced brain dominance, and 1 subject with right dominance. The following are the results of the brain dominance test of the three subject.

Table 1. Student Brain Domination Test Results

Subject	First Test Score	Second Test Score	Third Test Score	Category
S1	-5	-6	-4	Left Brain Domination
S2	0	0	0	Balanced Brain Domination
S3	3	4	4	Right Brain Domination

The data collection techniques used were brain dominance test, mathematical resilience questionnaire, and structured interview. The mathematical resilience questionnaire consists of several statements with answer choices of Strongly Agree (SS), Agree (S), Disagree (TS), and Strongly Disagree (STS) totaling 40 statements. The aspects measured in the questionnaire taken from sumarmo (in Hendriana et al., 2017) are 1) Self Efficacy with indicators showing a persistent attitude, being sure/confident, working hard and not giving up easily when facing problems, failures, and uncertainties, 2) Empathy with indicators showing a desire to socialize, easily giving help, discussing with peers, and adapting to the environment, 3) Causal Analysis with indicators generating new ideas/ways and finding creative solutions to challenges, 4) Optimism with indicators using failure experiences to build self-motivation, 5) Ability to achieve what is desired (Reaching Out) with indicators of having curiosity, reflecting, researching, and utilizing various sources, 6) Emotional Regulation, and Impulse Control with indicators of having curiosity, reflecting, researching, and utilizing various sources. The brain dominance test was taken from Tendero's dissertation (Tendero, 2000). The main instrument in this study is the researcher himself and the supporting instruments are the brain dominance test and Mathematical Resilience. The brain dominance test instrument and mathematical resilience questionnaire were validated by 3 expert before use.

The data analysis technique in this study is the Miles & Huberman Model. Stages in the Miles & Huberman Model (Miles & Huberman, 1994) are data reduction, data display, and conclusion drawing/verification.

3. RESULT AND DISCUSSION

3.1. Mathematical Resilience of Left Brain Dominant Students

Pay attention to the following table:

Table 2. Results of the Responses to the Mathematical Resilience Questionnaire of Left Brain Dominant Students

No	Aspects measured	Item Number		Number of Responses			
				SS	S	TS	STS
1	<i>Self Efficacy</i>	1, 3, 4, 5, 9	+	4	1		
		2, 6, 7, 8,	-	1	3		
2	<i>Empathy</i>	10, 12, 14	+	1	2		
		11, 13, 15	-		3		
3	<i>Causal Analysis</i>	16, 17, 20	+	2	1		
		18, 19, 21	-	3			
4	<i>Optimism</i>	22, 24, 25, 26,	+	4			
		23, 27	-	1	1		
5	<i>Reaching Out</i> (ability to achieve what you want)	28, 30, 31, 34,	+	1	3		
		29, 32, 33, 35	-	3	1		
6	<i>Emotional Regulation and Impulse Control</i>	37, 39	+	2			
		36, 38, 40	-	1	2		

Based on table 2, students with left brain dominance meet all indicators measured in mathematical resilience so that these students have very good mathematical resilience abilities, meaning that students can overcome difficulties in mathematics. This is based on table 1 that the mathematical resilience of students with left brain dominance tends to be high as seen from the results of student answers where only 2 statements out of 19 negative statements are in accordance with the student. This means that 17 negative statements are statements that do not match the student, while all positive statements are in accordance with him.

The first indicator measures the Self Efficacy aspect. Students are very persistent and confident that they will succeed in learning mathematics even though they have failed in previous tests. Students are also confident that they will try their best to complete and improve their math problem solving until they are finished. Students are not lazy, hesitant, and frustrated in solving math problems. They will not even avoid new ways of solving math problems that are at risk of failure. This means that students can be persistent, confident, work hard, and not give up easily when facing problems, failures, and uncertainties.

The second indicator measures the Empathy aspect. Students are very happy when explaining the solution to difficult math assignments to their friends. Students feel comfortable discussing and will try to adapt when learning math with new conditions. Students do not find it difficult to find friends to solve math problems and do not feel disturbed when friends ask for help, but students feel reluctant when conveying difficulties in learning math to new friends. This means that students can socialize, easily provide assistance, discuss with peers, and adapt to their environment, but are reluctant when discussing learning difficulties experienced by the student.

The second indicator measures the Causal Analysis aspect. Students dare to try different or new ways in solving mathematics. Students even deliberately choose math practice questions that are multi-answer and do not avoid them when solving the questions. Students also do not feel safe if the solution used is the same as their friend's method. This means that students can come up with new ideas/ways and find creative solutions to challenges.

The fourth indicator measures the aspect of Optimism. Students work very hard to practice again after experiencing failure, even students think that failure is a valuable experience for the next exam. Students also always try to find new ways to solve math problems

even though it takes a long time. Students are also never anxious in learning math and do not lose their enthusiasm in learning math even though they get bad grades before. This means that students can use the experience of failure to build self-motivation.

The fifth indicator that measures the Reaching Out aspect. Students' curiosity because students strongly agree with the opinion that studying various books will improve their understanding. Students try to compare the same explanations from various books and summarize the study. Students are also grateful if they find a way from the results. Students are not bored, not confused, and do not avoid when they must find ways from several sources. This means that students can show their curiosity, reflect, research, and utilize various sources.

The sixth indicator measures the aspects of Emotional Regulation and Impulse Control. Students know what to do and try to stay calm when they have difficulty learning mathematics, but students feel unable to overcome panic when they have not been able to solve a math problem. Students do not have difficulty overcoming sadness when they fail to solve a math problem and are not even upset if someone criticizes them. This means that students can speak, are aware of their feelings, and can control themselves when they have difficulty but are not yet able to overcome their panic.

The results of the research discussion were strengthened by the following interviews:

P : When you failed a previous test, what did you do to overcome the experience of failure?

S : I try to learn again and again

P : Do you like the type of Math Practice questions that are multi-answer?

S : Like more challenging. I like to find questions like that for Practice to get better at solving the questions.

P : If you experience failure, are you more enthusiastic in overcoming that failure?

S : Yes

P : Do you often look for sources from several books?

S : Yes, I often use some books

P : Do you try to stay calm when you are having trouble?

S : Yes. I try to stay calm, but I'm a bit less able to control my panic when I haven't finished the problem.

Based on the explanation above, students have very good mathematical resilience skills. In fact, their mathematical resilience skills tend to be high. Judging from the indicators and aspects measured, it can be concluded that students are able to: (1) be diligent, confident, work hard, not easily give up when facing problems, failures and uncertainties, (2) socialize, easily provide assistance, discuss with peers, and adapt to their environment, but are reluctant when discussing learning difficulties experienced by the student, (3) generate new ideas/ways and find creative solutions to challenges, (4) use experiences of failure to build self-motivation, (5) show curiosity, reflect, research, and utilize various sources, and (6) speak, be aware of their feelings, and be able to control themselves when experiencing difficulties but have not been able to overcome their panic.

3. 2. Students' Mathematical Resilience Dominates Balanced Brain

Pay attention to the following table:

Table 3. Results of the Responses to the Mathematical Resilience Questionnaire of Students with a Dominant Balanced Brain

No	Aspects measured	Item Number	Number of Responses			
			SS	S	TS	STS
1	<i>Self Efficacy</i>	1, 3, 4, 5, 9	+	4		
2	<i>Empathy</i>	2, 6, 7, 8,	-	1	1	
		10, 12, 14	+	1	3	
3	<i>Causal Analysis</i>	11, 13, 15	-	3	1	
		16, 17, 20	+	2		
4	<i>Optimism</i>	18, 19, 21	-	1	2	
		22, 24, 25, 26,	+	4		

No	Aspects measured	Item Number	Number of Responses			
			SS	S	TS	STS
5	<i>Reaching Out</i> (ability to achieve what you want)	23, 27	-	1	1	
		28, 30, 31, 34,	+	1	3	
		29, 32, 33, 35	-	3	1	
6	<i>Emotional Regulation and Impulse Control</i>	37, 39	+	2		
		36, 38, 40	-	1	2	

Based on table 3, students with a balanced brain dominance fulfill 4 aspects measured and 2 aspects are not fulfilled in mathematical resilience so that students have good mathematical resilience abilities, meaning that students can overcome difficulties in mathematics. This is based on table 2 that students answered 7 statements out of 21 positive statements that did not match the students. This means that 14 positive statements are statements that match the students. This proves that the statements that match are still more than those that do not match. While students answered 9 statements out of 19 negative statements that match the students. This means that 10 negative statements are statements that do not match the students. This proves that the statements that do not match are still more than those that match.

The first indicator measures the Self Efficacy aspect. Students are persistent and confident that they will succeed in learning mathematics even though they have failed in previous tests. Students also never give up and will try to solve and improve the solution of mathematical problems until they are complete, but students are not confident that they can check the correctness of solving complex mathematical problems themselves. Students are never lazy and frustrated in solving mathematical problems. They will not even avoid new ways of solving mathematical problems that risk failure, but students have doubts that they can solve mathematical problems correctly. This means that students are able to be persistent, confident, work hard, do not give up easily when faced with problems, failures and uncertainties, but students are less confident in the results of their work.

The second indicator measures the Empathy aspect. Students try to adapt when learning mathematics. Students do not feel reluctant when conveying difficulties in learning mathematics to new friends. Students do not even find it difficult to find friends to solve math problems and do not feel disturbed when friends ask for help, but students do not feel comfortable discussing and explaining mathematics to friends they know. This means that students are able to socialize, easily provide assistance, and adapt to their environment, but are not comfortable discussing with their peers.

The second indicator measures the Causal Analysis aspect. Students dare to offer new ideas and deliberately choose math problems that have multiple answers. Although students are brave and deliberate in new ideas, students do not try different ways from previous examples. Students feel safer using the same method as other people. In addition, students always avoid solving math problems that have various ways of solving. This means that students are unable to come up with new ideas/methods and find creative solutions to challenges even though they are brave in offering new ideas, but students do not try different ways.

The fourth indicator that measures the aspect of Optimism. Students try to find ways and practice harder after experiencing failure, even students think that failure is a valuable experience for the next exam. Students do not lose their enthusiasm for learning after failing to understand mathematics material, but students feel anxious in learning mathematics when they get bad grades before. This means that students are able to use the experience of failure to build self-motivation, students only feel anxious when they get bad grades before.

The fifth indicator measures the aspect of Reaching Out. Students are enthusiastic about finding relevant sources to complete math assignments and are grateful when they get them. Students do not try to compare and summarize the study of material from several relevant book sources even though they are enthusiastic about finding sources because students think that studying several book sources will not strengthen understanding. Students are confused and avoid finding new methods or different ways from various books. This means that students are able to show their curiosity but students are not able to reflect, research, and utilize various sources.

The sixth indicator measures the aspects of Emotional Regulation and Impulse Control. Students know what to do and try to stay calm when they have difficulty learning mathematics, but students feel unable to overcome panic when they have not been able to solve a math problem. Students do not have difficulty overcoming sadness when they fail to solve a math problem and are not even upset if someone criticizes them. This means that students are able to speak, are aware of their feelings, and can control themselves when they have difficulty but are not yet able to overcome their panic.

The results of the research discussion were strengthened by the following interviews:

- P : What did you do to overcome the experience of failure?
 S : How do you feel when discussing?
 P : How do you feel when discussing?
 S : Very happy sir. I can ask for help from friends when having a discussion
 P : If a friend asks for help, don't you feel annoyed? And do you help that friend?
 S : No, but sometimes I feel uncomfortable when explaining because I am not confident in the results of my work, especially on difficult questions.
 P : Based on the questionnaire you filled out, why don't you try a new method? It's even safer to use exactly the same method as the one you were taught?
 S : If I've found the answer and the method is exactly the same, I prefer that because I don't have to think anymore (with a smile)
 Why don't you like to look for information from several sources when solving math problems?
 Because if I have found the answer, I won't try to look for the answer in other books, sir (smiling)

Based on the explanation above, students have good mathematical resilience. This means that students as a whole have the ability to overcome difficulties in mathematics. Judging from the indicators and aspects measured, it can be concluded that: (1) students are able to be persistent, confident, work hard, do not give up easily when facing problems, failures and uncertainties, but students are less confident with the results of their work, (2) students are able to socialize, easily provide assistance, and adapt to their environment, but are not comfortable discussing with their peers, (3) students are not able to come up with new ideas/ways and find creative solutions to challenges even though they are brave in offering new ideas, but students do not try different ways (4) students are able to use experiences of failure to build self-motivation, students only feel anxious when they get bad grades before, (5) students are able to show their curiosity but students are not able to reflect, research, and utilize various sources, and (6) students are able to speak, are aware of their feelings, and can control themselves when experiencing difficulties but have not been able to overcome their panic.

3.3. Mathematical Resilience of Right Brain Dominant Students

Pay attention to the following table:

Table 4. Results of the Mathematical Resilience Questionnaire Responses of Right Brain Dominant Students

No	Aspects measured	Item Number		Number of Responses			
				SS	S	TS	STS
1	<i>Self Efficacy</i>	1, 3, 4, 5, 9	+	2	3		
		2, 6, 7, 8,	-			4	
2	<i>Empathy</i>	10, 12, 14	+	1	2		
		11, 13, 15	-		1	2	
3	<i>Causal Analysis</i>	16, 17, 20	+		3		
		18, 19, 21	-			3	
4	<i>Optimism</i>	22, 24, 25, 26,	+	2	2		
		23, 27	-			1	1
5	<i>Reaching Out</i> (ability to achieve what you want)	28, 30, 31, 34,	+	1	3		
		29, 32, 33, 35	-			4	
6	<i>Emotional Regulation and Impulse Control</i>	37, 39	+		2		
		36, 38, 40	-		1	2	

Based on table 4 , students with right brain dominance meet all indicators, so students have very good mathematical resilience abilities, meaning students can overcome difficulties in mathematics. This is based on table 3 that students answered 4 statements out of 21 positive statements that did not match the students. This means that 17 positive statements are statements that match the students. While only 3 statements out of 19 negative statements match the students. This means that 16 negative statements are statements that do not match the students. This shows that students have mathematical resilience that tends to be quite high.

The first indicator measures the Self Efficacy aspect. Students never give up and always work on solving math problems themselves until they are finished. Students are also diligent and confident that they will succeed in learning math even though they have failed in previous tests, but students are not sure and sometimes doubt that they can solve math problems by checking their own truth. Meanwhile, students are also not lazy and frustrated in solving math problems, and will not even avoid new ways of solving math problems that risk failure. This means that students are able to be diligent, confident, work hard, do not give up easily when faced with problems, failures and uncertainties, but students are less confident in the results of their work.

The second indicator measures the Empathy aspect. Students are happy when explaining the solution to difficult math assignments to their friends and do not hesitate to convey difficulties in learning math, and are not bothered if asked for help by friends who are having difficulties. Students also feel comfortable when discussing and will try to adapt when learning math with new conditions. Students find it difficult when looking for friends to ask for help in overcoming learning difficulties. This means that students are able to easily provide assistance and adapt to their environment, but find it difficult when socializing.

The second indicator measures the Causal Analysis aspect. Students dare to offer new ideas, often trying different or new ways from previous examples. Students deliberately choose math practice questions that are multi-answer and do not avoid them when solving the questions. Students also do not feel safe if the solution used is exactly the same as their friend's method. This means that students are able to come up with new ideas/ways and find creative solutions to challenges.

The fourth indicator measures the aspect of Optimism. Students work hard in practicing again, do not feel anxious, and do not lose their enthusiasm for learning mathematics after experiencing failure, even students think that failure is a valuable experience for the next exam. Students also always try to find new ways to solve mathematical problems even though it takes a long time. This means that students are able to use the experience of failure to build self-motivation.

The fifth indicator measures the Reaching Out aspect. Students strongly agree with the opinion that studying various books will improve their understanding. Students are also not bored, not confused, and do not avoid when they have to find ways from several sources. Students are enthusiastic about finding relevant sources and are also grateful if they find relevant learning sources, but students do not try to compare the same explanations from various books and do not summarize the study. This means that students are able to show their curiosity, reflect, research, and utilize various sources, but do not utilize various sources with the same explanations.

The sixth indicator measures the aspects of Emotional Regulation and Impulse Control. Students know what to do when they have difficulty learning mathematics. Students also feel able to overcome panic when they have not been able to solve a math problem and sadness when they fail to solve a math problem. Students are not upset when their math work is criticized, but they do not try to stay calm in order to solve the math problem. This means that students are able to speak, control themselves, and are aware of their feelings, but they are less calm when solving problems.

The results of the research discussion were strengthened by the following interviews:

- P : When it comes to solving math problems, do you never give up and always try to solve them?
S : Yes. I always try to find the answer until I find the result.
P : Sometimes in group discussions, you are in a new situation, how do you adapt with your friends?
S : I try to adjust to the conditions
P : When solving math problems, do you really dare to try different methods, either with your teacher or friends?
S : Yes sir. I always look for ways to do things myself and try to be different from other friends.

P : When you experience failure, what efforts do you make?

S : Practice again to fix the failure

P : Regarding the resolution of unsolved problems, how do you think you can find the answer?

S : I search for information from the internet and books

Based on the explanation above, students have very good mathematical resilience. Students have mathematical resilience that tends to be quite high. Judging from the indicators and aspects measured, it can be concluded that students are able to: (1) be persistent, confident, work hard, not easily give up when facing problems, failures and uncertainties, but students are less confident with the results of their work, (2) easily provide assistance, and adapt to their environment, but find it difficult when socializing, (3) come up with new ideas/ways and find creative solutions to challenges (4) use failure experiences to build self-motivation, (5) in showing their curiosity, reflecting, researching, and utilizing various sources, but not utilizing various sources with the same explanation, and (6) students are able to speak, control themselves, and be aware of their feelings, only students are less calm when solving problems.

4. CONCLUSION

Based on the results of research and discussion, mathematical resilience in terms of brain dominance can be concluded as follows:

- a. The mathematical resilience of students who are left brain dominant has very good mathematical resilience. Their mathematical resilience tends to be high. Judging from the indicators and aspects measured, it can be concluded that students are able to: (1) be persistent, confident, work hard, not easily give up when facing problems, failures and uncertainties, (2) socialize, easily provide assistance, discuss with peers, and adapt to their environment, but are reluctant when discussing learning difficulties experienced by the student, (3) generate new ideas/ways and find creative solutions to challenges, (4) use experiences of failure to build self-motivation, (5) show curiosity, reflect, research, and utilize various sources, and (6) speak, be aware of their feelings, and be able to control themselves when experiencing difficulties but are not yet able to overcome their panic.
- b. The mathematical resilience of students who are dominated by balanced brains has good mathematical resilience. This means that students as a whole have the ability to overcome difficulties in mathematics. Judging from the indicators and aspects measured, it can be concluded that: (1) students are able to be persistent, confident, work hard, do not give up easily when facing problems, failures and uncertainties, but students are less confident with the results of their work, (2) students are able to socialize, easily provide assistance, and adapt to their environment, but are not comfortable discussing with their peers, (3) students are unable to come up with new ideas/ways and find creative solutions to challenges even though they are brave in offering new ideas, but students do not try different ways (4) students are able to use the experience of failure to build self-motivation, students only feel anxious when they get bad grades before, (5) students are able to show their curiosity but students are unable to reflect, research, and utilize various sources, and (6) students are able to speak, are aware of their feelings, and can control themselves when experiencing difficulties but have not been able to overcome their panic.
- c. The mathematical resilience of students who are right-brain dominant has very good mathematical resilience. Even has a mathematical resilience that tends to be quite high. Judging from the indicators and aspects measured, it can be concluded that students are able to: (1) be persistent, confident, work hard, not easily give up when facing problems, failures and uncertainties, but students are less confident with the results of their work, (2) easily provide assistance, and adapt to their environment, but find it difficult when socializing, (3) come up with new ideas/ways and find creative solutions to challenges (4) use experiences of failure to build self-motivation, (5) in showing their curiosity, reflecting, researching, and utilizing various sources, but not utilizing various sources with the same explanation, and (6) students are able to speak, control themselves, and be aware of their feelings, only students are less calm when solving problems.

The results of this study can be used as a guideline for further, more in-depth development of similar research. However, this study still has several limitations. The analysis of each subject's mathematical resilience only focused on data obtained through questionnaires, interviews, and direct observation. In addition, this study only involved one subject for each brain dominance category, so further research is needed with a wider scope of subject to strengthen the findings related to mathematical resilience based on brain dominance. However, this study also has several advantages. One of them is the implementation of the brain dominance test three times, which makes the results of the brain dominance grouping of each subject more accurate. In addition, this study can be considered an important initial study, considering that there have not been many previous studies that have examined mathematical resilience based on brain dominance. Therefore, the findings in this study can be used as a reference for further researchers and as a reference for teachers in managing the mathematics learning process. Thus, this study contributes to enriching the variety of studies in the field of education, especially mathematics education.

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