DIAGNOSIS OF STUDENT ERRORS IN COMPLETING SPLTV STORY QUESTIONS VISITED FROM LEARNING INTERESTS AND GENDER USING THE NEWMAN METHOD

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ABSTRACT

Student errors in solving problems often occur in the learning process, especially in the process of solving contextually integrated story problems on SPLTV material. Therefore, it is necessary to research the diagnosis of student errors in solving SPLTV story problems in terms of learning interest and gender using the Newman method. The focus of the problems studied are: 1) How are the problem solving errors of male students who have high, medium, and low learning interests in solving SPLTV story problems using the Newman method? 2) What are the problem solving errors of female students who have high, medium, and low learning interests in solving SPLTV story problems using the Newman method? This research aims to diagnose the errors of male and female students who have high, medium, and low learning interests in solving SPLTV story problems using the Newman method. This type of research is descriptive with a qualitative approach. The research subjects were 30 students of class X IPA 1 using a purposive sampling technique. Data collection was done through a learning interest questionnaire, a written test on SPLTV material, interviews based on the Newman method, and documentation. Data analysis used the Miles. Huberman. and Saldana data analysis model. Based on the research results, it can be concluded that: 1) Male students who have high learning interest make skill errors and final answer writing errors, while male students who have low learning interest make transformation errors, skill errors, and final answer writing errors. 2) Female students with high learning interest made skill errors and final answer writing errors, while female students with low learning interest made comprehension errors, transformation errors, skill errors, and final answer writing errors.

Keywords: Student Error, Learning Interest, Gender, Newman Method

ABSTRAK

Kesalahan siswa dalam menyelesaikan soal sering terjadi dalam proses pembelajaran, terutama dalam proses penyelesaian soal cerita yang terintegrasi secara kontekstual pada materi SPLTV. Oleh karena itu, perlu dilakukan penelitian mengenai diagnosis kesalahan siswa dalam menyelesaikan soal cerita SPLTV ditinjau dari minat belajar dan jenis kelamin menggunakan metode Newman. Fokus masalah yang dikaji adalah: 1) Bagaimana kesalahan pemecahan masalah siswa laki-laki yang memiliki minat belajar tinggi, sedang, dan rendah dalam menyelesaikan soal cerita SPLTV menggunakan metode Newman? 2) Bagaimana kesalahan pemecahan masalah siswa perempuan yang memiliki minat belajar tinggi, sedang, dan rendah dalam menyelesaikan soal cerita SPLTV menggunakan metode Newman? Penelitian ini bertujuan untuk mendiagnosis kesalahan siswa laki-laki dan perempuan yang memiliki minat belajar tinggi, sedang, dan rendah dalam menyelesaikan soal cerita SPLTV menggunakan metode Newman. Jenis penelitian ini adalah deskriptif dengan pendekatan kualitatif. Subjek penelitian adalah 30 orang siswa kelas X IPA 1 dengan menggunakan teknik purposive sampling. Pengumpulan data dilakukan melalui angket minat belajar, tes tertulis materi SPLTV, wawancara berdasarkan metode Newman, dan dokumentasi. Analisis data menggunakan model analisis data Miles, Huberman, dan Saldana. Berdasarkan hasil penelitian, dapat disimpulkan bahwa: 1) Siswa laki-laki yang memiliki minat belajar tinggi melakukan kesalahan keterampilan dan kesalahan penulisan jawaban akhir, sedangkan siswa laki-laki yang memiliki minat belajar rendah melakukan kesalahan transformasi, kesalahan keterampilan, dan kesalahan penulisan jawaban akhir. 2) Siswa perempuan yang memiliki minat belajar tinggi melakukan kesalahan keterampilan dan kesalahan penulisan jawaban akhir, sedangkan siswa perempuan dengan minat belajar rendah melakukan kesalahan pemahaman, kesalahan transformasi, kesalahan keterampilan, dan kesalahan penulisan jawaban akhir.

Kata Kunci: Kesalahan Siswa, Minat Belajar, Jenis Kelamin, Metode Newman

A. Introduction

Education is a human need throughout his life. Without education, humans will find it difficult to develop and become backward. With education, humans can be directed to become better and more qualified. Education will continue to be carried out because education knows no time and is a process that continues throughout human life.

In the learning process at school, several factors influence the achievement of learning objectives, including educators, students, the environment, and learning media and learning models. Based on the goals of national education, the importance of the learning process is

part of the process of forming a "whole person", namely creating an individual who has developed abilities and personality. School is a very strategic place to develop and achieve educational goals, through a unified learning process development of the realm of knowledge, skills, attitudes, and values to develop the personality and self-realization of students. Schools have directed and planned programs, and have educational components that interact with each other to realize educational goals. Through the learning process, students will be able to adapt and adjust their behavior life in progressively.

Efforts to improve the quality of

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education must be carried out by mobilizing all components that are subsystems in a quality education. One of the most determining subsystems in improving the quality of education is the teaching staff factor, namely teachers. Teachers are the spearhead of education, because teachers directly influence, develop and develop students' abilities to become intelligent, skilled and moral human beings. Teachers must have the basic abilities needed as educators and instructors. One of the scientific disciplines that plays an important role in life and whose presence is closely related to the world of education is mathematics. Mathematics as the queen of science means that mathematics is the source of other branches of knowledge. There are many branches of science whose theory development is based on the development of mathematical concepts.

Mathematics has a crucial contribution to the development of science and technology. In line with the argument put forward by Sudianto who believes that mathematics is one of the universal sciences which has a crucial

contribution to the progress of modern technology the and development of science. Along with advances in modern technology and the development of science, it is possible that every student must study mathematics. Siti Rugoyyah et al said that mathematics is one of the fields of science in the world of education that must be studied and pursued at every level of education starting from elementary, middle, high school and even tertiary level. Through mathematics, students are trained to think logically, critically and mathematically. On the other hand, mathematics also acts as a skills reference for in solving problems in everyday life, so there is a need to develop and improve the quality of mathematics learning. One of the things that must be considered improving the quality and in development of mathematics learning is errors in the problem solving process. An error is something that is contrary to clear stages or procedures and also has incidental, consistent an and systematic nature. The student errors mentioned previously can be caused by a lack of reading comprehension skills, SO that

difficulty students have understanding the words in story problems (Boonen et al., 2016; Sepeng & Sigola, 2013). Apart from reading comprehension skills. student errors can also be caused by students not having good problem solving skills, where problem solving skills are directly related to students' ability to make efficient representations (Sajadi, Amiripour, & Rostamy-Malkhalifeh, 2013).

There are four forms of errors experienced by students in solving mathematics problems, namely conceptual errors, facts, procedures, and carelessness (Brown & Skown, 2016). In the case of working on story problems, Brown and Skow (2016) added that these four errors could be caused by students' weak reading comprehension skills, lack of mastery of mathematics material, and students' inability to translate relevant information into mathematical equations. However, mathematical errors shown by students through giving story problems do not mean something that needs to be viewed negatively. Teachers can use student answer errors to guide students toward the correct answer without providing the correct beforehand answer

(Hoffman, Breyfogle, & Dressler, 2009). In addition, students who experience errors or fail to provide the correct solution in solving math word problems can learn better from the mistakes they make (Kapur, 2014).

Linear equations with three variables are mandatory material that high school students must study. Based on researchers' observations at one of the 15 State High Schools in Medan, it was found that students often experienced difficulty in solving questions related to this material. Even though the teacher has taught the material about linear equations in three variables, when asked to do word problems about linear equations in two variables, students at this school still experience difficulties. Based on the results of interviews with mathematics teachers at the school and written answers, On average, in one class only around 10% of students are able answer correctly math story to questions about linear equations in two variables. Students who answered correctly also did not use the concept of linear equations with three variables in solving the problem. The process of solving story problems in this material uses several methods to solve it. Some students find it difficult to understand

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the meaning of the material story questions. So it is not uncommon for students to make mistakes during the problem solving process. There are several factors that students make mistakes when working on the process of solving problems, such as students' interest in learning and gender differences. Interest in learning is a condition of someone who has more interest and feelings for something accompanied by a desire to learn, know and prove it. Interest in learning is an encouragement or desire for something without any guidance or pressure. Interest in learning arises because of a feeling of pleasure, interest, attention, and involvement in a particular thing. Students who have an interest in learning will pay attention consistently with joy and enthusiasm. Interest in learning can influence students' problem solving processes in working on mathematics problems, because when students have an interest in learning, students will try to get good results and students will have the enthusiasm to learn it.

Another factor in student errors when working on the problem solving process is gender differences. Maccoby and Jacklyn stated that women and men have differences in their abilities, namely: 1) men are less superior in their potential power than women, which means women have higher potential power than men, 2) women are less superior in their visual spatial abilities compared to men, 3) men are superior in terms of their mathematical abilities compared to women. Apart from this, to find out the location or position of students' errors when completing the problem solving process, researchers used problem solving error analysis based on the Newman procedure. According to Pratikopong and Nakamura (2006), the Newman procedure is a method for analyzing problem solving errors in essav questions in mathematics learning. White argues that error analysis solves problems Based on the Newman procedure, it has the highest integrity. Newman classifies mathematical problem solving errors into 5 categories, namely: reading Comprehension errors, Errors. Transformation Errors, Processing Skill Errors, and Encoding Errors. Research conducted by Ayu Lestari (2020) analyzed students' mistakes when solving mathematical literacy problems in terms of students' cognitive level. The error analysis used is error analysis based on the Newman

procedure. The results of this research explain that students with high cognitive ability do not make errors in understanding, transformation, and reading. Students with a moderate cognitive level do not make errors in reading and understanding. Students with low cognitive levels make errors from the Newman procedure indicators. Research by Faiha et al (2017)also analyzed students' mistakes when working on story problems based on "Fong's schematic model for error analysis" in lessons on the volume of pyramids and prisms in terms of gender. The results of this research are that male students predominantly make operational errors, and female students tend to make errors on mathematical and operational themes. Research by Sri Hariyani and Verena Cony Aldita (2020) analyzed the types of students' errors in solving mathematics story problems based on the Newman procedure. The results of this research explain that more students made careless mistakes than students who made errors in understanding, transformation, and skills, whereas fewer students made reading errors than students who made answer writing errors. To find out the location or position of errors made by students in solving story problems in SPLTV material, a problem solving study is needed. Based on the previous explanation, the researcher considers it important to carry out research entitled "Diagnosis of student errors in solving story problems on SPLTV material in terms of learning interest and gender using the Newman method".

B. Method

The research is conducted at SMA Negeri 15 Medan. The research is conducted in the second semester of 2023/2024. The research method used in this research is a method with a qualitative approach.

The population of this research is all the students of X-1 grade of SMA Negeri 15 Medan. The sample of the research is 30 students of the X-1 grade class of SMA Negeri 15 Medan.

To collect data the researcher in this research is taking the data from a direct observation. As instruments of collecting data, the researcher is using.

A. Distribution of Questionnaires

A series of questions were distributed to the subject to be filled.

The learning interest questionnaire raised consists of 20 questions with 10 positive questions each and 10 negative questions. The questionnaire was distributed to classify interest criteria studying high, medium, and low class X Science 1 SMA Negeri 15 Medan. Measuring the results of distributing questionnaires uses a Likert scale. Scale Likert measures a person's attitudes, answers, opinions, or perceptions phenomenon you want to know. Researchers used four answers namely Strongly Agree = SS, Agree = S, Disagree = TS, Strongly Disagree Agree = STS with a score for each answer.

B. Test

In this research, the test was used in the form of a written test. A written test or pencil and paper test is tests that use stationery and paper media. Written test in research. This is in the form of story questions on SPLTV material which consists of 2 items of story questions (descriptions) that have been validated. Question characteristics the questions used are contextually integrated story questions. On the other hand, the test is used to measure problem solving errors in students to find out the location or position of the error solving

student problems through story problems on SPLTV material. Allocation the processing time for this test is 45 minutes.

Table 1. Error Indicators Accordingto the Newman Procedure

Ν	Error	Error	
ο		Indicators	
1	Reading error	Errors in	
		reading terms	
		or symbols in	
		SPLTV	
		questions.	
2	Misunderstandin	Errors in	
	g of the problem	identifying	
		known	
		information	
		and	
		what was	
		asked about	
		the SPLTV	
		question	
3	Transformation	a. Error in	
	error	converting	
		SPLTV	
		questions to	
		model form	
		mathematics.	
		b. Errors in	
		determining	
		strategies to	
		solve	
		problems	

			SPLTV	
4	Process	skill	Errors	in
	errors		carrying	out
			mathematical	
			calculation	
			operations	
5	Final answer	•	Errors	in
	writing error		writing	
			conclusions	6

C. Interview

An interview is a process to obtain an achievement research with direct interaction through questions and answers between researchers with respondents.

In this research, interviews were carried out after the research subjects completed the written test questions given by the researcher. This interview is based on indicators of Newman's problem solving.

C. Results and Discussion

The first analysis in this research is the analysis carried out to determine research subjects by distributing interest questionnaires studied with 30 class X Science 1 SMA Negeri 15 Medan (10 male students and 20 female students). After the results of the interest questionnaire learning are obtained, followed by a

discussion with the class mathematics teacher X IPA 1 SMA Negeri 15 Medan to determine the 20 subjects to be chosen consisting of 10 male student subjects and 10 female student subjects (4 students with high interest in learning, 3 medium, 3 low and 4 female students with interest learning high, 3 medium, 2 low). Based on the data analysis theory put forward by Miles and Huberman, here are the data analysis carried out by researchers:

a. Reading Errors

Based on data analysis carried out by researchers, reading errors almost all the research subjects did not make, however, there are still those who make reading errors, namely research subjects 6 (S6) and research subjects 12 (S12). S6 made a reading error on number 2 because S6 can't understand and digest question number 2 so S6 can't and can't Mention and write down the keywords in question number 2. Meanwhile, S12 made a mistake reading question number 1 is not precise in determining and writing words the key. In line with Parmjit Singha's opinion, Arba Abdul Rahmanb and Teoh Sian Hoon stated that reading error arises when students cannot read and understand

symbols, keywords, and so on so students will feel confused about working on the question.

b. Misunderstanding

Based on data analysis carried out by researchers, errors understand almost every subject does not do, but obeys Parmiit Singha, Arba Abdul Rahmanb, and Teoh Sian Hoon understanding error arises when students cannot, cannot understand information in the question. This is happened to the subject what research S6, S4, S11 and S12. Of all these subjects, they not quite right, can't or can't say, write down the information contained in question number 2, as a result, is satisfactory an indicator of understanding errors is that students are less precise in understanding write down and state the information known in the question. c. Transformation Error

Based on data analysis carried out by researchers, transformation errors almost all subjects made this error. As did subjects with codes S12, S11, S10, S6, S5, S4, and S2. Subjects with codes S12, and S2 made errors transformation because it is not appropriate to use the method to solve the problem. After all, S12 and S4 solved problem number 1 using logic. Meanwhile, the S11, S10, S5, S4, and S6 cannot or cannot write and mention examples and models math correctly. So the research subject the transformation meets error indicators because it is not precise write and mention enough to mathematical examples and models on the question.

d. Skill Error

Based on data analysis carried out by researchers, skills errors almost all subjects do it except subjects S1, S2, S7, S8, and S12 did not make any skill errors. Skill errors occur if students cannot continue stages of the settlement procedure used (on hold or stuck), students are less precise in completing calculations because less precise in using mathematical rules and concepts, students cannot or cannot write down and explain procedures or stages in completing the calculations used correctly and 11 subjects made a mistake skill.

e. Final Answer Writing Mistakes

Based on data analysis carried out by researchers, final answer writing mistakes in almost all subjects, except subjects S2, S7, and S8. S2 and S7 do not perform, fulfill indicator of an error in writing the final answer because S2 and S7 got it concluded the final answer correctly (correctly), even though S2 and S7 solve or work on problems using logic, but the concluded answer is correct. So the S2 and S7 don't meet the indicators of errors in writing the final answer. Meanwhile. S8 also wrote the final of the conclusion answer correctly, even though S8 didn't write it on the answer sheet but during the interview, S8 was able to state the conclusion of the answer end correctly.

D. Conclusion

the results Based on of discussions, findings, and research on students SMA Negeri 15 Medan at X Science 1 class in working on or solving problems the story in the based SPLTV material is on Newman's procedure and is reviewed from students' learning interests and gender are as follows:

- Male students who have a high interest in learning (S1 and S2 subjects) both of them made mistakes in writing the final answers and made mistakes in skills.
- b. Male students who have a moderate interest in learning (S3 and S4 subjects) both made mistakes in

writing the final answer and made mistakes in skills.

- c. Male students who have low interest in learning (subjects S5 and S6) both made mistakes in writing the final answer, mistakes skills as well as transformation errors.
- d. Female students who have a high interest in learning (S7 subjects and S8) both made mistakes in writing the final answer as well as skill errors
- e. Female students who have a moderate interest in learning (subjects S9 and S10) both made mistakes in writing the final answer as well as skill errors.
- f. Female students who have low interest in learning (S11 subjects and S12) both made mistakes in writing the final answer, mistakes in skills, transformation errors, and understanding errors.

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