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PROFILE OF CRITICAL THINKING SKILLS OF STUDENTS IN CLASS VII SMP ON FRACTION ADDITION MATERIAL IN TERMS OF GENDER

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ABSTRACT

This study aims to obtain an overview of the critical thinking skills of male and female students in class VII A SMPN 9 Palu on fraction addition material. This research aims to: 1) to obtain a description of the critical thinking ability of male students on the addition and subtraction of fractions 2) to obtain a description of the critical thinking ability of female students on the addition and subtraction of fractions. This type of research is descriptive using a qualitative approach. The subjects of this research were 2 students taken from 31 students of class VII A SMPN 9 Palu consisting of 1 male student with high mathematics ability and 1 female student with high mathematics ability. The results of this study showed that male and female subjects with high mathematics ability were able to fulfill the indicators of critical thinking ability by Facione (2015), namely: (1) can interpret the problem by identifying the information known and asked appropriately and able to interpret and understand the symbols contained in the problem, (2) connect between statements, questions and concepts by making mathematical modeling appropriately (3) determine and use the right strategy in the calculation process so as to find the right final solution, (4) able to draw conclusions from what is asked in the problem, and (5) have the awareness to re-examine the solution of the problem given by identifying errors in determining the strategy or in the calculation process and then being able to believe the answer.

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1. INTRODUCTION

Mathematics is a universal science that underlies the development of modern science, has an important role in various disciplines and is able to develop human thinking.

Developing a way of thinking through a strong mastery of mathematics from an early age allows a person to master and create technology in the future. Mathematics is indispensable in everyday life because there are various problems that can be solved by involving mathematics, such as solving financial problems in calculating sales results, in medicine to measure drug doses, making developments that require geometry concepts and many more. The many benefits obtained by learning mathematics cause mathematics is one of the various disciplines of education that is very important to learn and be equipped from an early age. Therefore, mathematics has been taught at all levels of education from elementary school to higher education.

One of the mathematical abilities that need to be developed is the ability to think at a high level which is often called Higher Order Thinking Skills (HOTS) because it can increase students' thinking power. (Hidayatullah, 2020)stated that HOTS is a thinking process that encourages students to find new information and ideas in a certain way and can provide new implications which include critical thinking, creativity, and problem solving skills. Higher order thinking skills are needed by students to solve problems or problems given in a learning material so that students are not only fixated on the final result, but can also mention every process in solving the problem and can determine the conclusion of the problem. In this case, the high-level thinking skills (HOTS) needed are critical thinking. This is in line with the opinion of (Sulistiani & Masrukan, 2016) who argue that critical thinking is very important for students to master so that students are more skilled in compiling an argument, checking the credibility of sources, and making decisions.

Critical thinking is an important ability possessed by students, so critical thinking should be one of the activities that must be developed and taught in every subject, because the ability to think critically is not innate from birth and does not develop naturally, the ability to think critically is an intellectual potential that can be developed through the learning process (Hidayanti et al., 2020). Especially in learning mathematics, the ability to think critically is needed by students, because the object of study of mathematics is abstract, making students have difficulty in understanding material or solving problems related to mathematics.

Literally every student has different abilities so that students' thinking ability in learning mathematics can also be different. This is because there are many factors that can affect students' thinking abilities, one of which is gender as expressed by (Liunokas et al., 2024) that the abilities of men and women are different due to differences in the brains of boys and girls which are known through observations that boys are superior in abstract reasoning mathematical and mechanical thinking while women are superior in language, memorization, accuracy, precision, accuracy and accuracy of thinking. (Leach, 2011) in his research also shows that gender significantly affects the average critical thinking skills of students. Based on this opinion, it can be seen that male and female students have many differences in their thinking processes so that gender differences can affect students' critical thinking skills.

One of the mathematics learning materials that has the potential as a means to develop critical thinking skills is fraction material, fraction material is material related to. everyday life. The fraction material used in this study is fraction calculation operations with the type of description questions in the form of story problems, because story problems are open middle and require students to not only remember and mention but students must analyze mathematical problems by identifying material, and are required to draw conclusions correctly, therefore fraction material in the form of story problems can be used by teachers as a study in order to choose the appropriate method in learning so that it

is expected to improve the critical thinking skills of seventh grade students of SMPN 9 Palu. This research is important to find out the description of critical thinking skills of male and female students in solving fraction addition story problems.

In accordance with previous research conducted by (Setyawati et al., 2020) which focused on revealing the critical thinking profile of students in terms of gender with the novelty of this research lies in the research subject, where the research subjects conducted by previous researchers were students while the research subjects conducted by researchers were seventh grade junior high school students. Research conducted by (La Saudi et al., 2018) which examines the critical thinking skills of students in solving mathematical problems based on cognitive style, while researchers conduct research with a focus on the critical thinking skills of seventh grade students on the material of addition and subtraction of fractions.

2. METHODS

This research uses a descriptive method with a qualitative approach. The type of data in this research is qualitative data. This research was conducted at SMPN 9 Palu which is located at Jl. Zebra, South Palu, Palu City, Central Sulawesi Province. The time of this research was carried out in the academic year 2022/2023 even semester. The research subjects used were students of class VII A SMPN 9 Palu consisting of 31 students and 2 students were selected who represented gender, namely male and female with high mathematics ability seen from the results of daily mathematics test scores. This research instrument used written assignments and in-depth interviews with research subjects. The data collection technique in this study is the assignment in the form of written assignments consisting of story problems in the form of descriptions that contain critical thinking indicators. Interviews were conducted with 2 students who became research subjects with questions asked about the profile of students' critical thinking skills on addition and subtraction of fractions. Furthermore, documentation in the form of image reports, sound recordings and videos of research activities. The data credibility test used in this research is membercheck by asking the two research subjects to carefully review the results of the interview transcripts that have been conducted. The data analysis technique used in this study refers to Milles and Huberman in (Sugiyono, 2014) namely: 1) data condensation, 2) data presentation and, 3) conclusion drawing..

This study uses the stages of critical thinking developed from the core components of critical thinking aspects proposed by (Facione, 2016), namely: interpretation, analysis, evaluation, inference, and self-regulation. The indicators can be seen in the following table:

Table 1: Indicators of Critical Thinking Ability According to Facione:

No.	Aspects of Critical Thinking	Indicator
1.	Interpretation	Students are able to understand and express the meaning or meaning of the problem shown in the problem
2.	Analysis	Identify problems, infer relationships between statements, questions and concepts in the problem shown by making mathematical modeling appropriately.

3.	Evaluation	Using the right strategy in performing calculations.
4.	Inference	Students are able to draw conclusions from the problems given appropriately.
5.	Self-Regulation	Students have the awareness to re-examine the solution of the problem given and are able to believe the answer.

Source : Facione (2015)

3. RESULTS AND DISCUSSION

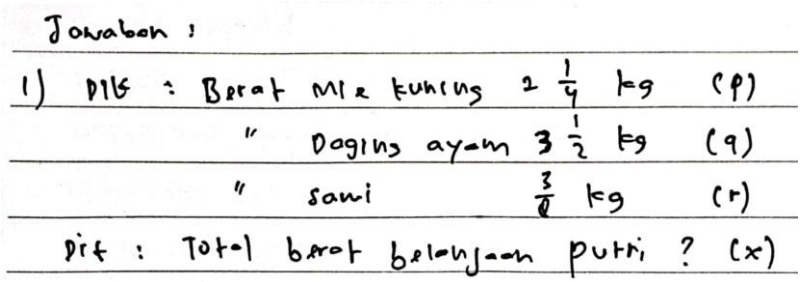
3.1. RESULTS

Based on the results of students' daily test scores, 2 research subjects with high mathematics ability were obtained as follows:

Table 2. Research Subjects

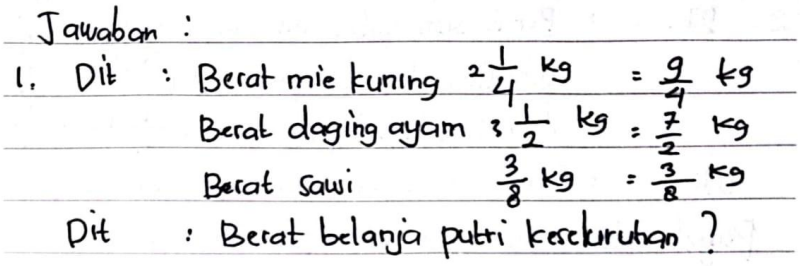
No	Subject Code	Gender	Daily Test Score
1	ND	Male	86
2	EF	Female	85

Phase 1 Interpretation



Picture 1. ND's answers at the interpretation stage

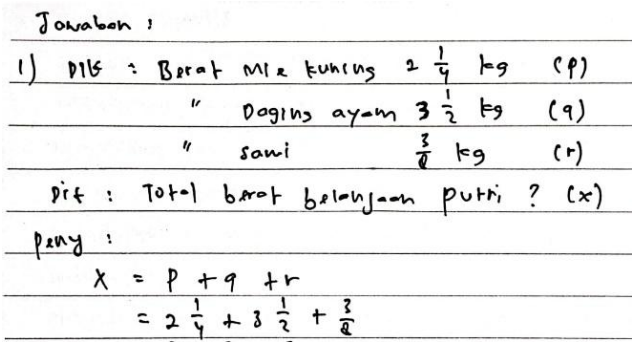
Jawaban tertulis siswa berjenis kelamin laki-laki (ND) dapat dilihat bahwa ND mampu memahami soal yang diberikan dengan menuliskan informasi yang diketahui dan ditanyakan. ND juga mampu memaknai simbol yang ada pada soal ketika diwawancarai.



Picture 2. EF's answer at the interpretation stage

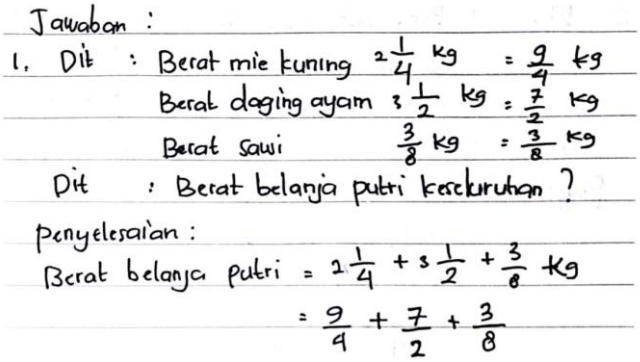
The written answers of female students (EF) can be seen that EF is able to understand the problem presented in the problem by writing down the known and questionable information. ND was also able to interpret the symbols in the problem when interviewed..

Phase II Analysis



Picture 3. ND's answers at the analysis stage

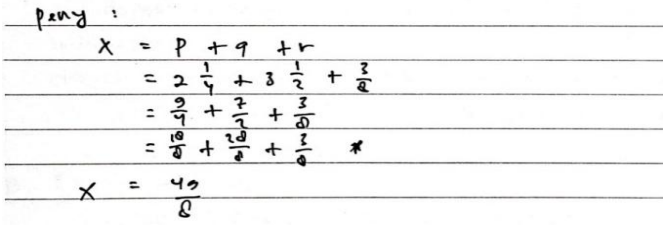
The written answer of the male subject (ND) can be seen that ND is able to connect the statements and questions in the problem well, so ND is able to make mathematical modeling appropriately. ND first generalized the weight of yellow noodles as (p), the weight of chicken meat as (q), the weight of mustard greens as (r) and the total weight of Putri's groceries as (x). Then ND summed up p,q,r and entered the value of each known and questioned variable.



Picture 4. EF's answer at the analysis stage

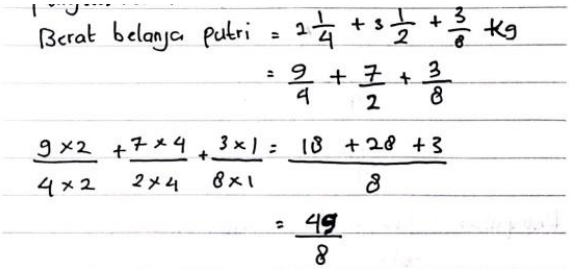
The written answer of the female subject (EF) can be seen that the subject EF can analyze the problem, namely by writing the solution strategy correctly. EF wrote the first solution step, namely adding up the weight of Putri's groceries by converting mixed fractions into ordinary fractions before the fractions were added up.

Phase III Evaluation



Picture 5. ND's answers at the evaluation stage

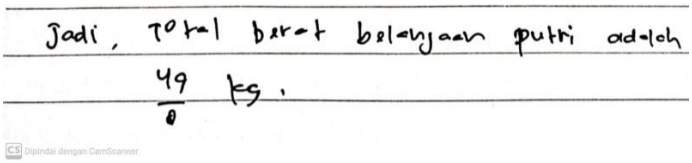
The answer of the male subject (ND) can be seen that ND can perform calculations using the right strategy, so that in the calculation process ND is able to find the right answer for the final solution needed in solving the problem.



Picture 6. EF's answer at the evaluation stage

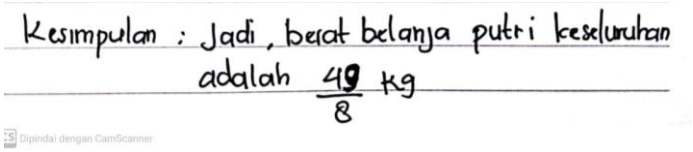
The answer of the female subject (EF) can be seen that the subject EF is able to perform calculations using the strategy that has been used before correctly. Subject EF was able to equalize the denominator of the fractions and then add them up which then resulted in the right final solution.

Phase IV Inference



Picture 7. ND's answer at the inference stage

The answer of the male subject (ND) can be seen that ND wrote the conclusion correctly, in accordance with what was asked in the problem. This proves that ND is able to draw conclusions from the problems given.



Picture 8. EF's answer at the inference stage

The answer of the female subject (EF) can be seen that the EF subject is able to draw conclusions from the problems given in the problem correctly, by writing down the results of the overall weight of Putri's shopping.

Phase V Self Regulation

Based on the results of interviews on male subjects (ND) it can be seen that ND is able to regulate himself well, by re-examining the results of his work and being able to believe that the solution steps are correct.

Based on the results of interviews with female subjects (EF), it can be seen that EF is able to do self-regulation well, by checking the results of his work carefully and believing that the results of his work are correct.

3.2. DISCUSSION

The subject is male, based on the research results obtained that (1) at the interpretation stage, the subject is able to understand the problem well so that the subject can identify the known and questionable information in the written task given, and is able to interpret and understand the symbols contained in the problem, (2) at the analysis stage, the subject performs mathematical modeling appropriately. The subject is able to connect what is asked with what is known in the problem and can use the right solution strategy and is able to explain it in detail and clearly in the interview results, (3) at the evaluation stage, the subject uses the right solution strategy, the subject is able to convert mixed fractions to ordinary fractions, then equalize the denominator by finding the KPK of each fraction to be operated so that the subject is able to get the final result that matches the question on the given task, (4) at the inference stage, the subject is able to draw conclusions from the problems given appropriately. The subject wrote the conclusion of what was asked at the end of his answer, and (5) at the self-regulation stage, the subject was able to do self-regulation well, namely being able to believe that the results of the written assignment he had done were correct on the grounds that the subject had studied this material before and was able to check his answers carefully before collecting them.

The subject is female, based on the research results obtained that (1) at the interpretation stage, the subject is able to understand the problem well so that the subject can identify the information known and asked in the written task given, and is able to interpret the symbols contained in the problem, (2) at the analysis stage, the subject can connect what is asked and known in the task and is able to determine the steps to solve the problem correctly, (3) at the evaluation stage, the subject can perform calculations correctly, namely equalizing the denominator of each fraction and then operating, so that the subject gets the right final solution, (4) at the inference stage, the subject is able to make conclusions at the end of the answer appropriately in accordance with what is asked in the written task, and (5) at the self-regulation stage, the subject is able to believe and double-check his answers before collecting them.

Based on the results of the research that has been presented, it can be seen that there is no significant difference between the critical thinking skills possessed by men and women, both of whom fulfill the 5 indicators of critical thinking skills well. This is in line with research by (Hayudiyani et al., n.d.) who said that highability male and female students have abilities that are in accordance with the indicators of critical thinking ability. This is also in line with research conducted by (Sutarji, 2018) who said that high-ability male and female students fulfill the five indicators of critical thinking ability so that there is no significant difference between the ability of male and female students in solving problems. Both subjects were able to solve the problems given in the problem well. This is in line with research (Mursidik, E.M & Hendra, E, 2014) in his research concluded that in general students who have high mathematical ability are in good criteria in determining ways to solve math problems.

4. CONCLUSIONS

Based on the results of the research and discussion, it can be concluded that the profile of critical thinking skills of seventh grade students of SMPN 9 Palu on the material of addition and subtraction of fractions in male subjects, is able to understand the problem well so that they can identify the information known and asked in the given task, are able to do mathematical modeling appropriately, are able to use the right solution strategy, are able to draw conclusions from the problems given appropriately, and are able to do selfregulation well so that ND subjects meet all indicators of critical thinking skills. Similarly, in the profile of critical thinking ability of seventh grade students of SMPN 9

Palu on the material of addition and subtraction of fractions in female subjects, male subjects with high mathematics ability and female subjects, both of them are equally able to fulfill the five indicators of critical thinking ability, namely, interpretation, analysis, evaluation, inference, and self-regulation.

SUGGESTIONS

Based on the results of the research and discussion that has been presented, the researcher suggests the following:

1. Teachers must often provide high-level problem exercises in order to train students' ability to think critically, so that students can develop and not be fixated on just one problem solving.
2. Teachers should use the right methods in the classroom to improve their students' mathematical critical thinking skills.
3. Teachers must give students the freedom to learn independently such as discussions, questions and answers, experiments, etc. so that their critical thinking skills can be honed and can familiarize students to solve problems independently. However, it is also necessary for teachers to continue to supervise and facilitate student learning activities in the classroom.
4. For further research, it should be able to utilize the results of this study with the aim of being used in the learning process, using learning models that emphasize students' critical thinking skills.

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