

## AN ERROR ANALYSIS OF STUDENTS OF DIFFERENT GENDERS IN SOLVING STORY QUESTIONS BASED ON THE STAGES OF NEWMAN'S ANALYSIS

Evelin Esta Elia Manisse<sup>1\*</sup>, Sri Hariyani<sup>2</sup>, Vivi Suswanti<sup>3</sup>

<sup>1,2,3</sup>Mathematics Education Study Program, Faculty of Teacher Training and Education, University of PGRI Kanjuruhan Malang, Jl. S. Supriadi No.48, Bandungrejosari, Kec. Sukun, Kota Malang, Jawa Timur 65148

### ABSTRACT

The focus of this study is to analyze the errors of students of different genders in solving story problems based on Newman's analysis stage. This research is a descriptive study using qualitative methods. The results showed that: 1) The form of errors made by male students in the high group were errors in understanding, processing skills errors and writing the final answer. In the middle group are errors in understanding and writing the final answer. The form of errors from female students in the middle group are errors in transformation, processing skills and writing the final answer, 3) The forms of errors from male students in the low group are skill errors, transformation and writing conclusions. Finally, the forms of errors for female students in the lower group are misunderstanding, transformation errors, process skills and writing errors in answers. Forget to write down the final conclusion, and didn't get the final conclusion right. It is recommended that teachers provide more math practice questions, especially with story questions in the form of problem solving to understand students' problem solving abilities and understanding.

**Keywords:** Error Analysis, Gender Difference, Newman Stages.

### 1. Preliminary

Mathematics is one of the most important subjects because at every level of education there are mathematics subjects. Error analysis is an investigation error or deviation from the real or predetermined steps, systematic, consistent or contingent, to find errors or mistakes (Setiawan et al., 2018). Problem solving requires several skills such as problem solving, planning and interpreting information, examining alternative strategies and outcomes for problem solving (Rohmah et al., 2021).

According to Jeharut et al.(2019) Both female students and male students make mistakes, mistakes in completing story tests can be used as information to find out how well these students master the material. The mistakes made by female and male students can be investigated further

about student errors in solving problems. Student errors must be resolved immediately. Problem solving is done by analyzing student errors in solving story problems.

According to the observations of researchers at SMP An-Nur Bululawang - Malang, errors were found in the story questions that were considered difficult. It looks like students are working on different questions from the example questions given by the teacher, students fail to complete the practice questions given by the teacher correctly and appropriately. This can be seen in the learning process there are still many students who make mistakes in doing the test questions. The following is one of the results of students in solving algebra story problems, namely: a) students do not write down what is asked in the question; b) students do not draw conclusions from the results of their work.

To make it easier for students to solve story problems, a method is needed. In this study, the method used is the error analysis method Newman. Oktaviana, (2018) believes that students

---

<sup>\*)</sup> Corresponding Author.  
E-mail: [evelinesta92@gmail.com](mailto:evelinesta92@gmail.com)  
Phone: +6285804563511

have passed through various obstacles in the problem-solving stage when they try to answer questions in the form of descriptive questions or stories. According to Newman, students must work through five stages to *solve* math problems, here Newman's analysis is based on the stages of errors, including: (1) reading errors, (2) understanding the problem, (3) transformation, (4) process skills, (5) writing final answer.

Previous research related to analysis based on Gender was conducted by Rojabiyah & Setiawan, (2019) in error stage one, male students' interest in learning is more. Most of the female students, namely, 76.54% of male students and 67.50% of female students. The second stage of the male students' learning interest scale is 67.69%, and female students are 67.81%, stage three the male students' learning interest scale is lower than female students, which is 73.44%, while the male students -men by 69.71%. In stage four, the scale of male students who are more interested in learning than female students is 76.28% and 65.10%. At stage five, the male student's interest in learning scale is 76.28%, while the female student is 66.15% lower. MTs AI-Barry in grade VII, there is a difference in the average percentage of students' interest and learning attitudes based on gender, which is 73.30% for male students, 59.93% for female students. From this study, it can be seen that more male students answered correctly than female students. Meanwhile, another study was conducted by Amini & Nova Hasti Yunianta, (2018). From this study, students made 30% errors in transformation errors, 20% errors in understanding, 30% errors in writing answers, 17% errors in processing skills, and 3% errors in reading.

The difference in this study is that previous studies used Social Arithmetic material and additional Scaffolding methods, while this study used algebraic material. This study also analyzes the reasons why students of different sexes make mistakes in solving story test problems according to Newman.

## 2. Research Methods

The model and method used by the researcher is descriptive qualitative, because this research describes each other in detail and clearly, or can find patterns of relationships between certain aspects and other aspects. The research was conducted at SMP An-Nur Bululawang. The basis of the data for this study were students of

class VII KI 5 and VII KI 2, there were 30 students, 15 female students and 15 male students. The subjects of this research will be given story questions and 6 subjects will be selected from the test results, including 3 male students and 3 female students. 3. Procedures for preparing test instruments: (1) making test instructions; (2) arrange questions; (3) determine the appropriate assessment based on Newman's stage analysis; (4) consult with the supervisor for the test instrument; (5) test validation verification to the validator. The story test was conducted so that the researcher obtained data on the work of students who made mistakes in solving story questions based on Newman's error analysis. After the test, the story questions are compiled and then validated to find out their validity. test sheet story questions were assessed by 1 validator who was a lecturer in mathematics education at the University of PGRI Kanjuruhan of Malang. On the validation sheet given there were seven aspects that were assessed, from these seven aspects the validator gave a score of 4 on three aspects and a value of 3 on four aspects. The total assessment results given by the validator are 24. The results of the validation can be seen in the following table.

**Table 1.** Test Validation

No	Validator Code	Validation Score	Average	Category
1	VI	24	24	Very Good

From the validation assessment above, it shows that the validator gives a very good category value, this indicates the test can be used with a few revisions. The revision given by the validator mentions the name according to the name listed in the question and adds a unit of width to make it clear and not confusing. This interview was used to complement the results of previous data collection. Interviews were conducted to clarify student completion when solving story problems. In this case, researchers can collect documents according to the needs of researchers, such as photos during the research and data from schools.

The data analysis stage in this research is data reduction, data presentation and conclusion drawing. The data reduction stage in this study is to correct the test results and then group the test results based on the error rubric and then serve as a guide for interviews. The following is Newman's error analysis rubric.

**Table 2.** Error Analysis Rubric according to the Newman Stage Procedure

Type of Error	Error Indicator
<b>Kesalahan Membaca</b> ( <i>Reading Errors</i> )	a) Students misread the words, symbols and important terms in the questions b) Students have not been able to read information
<b>Kesalahan Memahami</b> ( <i>Transformasi Errors</i> )	a) Students do not understand what is known and what is being asked b) Students have not included information that is known and asked
<b>Kesalahan Transformasi</b> ( <i>Transformasi Errors</i> )	a) Students have not written the formula b) Students write the formula used but it is not accurate
<b>Kesalahan Keterampilan Proses</b> ( <i>Proces Skill Errors</i> )	a) The student is wrong in the process b) Students give answers according to the formula but the process and symbols are wrong
<b>Kesalahan Penulisan Jawaban Akhir</b> ( <i>Encoding Errors</i> )	a) Students have not written the set of answer completions b) Students write the set of solutions with the conclusion that the answers are incomplete

After that, interviews with the research subjects were then analyzed and the results of the interview tests were arranged so that a neat and good grammar was formed. After reducing the data, the next step to analyze the data is the presentation of the data. The data presented are the results of interviews and tests. The data are presented in the form of coding, tables and descriptions. In presenting the data for gender, coding is used, for male students using SL and female students using SP. The conclusion in this study is to draw conclusions from the errors of students of different genders in completing the test questions according to the stages of Newman's analysis. In this study, checking the validity of the

data used triangulation method. The technique in this triangulation is to compare student test results with interview data results.

### 3. Results and Discussion

The findings of this study were obtained from story questions done by seventh grade students of SMP An-Nur Bululawang. The researcher corrected the students' test results, then involved 6 students for research, consisting of 3 male students and 3 female students. The six research subjects were selected from three different ability levels, namely, two subjects at high ability levels, two subjects at moderate ability levels and two subjects at a low ability level. Research subjects were selected from different levels so that the researchers got complete information. The items are determined based on the student's test results, given a score, and then the researcher sorts the errors according to the students' scores from the lowest to the highest. The following tables of student analysis test results.

**Table 3.** Student Work Results in Working on the Male Gender Story Test

No	Inisial	Skor	Nilai	Kriteria Nilai	Kode Subjek
1	JM	25	33	Lower	SL <sub>1</sub>
2	MM	44	58	Middle	SL <sub>2</sub>
3	MFR	33	44	Middle	SL <sub>3</sub>
4	RSR	50	66	Middle	SL <sub>4</sub>
5	MRI	50	66	Middle	SL <sub>5</sub>
6	ARE	40	53	Middle	SL <sub>6</sub>
7	ZVPP	39	52	Middle	SL <sub>7</sub>
8	AHA	32	42	Middle	SL <sub>8</sub>
9	MFSF	50	66	Middle	SL <sub>9</sub>
10	SM	25	33	Lower	SL <sub>10</sub>
11	MMI	31	41	Middle	SL <sub>11</sub>
12	BNA	37	49	Middle	SL <sub>12</sub>
13	MW	43	57	Middle	SL <sub>13</sub>
14	FAN	46	61	Middle	SL <sub>14</sub>
15	MGG	58	77	Higher	SL <sub>15</sub>

**Table 4.** Student Work Results in Working on the Women's Gender Story Test

No	Inisial	Skor	Nilai	Kriteria Nilai	KodeSubjek
1	AF	45	60	Middle	SP <sub>1</sub>
2	NLF	38	50	Middle	SP <sub>2</sub>
3	MAP	32	42	Middle	SP <sub>3</sub>
4	VRC	33	44	Middle	SP <sub>4</sub>
5	AAP	55	73	Higher	SP <sub>5</sub>
6	NMP	20	26	Lower	SP <sub>6</sub>
7	NS	58	77	Higher	SP <sub>7</sub>
8	IPN	45	60	Middle	SP <sub>8</sub>
9	NRAA	50	66	Middle	SP <sub>9</sub>

10	MS	32	42	Middle	SP <sub>10</sub>
11	SWM	32	42	Middle	SP <sub>11</sub>
12	RY	47	62	Middle	SP <sub>12</sub>
13	NNP	45	60	Middle	SP <sub>13</sub>
14	IDAM	55	73	Higher	SP <sub>14</sub>
15	SLQ	55	73	Higher	SP <sub>15</sub>

Explanation:

 = Higher

 = Middle

 = Lower

Furthermore, the researchers grouped the scores into three different levels. The levels of students' written test results are arranged in Table 5.

**Table 5.** Grouping of Story Problem Test Results

Kelompok Hasil Tes	Jumlah Siswa		Kode Siswa	
	Laki-laki	Perempuan	Laki-laki	Perempuan
Kelompok Tinggi	1	4	SL15	SP14, SP15, SP7, SP5
Kelompok Sedang	12	10	SL9, SL12, SL8, SL11, SL4, SL7, SL6, SL5, SL14, SL13, SL3	SP8, SP4, SP10, SP3, SP2, SP9, SP11, SP1, SP12, SP13
Kelompok Rendah	2	1	SL10, SL1	SP6

Explanation:

SL : Male Student

SP : Female Student

- The results of the completion of high-ability students who make a lot of mistakes
  - SL15 male students who make more mistakes in question 2.

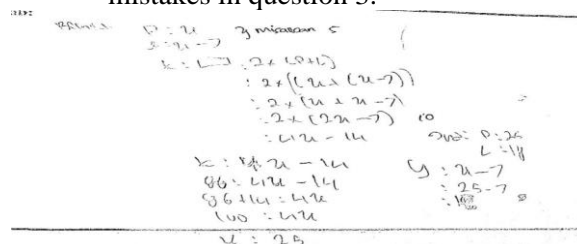
$$\begin{aligned}
 f &= 2x(P+l) && P: 2x-5 \\
 &= 2x \{ (2x-5)cm + (3x+1cm) \} \\
 &= 2x \{ 2x+3x+5+1 \} \\
 &= 2x \{ 5x+6 \} \\
 &= 2x \cdot 5x + 2x \cdot 6 \\
 &= 10x^2 + 12x
 \end{aligned}$$

*⇒ tidak menuliskan ditanya, dan transformasi (Pisalkan akhir)*

**Figure 1.** Results of Solving SL15 Problem 2

Based on the results of the story test results, the researcher analyzed that SL15 made mistakes at the stage of understanding the problem, processing skills and writing the final answer, namely not including the information asked and presented in the question, giving wrong answers, and not including the conclusion of the final answer.

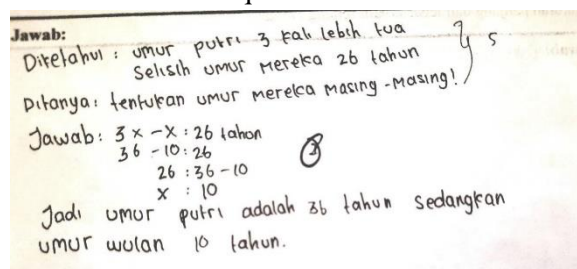
- Completion Results Medium-ability students who make a lot of mistakes
  - SL4 male students who make more mistakes in question 3.



**Figure 2.** Results of Completion of SL4 Question 3

From the results of the story test, the researcher analyzed that SL4 made mistakes at the stage of understanding and writing the final answer.

- The results of the completion of low-ability students who make a lot of mistakes
  - SP6 female students who make more mistakes in question 1.



**Figure 3.** Results of SP6 Problem solving. 1

From the test results, the researcher analyzed that SP6 made mistakes at the transformation stage, process skills, and writing the final answer. The types of errors based on the Newman procedure consist of 5 important error stages including reading errors, understanding, transformation, process skills, and writing errors in the final answer. The following is a discussion of the types of errors made by class VII students of SMP An-Nur Bululawang.

The first error stage in Newman's stage is reading error. From the analysis of the results in this study, it can be seen that male students with

subject codes SL15, SL4, SL10 and female students with subject codes SP7, SP9, SP6 which are classified as high, medium and low abilities at this stage do not make mistakes at all in question 1, 2, and 3 because they can explain the important points in the questions. In line with research conducted by Oktaviana, (2018) students who are able to reach the stage of reading well then at the stage of reading students have been reached.

The second error stage at the Newman stage is misunderstanding. From the analysis of the results in this study, it can be seen that high-skill male students with subject code SL15 and female students with subject code SP7 who are classified as highly capable, at this stage make the same mistakes in question 1 and 2. In questions 1 and 2 male students have not included what information is known and what is being asked. Meanwhile, female students have not written down what they know in question 1 and did not write down what was asked in question 2. So at the stage of misunderstanding the female students were more careful. At this stage, moderately capable male students with the subject code SL4 made mistakes on questions 1, 2 and 3. The error made by male students was that they had not written down what they knew and asked. Meanwhile, female students with moderate abilities with the subject code SP9 did not make mistakes. At this stage, low-ability male students with the subject code SL10 made mistakes in questions 1 and 2. The error made by male students was that they had not written down what was known and what was asked. A low-skill female student with the subject code SP6 made an error in question 3, which was not writing down what was asked. Based on the analysis, it was found that boys and girls made the same mistake by forgetting to write down what they knew and asked, but male students made more mistakes than girls. This is in line with the opinion of Jeharut et al., (2019), this shows that an indicator of error at the understanding stage is the student's failure to understand the information that is known and the information presented by the question.

The third error stage at the Newman stage is the transformation error. From the results of the analysis in this study, it can be seen that highly capable male students with subject code SL15 did not make mistakes in questions 1, 2 and 3. While high-skill female students with subject code SP7 did not write down the mathematical model or example in problem 3. At this stage, moderately capable male students with the subject

code SL4 did not make mistakes in questions 1, 2 and 3. Meanwhile, moderately capable female students with the subject code SP9 made mistakes and could not make an example. have not included the formula in 3. At this stage, low-ability male students with the subject code SL10 did not write down the formula on question 3. Meanwhile, the low-ability female students with the subject code SP6 made an error not including the formula, and could not make an example in 1, 2 and 3. Based on the analysis obtained at this stage, male students and women make transformation errors because students cannot write the operation of the example and have not been able to determine the formula and have not included the formula needed to solve the problem. Transformation errors are errors caused by students being wrong in determining the mathematical example operation used and incorrectly setting the formula (Darmawan et al., 2018). In the transformation stage, male students are superior to female students. This is in line with the opinion of Rahmawati et al., (2021) several studies say that boys are superior in mathematics than girls.

The fourth error stage at the Newman stage is process error. From the results of the analysis in this study, it can be seen that high-skilled male students with the subject code SL15 in question 2 made an error, namely right in the process of working but the final result was wrong. Meanwhile, high-ability female students with subject code SP7 did not make mistakes. At this stage, moderately capable male students with subject code SL4 did not make mistakes. Meanwhile, moderately capable female students with the subject code SP9 in question 3 made an error, namely not being able to perform the calculation process. At this stage, the low-ability male student with the subject code SL10 in question 3 made an error, namely not being able to do the calculation process correctly. While female students low ability with the subject code SP6 in questions 1 and 3 made an error, namely not being able to carry out the calculation process and not determining the correct result and not using the right steps. Based on the analysis, both men and women made mistakes because they could not do the calculation process correctly and were not careful. In line with Laila et al., (2019) said that the process skills stage is the stage where students also make mistakes in calculation operations, this happens when doing story tests because students are not careful and in a hurry.

The fifth error stage in Newman's stage is writing the final answer. From the results of this study, it can be seen that high-skilled male students with the subject code SL15 on questions 2 and 3 made mistakes, not writing the final answer. Meanwhile, female students with the subject code SP7 in questions 1, 2 and 3 are not at all wrong, because students can write the final answer completely and correctly according to the steps for solving the problem. At this stage, moderately capable male students with the subject code SL4 in questions 2 and 3 made an error, namely not writing down the final answer. Meanwhile, moderately capable female students with the subject code SP9 in question 3 made a mistake by not showing the final result of the question and not answering the final answer. At this stage, low-ability male students with the subject code SL10 on questions 2 and 3 made a mistake by not showing the final answer to the question and not concluding the final answer because they forgot. Meanwhile, female students with subject code SP6 in questions 1, 2 and 3 made an error, namely not showing the final answer to solve the problem, and not writing the conclusion of the final answer. Based on the analysis obtained at this stage, male and female students made the same mistake, namely forgetting to write down the final answer and not writing down the information contained in the question. Similar to the opinion of Lestari & Fianga, (2021) writing the final answer incorrectly, due to not getting the final results from the test correctly, students forget to write down and are less careful in writing the final answer.

#### **4. Conclusions**

From the results of research on the analysis of students' errors of different genders in SMP An-Nur Bululawang in solving story problems based on the stages of Newman's analysis, the conclusions of this study:

The forms of errors of high-ability male students are errors in understanding, writing the final answer and process skills. Students have been able to solve the problem correctly, but students forget to write what is asked and are known and forget to write the final answer. The form of the error of high-ability female students is the transformation error. Students are able to understand and interpret the meaning of each word in the problem, but students have not been able to write mathematical examples and models as desired by the problem.

The form of errors of moderate ability male students are errors in understanding and writing the final answer. Students have not included the information asked and are known to have not written the final answer but can read well. The forms of errors of moderate ability female students are transformation errors, process skills and writing the final answer. Students already understand the questions well and are able to include information that is known and asked, but students have not made examples, have not included formulas and are unable to complete the calculation process so that they have not written the final conclusion and have not shown the final answer to solving the problem.

The forms of errors of low-ability male students are transformation, understanding, writing the final answer and process skills. Students have not been able to include information that is known and asked, has not written the formula, has not been able to carry out the correct calculation process so that they cannot write the conclusion of the final answer. The form of the error of female students with low ability errors in processing skills, understanding, transforming and writing the final answer. Students have not included what information is being asked, have not written formulas, have not been able to make examples, cannot carry out the calculation process and cannot determine the results of calculations and do not use the right steps so that they do not write the conclusion of the final answer.

#### **5. References**

- Amini, S., & Nova Hasti Yuniarta, T. (2018). Analisis Kesalahan Newman Dalam Menyelesaikan Soal Cerita Aritmatika Sosial Dan Scaffolding-nya Bagi Kelas VII SMP. *Nabla Dewantara: Jurnal Pendidikan Matematika*, 3, 1–28.
- Darmawan, I., Kharismawati, A., Hendriana, H., & Purwasih, R. (2018). Analisis Kesalahan Siswa SMP Berdasarkan Newman dalam Menyelesaikan Soal Kemampuan Berpikir Kritis Matematis pada Materi Bangun Ruang Sisi Datar. *JURING (Journal for Research in Mathematics Learning)*, 1(1), 71. <https://doi.org/10.24014/juring.v1i1.4912>
- Jeharut, E. H. M., Hariyani, S., & Wulandari, T. C. (2019). Analisis Kesalahan Menyelesaikan Soal Cerita Berdasarkan Tahapan Newman Ditinjau dari Gender. *Prosiding Seminar Nasional FST*, 2, 575–

582.

- Laila, N., Khotimah, H., & Permatasari, B. I. (2019). Cerita Perbandingan Berdasarkan Prosedur Newman Pada Siswa Kelas Vii Smp Negeri 14 Balikpapan Tahun Ajaran 2018/2019. 13(1), 1–8.
- Lestari, E. P., & Fiangga, S. (2021). Analisis Kesalahan Siswa dalam Menyelesaikan Soal Cerita Pecahan Berdasarkan Jenis Kelamin Ditinjau dari Teori Newman. *Jurnal Tadrif Matematika*, 4(2), 187–200.
- Oktaviana, D. (2018). Analisis Tipe Kesalahan Berdasarkan Teori Newman Dalam Menyelesaikan Soal Cerita Pada Mata Kuliah Matematika Diskrit. *Edu Sains: Jurnal Pendidikan Sains & Matematika*, 5(2), 22.  
<https://doi.org/10.23971/eds.v5i2.719>
- Rahmawati, F., Adiningsih, N.A., Listiati, L., Sulistyani, S., Anjani, N. & Basuki, B.S. (2021). Analisis Kesalahan Siswa dalam Menyelesaikan Soal Kemaritiman dengan Prosedur Newman Ditinjau dari Gender. *Saintara : Jurnal Ilmiah Ilmu-Ilmu Maritim*, 5(2), 1–7.  
<https://doi.org/10.52488/saintara.v5i2.94>
- Rohmah, S. I., Widadah, S., & Agustina, E. N. S. (2021). Analisis Kesalahan Siswa Smk Dalam Menyelesaikan Soal Matematika Berdasarkan Analisis Kesalahan Newman. *JEDMA Jurnal Edukasi Matematika*, 1(2), 21–30.  
<https://doi.org/10.51836/jedma.v1i2.175>
- Rojabiyah, A. B., & Setiawan, W. (2019). Analisis Minat Belajar Siswa MTS Kelas VII Dalam Pembelajaran Matematik Materi Aljabar Berdasarkan Gender. *Journal On Education*, 01(02), 458–464.
- Setiawan, Y. B., Hapizah, H., & Hiltrimartin, C. (2018). Kesalahan siswa dalam menyelesaikan soal olimpiade SMP konten aljabar. *Jurnal Riset Pendidikan Matematika*, 5(2), 233–243.  
<https://doi.org/10.21831/jrpm.v5i2.18191>