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ANALYSIS OF LEARNING DIFFICULTIES OF ALGEBRAIC CALCULATION OPERATIONS BASED ON *NEWMAN'S ERROR* TYPE IN BEKASI CITY

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Abstract

The purpose of this study is to analyze the difficulty of learning algebraic calculation operations based on newman's error type in Bekasi City. This research is a qualitative research involving grade VIII students of Bekasi City. Researchers tried to collect information to analyze the difficulty of learning mathematics on the material of algebraic form calculation operations using the concept of Newman theory. Researchers only took 3 subjects to be the subject of research. At this stage, researchers use research instruments in the form of written tests that contain description questions and algebraic form calculation operations. Data collection by researchers using tests and interviews. The use of qualitative method techniques in analyzing research data shows that there are several factors based on the type of newman error so that they make mistakes doing questions such as, 1) students' answers are considered less thorough, 2) students find it difficult to understand the subject matter of the questions so that students cannot get important information from the questions, 3) students' inability to change story problems into mathematical forms also causes a Students make mistakes in answering questions, 4) students lack understanding of the concept of algebraic material. There are 3 types of difficulties experienced by these students, namely Difficulty in understanding concepts, Difficulty in Solving Verbal Problems, and Difficulty in understanding principles. While there are 5 types of newman type errors, namely, Reading Errors, Wrong Comprehension, Wrong Transformations, Wrong Skill Processes, Drawing Wrong Conclusions.

Keywords: learning difficulties, algebra, newman errors

Abstrak

Tujuan dari penelitian ini yakni untuk menganalisis kesulitan belajar operasi hitung aljabar berdasarkan tipe newman's error di Kota Bekasi. Penelitian ini adalah penelitian kualitatif yang melibatkan siswa kelas VIII Kota Bekasi. Peneliti berusaha mengumpulkan informasi untuk menganalisis kesulitan belajar matematika pada materi operasi hitung bentuk aljabar menggunakan konsep teori newman. Peneliti hanya mengambil 3 subjek untuk dijadikan subjek penelitian. Pada tahap ini peneliti menggunakan instrument penelitian berupa tes tertulis yang berisi soal uraian dan operasi hitung bentuk aljabar. Pengumpulan data oleh peneliti mengunakan tes dan wawancara. Penggunaan teknik metode kualitatif dalam menganalisis data hasil penelitian menunjukan bahwa ada beberapa faktor berdasarkan tipe newman eror sehingga melakukan kesalahan mengerjakan soal seperti, 1) jawaban peserta didik dinilai kurang teliti, 2) peserta didik sulit memahami pokok bahasan materi dari soal sehingga peserta didik tidak dapat memperoleh informasi penting dari soal, 3) ketidaksanggupan peserta didik untuk mengubah soal cerita menjadi bentuk matematika juga menyebabkan seorang peserta didik mempakat kesalahan dalam menjawab soal, 4) peserta didik kurang memahami konsep materi aljabar. Jenis kesulitan yang dialami siswa ini ada 3 jenis yakni Kesulitan dalam memahami konsep, Kesulitan dalam Menyelesaikan Masalah Verbal, dan Kesulitan dalam memahami prinsip. Sedangkan Jenis Kesalahan tipe newman ini ada 5 yakni, Kesalahan Membaca, Pemahaman yang salah, Transformasi yang salah, Proses Keterampilan yang salah, Penarikan Kesimpulan yang salah.

Kata kunci: kesulitan belajar, aljabar, tipe newman eror

INTRODUCTION

The subject of mathematics is very calculated in the field of study taught in the school. Problems that are well analyzed and mathematics are considered critical because they have the ability to think of students caused by other sources of knowledge whose growth depends

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a lot on mathematics. Improving the quality of education is also seen from the field of mathematics studies that have been taught in a formal institution (Sholihah & Mahmudi, 2015). Another problem in the world of education that has been faced by many during 2020 until now is the online learning process There are many studies found on students who have not been able to apply a concept of learning mathematics properly aimed at the open ended problems that are solved. The ability of students assessed is still lacking in solving some systematic algebraic form problems (Ilyas & Basir, 2016)

Not only understanding the material in mathematics, but students can apply it to everyday life the form of concepts that enter from the concept of mathematics. In mathematics, the existing material explains how to learn concepts and principles (Nurlaelah et al., 2017). In using this mathematical concept, students learn various kinds of material in mathematics lessons. If students do not understand the basic concepts, then students will be more difficult to understand the higher level of difficulty. The thing that makes many students afraid of mathematics subjects and these students become passive is that there are many students who find this mathematical material confusing and difficult to understand, seeing the importance of these mathematics subjects for that students are expected to understand and master it well (Jamaris 2015:185).

In following mathematics learning in class, students often have learning difficulties (Parnawi, 2019). There was more than one difficulty in discussing mathematics material, judging from the variety of mathematics learning materials that had an impact on students experiencing difficulties in discussing other mathematics. The purpose of the introduction of this algebra concept is so that students are able to think analytically, critically, collaboratively, logically and systematically. (Mulyono, 1999:251) students on the question material given and where the difficulties of the students are. When students complete the test that will be given by the researcher at the time of observation, there will be some errors during the completion process, after which the level of student learning difficulty can be analyzed. The difficulty of the material done by these students can be a benchmark in knowing where the difficulties of students are in working on the material provided. The existence of errors in the concept of science that has been conveyed at the level of education given by teachers can be associated with fundamental errors, namely fundamental explanations to the level of education that may

be increased. Therefore, it is necessary to identify and analyze in-depth related to what difficulties are experienced by students (Novitasari, 2016).

Of the several branches that are considered important in mathematics, on the other hand, in several other branches of mathematics, namely Algebra, such as power equations, algebra is related to variables and non-linear and linear equations where algebra is a branch of mathematics (Salamah, 2014). In science in learning mathematics, algebra is one of the difficult materials in mathematics because this algebra has a relationship with the equation of letter symbols, solving systems of equations, the use of quadratic formulation by applying a system of formulas and letters (Adhiska et al., 2020).

In solving some practical problems that have several branches such as analysis, arithmetic, geometry and mathematical algebra are also often considered as thinking tools used with the aim of finding solutions to these problems, namely analysis, individuality, construction, intuition, and geometry (Son et al., 2019). In everyday life, algebra has concepts that are used by some people in problems that are not realized or realized such as difficulties in learning mathematics for some people who take the education level. There is an understanding given to students about the concept of algebra, because the concept can be used in several fields of mathematics and the importance also in schools is the introduction of algebraic forms effectively.

In everyday life, algebra has concepts that are used by some people in problems that are not realized or realized such as difficulties in learning mathematics for some people who take the education level. There is an understanding given to students about the concept of algebra, because the concept can be used in several fields of mathematics and the importance also in schools is the introduction of algebraic forms effectively(Khatimah & Asdarina, 2020).

There are two objects of school mathematics learning, namely direct objects and indirect objects are objects that can be accepted by students in mathematics learning. Principles, facts, skills and concepts are part of the immediate object. These four things are expected by students to get it after students learn about algebra. In following mathematics learning in class, students often have difficulties (Parnawi, 2019). The discovery of difficulties experienced by students in other discussions while learning mathematics.

Therefore, researchers focused this study on analyzing the difficulty of learning mathematics on the material of algebraic form calculation operations based on the newman

type, because many students have difficulty in operating the form of algebraic material based on the newman type. This study also aims to identify the factors that cause students to face learning difficulties The factors that cause learning difficulties are not easy to determine because they are complex.10 These learning difficulties are not always caused by low intelligence factors (mental disorders), but are also caused by non-intelligence factors.11 Ahmadi and Supriyono stated that learning difficulties are divided into two, namely (1) internal factors (factors from within humans); and (2) external factors (factors from outside humans). As a result, researchers will present a study entitled Analysis of Learning Difficulties of Algebraic Calculation Operations Based on Newman's Error type in Bekasi City. The cause of this difficulty learning mathematics is the large number of discussions that have an impact on students having difficulty understanding mathematical material.

There are two types of mathematical science in understanding the difficulties of students, namely principle knowledge and concept knowledge, seeing the difficulties of these students can explore the difficulties of students in understanding algebra and how the principles and concepts in algebra itself. The learning difficulties experienced by some junior high school students in solving algebra material problems in Bekasi are related to principles and concepts, this needs to be done so that teachers can reduce student errors in algebra problems that are done (Dani, &; Shinta, 2021). Analyzing the difficulty of learning mathematics is the aim of this study. There are core things that must be understood for the purpose of learning mathematics is concepts, principles, facts and operations That is the cause of junior high school students being able to understand algebra material related to these four things.

An example of evidence that students have difficulty solving algebra concepts where in answering some of these algebra problems is from the need for students to understand how concepts in algebra and the many difficulties received by students in Bekasi City. Nature Algebra Learning is important to understand the concept of algebraic calculation operations to students to be analyzed by researchers. In this case, researchers want to analyze and identify mathematical learning difficulties in algebraic form calculation operations based on newman types. Anne Newman, a mathematics teacher, introduced the analysis of difficulties caused by errors in 1977 (Fitria, 2013).

Writing answers, reading skills, process skills in solving, and transfortation process skills are a form that we can see in students from the form of learning difficulties. There are several important activities given by Newman in a lesson with the aim of showing where a student's ability to solve problems. This math problem that is done has a type of error that is separated into five types, namely, (1) reading *error* (wrong reading) this happens because when reading the question students experience errors in the main information which results in working on the question and making student answers there is no na relationship to what is meant in this question because the main information is not used by students in working on the problem. (2) *Comprehension error* (wrong understanding) This occurs because students do not understand the concept, the student is still considered not too understanding the meaning of the question on the question and wrong in receiving the information that has been listed on the question. This results in students not being able to solve the problems contained in the problem. (3) *Transformation* error is a form of error caused by students who are unable to use how to calculate operation signs, changing shapes into mathematics correctly has errors. (4) *Process skills error* (wrong skill process) this occurs because in doing calculations students have not been trained for the calculations carried out. (5) *Endconding* error The error experienced is a process of completion (Fitria, 2013).

This study has a subject, namely junior high school students in Bekasi City, from various types of mistakes made by students, there are types of mistakes such as the wrong type of skill in the type and process of misunderstanding errors, and also the type of transformation errors.

In determining the part of student learning that is considered difficult in analyzing algebra material with the newman type. Teachers are expected to be able to identify what factors students experience during these learning difficulties. Therefore, the researcher's focus in this study refers to the analysis of the location of the difficulty of students solving newman type algebra material problems. This study aims to identify what factors influence learning difficulties. As a result, researchers will present a study entitled Analysis of Learning Difficulties of Algebraic Calculation Operations Based on Newman's Error type in Bekasi City.

METHODS

Researchers used qualitative methods in analyzing this study. which is used by researchers to see the condition of objects naturally, the researcher himself as a key instrument. Data collection and collection using purposive sampling and triangulation, as well as inductive and qualitative data in the results of this study. The emphasis is focused on generalization in the results of this qualitative research.

Understanding of this qualitative research aims to find out the condition of the subject. It has to do with actual field facts and also with problems in processing data. In this study, the so-called field is Bekasi City and the subject is called the class VIII students located in Bekasi. Researchers tried to collect information and also to analyze algebraic calculation operation material that had difficulty with the newman type to solve the problems of grade VIII students in Bekasi City. But the researcher will only take 3 subjects as research subjects.

The research instrument used by this researcher contains several description questions and some algebra material questions in the form of written tests. The validity of this content is used in testing the validity of the instrument which is the stage used using instruments with grids contained in indicators to be used as benchmarks in the question questions that have been described. The data used by researchers are interviews and tests. Error test data on learners is used by researchers to be analyzed based on Newman's stage. Newman's Error Analysis (NEA) consists of 5 stages, Reading Error, Comprehensions Error, Transformation Error, Processing Error, and Encodings Error. Furthermore, the use of unstructured interviews is more free with the aim of getting information from informants. Then researchers also use indicators of learning difficulties as follows as a benchmark for student results in solving math problems.

Triangulation is a reference method in the use of validity assurance techniques in data. With the same method through checking a data from several data confidence findings and collecting this data from the same method, namely the triangulation method. This different data collection is used by researchers in triangulation methods that have the aim of making data more reliable and also valid such as documentation, tests and interviews. In this study, the analysis technique used according to Huberman and Miles who argue that 1) checking conclusions and data collection (*coclusioan drawing verification*); 2) data presented (*display data*); 3) *Data Reduction* (Cooney, 2017).

Table 1. *Mathematics Learning Difficulty Indicator*

No.	Indicators	Information
1.	Difficult understanding of concepts	Understanding difficult concepts when working on algebra material by students
2.	Application of difficult principles	Application of difficult principles when students work on algebra material
3.	Difficult verbal problems to solve	In solving problems, story problems and verbal problems, students are considered difficult to solve

Source: Sibatik Journal

RESULTS AND DISCUSSION

The results of the first study are, Analysis of the Difficulty of Solving Algebraic Form Operation Problems written by Siti Sundari and EndahWulantina, where the results of this study state the results of the research carried out and refer to the problem, the following conclusions can be drawn: The difficulty of students in solving algebraic form operation problems is the difficulty of concepts and principles. The difficulty of algebraic concepts is that students have difficulty identifying variables, coefficients, constants and similar terms. In contrast to this study, namely:,

There were 3 students who were used as target subjects in taking this research data. The answers of the students were corrected and grouped by the researcher into 5 types of errors based on the type of Newman's Error. Furthermore, students who make mistakes are already known what the types of mistakes are by researchers will be discussed in more depth about the analysis of errors made by students on each practical problem. The completion of algebraic calculation operations is continued by identifying errors made by students that have been analyzed by researchers.

Here is the form of test questions that researchers use :

1. Jelaskan pengertian variable, koefisien, dan konstanta?
2. Diberikan bentuk aljabar $15x + 9y + 14$. Berdasarkan bentuk aljabar tersebut, manakah yang termasuk variable, koefisien, dan konstanta?
3. Tentukan bentuk sederhana dari :
   a. *hasil dari* $8x + 3y - 4z - 6x - 11y + 15z$
   b. *bentuk sederhana dari* $6(4x - 3y + 5z)$
   c. *sederhanakan hasil kali bentuk aljabar dari* $(5x - 3)(2x + 3 - 4)$
   d. *tentukan hasil bagi dari* $6y(2x - 3)/2y$
4. Sebuah kolam berbentuk persegi panjang memiliki lebar $(p + 3)$ dan panjangnya $(5p + 4)$. Hitunglah :
   a. Luas kolam (dalam bentuk aljabar)
   b. Luas kolam jika $p = 2$

Figure 1. Problem Bto Algebra

The difficulty found by the researcher is seen from the 4 questions given to students related to the concept of algebraic operations. This seemed to have an error when the researcher gave algebraic calculation operations questions to students which were then continued with three research subjects at the interview stage.

It is sought that the data to be discussed is not separate from the discussion. The data to be discussed is written adjacent to the discussion.

Difficulty in understanding concepts

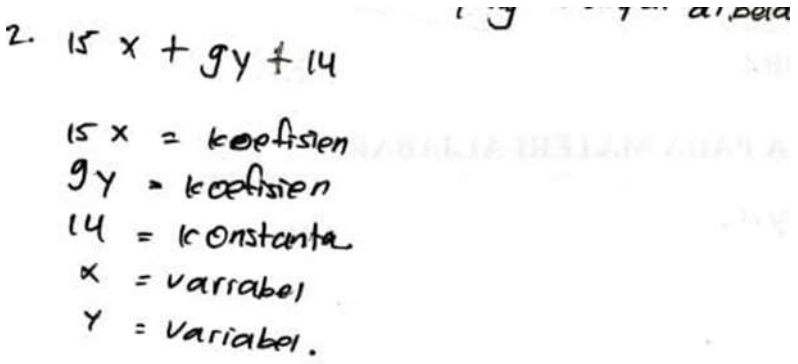

Figure 2. Student answers 1

Judging from figure 2, it shows that learner 1 can answer the question. But it seems that it is still unable to determine coefficients, variables, and constants. Student 1 is only able to

determine variables and constants. It is said that learner 1 has difficulty in understanding algebraic concepts.

Interview data:

Researcher	: on question number 2 what are you asked for?
Learner 1	: determine which one includes coefficients, variables, pak constants
Researcher	: what to do in the first step 15x = coefficient and 9y = coefficient?
Student 1	: I don't know sir
Researcher	: see if your answer is correct?
Learner 1	: wrong sir, the answers should be 15 and 9 that include the coefficient
Researcher	: why is your answer like that?
Student 1	: sorry, sir, I was in a hurry to do it so it was not thorough

Difficulty in understanding the principle

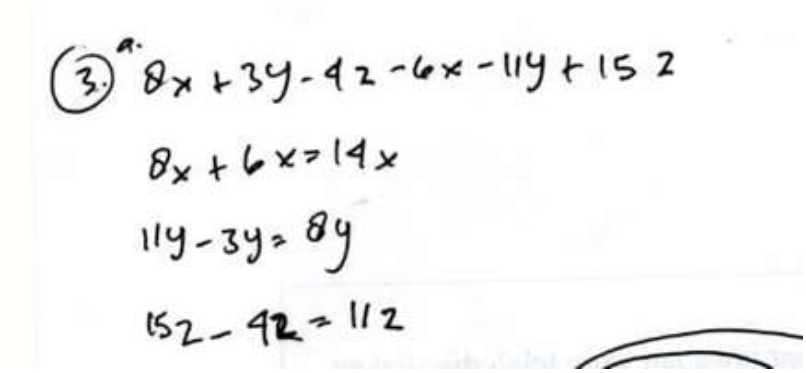

Figure 3. Student answers 2

Figure 3 above shows the difficulty of understanding student 2 in doing the calculation operation problem of subtraction and addition in algebra in question no. 3 part a. However, student 2 only understands grouping similar variables, but student 2 does not understand addition and subtraction. This means that learner 2 still has difficulty understanding the principles.

Interview data:

Researcher	: do you know the simple form of the problem?
Student 2	: first combined pack with the same variables
Researcher	: what is the back letter called?
Learner 2	: variable pack
Researcher	: what is the number in front of the variable called?

Learner 2 : pack coefficient

Researcher : do you understand what that is being asked?

Learner 2 : simplified pack

Researcher : Yes, but see what your answer is as asked by the question?

Student 2 : according to sir, I understand the same variables

Researcher : it's true that you grouped the algebraic terms

Student 2 : continue to pack what else

Researcher : You simplify according to what the question asks, can you?

Learner 2 : can pack

It can be concluded, based on the results of the interview in simplification. So it can be concluded that solving the algebraic form problem is considered to still have difficulties by students.

Difficulty in solving verbal problems (story problems)

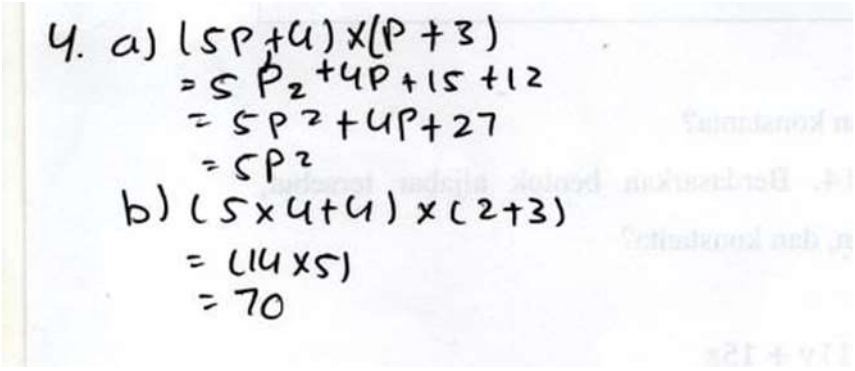

Figure 4. Student Answers 3

Based on figure 4, it shows that learner 3 can understand what is known from the problem, but learner 3 does not understand the formula used to find the area of the pool. But student 3 is to do problems that (a) there are errors in solving the form of algebraic operations in student 3. Learner 3 still misunderstands the multiplication of algebraic forms which results in incorrect answers given. As for the problem that (b) learner 3 is able to operate algebraic forms and learner 3 understands the multiplication of algebraic forms. However, student 3 only entered what was known from the problem. This shows that there seems to be difficulty in students in solving verbal problems and story problems.

Interview data:

Researcher : on question number 4 what is being asked?

Learner 3 : calculate the area of the pack pool

Researcher : then what steps did you take?

Learner 3 : for that a I multiply the rainbow first sir

Researcher : Yes, yes, but you didn't write the formula for the area of the pool that the question asked for

Student 3 : yes sir I forgot

Researcher : then for the b you also didn't write the formula for the area of the pool

Student 3 : Yes, sir, I am also in a hurry so I just follow the ones

Researcher : then to calculate the area of your pool what else?

Student 3 : I input what is asked about the pack

Researcher : then asked about p = 2, why did you write 4 and 2?

Student 3 : yes, sir, I wrote wrong

Some of the results of students' answers at the time of the interview can be said that solving the problem of story and verbal problems is still considered difficult by students.

Efforts to overcome difficulties learning mathematics

Previously it has been mentioned what are the factors that cause students to experience difficulties, then will explain how these difficulties in learning mathematics can be overcome. To find out how efforts to overcome learning difficulties are carried out by analyzing the results of interviews from researchers conducted by grade VIII students in Bekasi City. In this case, the researcher did not mention how efforts were made in overcoming learning difficulties in mathematics, but the researcher suggested the efforts he made. Here are things that need to be considered in overcoming difficulties in learning mathematics (Zainal Harifin et al., 2018).

a. Concrete learning is needed in learning media, in this mathematics learning nature students are considered unable to think abstractly therefore the importance of clear and reliable learning media.
b. To be able to understand algebra problems, regular practice is needed, the practice questions given by the teacher must be more to students because if students regularly learn algebra problems, it will be easier to understand and minimize students who

have learning difficulties. The practice questions can be done outside of school, can be given as homework.

c. The existence of cooperation with parents because it is considered that the role of parents is very influential in providing motivation for students, students who have good motivation while in this learning activity are sure to get good attention from their parents. The assistance of parents when children learn proves that parents provide support and attention to children and if children find learning difficulties here, the role of parents is needed by students. The role of parents here is to be able to teach their children until their children understand the problems that feel difficult, children can also be given additional learning in the form of mathematics subjects.

Many factors influence students in doing the questions, from the results of the study and the interview above shows several factors from students, namely, 1) students are considered unable to change to mathematical form from story problems, 2) questions done by students are considered incorrect, 3) students who do not do questions are caused by students' incomprehension of algebra question material and lack of understanding in concepts, 4) Information that is considered important cannot be received properly because students do not understand the purpose of the problem. Judging from the tests taken by students, most students are only able to do what they know but cannot answer.

Newman Errors type

Subject	Misconceptions	Misconception of the Principle	Errors in solving verbal problems
1	**V**	**X**	**X**
2	**X**	**V**	**X**
3	**X**	**X**	**V**

Indicates that subject no.1 can answer the question. But it seems that it is still unable to determine coefficients, variables, and constants. Student 1 is only able to determine variables and constants, The picture above shows the difficulty of understanding subject no.2 in doing subtraction and addition calculation operations problems in algebra, however, subject no.2 still does not understand the rules of addition and subtraction. The above also

shows that subject no.3 can understand what is known from the problem, but learner 3 does not understand the formula used to find the area of the pool.

Deviation of something that does not comply with the procedure is called an error. In solving math problems students are found to have errors, so that mistakes are not repeated by students, they must be analyzed with the aim of minimizing these errors. This deviation from the right thing is called an error. In 1977 Anne Newman introduced the Newman Analysis Method, she is a lecturer in Australia with a field of mathematics studies (Hendrayanto et al., 2021). Anne Newman in this method wants to help to solve a problem of al gebra problems by suggesting some specific things that aim to find the cause of the problem in students. Errors based on the newman type are mistakes made by students in solving problems with the newman type. Mathematics has specific skills defined by Newman to be used in solving problems, there are five specific skills, namely, encoding, transformation, reading, process skills and also comprehension (Puspitarini & Masriyah, 2017).

Almost most in the field of mathematics algebra is referred to as a unifying thread, the manipulation of symbols and rules in mathematics is the science studied in algebraic material. Elementary algebra is a basic part of algebra, while modern algebra or abstract algebra is part of abstract algebra. There are 5 types of student errors in doing algebra problems using Newman type analysis in this study (Susilowati & Ratu, 2018)

Table 3. *Newman Error Type (*The percentage of errors that have been made by students in each type of error, namely 41.93% of mistakes that are often made by students are transformation errors, then is 0 reading errors or 0%, 13 wrong transformations or 41.93%, then there are 9 errors from how to understand or worth 29.03%.)

Table 2. *3 Students who experienced this*

No.	Tipe Kesalahan	Indikator
1.	***Reading error***	This error occurs due to lack of understanding and lack of accuracy in students when reading questions which results in the answer in question not in accordance with the correct answer (Surya et al., 2019)

2.	***Comprehension error***	This error occurs due to lack of understanding and lack of accuracy in students when reading questions which results in the answer in question not in accordance with the correct answer
3.	***Transform error***	Inability of students to correctly change math problems into a form of mathematics
4.	***Weakness in process skill***	The inability to do this calculation is caused by mistakes owned by students due to not mastering the form of calculation clearly
5.	***Encoding error***	The completion process encountered an error.

The completion of the algebraic calculation operation by students who are considered to have errors, with the aim that the teacher wants to know what causes students to make mistakes in doing this algebraic calculation operation, the teacher is advised to help minimize errors by overcoming or correcting. The level of student understanding is considered very important for teachers to know because it will make it easier for teachers to find out student mistakes. Effective assistance needed by teachers towards students in overcoming learning difficulties. Based on the results of the above research, researchers can provide suggestions in overcoming student frustration based on this type of newman, namely: 1) For teachers, they should be able to find out the mistakes made by students in doing problems, and can provide scaffolding to students who have difficulty or errors in learning mathematical material or other materials; and 2) For other researchers, they can conduct further research on the development of error analysis tools for student error material based on this type of newman or other materials, or conduct research on the development of scaffolding guidelines for social arithmetic material or on other materials.

CONCLUSION

Based on interviews with students and examining the results of the work that students have done in solving the description problem, as a result, researchers can identify what are

the factors behind students doing the questions and the mistakes they make, such as 1) Lack of student accuracy in answering the questions; 2) Lack of student understanding on the subject matter of the question so that students cannot obtain important information from the problem; 3) Students who are unable to convert story problems into mathematical form result in a student agreeing errors in the questions answered; 4) The concept of algebra material that is considered is still poorly understood by students. The causative factors behind student difficulties are internal and external factors, internal factors such as, sensory abilities, IQ possessed by students, how healthy the body is owned by students, student attitudes when learning, and what motivation students have to learn are internal factors that influence students in learning mathematics. These external factors are external factors, which include the family environment, the use of learning media, teachers who teach students, and also infrastructure facilities in schools. Efforts that can be made to overcome learning difficulties are explained as follows, Using concrete learning media, Increasing algebra problem practice, in this case teachers need to provide more practice questions to students who have difficulty learning algebraic calculation because with more practice students will understand more and the need to cooperate with parents, parents have an important role in providing motivation for students. However, there will be fewer errors if teachers convey material to students more carefully and thoroughly when explaining algebraic concepts. It is hoped that teachers will be better able to teach this algebra concept to students so that they have the ability to remember the material and behave better in the material that has been discussed. For teachers, it is always expected to provide solutions and motivation for students so that learning difficulties can be resolved properly. In minimizing the learning difficulties faced by these students, teachers can invite parents to provide encouragement and motivation to students.

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REFERENCES

Abdurrahman, Mulyono. (1999). Pendidikan Bagi Anak Berkesulitan Belajar. Jakarta: Rineka Cipta.

Adhiska, D. P., Fathurrohman, M., & Khaerunnisa, E. (2020). Analisis pemahaman konsep matematis peserta didik pada materi aljabar. *Wilangan*, *1*(1), 64–75.

Fitria. (2013). Analisis kesalahan siswa menurut newman dalam menyelesaikan soal cerita materi operasi hitung pengurangan bilangan bulat kelas VII B SMP Pangudi Luhur Salatiga. *Journal of Chemical Information and Modeling*, *53*(9), 1689–1699.

Hendrayanto, D. N., Widodo, S. A., Wijayanto, Z., & Wahmad, W. (2021). Aplikasi Teori Newman: Bagaimana Kesalahan Siswa Dalam Menyelesaikan Permasalahan Geometri 3D? *JNPM (Jurnal Nasional Pendidikan Matematika)*, *5*(1), 94. https://doi.org/10.33603/jnpm.v5i1.3613

Ilyas, M., & Basir, F. (2016). Analysis of student's conceptual understanding of mathematics on set at class VII SMP Frater Palopo. *Prosiding ICMSTEA 2016*, *October*, 96–102. http://repository.uncp.ac.id/26/6/https://ojs.unm.ac.id/icmstea/article/view/2631/1369

Jamaris, Martini. (2015). Kesulitan Belajar: Perspektif, Asesmen, dan Penanggulangannya. Bogor: Ghalia Indonesia

Khatimah, H., & Asdarina, O. (2020). Diagnosis Kesalahan Siswa dalam Memahami Materi Faktorisasi Bentuk Aljabar pada Siswa Kelas VIII. *Mathema: Jurnal Pendidikan Matematika*, *2*(1), 40. https://doi.org/10.33365/jm.v2i1.464

Novitasari, D. (2016). Pengaruh Penggunaan Multimedia Interaktif Terhadap Kemampuan Pemahaman Konsep Matematis Siswa. *FIBONACCI: Jurnal Pendidikan Matematika Dan Matematika*, *2*(2), 8. https://doi.org/10.24853/fbc.2.2.8-18

Nurlaelah, Alimuddin, & Minggi, I. (2017). Deskripsi Kesalahan Siswa Dalam Menyelesaikan Soal Cerita Matematika. *Issues in Mathematics Educations*, *01*(01), 38–45.

Parnawi, A. (2019). *Psikologi Belajar*. Deepublish. https://books.google.co.id/books?id=BA-fDwAAQBAJ

Cooney, T. (2017). Dynamic of Teaching Secondary School Mathematics. Boshton: Houngthon: Mifflin Company.

Puspitarini, R. T. A. D., & Masriyah. (2017). Analisis kesalahan siswa dalam menyelesaikan soal cerita pada materi aljabar. *MATHEdunesa Jurnal Ilmiah Pendidikan Matematika*, *2*(6), 65–70.

Ramadhani, V. D., Roebyanto, G., & Umayaroh, S. (2019). Kemampuan Pemecahan Masalah Siswa Kelas V pada Materi Geometri Ditinjau dari Gaya Kognitif. *Sekolah Dasar: Kajian Teori Dan Praktik Pendidikan*, *28*(2), 80–90. https://doi.org/10.17977/um009v28i22019p080

Sholihah, D. A., & Mahmudi, A. (2015). Keefektifan experiential learning pembelajaran matematika MTs materi bangun ruang sisi datar. *Jurnal Riset Pendidikan Matematika*, *2*(2), 175–185. https://doi.org/10.21831/jrpm.v2i2.7332

Son, A. L., Darhim, & Fatimah, S. (2019). An analysis to student error of algebraic problem solving based on polya and newman theory. *Journal of Physics: Conference Series*,

1315(1). https://doi.org/10.1088/1742-6596/1315/1/012069

Sundari, S., Wulantina, E., Siswa, K., & Aljabar, O. (2022). *Analisis kesulitan menyelesaikan soal operasi bentuk aljabar*. *3*, 43–54.

Shinta, O. & Dani, F. (2021). Analisis Kesalahan Siswa Dalam Menyelesaikan Soal Cerita Materi Bentuk Aljabar. Jurnal Pembelajaran Matematika Inovatif. 4(5).

Surya, I. T. M., Suastika, I. K., & Sesanti, N. R. (2019). Analisis Kesalahan Siswa Dalam Menyelesaikan Soal-Soal Materi Operasi Bentuk Aljabar Berdasarkan Tahapan Newman Di Kelas VII SMP NU Bululawang. *RAINSTEK : Jurnal Terapan Sains & Teknologi*, *1*(1), 25–33. https://doi.org/10.21067/jtst.v1i1.3058

Aditya, Dedy. (2020). Analisis Kesalahan Siswa Menurut Newman Dalam Menyelesaikan Soal Cerita Materi Operasi Hitung Pengurangan Bilangan Bulat Kelas VII B SMP Pangudi Luhur Salatiga. Universitas Kristen Satya Wacana. Salatiga, Indonesia

Susilowati, P. L., & Ratu, N. (2018). Analisis Kesalahan Siswa Berdasarkan Tahapan Newman Dan Scaffolding Pada Materi Aritmatika Sosial. *Mosharafa: Jurnal Pendidikan Matematika*, *7*(1), 13–24. https://doi.org/10.31980/mosharafa.v7i1.337

Salamah, U. (2014). Berlogika Dengan Matematika Untuk Kelas VIII SMP dan MTs. Solo : Platinum.

Zainal Harifin, Ilyas, M., Basir, F., Dwi Kusumawati, A., Sutriyono, S., Hendrayanto, D. N., Widodo, S. A., Wijayanto, Z., Wahmad, W., Puspitarini, R. T. A. D., Masriyah, Surya, I. T. M., Suastika, I. K., Sesanti, N. R., Fitria, Paladang, K. K., Indriani, S., Dirgantoro, K. P. S., Novitasari, D., … Mahmudi, A. (2018). Analisis kesalahan siswa dalam menyelesaikan soal cerita pada materi aljabar. *MATHEdunesa Jurnal Ilmiah Pendidikan Matematika*, *1*(1), 8. https://doi.org/10.1088/1742-6596/1315/1/012069