

MATHEMATICS LEARNING DIFFICULTIES OF SLOW LEARNER STUDENTS IN TERMS OF REFLEKTIF ABSTRACTION MEASUREMENT

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Abstract

Slow learner students cannot be seen physically, because there is no difference between slow learner students and normal students. Slow learner students must get special attention, especially if the student is a prospective teacher. Slow learner students have difficulties in the process, but the learning difficulties are not in accordance with the facts. This article aims to determine the learning difficulties of slow learners in terms of students' reflective abstractions. The research was conducted using qualitative methods with phenomenological methods. The study involved 8 slow learner students who were given a test to measure their reflective abstraction ability. Followed by interviews based on the results of the written test. The results of the research conducted were analyzed qualitatively. The results of tests and interviews, it is known that students' learning difficulties based on reflective abstraction measurements, are difficulties in remembering mathematical concepts, difficulties in mathematical reasoning, difficulties in providing mathematical explanations, difficulties based on mathematical problem solving strategies, time management difficulties, mathematical technical difficulties, and difficulties in understanding mathematical problems.

Keywords: Mathematics learning difficulties, reflective abstraction, slow learner students.

Abstrak

Siswa slow learner tidak dapat dilihat secara fisik, karena tidak ada perbedaan siswa slow learner dengan siswa yang normal. Siswa slow learner tentunya harus mendapatkan perhatian yang khusus, terutama jika siswa tersebut merupakan calon guru. Siswa slow learner memiliki kesulitan-kesulitan dalam proses pembelajaran matematis, namun kesulitan tersebut belum teridentifikasi sesuai dengan fakta di lapangan. Artikel bertujuan untuk mengetahui kesulitan belajar siswa slow learner ditinjau dari abstraksi reflektif siswa. Penelitian dilakukan dengan menggunakan metode kualitatif dengan metode fenomenology. Penelitian melibatkan 8 orang siswa slow learner yang diberikan tes untuk mengukur kemampuan abstraksi reflektif mereka. Dilanjutkan dengan wawancara berdasarkan hasil tes tertulis tersebut. Hasil penelitian dilakukan analisis secara kualitatif. Berdasarkan hasil tes dan wawancara, diketahui kesulitan belajar siswa ditinjau dari pengukuran abstraksi reflektif, adalah kesulitan mengingat konsep matematis, kesulitan bernalar matematis, kesulitan memberikan penjelasan matematis, kesulitan mengatur strategi penyelesaian masalah matematis, kesulitan manajemen waktu, kesulitan teknis matematis, dan kesulitan memahami masalah matematis.

Kata kunci: Abstraksi reflektif, kesulitan belajar matematika, siswa slow learner.



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INTRODUCTION

Mathematical concept is one of the important points that must be mastered by students when they are learning mathematics. Learning mathematics cannot run smoothly if mathematical concepts are not mastered by students (Root, 2019), moreover mathematical concepts are connected to each other (Wafiqoh & Kusumah, 2019). It is not only understanding a concept, but students should be able to build their own mathematical concepts in order to make it easier for them to comprehend and remember more mathematical concepts in a longer period of time. One component related to mathematical concepts is the reflective abstraction (Scheiner, 2016).

Reflective abstraction is one of the mathematical abilities that has the function of combining, changing, or linking mathematical knowledge/concepts that have been previously owned by students to project and create new mathematical knowledge/concepts (Nutchey, Grant, & Cooper, 2014; Wiryanto, 2014). The Reflective abstraction students possessed creates a new mathematical concept/knowledge that can be formed and make students get a logical experience (Cooley, 2002). Therefore, according to Piaget, reflective abstraction is a form of higher thinking in mathematics learning process (Cetin & Dubinsky, 2017).

The expert's opinions above can illustrate the importance of reflective abstraction that is owned by students. Reflective abstraction can help students to comprehend mathematical concepts better because the mathematical concepts they comprehend are the result of their own thinking, it is not just transferred by the teacher. The concepts they mastered can help students in solving mathematical problems. The

concepts that are not mastered and not understood by students will cause students to make mistakes and have difficulty in solving mathematical problems (Asfar, Asfar, Darmawati, & Darmawan, 2018).

Learning difficulties that can interfere students in solving mathematical problems should be prevented by teachers. Because it will not only block students from solving mathematical problems, but it can block students to solve problems in other fields beside mathematics (Huijsmans, Kleemans, Ven, & Krosbergen, 2020). Teachers can prevent or find a way out when students seem to have difficulties. The role of teachers is very important in preventing or overcoming the difficulties experienced by students, by using the provision of didactic concepts that are already owned by teachers of course (Zakelj, 2014).

Students' learning difficulties can be overcome and prevented with the help of teachers, but this applies only when learning difficulties are known. Different cases when students' learning difficulties are yet known by the teachers. Especially for slow learner students, who to be given a special attention compared to normal learner students.

Slow students are students who have learning achievements below the average compared to normal children in general (Sovia and Herman, 2020). Intelligence Quotient (IQ) of slow learner students is below the average of other normal students, in the range of 70-90 (Khabibah, 2013; Marheni, 2017). There is also another opinion which said that the IQ of slow learner students is in the range of 70-89 (Hartini, Widyaningtyas, & Mashlulah, 2017), in the range of 70-85 (Ekowati, 2015), and in the range of 71-89

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(Widodo, 2020). Therefore, it can be concluded from all the opinions above that slow learner students have IQ below the average, which is in the 70-90 range. Even though they are below the average of normal students, a slow learner student cannot be labeled as someone who has mental retardation, because with that number, the IQ is still too high to label as mental disability. If it is viewed from a physical point of view, slow learner students have no difference with normal students, so slow learner students cannot be predicted physically (Khabibah, 2013).

Slow learner students experience difficulties when they are trying to solve mathematical problem, which is difficulties in following step-by-step instructions to solve problems (Novitasari, Lukito, & Ekawati, 2018). Slow learner students have limitations in learning and adapting caused by cognitive barriers (Mumpuarti, Handoyono, Pinrupitanza, & Barotuttaqiyah, 2020). Because there is no physical difference between slow learner students and normal students, it causes teachers to be oblivious of the slow learner students, so there is no special treatment done for these slow learner students. In fact, those slow learner students should be given special assistance and attention in order to optimize the results obtained from the learning process (Marheni, 2017).

Considering the conditions of students' reflective abstraction and learning difficulties that teachers should know, especially slow learner students, observations have been made at one of the senior high school in the Province of Bangka Belitung Islands. When the mathematics learning process takes place, it is observed how students construct mathematical concepts, as well as any difficulties experienced by

them are not clearly visible. This is because during the learning process, there are only a few students who were active therefore only a few of students' reflective abstractions and learning difficulties can be identified. The important point is, if students with IQ abilities are above average, of course there is no need to worry. On the other hand, for students who are slow learners, because they are not physically visible, teachers have difficulty in detecting students who are in this category. Therefore, a study was conducted that aims to determine the learning difficulties of slow learner students in terms of measuring the reflective abstraction.

RESEARCH METHODS

The research was conducted by looking at the phenomena that occur in slow learner students from their reflective abstraction measurements. The approach used in this research is a qualitative approach because it is about researching, studying and understanding a certain phenomenon. As stated by experts that the qualitative research approach is an approach used by people all over the world who have the aim of studying a particular phenomenon so that research results can be stated in accordance with reality (Creswell & Poth, 2018). The research method used in the qualitative approach in this study is the phenomenology method.

This study involved students of grade eleven in one of the senior high schools in South Bangka Regency. Students who were selected as research subjects were students who were classified as slow learners. There were 8 students involved in this study, consisting of 4 male slow learner students and 4 female slow learner students. The determination of the slow

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learner students is determined after a discussion with the class teacher by adjusting the characteristics of the subject belonging to the slow learner group. Characteristics of the slow learner students are, limited cognitive, poor memory, weak concentration, and unable to express the ideas (Sangeeta, 2011).

Data were collected using test and interview techniques. Then it is analyzed using triangulation method, that is the time triangulation and the source triangulation.

RESULTS AND DISCUSSION

Written test results

The written score was carried out to measure the reflective abstraction of the slow learner students who were the research subjects in this study. The written tests given were 8 students with the test code as shown in Table 1. The results of the written test were used as material to determine students' learning difficulties in terms of the reflective abstraction measurement. The written results are presented in the following Table1.

Table1. Reflective Abstraction of Slow Learners.

Subject	Reflective Abstraction Level							
	A1	A2	A3	A4	B1.1	B1.2	B2.1	B2.2
S1	UL	UL	L1	L2	L2	L2	L2	L2
S2	L1	L1	L2	L1	L2	UL	L2	L2
S3	L1	L1	L2	L1	L2	UL	L2	L2
S4	L2	L2	L2	L2	L2	UL	L2	L1
S5	UL	UL	L1	L1	L2	UL	L2	UL
S6	L1	L2	UL	L1	L2	L2	L2	L1
S7	UL	UL	UL	UL	L2	UL	L2	L2
S8	UL	UL	L1	L1	L1	L1	UL	UL

Descriptions:

UL: Unleveled

L1: Recognition

L2: Representation

In Table 1, it can be seen that the written results of slow learner students' reflective abstraction measurements. It is obtained that the reflective abstraction S1 to S8 is at the highest level 2 of reflective attraction (representation).

Interview result

Interviews were conducted to determine students' learning difficulties in terms of the results of the student's reflective abstraction measurement test. Some of the results of the conversation

with the subject when discussing the test results as follows.

P : What was the difficulty in solving this problem?

S3 : To memorize x and y

P : What were the difficulties in solving this problem?

S3 : It is hard to answer ma'am

P : You do not understand inequality?

S3 : I understand ma'am, but it is hard to answer

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The conversation above is a conversation between the research team and S3 when discussing the S3 answer sheet in completing the A1 test. S3 explained that, in answering the A1 test questions, S3 had difficulty in remembering the material that had been studied and in providing logical reasoning about examples of inequalities, because according to him, he found it difficult to explain such things. The results of the interview with S6 are as follows.

- P : What was the difficulty, why did you answer that way?*
S6 : I forget and I do not know
P : Then the next question
S6 : Number 1 is regarding inequality
P : Why?
S6 : I do not know how to explain it. It is difficult
P : What do you think the difficulty is?
S6 : It is difficult to explain ma'am

In the conversation above, you can see the conversation between the team and S6. S6 explained that the difficulty is forgetting the material that has been studied and it is difficult to explain or to describe the answers written by him. The following is a conversation of several studies about the results of the answers on the A2 test.

- P : Was there any difficulty in answering the question?*
S2 : Yes, ma'am, I do not know how to explain

The conversation above is a conversation one of the team had with S2. S2 admitted that they have difficulties, but S2 was unable to explain what difficulties they

experienced. The following is a conversation with S3.

- P : So what was the problem in answering this question?*
S3 : Finding the point of intersection of X and Y
P : The next question is not answered, why?
S3 : I forgot and had trouble because the problem is prolonged

In the conversation above, S3 explained that he was unable to complete or answer questions because he forgot and the next question could not be answered because the questions were related to each other, so that when the first question could not be answered, then the next question could not be answered as well. The conversation with S6 is as follows.

- P : Why is it empty?*
S6 : Because I forgot, I do not know yet
P : Tell me where is the problem?
S6 : At that time because I had not studied, so I did not know. If I have studied, I should know more
P : Does this mean you haven't learned yet?
S6 : I learned, but I forgot
P : How about the next question?
S6 : I do not know, ma'am, because the previous one I did not know so I also had a hard time explaining the reason

In the conversation above, S6 explained that he could not answer because he forgot and did not know. S6 explained that he had difficulty in explaining the solution to the problem because he had never studied it, because

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some of the material that had been studied was not remembered by S6. Next conversation is done with S7.

- S7 : *(reading the question)*
P : *So what is the answer?*
S7 : *There is not any*
P : *Why?*
S7 : *I do not know ma'am*
P : *Any difficulties?*
S7 : *I do not know ma'am*
P : *Another difficulty?*
S7 : *I am confused ma'am*

On the answer sheet S7 did not write down the answer. During the interview, S7 explained that he was unable to complete the answer because he did not understand and was confused how to solve it. The following is a conversation with several research subjects in completing the A3 test.

- P : *What were you told to do?*
S1 : *Looking for mathematical models and constraint functions*
P : *Then why did you not finish answering it?*
S1 : *Time out ma'am*

The conversation above is a conversation between the team and S1. S1 explained the answer exactly as it is written on the answer sheet. S1 explained that he could not complete the completion due to running out of time. The following is a conversation with S3 discussing the solution for the A3 test.

- P : *What difficulties did you experience?*
S3 : *Describing it*
P : *Any other difficulty?*
S3 : *Explaining the meaning of it*

The conversation above is a conversation of the team and S3. S3

explained that he had difficulty in describing and explaining the meaning of what he wrote. The conversation with S5 is as follows.

- P : *Why did you answer like that?*
S5 : *I did not really understand at that time*
P : *What did make you not understanding it at that time?*
S5 : *I do not understand, ma'am, I do not understand what to do with this. I want to add or subtract, I do not understand that*

The conversation above is a conversation between the team and S5. S5 explained that at the time of the A3 test, he did not know how to complete it. S5 did not understand what steps should be taken to solve the problems presented in A3. The results of the A4 test with several subjects are as follows.

- P : *Were there any difficulties?*
S1 : *Out of time*
P : *Apart from running out of time, were there any other difficulties?*
S1 : *I did not know how to work on it and find the maximum score*

In the conversation above, S1 admitted that he had not completed the answer due to running out of time. S1 said they had difficulty in determining the maximum score because they had not studied the material or the teacher had not explained the material. The following is a conversation with S2.

- P : *What difficulties did you experience?*
S2 : *Because I have never done tests like this before*
P : *When you were in middle school, did you ever get a*

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- question like this that was related to linear equations?*
- S2 : *I did, but it was not a word problem*
- P : *Oh so it was not a word problem before, was it the word problem that made it more difficult to answer?*
- S2 : *(nods)*
- P : *But if it is not a word problem, does that mean you can do it?*
- S2 : *(nods)*

In the conversation above, S2 explained the reason why he did not write down the results on the answer sheet. S2 explained that he did not know how to solve it because of the difficulty in the problem is in a form of word problem. The following is a conversation with S3.

- P : *Why did you not answer it?*
- S3 : *I did not know about it*
- P : *Haven't studied it yet?*
- S3 : *I have never studied it*

In the conversation above, S3 explained the reason why he did not write anything on the answer sheet. S3 did not know the answers to the questions presented by the questions because he did not understand the questions given, S3 admitted that he had never received learning material according to the questions, so he is unable to understand the questions and as a result S3 did not answer A4 test at all. Here is a conversation with the S7.

- P : *What do you mean by this?*
- S7 : *Maximum score*
- P : *Why can't you answer?*
- S7 : *I cannot, I do not understand*
- P : *If you understand the problem, can you solve it?*
- S7 : *(shakes) I can not*

- P : *In your opinion, what is mathematics learning like?*
- S7 : *I do not understand*
- P : *In class, do you understand the teacher explaining the material?*
- S7 : *I often do not understand*

In the conversation above, it can be seen that S7 explained the reason for not being able to complete the questions presented. S7 admitted that S7 did not understand the problem, and he did not understand the question, S7 also admitted that he was unable to solve it. S7 explained that learning mathematics is a lesson that he often does not understand when the teacher explains the material. S7 admitted that he often did not understand the material presented in mathematics learning.

In this section, the research results are presented in a clear and detailed manner. Research results can be presented based on research results at each stage of research or research results that answer each problem formulation or others as long as the results of the research that have been carried out are visible. Research results should be supported by empirical evidence.

This section may be divided into subheadings. It should provide a concise and precise description of the experimental results, their interpretation, and the experimental conclusions that can be drawn.

Discussion

Some of the findings from the written test and interviews starting from the A1 test to the B2 test and from S1 to S8 have been presented and described in the results section above. Based on the results of the A1 test, there are difficulties experienced by S3 in solving test questions, namely difficulties in

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remembering mathematical concepts, difficulties in mathematical reasoning, and difficulties in providing mathematical explanations. S6 has difficulty in completing the A1 test, namely difficulty in remembering mathematical concepts and difficulty in providing mathematical explanations.

Based on the results of the A2 test, S2 had difficulty in completing the A2 test, namely the difficulty in providing a mathematical explanation. S3 had difficulty in completing the A2 test, namely the difficulty in remembering mathematical concepts. S6 has difficulty in completing the A2 test, namely difficulty in remembering mathematical concepts and difficulty in providing mathematical explanations. S7 admitted that he had difficulty in completing the A2 test, which is the difficulty in managing mathematical strategies.

Based on the results of the A3 test, S1 admitted that he had difficulty completing the A3 test, which is the difficulty in time management. S3 admitted that he had difficulty in completing the A3 test, which is the difficulty in providing mathematical explanations. S5 admitted that he had difficulty in completing the A3 test, which is difficulty in setting strategies for solving mathematical problems. S6 admitted that he had difficulty in completing the A3 test, which is the difficulty in setting strategies for solving mathematical problems. S8 admitted that he had difficulty in completing the A3 test, which is the difficulty in setting strategies for solving mathematical problems.

Based on the results of A4, S1 admitted that he had difficulty in completing the A4 test, namely the difficulty in time management. S2 admitted that he had difficulty in

completing the A4 test, which is the difficulty in understanding the mathematical word problem. S3 also admitted that he had difficulty in completing the A4 test, which is the difficulty in understanding mathematical problems. S5 admitted to having difficulties in completing the A4 test, which is in mathematical technical difficulties. S6 admitted that he had difficulties in completing the A4 test, which is the difficulty of setting strategies for solving mathematical problems and mathematical technical difficulties. S7 admitted that he had difficulty in completing the A4 test, which is the difficulty in understanding mathematical problems. S8 admitted that he had difficulty in solving the test questions given, which is the difficulty in setting strategies for solving mathematical problems.

Based on the results of the B1 test, S2 admitted that he had difficulty in solving the B1 test questions, which is the difficulty in understanding mathematical problems. S3 admitted that he had difficulty in completing the B1 test, which is difficulty understanding mathematical problems and difficulty remembering mathematical concepts. S5 admitted that he had difficulty in completing the B1 test, which is the difficulty of remembering mathematical concepts and difficulties in arranging mathematical solving strategies. S6 admitted difficulty in completing the test B1, which is mathematical technical difficulty. S7 admitted difficulty in completing the test B1, which is mathematical technical difficulty.

Based on the B2 test, S1 admitted that he had difficulties in completing the B2 test, which is mathematical technical difficulty. S2 admitted that he had difficulty in completing the B2 test,

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namely the difficulty in setting strategies for solving mathematical problems. S4 admitted that he had difficulty in completing the B2 test, which is the difficulty of time management. S6 admitted that he had difficulties in completing the B2 test, which is difficulty in remembering mathematical concepts and mathematical technical difficulties. S7 admitted having difficulties in completing the B2 test, which is difficulty in understanding

mathematical problems. S8 admitted that he had difficulties in completing the B2 test, which is the difficulty in setting strategies for solving mathematical problems and difficulties in remembering mathematical concepts.

Based on the results of the tests and interviews that have been discussed as discussed above, it can be concluded that some of the difficulties of slow learner students are presented in the following Table 2.

Table 2. Learning difficulties for slow learners

Subject	Difficulty	Description
S1	5, 6	1. Difficulty in remembering mathematical concepts
S2	3, 4, 7	2. Mathematical reasoning difficulties
S3	1, 2, 3, 5	3. Difficulty in giving mathematical explanation
S4	5	4. Difficulty in organizing mathematical problem-solving strategies
S5	4, 6	
S6	1, 3, 4, 6	5. Time management difficulties
S7	4, 6, 7	6. Mathematical technical difficulties
S8	1, 4	7. Difficulty in understanding mathematical problems

In Table 2 it can be seen the difficulties experienced by the research subjects. Learning difficulties experienced by slow learners are difficulties in recalling mathematical concepts, mathematical reasoning difficulties, providing mathematical explanations, arranging mathematical problem-solving strategies, time management difficulties, mathematical technical difficulties, and understanding mathematical problems.

CONCLUSION AND SUGGESTION

Based on research questions, results and discussion, it can be concluded that the learning difficulties experienced by slow learner students are difficulties in remembering mathematical concepts, mathematical reasoning, providing mathematical explanations, arranging mathematical problem-solving

strategies, time management difficulties, mathematical technical difficulties, and understand mathematical problems.

The resulting learning difficulties can be used as reference material for teachers to pay more attention to slow learner students and minimize the difficulties faced by these students. It can be done by providing scaffolding or finding solutions so that slow learners no longer experience these difficulties. Slow learner students should work on math problems more often, both routine and non-routine, so they do not find learning difficulties again.

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