ANALYSIS OF THE DIFFICULTY OF STUDENTS 'MATHEMATICS LEARNING IN CLASS VIII FUNCTION MATERIALS

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ABSTRAK

State Junior High School (SMP Negeri) 1 Tempel students in mathematics are still low. Judging from the mathematics scores of Year-End Assessment (PAT) class VIII SMP Negeri 1 Tempel show that as many as 98.40% of students have not reached the minimum completeness criteria (MCC). Based on interviews with students, it was found that learning mathematics was complicated. Students tried to solve math problems but had difficulty solving them. Therefore, the purpose of this study is to determine the problems experienced by students in solving math problems and the factors that cause real challenges, conceptual difficulties, and procedural difficulties in learning mathematics in the function material of class VIII SMP Negeri 1 Tempel in the 2019/2020 school year. This research method is qualitative research. The subjects of this study were 31 students of class VIII A SMP Negeri 1 Tempel. The object of this research is learning difficulties in factual, conceptual, and procedural aspects. Retrieval of data using tests and interviews. The test instrument is in the form of function material questions. Data analysis techniques used the Miles and Huberman model, namely Data Reduction, Data Display, and Data Verification. The results of this study indicate that students have difficulty learning mathematics in terms of functions. Students' problems in the function material obtained 69.25% real difficulties, 63.79% conceptual difficulties, and 61.41% procedural difficulties. Students have a problem in (1) the factual aspect, namely writing the name of the function, writing the set's name, making arrow diagrams, making Cartesian diagrams, and writing the set of consecutive pairs. (2) Students have difficulty defining a function in the conceptual aspect, giving reasons why a relationship can be called a process, distinguishing the origin from the relationship, describing the origin and result area, calculating the number of members of the set, and writing the formulas a function. (3) procedural aspects, students are still lacking in determining the correct and appropriate steps in solving problems. Some students have difficulty determining what steps to take first. Thus resulting in incomplete procedures in solving questions. The factor that causes difficulty in learning mathematics in the function material is students' inaccurate learning patterns. This causes students to forget often and be confused when solving questions.
Keywords: Analysis, Learning Difficulties, Mathematics

INTRODUCTION

According to Heruman, mathematics is a language of symbols; deductive science, which does not accept proof inductively; knowledge of regular patterns and organized structures, starting from undefined elements to defined elements, to axioms postulates, and finally propositions (in Rahayuningrum and Setyawan, 2018) because the purpose of learning mathematics is to form the ability to reason in students, which is reflected through the ability to think logically, critically, systematically and has the nature of being objective, honest, disciplined in solving problems in mathematics and everyday life (Depdiknas, 2006: 9).

One of the mathematics materials taught in junior high school is a function. The function is one of the basic materials that students must understand to continue their knowledge. Based on the research of eighth-grade students of SMP Negeri 1 Tempel, there are still many students who have difficulty solving questions.

Anyone can experience learning difficulties. According to Jamaris (2014: 11), learning difficulties are caused by the brain's problems receiving, processing, analyzing, and storing information. Meanwhile, the definition of learning difficulties, according to Abdurrahman, Mulyono (2008: 9), Learning difficulty is a deficiency in one or more academic fields, both in specific subjects or in various skills.

According to Sudrajat (2009) in Amir, Zubaidah, and Risnawati (2015: 187-188) that student learning difficulties include a broad definition, namely:

a. Learning Disorder or learning disorder is when a person's learning process is disrupted due to conflicting responses.
b. Learning dysfunction is a symptom where the learning process carried out by students does not function properly, even though the student does not show any mental subnormalities and other psychological disorders.
c. A slow learner or slow learner is a slow learner in the learning process, so it takes longer than a group of other students with the same intellectual potential.

The results of Reid's (in Jamaris 2014: 186), The characteristics of children who have difficulty learning mathematics are marked by the inability to solve problems. Meanwhile, according to Lerner (in Runtukahu, 2014: 19), one of a child's characteristics with learning difficulties is that he has difficulty learning mathematics. Therefore, it is concluded that the understanding of mathematics learning difficulties is the obstacle to students' mathematics learning where the acceptance process of learning mathematics takes a long time so that the learning outcomes are not optimal. Learning difficulties refer to a group of difficulties manifested in real difficulties in proficiency and use of listening, conversing, reading, writing, reasoning, or abilities in mathematics.

In this study, researchers will discuss students' difficulties in factual, conceptual, and procedural aspects:

1) Factual Knowledge

According to Gunawan (2016), factual knowledge is divided into two subtypes, namely:

a. Knowledge of terminology is knowledge of verbal and nonverbal labels and symbols (words, numbers, pictures).
b. Knowledge of specific details and elements, namely knowledge of events, locations, people, dates, sources of information, and the like.

Based on the Ministry of Education and Culture (2016: 12), factual knowledge is that junior high school graduates have superficial level technical and specific knowledge about science, technology, art, and culture related to the surrounding community and natural environment, nation, state, and regional area. Understanding facts according to Suherman, Erman (2003: 33), Facts are mathematical objects that only need to accept them, such as the symbols of numbers, angles, and other mathematical notations. Meanwhile, according to Merrill in Prawiradilaga (2007: 83), facts are information about the names of people, places, events, nicknames, symbols.

2) Conceptual Knowledge

According to Gunawan (2016), conceptual knowledge consists of three subtypes, namely.

a. Knowledge of classification and categories
b. Knowledge of principles and generalizations
c. Knowledge of theories, models, and structures.

Based on the Ministry of Education and Culture (2016: 12), factual knowledge, namely junior high school graduates have knowledge of terminology/terms and classifications, categories, principles, generalizations, and theories, which are used to superficial level technical and specific knowledge about science, technology, arts, and related culture with the surrounding community and natural environment, nation, state and regional area.

A concept can be viewed as an abstraction of experiences involving examples of concepts. Based on Permendikbud number 59 of 2014, understanding concrete concepts is formed through several indicators, including restating the concepts studied, identifying the properties of operations or concepts, presenting concepts through various representations, and linking mathematics concepts. Understanding the concept, according to Kemp et al. in Prawiradilaga (2007: 85), the concept is a category or variety that shows the similarity or similarity of ideas, events, objects, or things.

3) Procedural Knowledge

According to Gunawan, procedural knowledge consists of three subtypes, namely.

a. Knowledge of skills in a specific area and algorithms
b. Knowledge of techniques and methods in a particular field
c. Knowledge of the criteria for determining when to use appropriate procedures.

Based on the Ministry of Education and Culture (2016: 12), procedural knowledge is that junior high school graduates know how to carry out an or activities related to technical, specific, algorithmic, simple-level knowledge about science, technology, art, and culture related to society and the natural environment around, nation, country, and regional area. According to Merrill in Prawiradilaga (2007: 87), a procedure is a series of steps to carry out work that must be carried out in stages to achieve a specific goal or solve a problem.

METHODS

This research is a qualitative descriptive study because it describes students' mathematics learning difficulties in the function material. This study's subjects were class VIII students of SMP Negeri 1 Tempel in the 2019/2020 academic year. The subjects taken in this study were six classes, which were class VIII A students of SMP Negeri 1 Tempel with 32 students. The research was conducted from November 2019 to January 2020. In selecting the subjects in this study using purposive sampling. Definition of purposive sampling, according to Sugiyono (2017: 301), "Purposive sampling is a technique of sampling data sources with certain considerations." The process/data analysis technique in this study using the Miles and Huberman model. The steps of the Miles and Huberman model data analysis technique (in Sugiyono, 2017: 337) are as follows (1) Data Reduction, (2) Data Display, and (3) Data Verification. Qualitative research, according to Yusuf (2017: 43), research is used to find deep meaning about a problem at hand, which appears in qualitative form, both in the form of images, words, and events. Qualitative research is a type of research to find deep meanings that are not obtained from statistical procedures. This research is descriptive, where the data obtained are not numbers, but in the form of words. The research conducted will produce a description, analysis, and phenomena of reality in the field.

RESULTS AND DISCUSSION

The research was conducted at SMP Negeri 1 Tempel at the address Jl. Magelang Km 17.5, Ngebong, Margorejo, Sleman, Sleman Regency, Yogyakarta Special Region. The research object was taken using random sampling to class VIII-A. The study was conducted from October 2019 to November 2019. The study focused on mild mathematics learning difficulties, including real difficulties, conceptual difficulties, and procedural difficulties. The research method used is descriptive qualitative. The first step is to take data through test questions. Then the test questions were corrected to determine the respondents in order to obtain qualitative data.

The research was conducted using test questions in the form of descriptions. 4 questions were made by the researcher and validated by the supervisor (attachment 5). The questions made are related to the function material taught, including factual, conceptual, and procedural aspects. The test was conducted on Tuesday, November 19, 2019. The researcher collected and corrected the students' work to determine real difficulties, conceptual difficulties, and procedural difficulties in learning mathematics on operational matters. Then grouped by type of difficulty. The results of grouping based on the type of difficulty are shown in the table of results of the analysis of learning difficulties as follows:

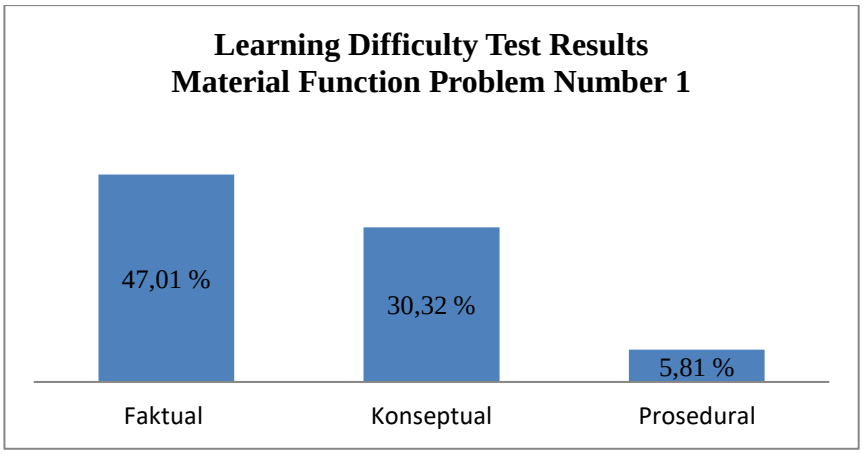

Figure 1. The Results of the Learning Difficulty Test for Problem Function Material Number 1

Based on Figure 1, which is the table of the results of the difficulty analysis, it can be concluded that the mild difficulties in learning mathematics in the function material in question number one are real difficulties of 47.01%, conceptual difficulties of 30.32%, and procedural difficulties of 5.81%. Based on the picture of the analysis of difficulties in question number 1, students' most significant difficulty was real difficulties of 47.01%. The smallest difficulty experienced by students was procedural difficulties of 5.81%.

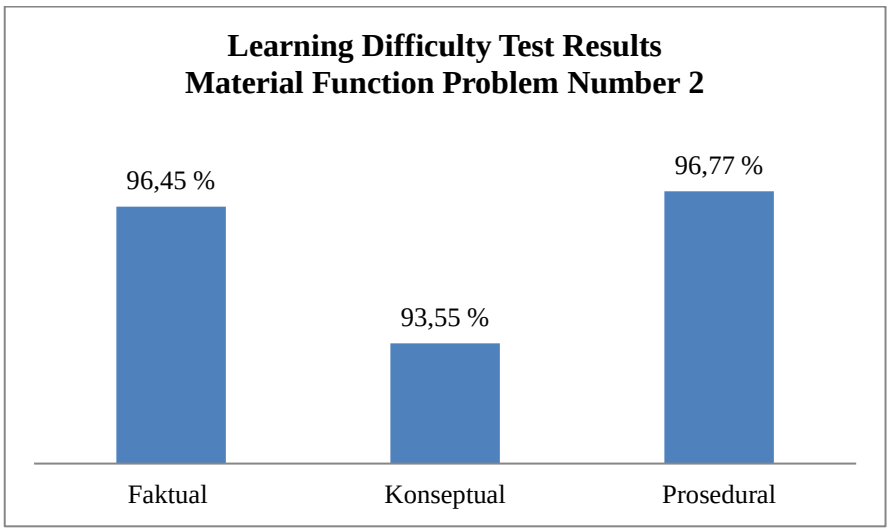

Figure 2.The Results of the Learning Difficulty Test for Problem Function Material Number 2

Based on Figure 2, which is the table of the results of the difficulty analysis, it can be concluded that the mild difficulties in learning mathematics on the function material in question number 2 are real difficulties of 96.45%, conceptual difficulties of 93.55%, and procedural difficulties of 96.77%. Based on the difficulty analysis results in question number 2, students' most significant difficulty was procedural difficulties of 96.77%, and the smallest difficulty experienced by students was the conceptual difficulties of 93.55%.

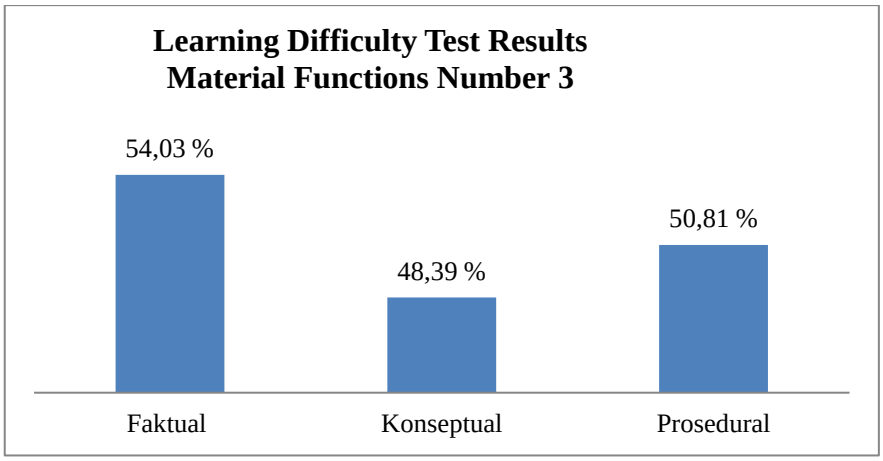

Figure 3.The Results of the Learning Difficulty Test for Problem Function Material Number 3

Based on Figure 3 in the table of results of the difficulty analysis, it can be concluded that the mild difficulties in learning mathematics on the function material in question number 3 are real difficulties of 54.03%, conceptual difficulties of 48.39%, and procedural difficulties of 50.81%. Based on the difficulty analysis results in question number 3, students' most significant difficulty was real difficulties of 54.03%, and the smallest difficulty experienced by students was conceptual difficulties of 50.81%.

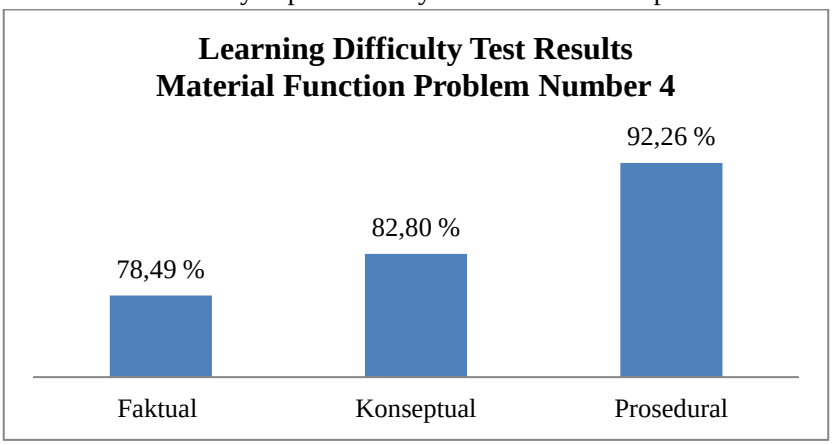

Figure 4. The Results of the Learning Difficulty Test for Problem Function Material Number 4

Based on Figure 4 and the table of the results of the difficulty analysis, it can be concluded that the mild difficulties in learning mathematics on the function material in question number 4 are real difficulties of 78.49%, conceptual difficulties of 82.80%, and procedural difficulties of 92.26%. Based on the difficulty analysis results in question number 4, students' most significant difficulty was procedural difficulties of 92.26%, and the smallest difficulty experienced by students was real difficulties of 78.49%.

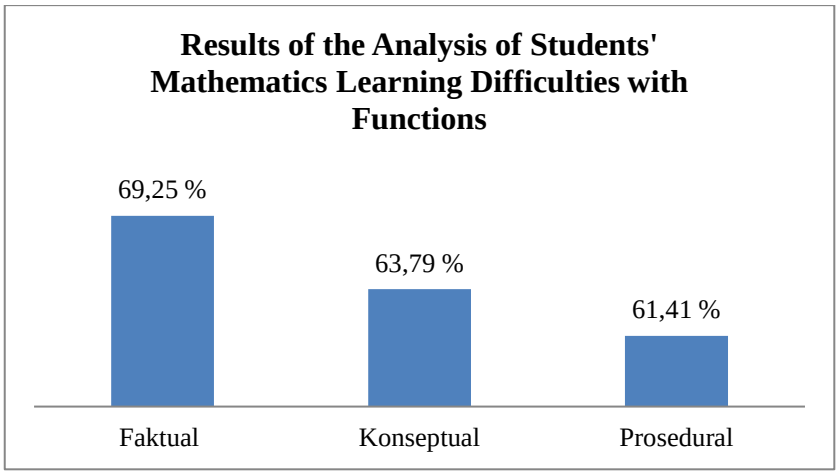

Figure 5. Results of the Analysis of the Study Material Functional Difficulty Test

Based on Figure 5 and the table of the results of the analysis of students' mathematical learning difficulties, it can be concluded that the difficulties experienced by students in real difficulties are 69.25%, conceptual difficulties are 63.79%, and procedural difficulties are 61.41%. The completion of various kinds of questions produces difficulty levels. It can be concluded that the most significant difficulty is a real difficulty and the lowest difficulty is the procedural difficulty.

1. Factual Difficulty
   Based on the graph of the analysis results of students' mathematics learning difficulties, the function material shows that the real difficulty is 69.25%. The real difficulty is the highest classification among the three difficulties compared to conceptual difficulty and procedural difficulty. After analyzing the results of student tests and interviews, it was found that students were unfamiliar, forgetful, and less careful in writing down symbols, symbols, and notations in solving math problems. Students experience difficulties in the factual aspect, namely writing the name of the function, writing the set's name, making arrow diagrams, making Cartesian diagrams, and writing the set of consecutive pairs.
2. Conceptual Difficulties
   Based on the graph of the analysis results of students' mathematics learning difficulties, the function material shows that the conceptual difficulty is 63.79%. Among the three difficulties, the conceptual difficulty is a classification that lies between real difficulty and procedural difficulty. After analyzing the results of student tests and interviews, it was found that the students were unable to state the principles of function correctly. Students are not sure about themselves, so they do not do the test questions. Students are still confused in determining the origin and area of results of a function in the form of mathematical problems. Students do not change from what is known to solve math problems. Of the various existing indicators, only part of it is applied by students to understand the concept. Students experience difficulty in defining functions, providing reasons why a relationship can be called a function, distinguishing the origin from the result area, describing the origin and result area, calculating the number of members of the set, and writing the function's formulas.
3. Procedural Difficulties
   Based on the graph of the analysis results of students' mathematics learning difficulties, the function material shows that the conceptual difficulty is 61.41%. Among the three difficulties, conceptual difficulties are the lowest classification of real difficulties and conceptual difficulties. After analyzing the results of student tests and interviews, it was found that students were still lacking in determining the correct and appropriate steps in solving the questions. Students have difficulty determining what steps to take first. Thus resulting in incomplete procedures in solving questions. In cases like this, various exercises are needed to understand the appropriate steps to correctly and accurately solve mathematical problems.

Based on the student interviews results, various factors were found to cause difficulties in determining factual, conceptual, and procedural. Factors that cause students to experience difficulties are that students do not repeat the material taught, forget, lazy, and are not careful when working.

Repeating the material that has been taught causes us to understand better what has been learned. As stated in Thorndike's theory (in Suherman, 2003: 29), one of the laws of learning is low exercise. The definition of the law of training, according to Thorndike, is that if the stimulus-response relationship occurs, the relationship will be stronger. In other words, the more we practice, the more responsive we are in accepting something. Based on the interview results, the students said that they did not study it again when the material had passed. Also, students rarely relearn or practice solving questions related to the material presented by the teacher. Students say they work on questions only when the teacher gives them questions to work on.

The factor of forgetting yourself is a natural thing. As stated by Winataputra (2007: 2.15), forgetting is a joint event in human life. Students who are learning new things forget it is an extinction process based on classical conditioning theory parameters. Forgetting occurs when no stimulus conditions the correct response so that students cannot generate a response. Based on student interviews, some students said that students forgot to complete the questions given. Most said they forgot because the material had passed.

Lazy students, whether they are lazy to learn, lazy to do, will result in a job that is not optimal. The lazy factor in a person is due to a lack of motivation from students. It takes motivation or encouragement from the environment. Thus students practice more so that the feeling of laziness slowly disappears. Besides that, it comes from awareness, such as when learning occurs, and the teacher explains, students ignore what is explained by the teacher because they are lazy. This results in students having difficulty learning both in factual, conceptual, and procedural difficulties. Based on interviews with students and observations while carrying out tests, it was found that students said that when the teacher explained, students sometimes listened and sometimes did not. This results in students not understanding what the teacher says. Students did not want to do them when given questions because they did not understand how to do them, so students are lazy.

CONCLUSION

Based on the results of research and discussion of data, it is concluded that the difficulties experienced by class VIII A students of SMP Negeri 1 Tempel are difficulties in the factual aspect, namely in writing the name of the function, writing the name of the set, making arrow diagrams, making Cartesian diagrams, and writing the set of pairs. Sequentially. Then in the conceptual aspect, students have difficulty defining a function, giving reasons why a relationship can be called a function, distinguishing the origin from the result area, describing the origin and result area, calculating the number of members of the set, writing the formulas of a function. Finally, in the procedural aspect, students are still lacking in determining the correct and appropriate steps in solving problems. Some students have difficulty determining what steps to take first. Thus resulting in incomplete procedures in solving questions.

The factor that causes difficulty in learning mathematics in the function material is students' inaccurate learning patterns. This causes students to forget often and be confused when solving questions. Especially if the material has been missed, students will no longer learn the material independently. Even though they have been given training in school, students tend to solve problems just then. A week or two later, I forgot.

REFERENCES

Abdurrahman, M. 2003. Pendidikan Bagi Anak Berkesulitan Belajar. Jakarta: Rineka Cipta.

Amir, Zubaidah Dan Risnawati. 2015. Psikologi Pembelajaran Matematika. Yogyakarta: Aswaja Pressindo.

Depdiknas. 2006. Kurikulum Tingkat Satuan Pendidikan (KTSP). Jakarta: Direktorat Jendral Pendidikan Dasar dan Menengah.

Gunawan, Imam. "Taksonomi Bloom-Revisi Ranah Kognitif: Kerangka Landasan Untuk Pembelajaran, Pengajaran, Dan Penilaian". Jurnal Program Studi PGSD FIP IKIP PGRI Madiun, diakses tanggal 13 Desember 2019.

Jamaris, M. 2014. Kesulitan Belajar: Perspektif, Asesmen, dan Penanggulangannya Bagi Anak Usia Dini dan Usia Sekolah. Bogor: Ghalia Indonesia.

Kemendikbud. (2016). Panduan Pembelajaran untuk Sekolah Menengah Pertama. Jakarta: Kemendikbud.

Permendikbud. 2014. Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 59 Tahun 2014 Tentang Kurikulum 2013 SMA/MA. Jakarta: Departemen Pendidikan dan Kebudayaan.

Rahayuningrum, A., & Setyawan, F. 2019. Analisis Kesalahan Siswa Kelas V SD Dalam Menyelesaikan Masalah Sehari-hari yang Berkaitan Dengan Operasi Hitung Pecahan. In Seminar Nasional Pendidikan Matematika Ahmad Dahlan (Vol. 6).

Runtukahu, Tombokan dan Selpius K. 2014. Pembelajaran Matematika Dasar Bagi Anak Berkesulitan Belajar. Yogyakarta: Ar-Ruzz Media.

Suherman, E. 2003. Strategi Pembelajaran Matematika Kontemporer. Bandung: Jica.

Winataputra, U. S. 2007. Teori Belajar dan Pembelajaran. Jakarta: Universitas Terbuka.

Yusuf, M. 2017. Metodologi Penelitian Kuantitatif, Kualitatif & Penelitian. Jakarta: Prenadamedia Group.