Prima: Jurnal Pendidikan Matematika
Vol. 7, No. 2, July 2023, pp. 143-156
P-ISSN: 2579-9827, E-ISSN: 2580-2216
Web: http://jurnal.umt.ac.id/index.php/prima

ANALYSIS OF STUDENT'S CRITICAL THINKING ABILITY IN SOLVING SOCIAL ARITHMETIC PROBLEMS IN VIEW OF GENDER

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Abstract

This study aims to develop students' ability to use critical thinking to solve social arithmetic problems. This study adopted qualitative and descriptive methods. The subjects of this study included 3 male students and 3 female students from VII E of SMP Negeri 1 Masaran. The data collection techniques used in this study are tests, interviews and documents. Data validity is based on a triangulation process. Analytical techniques reduce data, display it, and draw conclusions. The results revealed differences in critical thinking skills when solving social computing tasks associated with gender differences. In terms of high critical thinking skills, both male and female students mastered all the indicators of critical thinking, namely interpretation, analysis, evaluation and reasoning. In terms of critical thinking ability, boys in the middle category can master three indicators, namely interpretation, evaluation and conclusion. Female students, on the other hand, can only understand explanatory, analytical and evaluative indicators. In the low category, critical thinking ability has only two indicators of critical thinking, interpretation and analysis.
Keywords: critical thinking, *gender*, social arithmetic

Abstrak

Tujuan dari penelitian ini adalah untuk mengembangkan kemampuan siswa dalam menggunakan berpikir kritis untuk memecahkan masalah aritmatika sosial. Penelitian ini menggunakan metode kualitatif dan deskriptif. Subjek penelitian ini adalah 3 siswa laki-laki dan 3 siswa perempuan kelas VII E SMP Negeri 1 Masaran. Teknik pengumpulan data yang digunakan dalam penelitian ini adalah tes, wawancara, dan dokumen. Keabsahan data didasarkan pada proses triangulasi. Teknik analisis mereduksi, menampilkan, dan menarik kesimpulan dari data. Hasilnya mengungkapkan perbedaan keterampilan berpikir kritis dalam menyelesaikan tugas komputasi sosial terkait gender. Untuk kemampuan berpikir kritis yang tinggi, baik siswa laki-laki maupun perempuan menguasai interpretasi, analisis, evaluasi, dan penalaran, semua indikator berpikir kritis. Dalam hal kemampuan berpikir kritis, anak laki-laki di kelompok tengah dapat menguasai tiga indikator, yaitu interpretasi, evaluasi, dan kesimpulan. Sedangkan siswa perempuan hanya dapat memahami indikator penjelas, analitis, dan evaluatif. Pada level rendah, indikator kemampuan berpikir kritis hanya ada dua, yaitu berpikir kritis, interpretasi, dan analisis.
Kata Kunci: aritmatika sosial, berpikir kritis, *gender*

INTRODUCTION

Mathematics is a science that plays an important role for humans (Uscianowski et al., 2020). Its important role is useful for the development of information and communication technology, as well as many other day-to-day knowledge bases. (Widakdo, 2017). Therefore, realizing the importance of mathematics for human life, therefore mathematics education is intended for all levels of education, from elementary to university level, with the aim that students can understand the use of mathematics, reason, solve problems, communicate mathematically, and have good actions. positively to appreciate the benefits of mathematics

Received: May, 2023; Revised: June, 2023; Accepted: July, 2023

for life (Widada et al., 2018). Mathematics learning that is often applied in everyday life is social arithmetic.

Social arithmetic is a science related to money and its uses (Yulianti et al., 2018). Mubaraka (2020) states that social arithmetic is knowledge to be used in community activities, for example in calculating buying and selling prices, profits, losses, gross, tare, net and discounts. This material should be mastered by students because they remember how important it is to be used in everyday life, for example measuring weight, profit, sales, purchases, savings and loans. Paramitha, N., & Yunianta (2017), stated that this knowledge studies economic sums or business aspects in daily activities. Megawati (2019) the following are things that are learned in social arithmetic: 1) Social calculations that are associated with daily activities. 2) Learn about the economy or business and buying and selling activities. 3) Learn about total prices, unit prices to partial prices. 4) Calculations used with the concept of algebraic operations are in the form of scores through the concept of arithmetic operations.

Mufidah (2017) said that social arithmetic is material that requires high accuracy in order to be fulfilled. Therefore, critical thinking skills are very high to describe problems, find problems and solve problems correctly. Ennis (1996), critical thinking skills are able to classify, organize, memorize, analyze, test, combine and re-examine all aspects of the problem. Hasibuan & Surya (2016) say that critical thinking ability is a science that is used to analyze opinions and cultivate a logical way of thinking. Critical thinking is a very important skill for students, especially for solving questions, because social arithmetic questions combine students' initial insights into the problem so that it requires a thorough thought process (Arend, 2009; Ennis, 1996; Scriven & Paul, 2019). Sutarman et al. (2014) said that students use different strategies to solve arithmetic problems by thinking critically. Cahyono (2017), gender differences can affect student strategies.

Basically, human creativity is different, including gender differences, namely men and women. Because of these differences, instructors understand and focus better because each orientation has its own attributes (Ayuni, 2018). With regard to gender differences, gender itself is the formation of the attitude of each student from their social environment (Rosania, 2018). According to Wood explained that men have more development of the left brain, enabling them to think logically, abstractly and analytically, while women have more development of the right brain, so they tend to be active in visual skills. (Hodiyanto, 2017).

Gender is social psychology, and it determines how to act in parallel to accept it in society. Gender differences can differentiate a person's thinking and determine problems. Male and female students have different problem solving skills (Davita & Pijiastuti, 2020).

With the background described above, the question arises how the critical thinking skills of seventh grade junior high school students when solving social arithmetic questions in terms of gender differences. So The purpose of this study is to describe students' problem-solving abilities social arithmetic problems with critical thinking in class VII junior high school when solving social arithmetic story problems in terms of gender differences.

METHODS

This study uses a qualitative method with a descriptive approach. This research is used to determine the level of students' critical thinking in solving gender problems. This study was conducted at Masaran 1 Public Middle School in March 2023. As a research position at Masaran 1 Public Middle School, he has never studied criticism of students' critical thinking skills.

This study took subjects from class VII E as many as 6 students from three female students and three male students who studied social calculation material. Through objective sampling technology, subjects were selected in this study. The purpose of the goal is a data collection technique that involves determining a sample that has been considered (Sugiyono, 2010). The criteria for selecting subjects are selected through the results of critical thinking tests based on predetermined criteria.

This study uses primary data (primary) and additional data (secondary). Main data is information obtained directly from the object of research, namely from the results of interviews and tests. In this section the types of secondary data are divided into words and deeds, sources of written information and photographs. Data from this study was carried out by taking pictures, interviews, and testing methods. This shooting stage was carried out by collecting data about the school, photos of students while doing tests, photos of students when conducting interviews. Then this interview stage is used to strengthen the results. Students' critical thinking skills are resolved through problem testing. Then the test stage is intended to measure students' critical thinking skills to solve social computing problems

gender differences. Test scores are calculated and then determined based on the level of critical thinking.

Table 1. Level of students' critical thinking

Critical Thinking Levels	
Low	<65
Currently	65 – 79
Tall	80 – 100

Source: KEMENDIKBUD, 2016

This study applies data analysis using the Miles and Huberman models, namely reducing data, displaying data, and drawing conclusions (Nurani et al., 2020). Data reduction is used to get important information and eliminate unused data. This allows researchers to summarize data and draw conclusions. Presentation of data is used to describe the results students' critical thinking skills in problem solving various forms. Drawing conclusions is the final stage of data analysis, in this section the researcher compares the data that has been obtained during the study. Conclusion is used to see whether the results of data reduction meet the problem to be solved. The method used is triangulation because it is consistent with the data collection technology carried out by researchers.

RESULTS AND DISCUSSION

Results

Researchers get research results after completing the test questions and asking the subject. The researcher corrected the subject's work by giving a score based on the evaluation title, to find students' critical thinking. According to the research results, as shown below.

Table 2. Recapitulation of Student Tests

Critical Thinking Ability Level	Male	Female	Total Students
Tall	2 (6.67%)	13 (43.33%)	15 (50%)
Currently	3 (10%)	1 (3.33%)	4 (13.33%)
Low	9 (30%)	2 (6.67%)	11 (36.67%)

According to the test results, 6 students were selected, It consists of 2 senior students, 2 middle grade students and 2 low grade students. Below is the subject to be interviewed by the researcher.

Table 3. Research Subjects

No	Student Identity	M/F	Critical Thinking Level	Subject Identity
1	ADP	M	Tall	ST1
2	JAMS	F	Tall	ST2
3	DAP	M	Currently	SS1
4	GPL	F	Currently	SS2
5	ANH	M	Low	SR1
6	JFP	F	Low	SR2

In this study, researchers analyzed the subject above addressing social computing issues related to gender differences. The following is the analysis result each category.

Male Student Analysis

1. Male Students with High Category

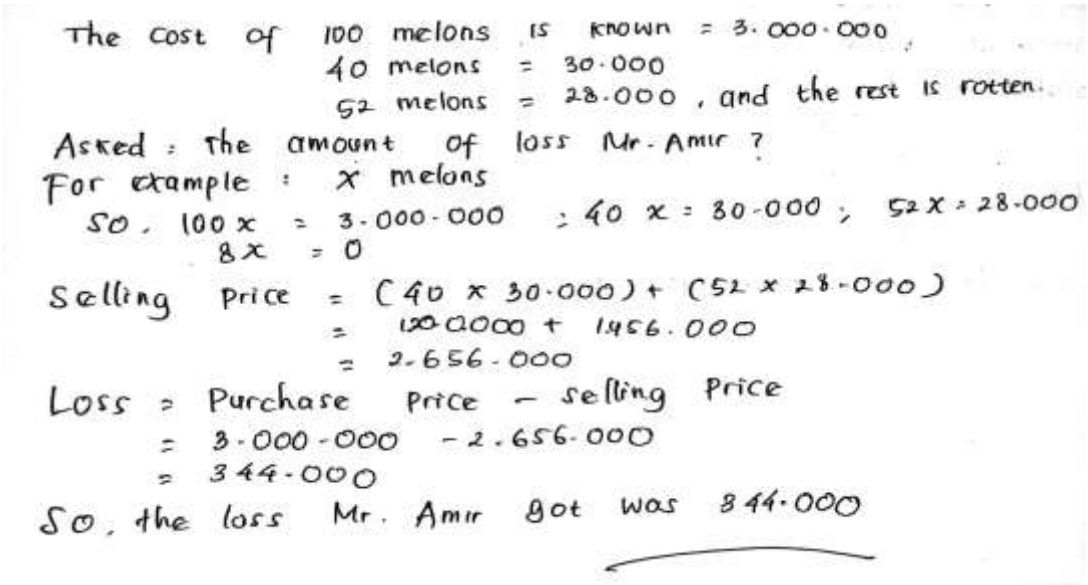

Figure 1. Answers to ST1

Based on ST1's analysis of critical thinking indicators, you can see in Figure 1. The figure above shows that ST1 can master the four Indicators of critical thinking, namely 1) interpretation, 2) analysis, 3) evaluation, 4) conclusion. Result of ST1's work analysis show that ST1 can write information from existing problems. ST1 can change the problem sentence by creating a mathematical model and writing the equation proposed by the variable "x" as an example. ST1 has the ability to use the correct process strategy to use mathematical operations. ST1 can master reasoning and reasoning skills, because ST1 draws conclusions. To strengthen the results above, The following are excerpts from the interview the researcher and ST1

Researcher : What is meant by question number 1?

SST1 : About looking for losses Mr. Amir

Researcher : How do you make a mathematical model of the problem?

SST1 : By assuming that the melon fruit is the variable x sis

Researcher : Explain what you used to solve question 1?

SST1 : First, look for the selling price, sis, only then can you calculate the loss

Researcher : How to determine the loss?

SST1 : Using the loss formula = purchase price – selling price

2. Male Students with Moderate Category

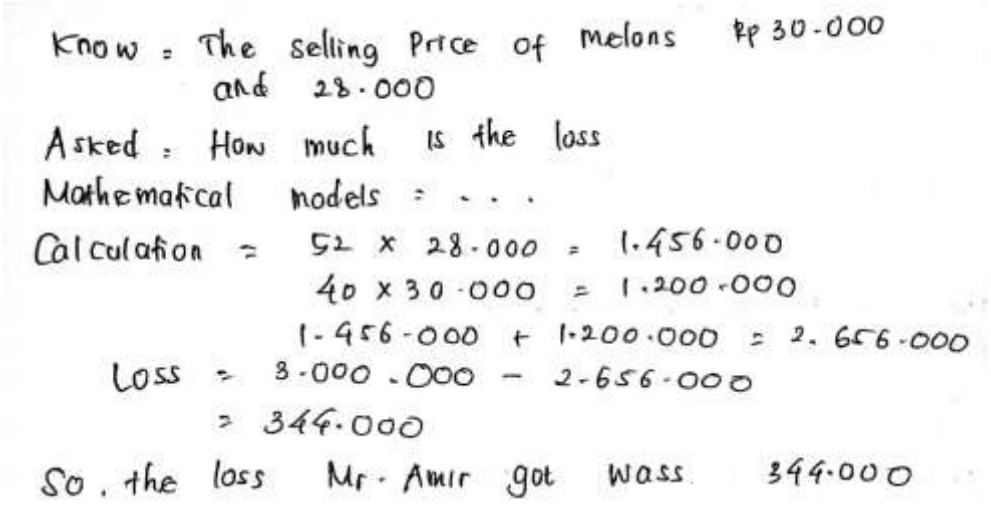

Figure 2. Answers to SS1

Based on SS1's analysis of critical thinking indicators, see Figure 2. The figure above shows that SS1 can only master indicators 1, 3, and 4, namely 1) Interpretation, 3) Evaluation, 4) Inference. The results of SS1's work analysis show that SS1 can write information from existing problems, but SS1 cannot convert the problem into a mathematical model. When interviewed, SS1 admitted that he was unable to make a mathematical model. SS1 has the ability to use mathematical operations using the right processing strategy. SS1 can master reasoning and reasoning abilities, because SS1 draws conclusions. To strengthen the results above, the following is an interview between the researcher and SS1.

Researcher : What is meant by question 1?

SS1 : That's looking for a loss

Researcher : Why don't you make a mathematical model?

SS1 : I don't know how to make a mathematical model, sis

Researcher : Then How did you solve the first problem?

SS1 : Yes, I did the math, sis, you already know what you're looking for, it's about the loss

Researcher : How to calculate the loss like what?

SS1 : Loss = Purchase price – Selling price

3. Male Students with Low Category

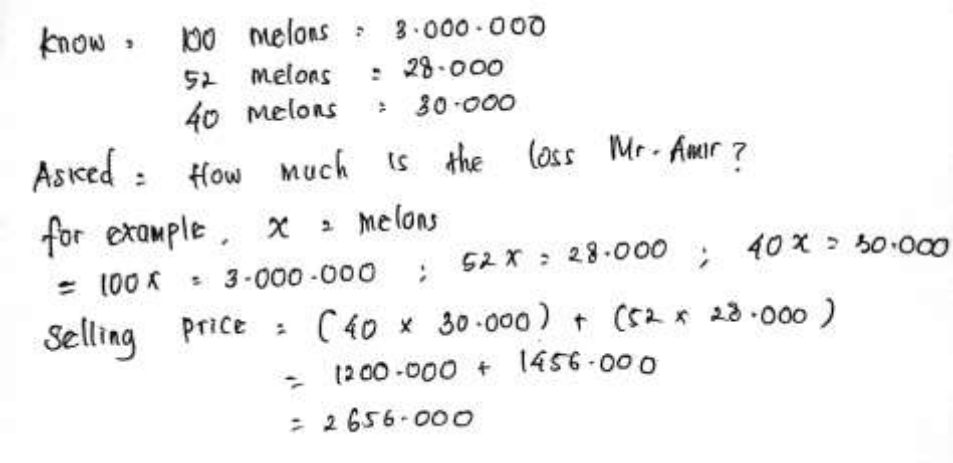

Figure 3. Answers to SR1

Based on SR1's answer about critical thinking, it can be seen in the picture above. The picture shows that SR1 is only able to master indicators 1 and 2, namely 1) Interpretation, and 2) Analysis. Analysis of SR1's answers shows that the information can be written from the existing problem. SR1 can turn the problem sentence into a mathematical model, and use the variable "x" as an example to write the equation below. However, in an interview, SR1 said that he could not continue to solve this problem because he forgot the next step. To strengthen the results above, the following is an interview between the researcher and SR1.

Researcher : What is meant by question number 1?

SR1 : Looking for losses

Researcher : How did you make the mathematical model?

SR1 : For example a melon with x

Researcher : Why didn't you finish calculating question number 1?

SR1 : Because you don't know sis

Analysis of Female Students

1. Female Students with High Category

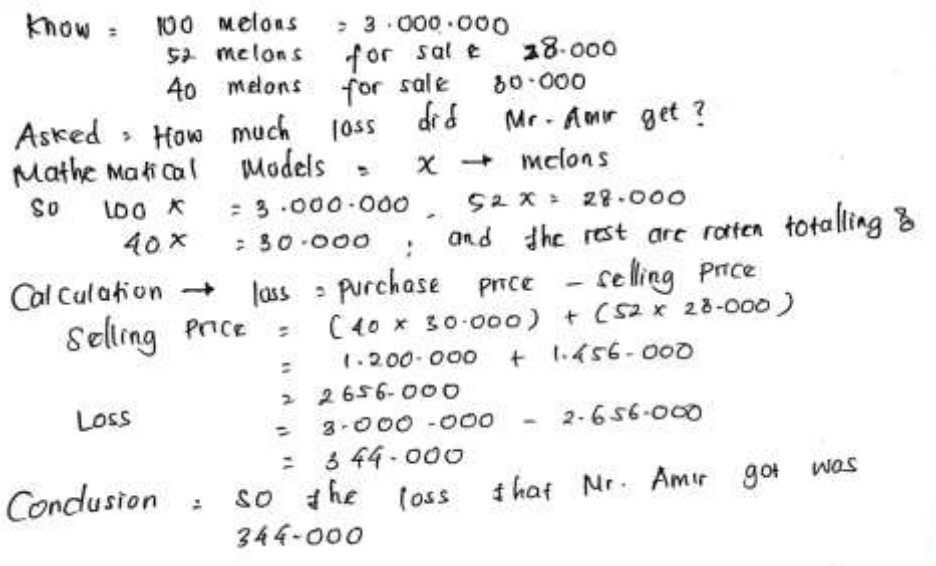

Figure 4. Answers to ST2

Based on ST2's work on critical thinking indicators can be seen in the picture above. The picture shows that ST2 can master the four indicators of critical thinking skills, namely 1) explanation, 2) analysis, 3) evaluation, 4) conclusion. The results of ST2's work analysis show that ST2 can write information from existing problems. ST2 can change the question sentence by making a mathematical model and writing equations using the variable "x" as an example. ST2 masters the ability to use mathematical operations using the right processing strategy. ST2 has ST2 can master reasoning and reasoning abilities, because ST2 draws conclusions. To strengthen the results above, following interviews between researchers and ST2.

Researcher : What is meant by question 1?

SST2 : Asked how much the loss is

Researcher : Then how do you make a mathematical model of what is known in the problem?

SST2 : I am using a linear program sis, where the variable x is a melon

Researcher : Describe the strategy you used to solve question 1?

SST2 : First find the selling price, sis, only then can you calculate the loss

Researcher : How to determine the loss?

SST2 : Using the loss formula = purchase price – selling price

2. Female Students in the Moderate Category

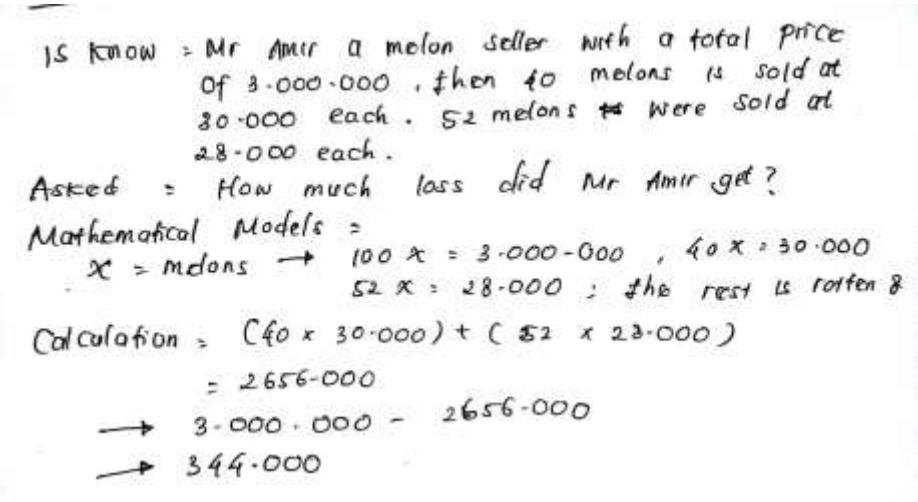

Figure 5. Answers to SS2

Based on SS2's answer about critical thinking, it can be seen in the picture above. The picture shows that SS2 can only master indicators 1, 2 and 3, namely 1) Interpretation, 2) Analysis, and 3) Evaluation. The results of the SS2 job analysis show that SS2 can write information from existing problems. SS2 can change the question sentence by making a mathematical model and writing equations using the variable "x" as an example. SS2 masters the ability to use mathematical operations using the right processing strategy. However, SS2 cannot understand reasoning abilities and reasons for not writing conclusions. To strengthen the results above, following interviews between researchers and SS2.

Researcher : What is meant by question number 1?

SS2 : find the amount of loss sis

Researcher : How do you make a mathematical model of problem number 1?

SS2 : By using linear programming

Researcher : How did you solve the first problem?

SS2 : Subtract the price of all melons from the selling price of melons, sis

3. Female Students with Low Category

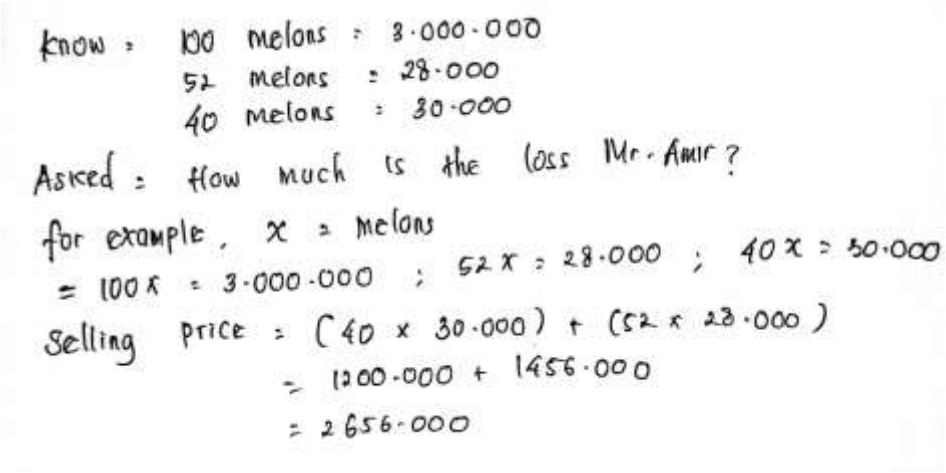

Figure 6. Answers to SR2

Based on SR2's answer about critical thinking, it can be seen in the picture above. The figure shows that SR2 can only master indicators 1 and 2, namely 1) Interpretation, and 2) Analysis. The results of the SR2 subject's work analysis show that the information can be written from existing problems. SR2 can turn the problem sentence into a mathematical model, and use the variable "x" as an example to write the equation below. However, in an interview, SR2 said he couldn't solve this problem because he forgot the next step. SR2 subject cannot master reasoning skills and reasons for not writing conclusions. During the interview, SR2 said that during the calculation process, it was due to time. To strengthen the results of the following interviews between the researcher and SR2.

Researcher : What is meant by question number 1?

SR2 : Looking for losses

Researcher : How do you make a mathematical model like what?

SR2 : For example a melon with x

Researcher : Why didn't you finish calculating question number 1?

SR2 : I forgot sis

Discussion

Based on the results of critical thinking tests and interviews, it was found that high-level male and female subjects were able to master all indicators of critical thinking. This agrees with the research of Saputri & Khotimah (2020) that students who think highly critically can master the ability to write information, application concepts, procedures, facts and arguments, can explain and evaluate results and explain their answers.

Male and female Middle class students fail to master all indicators critical thinking. Male subjects in the moderate category have not been able to change the question sentences by making mathematical models and writing equations. Meanwhile, female subjects in the moderate category could not master reasoning skills and did not write final conclusions. Based on Santoso & Setyaningsih (2020), subjects with moderate critical thinking. able to write down information correctly, understand the definitions of the variables used, carry out the stages of completing questions but are not complete, and cannot get results.

Male and female students with low categories can only master communication skills. Putri Apriliana, L., Handayani, I., & Ajiz Awalludin, S. (2019). said that if the critical thinking skills of students in Indonesia are relatively low, it must be improved through the teaching and learning process. This is in accordance with Murtiyasa & Perwita (2020) who concluded that students with low critical abilities have communication skills, but they are still unable to solve problems. According to Ociningrum et al. (2016) It was found that students with lower critical abilities were still unable to use problem-solving strategies.

From this study, it was found that gender differences greatly affect critical students who have the ability to solve social arithmetic problems. Ramdiah and Duran Corebima (2014) said that biological growth with gender differences resulted in very significant differences in critical thinking with student achievement. This study is in line with Khoiril Anwar and Sutama (2019) who said that the way of thinking critically between men and women is different when solving problems. It is said that men are better at arithmetic than writing. Female students on the other hand tended to write clearly and extensively, regardless of whether they asked questions or not. Mahmud, M., & Nur, S. (2018) said that female student more often Cognitive use, compensatory, and affective strategies, while boys use memory, metacognition and social strategies more frequently than female students.

CONCLUSION

Based on research on students' critical thinking skills to solve social arithmetic in gender differences. students in high level category can master the four Critical Thinking Skills Index all the questions given. Male students in the moderate category have not mastered four indicators of critical thinking. Male students in the medium category three indicators you can master critical thinking 1, 3, and 4. Meanwhile, intermediate girls can only master three

indicators of critical thinking, namely 1, 2, and 3. Men and women in the low category only two indicators of critical thinking can be mastered, namely indicators 1 and 2 only.

ACKNOWLEDGMENTS

On this happy occasion the author would like to thank several people. Acknowledgments to Ms. Rita Pramujiyanti Khotimah, M.Sc as my supervisor as well as the teachers and students at SMP N 1 Masaran who have assisted in the observation and interview activities.

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