

Analysis of Mathematics Learning Difficulties in Material Greatest Common Factor Class VII

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DOI: <http://dx.doi.org/10.18592/tarbiyah.v13i2.12733>

Key Words:

analysis of mathematics
difficulty learning
greatest common factor

Abstract:

In Class VII, some students still need help finding the most significant common factor of several numbers. This research aims to describe the difficulties experienced by students in finding the Greatest Common Factor (FPB) of several numbers. The subject of this research was 1 class VII student of SMPII Lukman Al-Hakim 02 Batam. The object of this research is the difficulty of learning mathematics in the Greatest Common Factor (FPB) material. The data collection technique in this research was conducting interviews, giving test questions, and documenting 1 class VII female student. Based on the interview results, it was clear that the student needed help working on the questions and understanding the FPB material. Apart from that, the test result showed that students were both in ordinary questions and stories; students are less able to do them, so they need repetition and learning to be done so that their understanding of the mathematics of the FPB material can be understood well. The difficulties were: (1) Students needed to correct their carrying out division calculation operations in FPB questions; (2) Students needed help concluding the final answers to FPB questions. This research implies that mathematics teachers must emphasize instilling the concept of FPB material, ensuring that students have mastered division arithmetic operations in solving FPB problems.

Received : 10 May 2024

Revised : 29 May 2024

Accepted : 22 December 2024

Published : 23 December 2024

To cite this article: Muthma'innah, M. (2024). Analysis of Mathematics Learning Difficulties in Material Greatest Common Factor Class VII. *Tarbiyah: Jurnal Ilmiah Kependidikan*. Vol 13(2), 125-135.

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Introduction

Learning is a process carried out by individuals to obtain a new change in behavior due to the individual's experience interacting with their environment (Aunurrahman, 2010; Ahmadi & Supriyono, 2013; Susilawati, 2020). Next, Dimiyati explained that if students learn, there will be mental changes in the students. Learning is a process of experience by a person or student in providing self-change to achieve the expected results based on the goals to be achieved, thereby creating a behavior change that occurs in a person or student (Dimiyati & Mudjiono, 2015; Slameto, 2013; Wardana & Djamaluddin, 2021).

Mathematics learning is a process of building or constructing concepts and principles that are active and dynamic. Students need to develop their beliefs, habits, and learning styles so that their cognitive skills develop. The mathematics learning process is the management of ideas in students' minds, so teaching and learning interactions are not just about managing students, the environment, and learning facilities. However, the students themselves must build knowledge based on the knowledge and experience they have experienced (Susilawati, 2020; Subarinah, 2006).

Mathematics is a lesson that is often assessed as quite complex or even very difficult. So, in this case, various difficulties will be conveyed to each student who works on these mathematics problems. Learning difficulties can be seen from how students work on the questions given and the maximum explanation given by the teacher but cannot be accepted by students well, so they can be called learning difficulties; one example of students' learning difficulties is accepting mathematics learning. Students' interest in learning can also be seen in each student, such as students' acceptance of learning based on internal and external factors (Amalia & Unaenah, 2018; Susilawati, 2020). So that learning achievements will also influence student learning. The role of parents, schools, educators, and strategies or methods is expected to have a significant influence.

One of the objectives of mathematics subjects is for students to be able to solve problems related to FPB (Nabilah et al., 2022). In mathematics, the Greatest Common Factor (FPB) of two numbers is the largest positive integer that can divide both numbers evenly (Sintika et al., 2021). This material requires a comprehensive understanding of the topic, making it easier for students to understand FPB (Fariana, et al., 2022). One of the difficulties experienced by students is in solving the Greatest Common Factor (FPB) questions. In solving story questions on FPB material, students still need to learn the concepts that must be used to solve the questions. Then, students still need help to complete the steps in completing the calculations in the problem. Furthermore, students must still relate existing concepts to the problems (Rohayani, 2022; Utami et al., 2020).

Another problem found is that, in general, teachers focus more on procedures or steps in completing FPB, such as those related to prime factorization steps and factor trees. However, the teacher needs to explain the concepts of FPB and KPK (Mahmud & et al., 2023). Apart from that, there are four types of errors that occur when students solve FPB and KPK questions, significantly when solving word problems, namely: errors in understanding the questions, errors in preparing plans, errors in implementing plans, and errors in checking the solutions obtained again (Utami et al., 2020). Other learning difficulties were found, namely difficulties in cultivating

concepts, understanding concepts, numeracy skills, and applying FPB concepts (Alimah et al., 2022).

Students who understand mathematical concepts can answer and solve mathematical problems (Muthma'innah, 2023; Kholil, 2020; Sintika et al., 2021). The ability to solve problems can also be seen from the factors that influence each learning, such as factors within the student so that if there are improvements, it will be easier for them to understand mathematics learning.

The phenomenon of learning difficulties in mathematics needs to be taken seriously. Untreated learning disabilities can have a detrimental impact on a student's academic growth and self-esteem. Apart from that, difficulties in learning mathematics can also affect students' interest and motivation. Consequently, a comprehensive analysis of mathematics learning difficulties is needed, especially on FPB material, in order to identify causal factors and find practical solutions to improving students' understanding and achievement (Unaenah et al., 2023; Alimah et al., 2022; Mahmud et al., 2023).

One of the learning difficulties students experience in learning mathematics in FPB material is their low ability to solve problems and memorize multiplication and division. These students also have weak abstract thinking abilities in solving mathematical problems (Asmawati et al., 2023; Alimah et al., 2022; Fariana et al., 2022).

It is important to analyze the challenges of learning arithmetic, especially in the context of FPB content. By understanding the elements that influence students' learning challenges, educators can develop effective teaching methods that suit students' demands and learning styles. In addition, by dealing with mathematics learning difficulties effectively, students can improve their understanding, increase learning motivation, and optimize their potential in the field of mathematics (Unaenah et al., 2023; Rohayani, 2022; Asmawati, Husniati, & Khair, 2023). Based on this description, researchers are interested in researching mathematics learning difficulties in material most significant common factor. This research aims to analyze the description of the mathematics learning difficulties of Class VII students in the most significant common factor (FPB) material.

Research Methods

This research is qualitative research with a case study approach. The subjects of this research were class VII students; the subject selection was based on class VII students who were not currently in the learning process at SMP II Lukman Al-Hakim 02 Batam. The object of this research is the difficulty of learning mathematics in the Greatest Common Factor material. Researchers found several students with difficulties learning mathematics, especially FPB material. In other words, the sampling technique used in this research was purposive sampling. Data collection techniques in this research used interviews and test questions. Researchers also carry out documentation to ensure data completeness. The data analysis technique in this research uses qualitative descriptive analysis techniques, namely describing data on students' mathematics learning difficulties obtained qualitatively. The qualitative description method is based on the philosophy of postpositivism, which is used to research the condition of natural objects, where the researcher is the critical instrument

(Sugiyono, 2016). So, in this research, the researcher must be able to explore information from informants in depth.

Results and Discussion

Regarding the meaning of learning, learning is a process carried out by individuals to obtain a new change in behavior as a whole as a result of the individual's own experience in interaction with his environment (Aunurrahman, 2010; Moku et al., 2022). Furthermore, if students learn, there will be mental changes, such as developing new cognitive structures, changes in attitudes, or acquiring new skills (Dimiyati & Mudjiono, 2015; Djamarah, 2015). Slameto (2013) explained that the psychological meaning of learning is that learning is a process of change, namely changes in behavior resulting from interaction with the environment in meeting one's life needs. Learning is the process of searching, understanding, and analyzing a situation so that changes in behavior occur. These changes cannot be said to be the result of learning if they are caused by growth or temporary conditions (Iskandar, 2008; Djamarah, 2015).

Based on the opinion above, learning is a process of a person or student's experience in providing self-change to achieve the expected results based on the goals to be achieved, thereby creating a behavior change that occurs in a person or student. Paying attention to the student's condition is necessary in the learning process. Teachers need to understand learning theory first for the reasons: 1) Helping teachers to understand the learning process that occurs within students; 2) With this condition, teachers can understand the conditions and factors that influence, facilitate or hinder the learning process; 3) Maybe the teacher makes reasonably accurate predictions about the results that can be expected in a learning activity; 4) This theory is a source of hypotheses or conjectures about the learning process which can be tested for truth through experiments or research, thereby increasing a person's understanding of the teaching and learning process; 5) These hypotheses, concepts and principles can help the teacher improve his performance as an effective teacher (Moku et al., 2022). So, learning cannot be obtained based on one's abilities but through sources that already understand learning, such as teachers or technological media that help someone understand learning.

Mathematics, derived from the Latin words *mathanein* or *mathema*, meaning 'learning or things studied,' and the Dutch word *wiskunde*, or 'exact science,' is a discipline deeply rooted in reasoning (Depdiknas, 2001). Mathematics is a deductive, axiomatic, formal, hierarchical, abstract science, a language of symbols rich in meaning. It is a beautiful system that can solve real-world problems (Subarinah, 2006).

Mathematics is a science that cannot be separated from everyday life (Muthma'innah, 2023). Students always see mathematics as a lesson of little interest, or mathematics is often monotonous and unpleasant, especially in discussions about formulas and memorization, which are pretty tricky to understand. Suppose the student's concentration could be more optimal. In that case, the student will have difficulty absorbing the material being taught then, especially mathematics lessons with material on flat shapes and space shapes, considering that the material must be systematic and requires many practice questions to deepen mathematical concepts and problems.

Educators, parents, and policymakers must be aware of students' challenges in learning mathematics. This condition, where students struggle to learn as they should, particularly in mathematics, can significantly impact their academic performance (Amalia & Unaenah, 2018). Mathematics learning difficulties are a person's inability to perform mathematical skills expected at their education level and intellectual capacity (Muthma'innah, 2023).

This FPB and KPK material is taught from elementary to middle school levels and is widely used to understand high school mathematics concepts. The concepts of factors, multiples, KPK, and FPB at the elementary and middle school levels are presented basically but not in their entirety. For example, to determine the KPK and FPB, they use one method, namely the concept or factor tree model (prime factorization). In contrast, the emergence of this concept is not studied in its entirety or forgets the prerequisite material, namely the concept of prime numbers (Unaenah et al., 2020).

A factor is a divisor of a number, namely a number that divides evenly into another number. Working on questions for FPB can be done in many ways, such as by common factors, prime factorization, division tables, and multiplication. The FPB of several numbers is the most significant common factor among the existing common factors of known numbers. There are many ways to answer FPB questions, but students often know to use prime factorization, often called working on questions using factor trees. The problem-solving in this discussion is related in two ways: prime factorization (factor tree) and division tables.

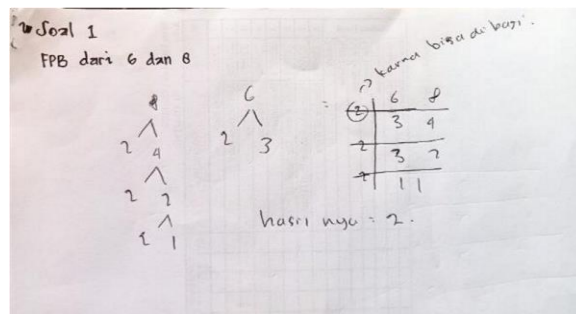


Figure 1. Students Answers to Question Number 1

In question number 1, as seen in Figure 1, students are asked to determine the FPB of two numbers. Then, students try to solve the FPB in two ways: factor trees and tables. The student's answer to this question shows that the student understands how to work on factor trees and division tables but still cannot determine the final result or explanation to determine the answer; the student can only work out how to divide it.

Students who understand mathematical concepts can answer and solve mathematical problems (Muthma'innah, 2023). The reasons why students understand mathematics learning cannot be concluded. Learning mathematics is indeed tricky because students' thoughts or perspectives dominate students when they say such things. The previous discussion also included external and internal causes for each student, and it was also found in the explanation above that the concepts contained in mathematics learning needed to be understood more carefully by students. Hence, students had difficulty learning mathematics learning.

Apart from that, Asmawati also stated that the learning difficulties experienced by students in learning mathematics consist of three components: difficulties in understanding concepts, difficulties in calculating skills, and difficulties in solving problems. The factors that cause students' learning difficulties consist of internal and external factors. Internal factors include intellectual factors in the form of being slow in understanding the material and not yet mastering arithmetic operations, psychological factors in the form of feelings of dislike for mathematics subjects, causing a negative attitude of not paying attention when the teacher explains the material and not being active during learning, and physiological factors in the form of students feeling dizzy, during math class. External factors include the methods used, which still need to be more varied, namely lectures, and do not involve students being physically actively involved in learning (Asmawati et al., 2023).

Handwritten student answer for finding the Greatest Common Divisor (FPB) of 30 and 25 using a division table. The table shows the following steps:

30	15
6	5
4	5
2	5
1	1

Handwritten text next to the table: "hasilnya = 2"

Figure 2. Students Answers to Question Number 2

In question number 2, as seen in Figure 2, students are asked to determine the FPB from two numbers, which is more significant than in the previous question. Students could solve this question but needed help determining the conclusion or answer. The student answered the second question using a division table. However, the results needed to be corrected, and it was very clear from this answer that the student needed help with doing it and making a mistake in dividing.

The ways to overcome learning difficulties in students are parental attitude and school and teacher attitude (Triwiyanto, 2014). Efforts made based on the opinion enable students to understand mathematics learning more optimally. The attitude of parents or the role of parents here is critical, such as providing motivation and enthusiasm to the child so that the child is interested in learning mathematics and also giving appreciation to the child even though the child's understanding has not reached the expected target. The role of schools and teachers is also something that has a considerable influence, from the school's perspective, whether the facilities or infrastructure owned by the school can provide quality education for students in understanding learning, especially in mathematics. Good facilities and equipment will provide or solve students' learning difficulties in mathematics. Of course, it also depends on each teacher; the teacher's discipline in providing effective and optimal teaching based on mathematics learning abilities will also greatly influence students, so teachers will also think about how to make students' understanding of mathematics learning more accessible and enjoyable. In contrast to this opinion, there are six stages to overcome learning difficulties, namely: Data collection, Data processing, Diagnosis, Prognosis, Treatment and Evaluation (Ahmadi & Supriyono, 2013).

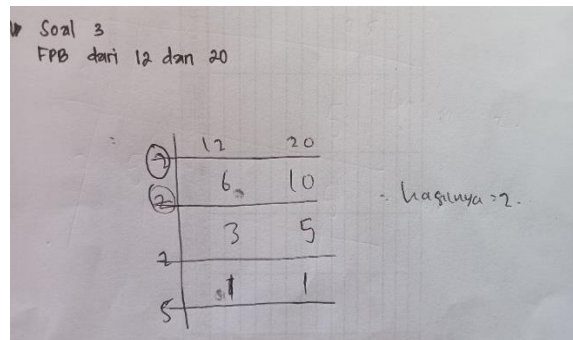


Figure 3. Students Answers to Question Number 3

In question number 3, as seen in Figure 3, students are asked to determine the FPB of two numbers. Students can already work out how to determine the GCF of two numbers, but they still do not need to understand how to write the result of two numbers' most significant common factor. The division results are correct, but the final result cannot be determined with the correct answer

Apart from efforts to overcome difficulties in learning mathematics based on the opinion above, educators can also create other interesting alternatives by using tools such as teaching aids so that students are not considered tedious and complex learning in understanding. By using many or various methods or strategies, students can easily find their interest in working on FPB (Greatest Common Divisor) questions.

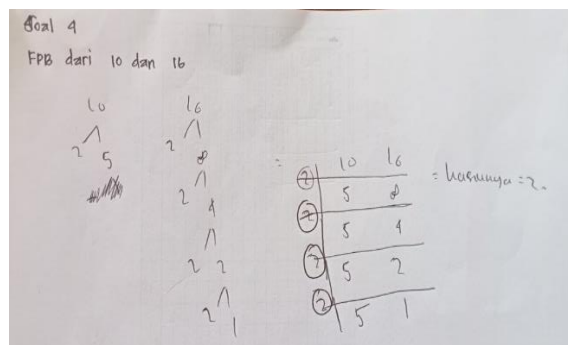


Figure 4. Students Answers to Question Number 4

In question number 4, as seen in Figure 4, students are asked to determine the FPB of two numbers. Students can already work out how to determine the GCF of two numbers, but they still do not understand how to write the result of the most significant common factor of two numbers. Almost the same as the answer to question number 3, the student still cannot understand the answer to this question.

The difficulties experienced by children with difficulty learning mathematics are: First, Weaknesses in calculating. Students with a good understanding of mathematical concepts sometimes have different calculation abilities. Students must read mathematical symbols and operate numbers correctly. Second, transfer knowledge. One of the difficulties experienced by students who need help learning mathematics is bringing mathematical concepts with existing reality. Third, they need a better understanding of mathematical language. Students need help making meaningful mathematical connections, such as solving calculation problems presented

in story form. Fourth, visual perception is complex. Students who experience visual perception problems will experience difficulty in visualizing mathematical concepts. This problem can be identified from the difficulties experienced by children in determining the length of lines displayed parallel in different shapes (Jamaris, 2015).

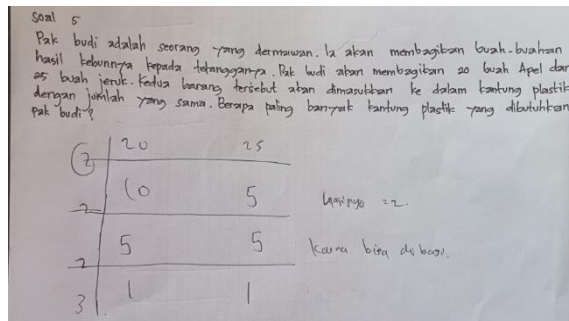


Figure 5. Students Answers to Question Number 5

In n question 5, as seen in Figure 5, students are given story questions about FPB. Students can translate the story questions into mathematical language and solve the problem. However, when determining the final FPB results, students were again confused. So, from the student's answer to question 5, the student still needed to be corrected in his work. The following at Table 1 is an explanation of each question that students work on:

Table 1. Explanation of Students Answers

Question Number	Explanation of Students answers
Answer to Question no. 1	The student's answer to this question shows that the student understands how to work on factor trees and division tables but still cannot determine the final result or explanation to determine the answer; the student can only work out how to divide it.
Answer to Question no. 2	The student answered the second question using a division table. However, the results needed to be corrected, and it was very clear from this answer that the student needed help and made a mistake in dividing.
Answer to Question no. 3	The division results are correct, but the final result cannot be determined with the correct answer.
Answer to Question no. 4	Almost the same as the answer to question number 3, the student still cannot understand the answer to this question.
Answer to Question no. 5	From the student's answer to question number 5, the student still needed to be corrected in his work.

Based on the results of research and discussion of the analysis of factors causing difficulties in learning mathematics for class VII, the following conclusions were obtained: First, Mathematics learning difficulties experienced by students consist of three components, namely difficulties understanding concepts, difficulties in skills, and difficulties solving problems; Second, Factors that cause learning mathematics come from internal factors and external factors. Internal factors originating from students include students' attitudes toward learning mathematics and low motivation to learn. Meanwhile, external factors originating from outside students include the need for more variation in teacher teaching, the use of learning media that could be more optimal, and the environment for students to understand mathematics learning.

The factors that influence students' mathematics learning difficulties are internal and external. Internal factors include individual student characteristics that can influence understanding and learning difficulties of FPB and KPK material. Several internal factors were found: First, Cognitive level: Students' intelligence, problem-solving ability, and abstract thinking ability can influence their learning difficulties in mathematics material. Second, Interest and motivation: Students' level of Interest in mathematics and their motivation to learn and actively participate in learning can influence how much they master the concepts of FPB and KPK. Third, Previous experience: Previous experience in learning mathematics, including a previous understanding of the concepts of FPB and KPK, can influence students' ability to overcome learning difficulties (Unaenah et al., 2023).

External factors include the environment and conditions around students, which can influence their learning process. Some of the external factors found in this research are the following: Social support: Support from teachers, classmates, and parents can be influential in helping students overcome learning difficulties and improve their understanding of FPB and KPK material. Second, Teaching methods: The teaching approach used by the teacher, the quality of explanations, and the suitability of teaching methods to students' learning styles can influence their understanding of the concepts of FPB and KPK. Third, Learning environment: Factors such as classroom atmosphere, the size of the study room, and the availability of learning resources can influence students' concentration and focus in studying mathematics material (Unaenah et al., 2023).

Efforts that can be made to reduce difficulties in learning mathematics based on the difficulties experienced and the underlying factors include teaching mathematics in a fun way, using interesting methods and strategies such as gamification, real-life applications, and interactive learning tools, increasing practice questions, and establishing cooperation between teachers' guidance towards the understanding of each student. In solving FPB questions, it can be concluded that students can use factor trees and division tables but cannot determine the final result from these two methods, so in determining the final result, students are still guessing the answer or guessing the answer from their estimates. Be careful when disseminating FPB material. This needs to be a concern for mathematics teachers in instilling the concept of FPB in students. So, they need repetition and learning to be done so that their understanding of the mathematics of the FPB material can be understood well.

Based on the interview results, it was clear that the student needed help working on the questions and understanding the FPB material. Moreover, students need help with ordinary questions and stories. Hence, they need repetition and learning so that their understanding of mathematics in the FPB material can be understood well. Apart from that, the test result showed that students were both in ordinary questions and stories; students are less able to do them, so they need repetition and learning to be done so that their understanding of the mathematics of the FPB material can be understood well. The difficulties were that students needed to correct their carrying out division calculation operations in FPB questions. Then, students need help concluding the final answers to FPB questions. This needs to be a concern for mathematics teachers in instilling the concept of FPB in students.

Conclusion

Based on the research results and discussion of the difficulties in learning mathematics for class VII in FPB material, the following conclusions were obtained: First, students made mistakes in carrying out division calculation operations in FPB questions; Second, students need help concluding the final answers to FPB questions. This needs to be a concern for mathematics teachers in instilling the concept of FPB in students. This research implies that mathematics teachers must emphasize instilling the concept of FPB material, ensuring that students have mastered division arithmetic operations in solving FPB problems.

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