

Exploration of Creative Thinking Ability: Qualitative Analysis of Students' Learning Difficulties in Mathematics

Adde Iskandar, Wahyu Hartono, Cita Dwi Rosita

Mathematics Education, Universitas Swadaya Gunung Jati, Cirebon, Indonesia
addeiskandar2018@gmail.com, wahyuhartono.id@gmail.com, citadwirosita@gmail.com

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Abstract: In this study, the meaning of the ability to think creatively and learning difficulties in mathematics as well as the factors that influence the ability to think creatively and the reasons participants experience difficulties in learning mathematics is raised. The participants of this study were grade VIII junior high school students in one of the schools in Kuningan Regency. The research participants were 20 people with 9 male students and 11 female students. The research methodology used is a qualitative method with a phenomenological approach. The results of the study are in the form of a description of the meaning of creative thinking ability, the meaning of learning difficulties in mathematics, factors that affect creative thinking skills and the reasons participants have difficulty learning mathematics. It is known that in this study, the most dominant factor in the ability to think creatively was the internal factor experienced by the participants, therefore the participants found it difficult to learn mathematics.

Keyword: *creative thinking ability, learning difficulties in mathematics, phenomenology*

INTRODUCTION

The ability to understand mathematics is a basis that must be owned by every student in learning mathematics material. This is intended so that students will be able to solve problems and improve other abilities they have¹. In addition, according to Purwasih² mathematical understanding skills are needed by students in dealing with problems or math problems in the future. Because the understanding between one student and another student is different, ideas or ideas for solutions emerge that are developed in students' minds which are called creative thinking abilities.

The ability to think creatively is a thinking process that is capable of generating various ideas or methods, has the ability to solve mathematical problems, has the ability to understand mathematical concepts and is also able to convey the ideas or concepts they have³. In addition,

¹ Ratna Sariningsih, "PENDEKATAN KONTEKSTUAL UNTUK MENINGKATKAN KEMAMPUAN PEMAHAMAN MATEMATIS SISWA SMP," *Infinity Journal* 3, no. 2 (2014): 150, <http://dx.doi.org/10.22460/infinity.v3i2.60>.

² Ratni Purwasih and Ratna Sariningsih, "Pembelajaran Berbasis Masalah Untuk Meningkatkan Kemampuan Berpikir Kreatif Dan Self-Concept Siswa SMP," *Jurnal Didaktik Matematika* 4, no. 1 (2017): 15–24.

³ Nichen Irma Cintia, Firosalia Kristin, and Indri Anugraheni, "PENERAPAN MODEL PEMBELAJARAN DISCOVERY LEARNING UNTUK MENINGKATKAN KEMAMPUAN BERPIKIR KREATIF DAN HASIL BELAJAR SISWA," *Perspektif Ilmu Pendidikan* 32, no. 1 (2018): 67–75, <http://dx.doi.org/10.21009/pip.321.8>.

according to Siswono ⁴ the ability to think creatively is an ability that generates many possible answers.

The ability to think creatively has the following characteristics: 1) self-confidence; 2) have the motivation to excel; 3) mastery of basic skills; 4) mastering the ability to think; and 5) mastering interpersonal skills ⁵. The learning process that has been carried out by the teacher so far is teaching mathematics material procedurally by providing formulas and practice questions without giving students the opportunity to think creatively. With a tendency to carry out the learning process, students cannot find meaning about the mathematical material they are studying.

According to Suryapermana ⁶ during the learning process at school, there are 2 determining factors that distinguish one student from another, namely; student background (pupil formative experience) and the nature of the student (pupil properties). The background factors include; gender, family economic status, place of residence, and student characteristics including: basic skills, knowledge and attitudes. Departing from the student nature factors mentioned above, one of the basic abilities that students should ideally have is good creative thinking skills.

A person is said to be creative, according to Munandar in Harisuddin⁷ if he is able to assess problems from various sides, so that he can provide answers that are diverse and different from other people. In the world of education, students must have different creative thinking abilities, so the ideas and solutions to the problems will be different.

Every child has different intellectual or academic abilities. There are those who have academic abilities above average, average, or below average. This is what distinguishes the learning achievements achieved by each child in school. Poor or unsatisfactory achievement based on the academic grades obtained can be said that the child or student is experiencing problems or difficulties in learning.

Learning difficulties can be interpreted as the inability of students to complete tasks given by the teacher ⁸. According to Novferma ⁹ student learning difficulties are obstacles experienced by students in learning. These obstacles include the inability of students to solve most of the questions given, difficulties in thinking, writing, speaking, reading and mathematical operations. Therefore, students who experience learning difficulties tend to avoid and feel afraid to participate in mathematics learning.

In learning mathematics, the difficulties experienced by students are often considered normal,

⁴ Utomo, D. Juniati, and T. Y.E. Siswono, "Exploring Aspects of Mathematical Visualization of Junior High School Student in a Problem-Solving Task," *Malaysian Journal of Mathematical Sciences* 12, no. 3 (2018): 421–436; Herfa Maulina Dewi Soewardini et al., "Mathematical Comics on Class X Trigonometry Learning," in *Journal of Physics: Conference Series*, vol. 1175 (IOP Publishing, 2019), 12013.

⁵ Munandar Utami, "Pengembangan Kreativitas Anak Berbakat," *Jakarta: Rineka Cipta* (2004).

⁶ Nana Suryapermana, "MANAJEMEN PERENCANAAN PEMBELAJARAN," *Tarbawi: Jurnal Keilmuan Manajemen Pendidikan* 3, no. 02 (2017): 183, <http://dx.doi.org/10.32678/tarbawi.v3i02.1788>.

⁷ Muhammad Iqbal Harisuddin, "BERPIKIR KREATIF DAN MOTIVASI BELAJAR MELALUI PROBLEM BASED LEARNING DENGAN PEMBELAJARAN INTERAKTIF GEOGEBRA," *Didaktik : Jurnal Ilmiah PGSD STKIP Subang* 2, no. 1 (2016): 50–60, <http://dx.doi.org/10.36989/didaktik.v2i1.37>.

⁸ Ety Mukhlesi Yeni, "Kesulitan Belajar Matematika Di Sekolah Dasar," *Jurnal Pendidikan Dasar (JUPENDAS)* 2, no. 2 (2015).

⁹ Novferma Novferma, "Analisis Kesulitan Dan Self-Efficacy Siswa SMP Dalam Pemecahan Masalah Matematika Berbentuk Soal Cerita," *Jurnal Riset Pendidikan Matematika* 3, no. 1 (2016): 76–87, <http://dx.doi.org/10.21831/jrpm.v3i1.10403>.

these learning difficulties in mathematics are usually influenced by students' lack of liking in learning mathematics, lack of confidence in learning, find it difficult to grasp material and tend to avoid learning mathematics. In the end, this makes it difficult for students to work on calculation problems, word problems and solving other math problems¹⁰. In addition to the problems above, student difficulties also have an impact on online learning implemented by the government during the Covid-19 pandemic.

The ability to think creatively is important for students to have, because the better or higher the ability to think creatively possessed by students, makes students able to easily receive information and be able to update and sort the information they have. However, given the importance of this creative thinking ability, some students must experience difficulties.

The difficulties experienced by students in learning or studying the material presented by the teacher, causes students to tend to be less creative, because they feel they do not master the material and tend to avoid it. This also causes students' creative thinking skills to be low. Based on this, the purpose of this research is to find out the meaning of creative thinking for students and the factors that cause students' low creative thinking ability.

METHODS

This study uses a qualitative research method with a phenomenological approach. Qualitative research methods are research methods that explore certain topics and one's perspective in viewing these topics¹¹.

The subjects in this study were 20 Class VIII junior high school students consisting of 9 male students and 11 female students ranging in age from 14 to 15 years. In qualitative research, research subjects are also called participants. In this study, the participants selected were eighth grade junior high school students at a school in Kuningan District.

Determining the subject of this study using a purposive sampling technique. Purposive sampling is a sampling technique in which researchers determine research subjects based on certain criteria¹². In research that uses a phenomenological approach, the number of participants is 5 to 25 participants¹³.

The main instrument in qualitative research is the researcher himself. The settings for data collection are done as natural as possible. In this study, the main sources of data consisted of interviews and document studies.

¹⁰ Dian Rizky Utari, M Yusuf Setia Wardana, and Aries Tika Damayani, "Analisis Kesulitan Belajar Matematika Dalam Menyelesaikan Soal Cerita," *Jurnal Ilmiah Sekolah Dasar* 3, no. 4 (2019): 545, <http://dx.doi.org/10.23887/jisd.v3i4.22311>.

¹¹ Lisa Given, *The SAGE Encyclopedia of Qualitative Research Methods* (SAGE Publications, Inc., 2008), <http://dx.doi.org/10.4135/9781412963909>.

¹² Gregg G Van Ryzin, "Cluster Analysis as a Basis for Purposive Sampling of Projects in Case Study Evaluations," *Evaluation Practice* 16, no. 2 (1995): 109–119, [http://dx.doi.org/10.1016/0886-1633\(95\)90020-9](http://dx.doi.org/10.1016/0886-1633(95)90020-9).

¹³ John W Creswell and Cheryl N Poth, *Qualitative Inquiry and Research Design: Choosing among Five Approaches* (Sage publications, 2016).

RESULT AND DISCUSSION

Research result

Based on the results of the interviews, several themes were found that were interconnected with students' creative thinking abilities and students' learning difficulties in mathematics, while the themes found were grouped into four main themes, including: Confusion in working on math problems so as to provide answers that were considered correct based on their own understanding, difficulties in studying mathematics material, mathematics learning resources and the concept of creative thinking. The following presents sub-themes based on the four main themes.

Confusion in working on math problems so as to give answers that are considered correct based on their own understanding

Most of the research participants had experience learning mathematics with the same material. However, there were some students who had taken mathematics lessons outside of school hours some time ago before turning VIII grade. Nazwa shared her experience while taking math lessons, "I used to take math lessons, but I still don't really understand the math material." It can be seen from this opinion that even though students have learning experiences that are slightly different from other participants, participants still find it difficult to understand mathematics.

In addition, when participants answered math questions, participants had doubts about their answers so they used their own understanding in working on the questions, even though the questions they worked on were not in accordance with their mathematical concepts. Citra said, "The formula used to work on this problem is the right-angled triangle formula, and the right-angled triangle formula is used to find the area." is the length of the slanted side of a triangle, therefore the participants do it with their own understanding even though the concept they use is not correct. After being confirmed again, Citra said that, "oh yes, you should use the Pythagorean theorem,

The ability to read questions and understand keywords in solving math problems is very necessary, but in reality Widy said, "the problem is quite difficult to understand". In working on math problems the keywords in the questions are needed to make working on the questions easier, besides that by using the keywords questions participants will find it easier to determine the concept of the mathematical material they are using, how to do it and what is asked in the given problem.

The concern of the participants in working on the questions given is one of the things that needs attention, according to Dini "I don't understand how to do it, so I see I have friends". Based on the participants' opinions, the participants' concern to participate in working on the questions given was lacking, therefore participants tended to avoid the questions given during the interview. When participants are under pressure, participants find it difficult to do the math problems given, as according to Widy, "because time is in a hurry". Based on this, the pressure experienced while working on math problems resulted in participants having difficulty answering the math questions given.

However, another opinion said that the participants were only able to work on the questions according to the examples given by the teacher, such as the opinion given by Alan, "if the questions are the same as those in the textbook, you can, sir, but if the questions are different, you can't do it, I don't understand." . The math questions given to the participants sounded foreign because the questions that had been given by the teacher so far led to an easy way of solving them, without any other analysis of the questions given. Alan further said "yes, sir, in the tea package book there is a question, because there are examples, the answers are counted, I can, sir." From the

participants' answers it was known that participants could only answer questions that were in the easy category and it was easier to do when previously given examples of questions. The explanation regarding the meaning of the theme of confusion in working on math problems so as to provide answers that are considered correct based on their own understanding is summarized in Figure 1.

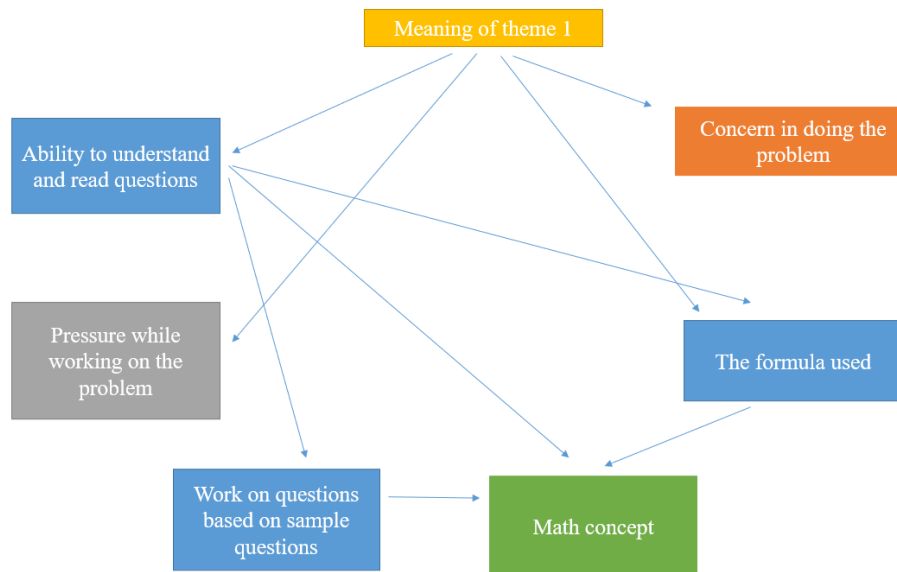


Figure 1. The meaning of confusion in working on math problems so as to give answers that are considered correct based on their own understanding

Difficulty in learning math material

It is known that at the beginning of the study, based on information obtained from the mathematics teacher, the participants had received mathematics material at the same stage. Therefore, the participants are in the same position to start research, because they have the same experience of learning mathematics. However, when conducting interviews with the participants, they obtained answers such as Alan's opinion, "sometimes the teacher teaches it well, sometimes it's not good, if it's good the material is easy, if it's not good the material is difficult". Based on that opinion, material factors affect the way the teacher delivers according to the participants. When the mathematics material presented was relatively easy, the participants also found it easy to understand, but when the material was difficult the participants felt that the teacher was less pleasant in teaching so that the participants found it difficult to learn. Besides that, when asked more deeply, Alan gave the answer that "if you're studying, you like being bullied by your friends, so you're also joking too". Based on this, one of the reasons the participants had difficulty learning math material was due to external factors from themselves, namely because of distraction from their friends while studying.

When other participants were asked about their difficulty in learning mathematics, Rifaldo gave his opinion, "It's quite difficult sir, I can't pay attention, it's hard to understand, the teacher is good but I don't understand. Actually, studying is just fun and enjoyable, but since going online, it's been lazy, from grade 7 until last January, we just started face-to-face." Based on the participants' opinions, it was found that the participants were quite pleasant while participating in mathematics learning, but had difficulty understanding and difficulty paying attention to the material provided. This relates to the focus of participants in learning. In addition, it was also explained that the participants' learning difficulties were caused because the learning system used was online, participants felt less interested in learning, especially learning mathematics. Online learning is one

of the factors that causes participants to have difficulties in learning mathematics, as Agin said, "It's not online, so you don't understand. While I was online, I was taught by my parents, right? If I was online, I was given a number, then I was given an example, I counted it myself, and I immediately found it." So in this case the participants studied math material together with other people due to a lack of understanding of the learning being given. In addition, during online learning, teachers more often give assignments in the form of easy questions along with sample questions. Therefore, when participants get questions or material that requires high concentration, participants have difficulty answering and studying the mathematical material in question. The participants also basically didn't know the math material being studied, so the participants also studied math material from their friends. As Alan said, "Grade 7 online is rarely done, sometimes the teacher likes to ask questions, then they like studying there, Pak Fajri, but sometimes they understand. no". But Alan added "it's better to study with his mother, if my friends tell me to just look at it from the book, I'll just be told to write it down without thinking anymore". Based on the answers from the participants it was known that the participants preferred to study with the math teacher, but when the participants could not, they would ask their friends, but sometimes their friends only gave answers without giving explanations about the answers they gave. Participants experienced fear when they could not get satisfactory learning results, as Epin said, "afraid that their grades will drop, sir, they are afraid that if their grades are low, they will be scolded by their parents if they don't go to class." Participants experience fear of having a low score so they look for ways to make the math scores they get satisfactory. There were several difficulties experienced by participants in learning mathematics material such as interest in learning mathematics, the teacher's method of delivery, external factors, only being able to master basic material, and learning systems that caused participants to be less enthusiastic when learning mathematics. As for the description, it is explained in Figure 2.

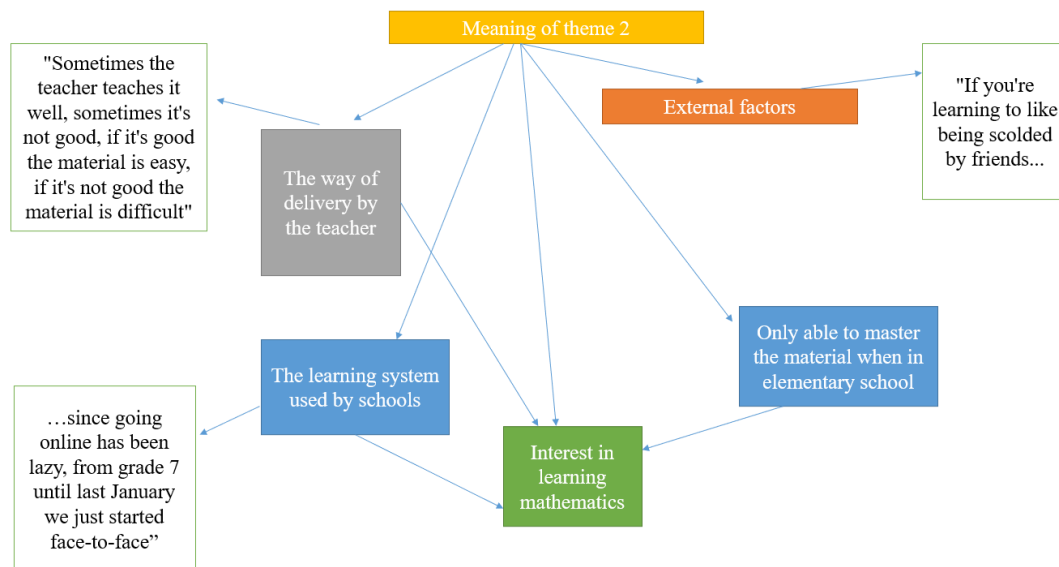


Figure 2. The meaning of difficulty in learning math material

Mathematics learning resources

There are several other learning resources that are used by participants in studying mathematics material and working on the math problems given. In her statement, Rena said that "from YouTube, most of it is from Google, but if from Google you don't understand it, it's better if there's an explanation from YouTube." Based on this information, it is known that the learning resources used by the participants are Google and YouTube, but the use of Google experiences

obstacles because the participants do not understand the explanations given. But there are other participants who do not use other learning resources. Dini argues "never learn from YouTube, if there is a problem that can be done, then do it if you can't, just leave it blank, just wait for the teacher".

The tendency of participants to choose learning resources from YouTube is because it is easier to understand compared to other learning sources such as books, as Fariz's opinion says, "yes sir, the problem is that YouTube is easier to learn, sometimes it's hard to understand from books." Based on the participants' answers, it is known that interactive learning resources are considered capable of helping participants to learn mathematics more easily, in contrast to learning resources in the form of books or mere writing which makes participants still feel confused.

However, behind the many learning resources that participants can choose from, there are still some participants who don't want to learn, as Rifqi said "I don't know, I've never studied either, I just watched it from my friends, if I don't watch YouTube it's also rare." In the end, participants preferred not to study when they had difficulty learning math material or working on difficult math problems, most of the participants always relied on their friends when finding material or math problems that were considered difficult. This tendency is one of the factors that comes from the participants themselves, this causes participants to always feel difficult in learning mathematics, even though when participants want to learn it, participants are sure to be able to understand mathematics material.

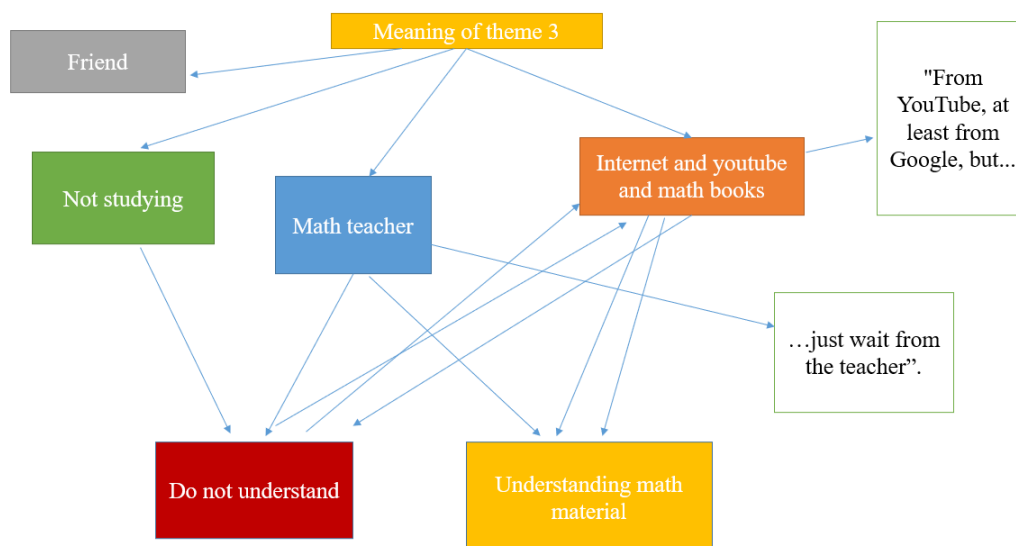


Figure 3. The meaning of mathematics learning resources

Possess the concept of creative thinking

The concept of creative thinking found in this study, it is known that the participants when working on the problem did not know any other way to do the same problem, for example when participants were given a matter of a system of two-variable linear equations, participants felt confused when asked to work on other methods of solving, such as Nazwa said that "I don't understand any other way sir, that's the only way I know, because I don't really understand it and I panic when I fill it out" linear equation of two variables.

Furthermore, other participants admitted that they did not know how to make a mathematical model of the problem. Elisa said "I don't understand what a mathematical model is". Then Haniefa added "what is the mathematical model, sir?" It can be seen from the participants' answers that the participants still do not understand how to turn word problems into mathematical forms. Then

when asked further, Elisa replied "oh yes, I remember that the xy one is like that, sir", then Haniefa also answered "oh yes, sir, my mother once told me, but I don't know if that's what she calls a mathematical model". When asked in more depth it turned out that the participants did not know about the terms of the mathematical model, so that the participants had difficulty answering the questions. Then in Zaki's opinion, "Did you ever hear, sir? At that time, her mother said that if x and y can be changed, but I don't know how to change it, I don't understand." From the participants' opinions, it was known that the participants actually understood the mathematical model, but only used the variables x and y. From the participants' answers, it can be concluded that the participants were still not skilled enough in processing the questions into mathematical models.

When participants were asked about the meaning of creative thinking, Tiara argued "creatively, you can create something new or different from the others". Then Tiara added "means if you think creatively, think differently from the others sir". Another participant, Sayla, said that "if you are creative, it's like you're not doing what you've shown, sir, for example, if you're told to make a picture of a tree, the picture is different from what you saw before." Sayla added "if you think creatively, think differently." From the participants' answers, it can be concluded that the meaning of creative thinking according to the participants is a way of thinking that is different from other people so as to produce new ideas.

There is concern experienced by the participants when working on the questions given, namely the fear of answering wrongly, as stated by Suci, "following the example, but sometimes you use your own method, if you follow the example, you are afraid of being wrong, afraid that it will not match the problem". Based on the participants' answers, it is known that the participants lack confidence in themselves allegedly because they do not have sufficient references in understanding the material of a system of two-variable linear equations. Based on this, it is possible that the elaboration aspects of the participants resulted in their less developed creative thinking skills. This elaboration aspect is an aspect that arises based on the participants' learning experiences from several sources which are then used as a reference by the participants in understanding mathematical material.

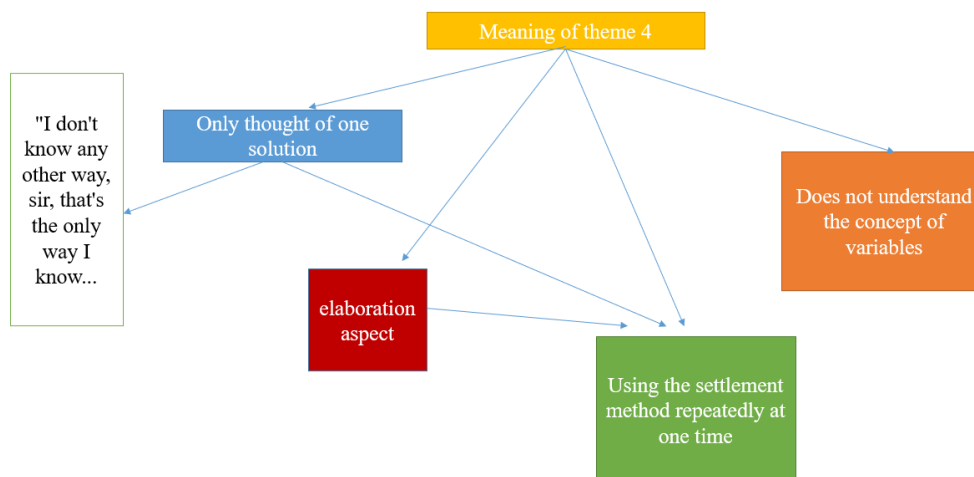


Figure 4. The meaning of the concept of creative thinking

Discussion

When research participants were asked about the meaning of difficulty when learning mathematics, they were more likely to explain the factors that caused participants to feel difficult, such as the number of mathematical formulas used, the ability to understand and read questions, concern, pressure while working on questions, and so on. However, in general, the participants did not

know the mathematical concepts used while working on the math problems given, the participants were more likely to guess at the concepts and ways of solving the problems. Research participants revealed factors regarding difficulties in learning mathematics, such as lack of interest in learning, teacher factors in delivering material, online learning systems, only mastering easy material and distraction from friends which causes participants to be less able to understand math material. Based on this, the participants conveyed the factors that caused them to experience difficulties while learning mathematics, not the meaning of the difficulties in learning mathematics itself. Participants answered that the meaning of the ability to think creatively is a way of thinking that is owned by someone who is different from other people so that they are able to produce new answers or opinions. This is in line with research conducted by Cintia et al (2018) which states that the ability to think creatively is the ability to produce various ideas or ideas in solving a problem. The ability to think creatively owned by the participants is low. When asked about the meaning of the ability to think creatively, the participants also mentioned the factors of the ability to think creatively. The most influencing factor is the internal factor of the research participants themselves. This is in line with research conducted by Sari et al (2019) which states that the ability to think creatively is influenced by student motivation. The higher the student's motivation, the easier it will be for students to provide relevant ideas in solving mathematical problems. The lack of self-confidence possessed by students causes a lack of creative thinking skills. Students are also unable to determine the formula used, and students consider that re-checking answers is not important. In addition, research conducted by Andiyana et al (2018) found that students' creative thinking skills were low because at the students' thinking stages there were wrong steps, besides that students forgot about formulas, and students were unable to provide the desired answers. Based on this, the participants' thinking abilities were strongly influenced by internal factors but there were also external factors that caused participants to have low creative thinking abilities such as the teacher's factor in teaching mathematics.

CONCLUSION

Aspects of student learning difficulties are dominant to the meaning that is built from students' creative thinking abilities and students' difficulties in learning mathematics material. The themes obtained from the results of data analysis represent research participants in terms of creative thinking and students' learning difficulties in mathematics. The themes found included: confusion in working on math problems so as to provide answers that were considered correct based on their own understanding, difficulties in learning mathematical material, learning resources for mathematics, and the concept of creative thinking. The findings obtained are findings that are still broad. Although the meaning obtained is based on findings in class VIII, in general, class VIII is not always as contained in this finding. there may be differences when conducting research in other classes. The factors that most influenced him were the internal factors in the participants, such as being lazy to study mathematics, difficulty understanding mathematical concepts, and fear in working on mathematical problems. In addition, only a few influential external factors were found, including the teacher's factor in delivering material and the online learning system used by schools. Researchers try to do research as well as possible, but researchers can be sure that this research still has some shortcomings due to the relatively short research time, and relatively short time of data collection. Suggestions from this research are expected for further research regarding teacher involvement in building creative thinking skills or the impact of the environment in building creative thinking skills.

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