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IDENTIFICATION OF STUDENT ABILITY IN SOLVING MODEL OF NATIONAL ASSESSMENT IN KEFAMENANU EAST OF NUSA TENGGARA

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***Abstract*:**
The purpose of the study was to determine the ability of students in solving the national assessment problem model. The study belonged to qualitative approach. The research was conducted at SMPK Putra St. Xavier Kefamenanu. The data conducted from test results of national assessment collection problems and selected-participants interviews. The collected data then identified based on the following stages: data reduction, data presentation, conclusion and verification. The results of data analysis showed that the level of students' ability in completing the national assessment model problems in the percentage is the low-level ability category of 30%, at the medium level by 60% and the high level by 10%. The findings of this study: students with high math ability master all components of MCA in terms of content, cognitive processes, and context; students with moderate math abilities are able to master reading literacy content but are weak in numeracy literacy; students with low math abilities are very weak in content, cognitive processes, and context. In terms of cognitive processes, students with moderate mathematical ability can find and interpret text content but fail to integrate and evaluate text content into mathematical concepts and procedures and the context of the questions that can be worked on are personal and scientific. In cognitive process, students with low mathematical abilities can find information but are unable to interpret it to evaluate the content of the text into a mathematical concept and procedure.

Keywords: National assessment, minimum competency assessment, numeracy ability, mathematics

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INTRODUCTION

Mathematics is a place to train and explore students' thinking skills. Hendra (2018) and Fauzi & Arisetyawan (2020) explain that mathematics is one of the basic sciences that has an important role in the world of education, because mathematics lessons are a means that can be used to shape students to think scientifically. Thinking skills that are trained and explored in this forum are problem solving skills, critical thinking skills, and creativity. This ability is

important because it relates to a person's logical flow of thinking in solving problems in daily life (Panggabean & Tamba, 2020).

To realize the importance of thinking ability, it is necessary to have a proper evaluation in measuring it. Which was then answered by the Minister of education in Indonesia by making the transition from the National Examination to the National Assessment which consisted of three parts, namely: Minimum Competency Assessment (MCA), Character Survey, Environmental Survey (Herman et al., 2022). Minimum Competency Assessment is used to measure cognitive learning outcomes including reading literacy and numeracy literacy (mathematics). Numerical content at level 4 in the MCA consists of: numbers, geometry of measurement data, algebra, data and uncertainty (Cahyana, 2020). The implementation of MCA will be carried out by students who are in the middle of the school level, such as class V SD/MI, class VIII SMP/MTS and class XI SMA/SMK/MA. Thus, encouraging teachers and principals to improve the quality of learning. The policy is expected to provide opportunities for education actors to improve learning in the following year (Rokhim et al., 2021). The results of this exam are not used as a selection of students to the next level.

The national assessment aims to change the paradigm of education evaluation in Indonesia as an effort to evaluate and map the education system in the form of inputs, processes, and results instead of evaluating the achievements of students that were previously used in the national exam. To take part in the national assessment, each education unit must prepare learning that is able to improve students' critical thinking skills, reading literacy skills and numeracy skills (Tohir et al., 2021).

There is strategy that can be done is to package learning activities into various kinds of fun learning activities. Collaborating between subjects so that there is a link between each basic competency in each subject (Cahyanovianty & Wahidin, 2021; Indah et al., 2016). This can be done by providing an interesting, contextual, contemporary stimulus and meaningful. Thus, students can relate various concepts in their minds to solve the problems they face. Students do not just study theories in books, but can apply them and help them solve problems in everyday life. So that students understand that the purpose of learning at school is for life skills and helping them solve problems in their environment (Anggraini, 2021).

This transitional condition certainly requires regular habituation. Students are not used to solving MCA problem models. Even teachers are not used to developing this problem model and some are not used to solving it. For this reason, it is necessary to identify students' abilities in completing this model question so that it becomes an evaluation material for teachers in providing appropriate learning and appropriate instruments for students in achieving the specified outcomes. This is also an evaluation material for students in improving the performance of their thinking skills and minimizing mistakes made in solving the MCA question model.

The components in MCA that support students' literacy and numeracy abilities are content, cognitive processes, and context. The content is in the form of an assessment of reading literacy by presenting several informational texts as well as fiction and numeracy assessments testing numbers, geometry and

measurement, data and uncertainty, and algebra. Cognitive processes are related to reading literacy competence based on cognitive processes and finding information, interpreting, and integrating text content as well as evaluating and reflecting on the content of the text with other contexts outside the text. While the cognitive process in numeracy assessment involves the process of understanding concepts, the ability to apply concepts to routine problems and reasoning to solve non-routine problems. In the context component, assessment of reading and numeracy literacy is based on personal, social and cultural, and scientific contexts.

This study examined the ability to determine students' abilities based on students' cognitive abilities and characteristics of MCA, namely literacy and numeracy abilities (Winata et al., 2021) who study the components in MCA, namely content, cognitive processes, and context.

RESEARCH METHODOLOGY

The research belonged to qualitative research. The subjects in this study were students of class VIII SMPK Putra St. Xavier, Kefamenanu, East Nusa Tenggara, Indonesia. Then 6 respondents were selected as data representatives for interviews. The instruments used in this study were the minimum competency assessment test (MCA) and interview guidelines. The stages of data analysis carried out in this study were data reduction, data presentation, conclusion drawing and verification. The form of the questions refers to the national assessment questions, multiple choice (MC), description, and complex multiple choice (CMC).

The research procedure is by conducting a test in the form of MCA, identifying the cognitive level of students based on the table of subject value categories, identifying them into literacy and numeracy indicators based on the category of subject scores, and mapping the results of the identification on topics and MCA content that can be completed. The stages of data analysis in this study are preparing and reading the entire data, coding the data, connecting the results of data coding, interpreting the results of data coding (Creswell, 2013).

Table 1. Student's Score Category

No.	Ability Category	Interval Score
1.	High	76 – 100
2.	Moderate	51 – 75
3.	Low	0 – 50

Table 2. The Blueprint of National Assessment Model

Domain	Subdomain	Competency	Form	No of problem
Geometry dan Measurement	Plane and Geometry	To comprehend the properties of plane and the relationship between plane and to able to use the Pythagorean Theorem.	MC	1
Algebra	Equality and Inequality	To solve one-variable linear inequalities or systems of two-variable linear equations	Essay	2
	Number Pattern, Relation, and Function	To determine n-series in simple ration	MC	3
	Ration	To solve social arithmetic problems related to ratios/percentages.	Essay	4
Data and Uncertainty	Data and Representation	To determine and to apply mean, median, and mode.	CMC	5

RESULT AND DISCUSSION

RESULT OF RESEARCH

Identification of Mathematical Students' Ability

The test given are in the form of 2 multiple choice questions, 1 complex multiple choice question and 2 description questions with a total of 5 questions.

Table 3. The results of the student's ability to complete the national assessment

No.	Ability Category	Number of Student
1.	High	2
2.	Moderate	12
3.	Low	6

The results of the work on the model of the national assessment questions given, show that the subjects belonging to the low-level ability category are 30%, at the medium level by 60% and the high level by 10%. Respondents had difficulty in solving the problems due to lack of understanding of the problems contained in the questions and unable to answer optimally.

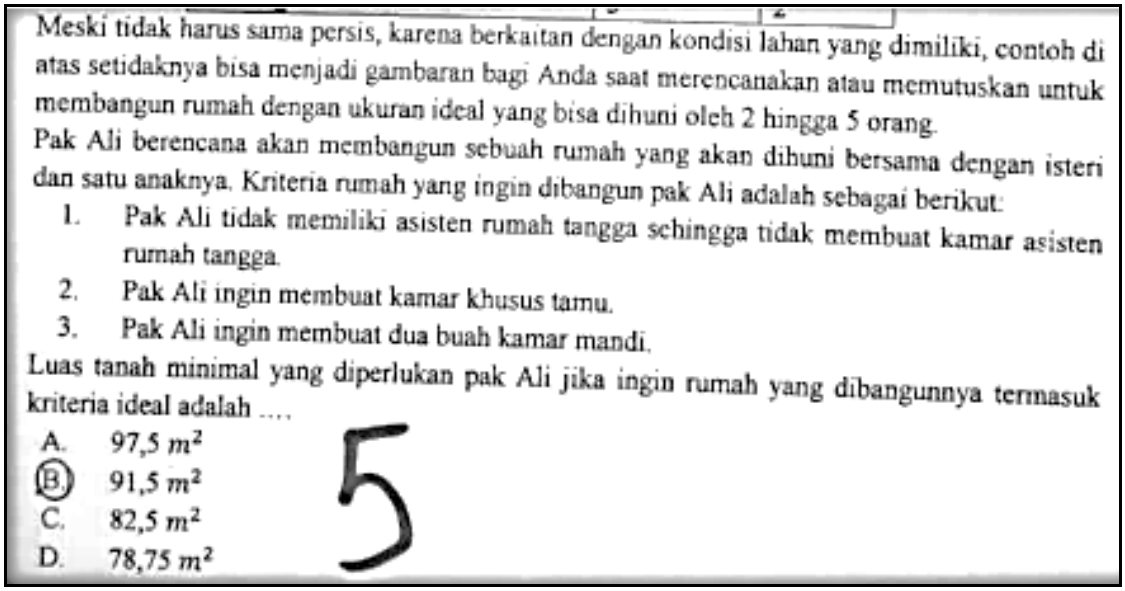
Furthermore, two respondents were selected from each category of subject values that represent the cognitive level of students; high, medium, and low. The selection of respondents was carried out based on the results of data reduction and data coding and also considering the recommendations of subject teachers who

have good communication skills so that interview data can be obtained broadly and deeply.

Identification of MCA Component – Cognitive Level Based

a. Students with High Mathematics Ability

Students with this cognitive level have good content mastery. This can be seen from the students' ability to answer problems in the form of text and numeration. In question number 1, it relates to the selection of the size of a building (house) given several criteria in the form of a description. Then students are invited to determine the minimum land area according to the criteria requested. Based on the results of the interviews, students were able to interpret the meaning of the problems presented and students had good reading literacy as indicated by the answers given meeting the criteria presented in the problem. Students are also able to use the concept of flat shapes (geometry) in solving this problem. The context used in this question number is a personal context.


Meski tidak harus sama persis, karena berkaitan dengan kondisi lahan yang dimiliki, contoh di atas setidaknya bisa menjadi gambaran bagi Anda saat merencanakan atau memutuskan untuk membangun rumah dengan ukuran ideal yang bisa dihuni oleh 2 hingga 5 orang.

Pak Ali berencana akan membangun sebuah rumah yang akan dihuni bersama dengan isteri dan satu anaknya. Kriteria rumah yang ingin dibangun pak Ali adalah sebagai berikut:

1. Pak Ali tidak memiliki asisten rumah tangga sehingga tidak membuat kamar asisten rumah tangga.
2. Pak Ali ingin membuat kamar khusus tamu.
3. Pak Ali ingin membuat dua buah kamar mandi.

Luas tanah minimal yang diperlukan pak Ali jika ingin rumah yang dibangunnya termasuk kriteria ideal adalah ....

A. $97{,}5\ m^2$
B. $91{,}5\ m^2$
C. $82{,}5\ m^2$
D. $78{,}75\ m^2$

5

Figure 1. The representation of the solution of problem number 1 from high level of cognitive students

In problem number 2, students were able to identify information from the questions regarding the minimum time and minimum distance from the provided transportation modes. Based on the interviews, students were able to explain the selected mode of transportation based on the information on the questions well. Thus, students were able to comprehend the problem text well.

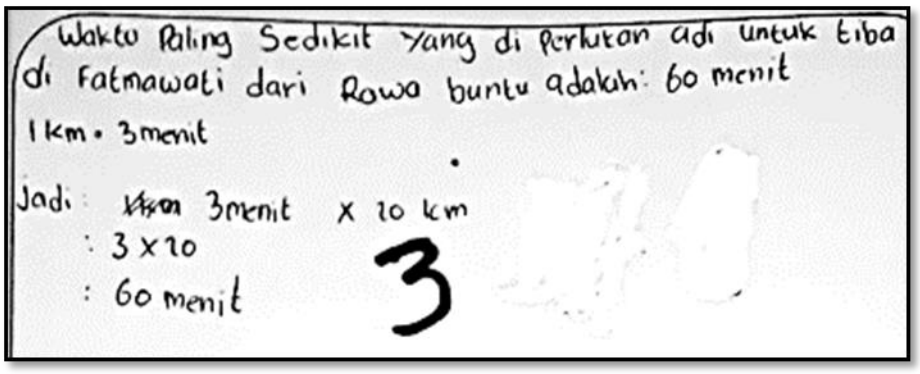


Figure 2. The representation of the solution of problem number 2 from high level of cognitive students

In problem number 3, students could find the pattern of a number. Without the student realizing it he was able to make a formula from the pattern of arithmetic numbers. Based on the interview, he made the order of birds from 1, 3, and so on to 10 rows of birds with a difference of two birds in each row. To count the total number of birds, he added the total number of birds in each row.

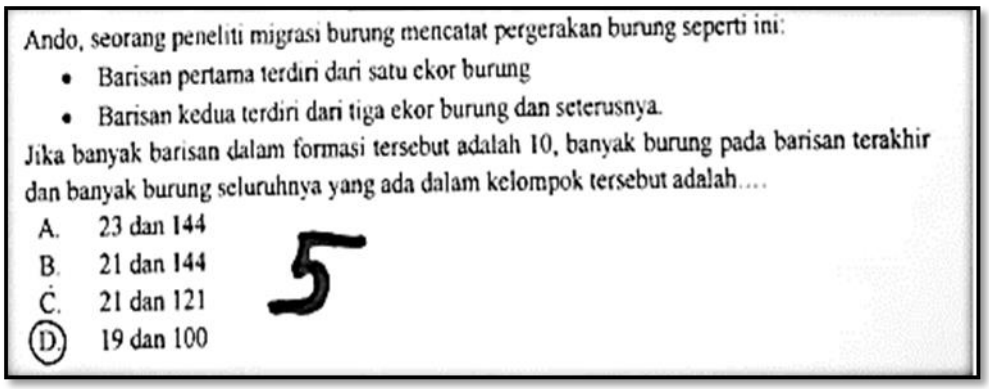


Figure 3. The representation of the solution of problem number 3 from high level of cognitive students

In problem number 4, students mastered the concept of worthless comparison. For the first high-ability student, by made an equation $\frac{16}{10} = \frac{x}{5}$ and obtained $x = 8$ so that the additional workers were $8 - 5 = 3$ workers. As for the second high-ability student, immediately calculated $16 \div 2 = 8$ so that there were 3 additional workers. From the data of the two students' answers, they understand and can operate the mathematical procedure of invaluable comparisons and can also determine the additional workers needed. Supported by the results of interviews, they can distinguish which problems are related to the comparison of worth and which are not worth the comparison.

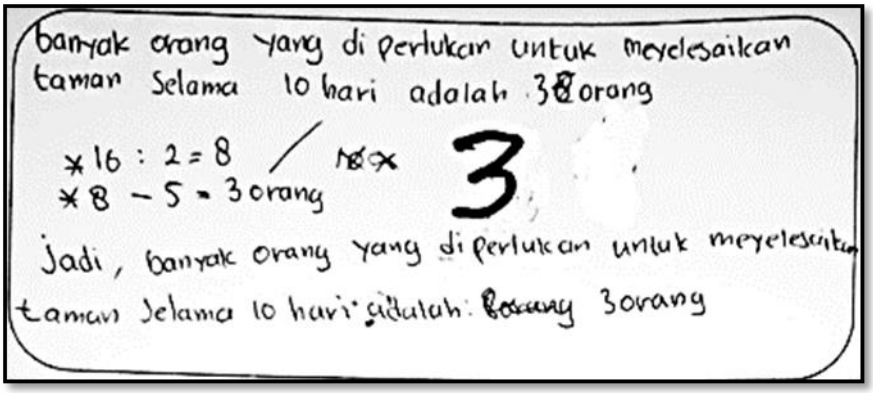


Figure 4. The representation of the solution of problem number 4 from high level of cognitive students

At the problem number 5, students can determine the statement that is in accordance with the information provided. Both students were able to choose a statement that is in or around the context of the problem.

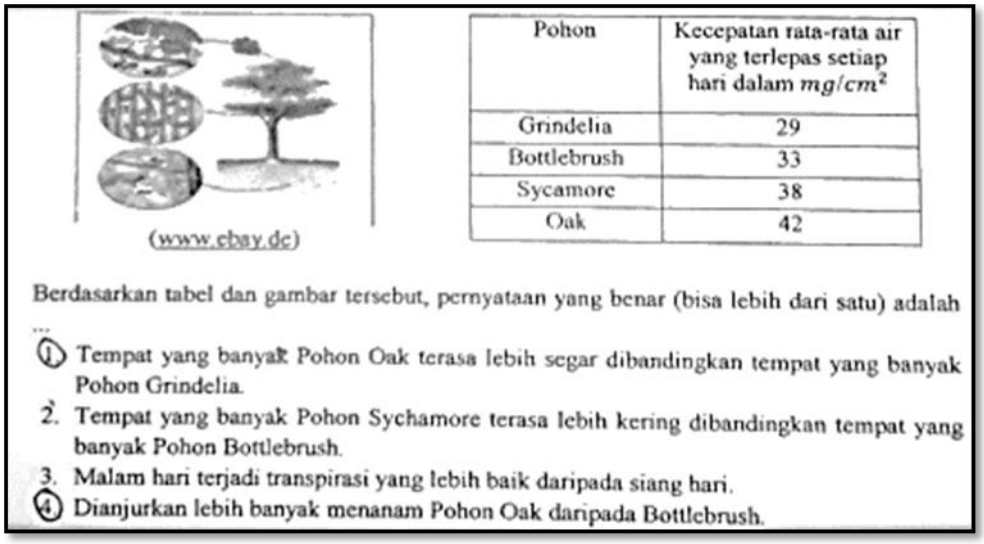


Figure 5. The representation of the solution of problem number 5 from high level of cognitive students

b. Students with Moderate Mathematics Ability

The representation of students with moderate cognitive level is that they have been able to find information, interpret the problems presented, but they have not been able to evaluate the text and integrate it into the solution. Thus, in the counting process they made mistakes and the answers did not match the instructions for the questions asked.

As in problem number 2, the representation of two moderately capable students only focused on one of several alternative uses of transportation modes. They only focus on online motorcycle taxi transportation. They did not consider

that there was other transportation that could accommodate from Rawa Buntu to Fatmawati.

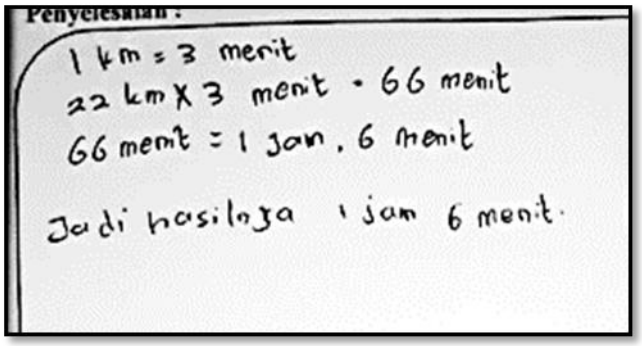


Figure 5. The representation of the solution of problem number 2 from moderate level of cognitive students

In problem number 4, students performed a subtraction operation on the number of days, $16 \text{ hari} - 10 \text{ hari} = 6 \text{ hari}$. The additional 11 workers were

obtained from the sum of 6 days and 5 people. Based on interviews, these two students did not understand the problem domain so they did not understand the form of the solution they provided. For the other number of problems, students were not able to provide solutions according to the problems presented.

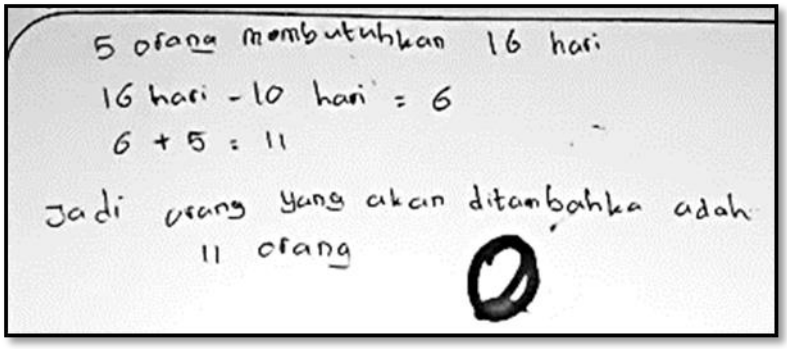
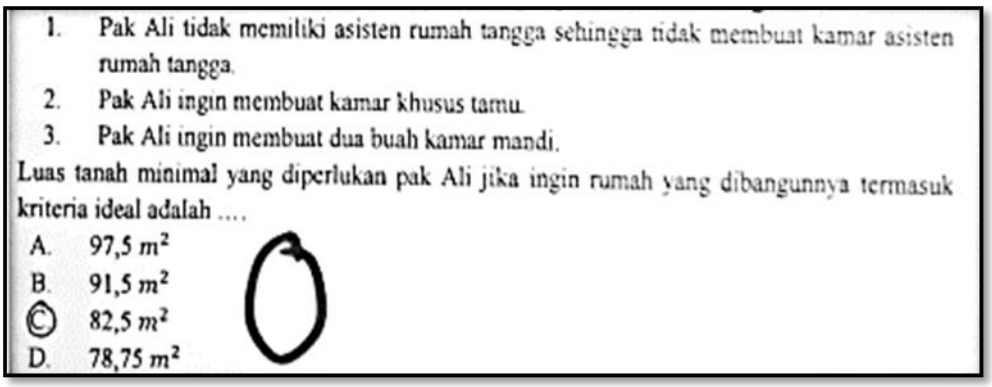


Figure 6. The representation of the solution of problem number 4 from moderate level of cognitive students

c. Students with Low Mathematics Ability

Students who have low cognitive abilities make mistakes in solving problem number 1. The representation of students at this level of thinking do not comprehend the concept of plane geometry yet failed to consider the house criteria written in the problem. This information was obtained from interviews that they did not understand that each required area of the room for Mr. Ali's house must be added up and the area of the room that is not needed will be subjected to a reduction procedure.


1. Pak Ali tidak memiliki asisten rumah tangga sehingga tidak membuat kamar asisten rumah tangga.
2. Pak Ali ingin membuat kamar khusus tamu.
3. Pak Ali ingin membuat dua buah kamar mandi.

Luas tanah minimal yang diperlukan pak Ali jika ingin rumah yang dibangunnya termasuk kriteria ideal adalah ....

A. $97{,}5\ m^2$
B. $91{,}5\ m^2$
C. $82{,}5\ m^2$
D. $78{,}75\ m^2$

Figure 7. The representation of the solution of problem number 1 from low level of cognitive students

Based on the answers to problem number 2, students wrote down the completion procedures and answers that lack in accordance with the information that was known and what was asked with what he wrote on the answer sheet. As in Figure 8, the student wrote down the known information, rate Rp 2.000,00 per km but he wrote down 22 × 3 = 66 minutes. There was no information that

students write about 22 but it involves 22 in the calculation process.

In addition, when referring to the information on problem number 2, number 22 shows the distance from Rawa Buntu to Fatmawati using online motorcycle taxis. Then the unit of number 22 is kilometers (km) and the unit of number 3 is minutes and students make their multiplication results in minutes. This is meaningless for sure. The results of student work are also in line with the results of interviews conducted on representations of students who have low cognitive abilities. They are unable to process the information presented, interpret it, and use it as a solution to a problem.

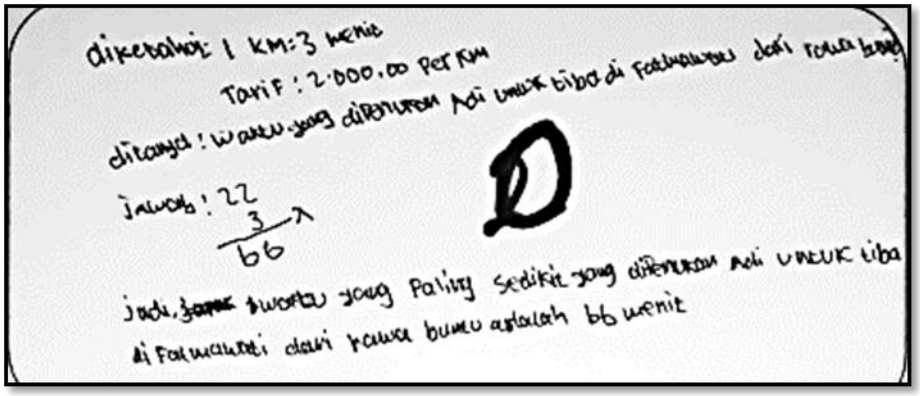
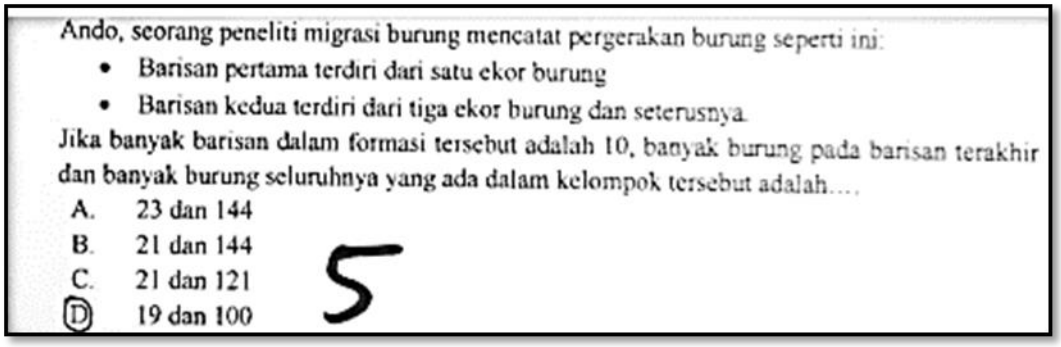


Figure 8. The representation of the solution of problem number 2 from low level of cognitive students

The interesting thing about problem number 3. This student's representation answered choosing the correct answer because the form of the question was multiple choice. However, this contradicts the results of the interview. They do not

understand the meaning of the numbers 19 and 100 that they choose. They are just figuring out how to get that number. One of the students thought that he did not know how to get the number 19, but for the number 100 it was obtained from one bird in the first row multiplied by 10 from many rows and then multiplied by 10 again so that the result was 100. That is why the student chose the answer D.


Ando, seorang peneliti migrasi burung mencatat pergerakan burung seperti ini:

- Barisan pertama terdiri dari satu ekor burung
- Barisan kedua terdiri dari tiga ekor burung dan seterusnya.

Jika banyak barisan dalam formasi tersebut adalah 10, banyak burung pada barisan terakhir dan banyak burung seluruhnya yang ada dalam kelompok tersebut adalah....

A. 23 dan 144
B. 21 dan 144
C. 21 dan 121
D. 19 dan 100

5

Figure 9. The representation of the solution of problem number 3 from low level of cognitive students

In problem number 4, students at a low cognitive level have no idea and picture at all about the information and problems presented. This can be seen in the written answer. When confirmed through interviews, this student also did not understand what he wrote.

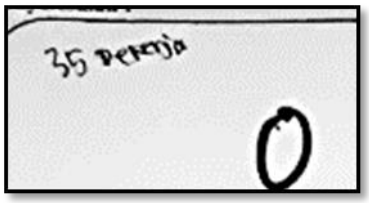


Figure 10. The representation of the solution of problem number 4 from low level of cognitive students

In problem number 5, students were able to choose correctly the statements that match the information about the questions. When the interview was conducted, the student was initially confused to choose the right statement as seen from the scribbles they did.

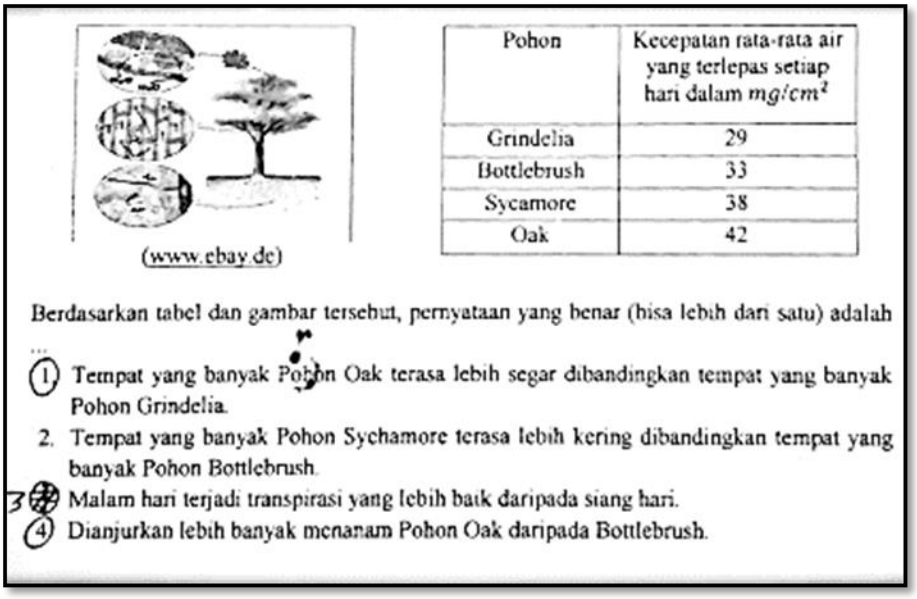


Figure 11. The representation of the solution of problem number 5 from low level of cognitive students

DISCUSSION

The way students provide solutions to each problem presented influences the student's mathematical ability. This is related to the thinking process of students for sure. The results of research by Peng et al. (2016) found that a student's mathematical ability affected mathematical problem-solving abilities. Students with high mathematical abilities have high ability in problem solving, students with moderate mathematical abilities have good problem-solving abilities, and students who have low mathematical abilities have poor problem-solving abilities.

Thinking activity requires two main components, which are incoming information and schemas that have been formed and stored in the mind of each individual. Piaget in Qayumi (2001) states that through reflex activities, feeling and motor movements a student will form a schema. Schemes are formed because of experience (Sanjaya, 2017). Regarding the cognitive schema, Piaget (Crain, 2005) states that the mental or cognitive structure of an individual intellectually adapts and coordinates the surrounding environment. Schema is a series of processes in the consciousness system of people, has no physical form, is not a real object and cannot be seen.

Seel (2014) revealed that schemas are the result of conclusions or mental forms, hypothetical constructions, such as intellectual creativity, ability and instinct. Schemas develop continuously through adaptation to the environment. The scheme forms a certain pattern of reasoning in one's mind (Sundawan, 2016). The better the quality of the scheme, the better one's reasoning pattern will be. The process of adaptation of the scheme that has been formed with a new stimulus can be done by assimilation or accommodation revealed by Piaget (Crain, 2005; Melnick, 1974; Qayumi, 2001).

The results of research on students who have high mathematical abilities show that they fully understand the problems presented. Literacy ability to read from the description of the problem is quite good. They are able to process information and identify it according to the needs of the problem and the desired solution. Then from that information they use it to carry out numerical procedures related to material or content that is in accordance with the topic of the problem.

In addition, an indicator of their understanding is that they could recognize mathematical procedures from the many procedures they have learned. Their thinking level could map the appropriate concepts and procedures that they will use. This is related to the thinking process of students.

Students with high mathematical abilities go through (Hidayah & Ekawati, 2021) . Students are said to receive and to store information as seen from students understanding the problems presented well. This means that the reading literacy of students is said to be good. At the stage of processing information, the students could identify the data presented in the problem and in the interview session, students are able to explain well the necessary and sufficient conditions to find a solution to the problem. Finally, in the process of recalling information, students' brains can recall memories related to concepts and procedures in the problems presented. Then the previously identified data is used to execute mathematical procedures.

Students with moderate math skills could identify sufficient and necessary information in a problem but fail to evaluate the text. This is shown by the way they apply procedures that do not consider other information that can be used as alternative solutions to the problems presented. Based on the interviews, they did experience difficulties and were trying to find a solution. This student's way of thinking can be included in the illumination stage, where students find the solution to a problem related to mathematical concepts and procedures after going through the incubation stage where students had “frozen” for a while due to the difficulties they experienced (Sari, 2016).

Meanwhile, students with low mathematical ability have difficulties starting from understanding and interpreting information on the problem so that it results in errors in solving the problems given. Furthermore, students just do the calculations without paying attention to the concepts and procedures that will be used. This is in line with the opinion of Patta et al. (2021) and (Warli, 2014) that people with an impulsive cognitive style tend to be quick, less careful, do not think deeply so they tend to give inaccurate answers. The answers given can look complex and many but tend to be wrong.

To further improve literacy and numeracy skills, students are expected to continue to learn and explore themselves in working on MCA questions. Support from schools and teachers to facilitate the provision of access to MCA questions is also very important so that students are better prepared in solving MCA questions (Cahyanovianty & Wahidin, 2021).

CONCLUSION AND SUGGESTION

Based on the results of research and discussion, the identification of students ability in solving model of national assessment: students with high mathematical

ability master all components of MCA in terms of content, cognitive processes, and context based on how they answer questions in writing then confirmed it in interview session. Students with moderate mathematical ability are able to master reading literacy content but are weak in numeracy literacy. In terms of cognitive processes, students with moderate mathematical ability can find and interpret text content but fail to integrate and evaluate text content into mathematical concepts and procedures and the context of the questions that can be worked on are personal and scientific. Students with low mathematical ability are extremely weak in content, cognitive processes, and context. In the cognitive process, students with low mathematical abilities can find information but are unable to interpret it to evaluate the content of the text into a mathematical concept and procedure. These findings could be the fundamental data for teacher to evaluate the learning process yet to prepare the instrument that in line with the model of national assessment, particularly minimum competency assessment (MCA).

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