ANALYSIS OF HIGH LEVEL THINKING IN SOLVING MATHEMATICAL PROBLEMS ON SPACE BUILDING MATERIALS

Nurul Sakinah[1], Nalim[2]
Universitas Islam Negeri K.H. Abdurrahman Wahid Pekalongan
sakinahnurul2023@gmail.com, [2] yusufnalim@uingusdur.ac.id

ABSTRAK

Tujuan penelitian ini adalah mengetahui dan menganalisis kemampuan berpikir tingkat tinggi siswa dalam menyelesaikan soal matematika pada materi bangun siswa. Subjek penelitian ini adalah siswa kelas VIII A SMP Negeri 1 Kedungwuni yang jumlahnya mencapai 30 siswa. Jenis penelitian yang digunakan adalah kualitatif deskriptif. Teknik pengumpulan data yang digunakan adalah tes tertulis dan wawancara. Teknik analisis data yang dilakukan adalah menentukan nilai tes siswa, membagi siswa menjadi 3 kategori yaitu tinggi, sedang dan rendah. Hasil yang diperoleh menunjukkan bahwa kemampuan berpikir tingkat tinggi siswa SMP Negeri 1 Kedungwuni berada pada kriteria yang cukup baik.

Kata Kunci: analisis, kemampuan berpikir tingkat inggi, bangun ruang

ABSTRACT

The aim of research is to know and analyze high-level thinking skills in solving mathematical issues on students' awakening materials.The subjects of this study are students of the 5th grade a SMP state 1 inhabited with a total of 30 students.The type of research used is qualitatively descriptive.Data collection techniques used are written tests and interviews.The technique of data analysis is to determine the value of the student's test, Divide students into three categories: high, medium and low.The results obtained show that the high-level thinking capacity of SMP students is at a fairly good criteria.

***Keyword** : analysis, higher level thinking skills, building space*

INTRODUCTION

Thinking abilities are important for educational success, especially higher order thinking skills or Higher Order Thinking Skills (HOTS) which are really needed in the 21st century educational era (Maulana, 2017, p. 1). Advanced thinking is a level of thinking that is higher than the usual level of thinking which includes not only remembering, understanding and applying facts and information received, but also includes the ability to analyze information based on one's own understanding, evaluate and present it in one's own words (Pujiastuti, 2020, p. 248).

High-level thinking allows a person to absorb new information, store, combine, seek understanding, solve problems and make decisions combined with the aim of understanding everything they encounter in life (Maulana, 2017, p. 1).

High-level thinking abilities include logical thinking, reflective thinking, metacognitive thinking, and creative thinking. These abilities are the abilities that students need in facing the current era of education due to the implementation of the 2013 curriculum (Mulyasa, 2018, p. 5). According to Krathwohl, indicators of high-level thinking abilities include the ability to analyze (C4), evaluate (C5), and create (C6). Analysis refers to the process of connecting problems. Evaluation refers to checking activities. Meanwhile, creating means creating something new that is different from what already exists (Abdullah, 2020, pp. 1-2).

Implementing the 2013 Curriculum which is in line with government policy will be very helpful in developing thinking skills in learning, because it requires students to be the center of learning. However, the assessment carried out still follows the old model, namely multiple choice questions which emphasize memorization compared to understanding concepts. The question format needs to be updated so that students are used to questions that challenge their thinking abilities. One of the principles that students must follow in training their thinking skills is to get used to practicing questions intensively and repeatedly. Apart from that, students need to be given questions that are oriented towards HOTS (high level thinking) so that those who initially only have the ability to remember and understand because they rely on simple formulas and concepts, it is hoped that they will be able to improve their thinking abilities to the stage of creating (Pujiastuti, 2020, p. 249).

However, in its implementation, there are still several obstacles in the learning process of implementing the 2013 curriculum, such as the role of teachers as transmitters of knowledge in schools which is too dominant. Students are not given the opportunity to express their abilities and learn only by memorizing and listening. Students are just vessels of knowledge for teachers. Another barrier that is common and difficult to change is that students' intelligence is measured using test instruments that test low-level cognitive abilities. A student is considered

successful if he obtains good and satisfactory exam results. This is a quite difficult problem for the world of Indonesian education (Suyani, 2022, p. 14).

According to the problems mentioned previously, it can be concluded that the low understanding of mathematics in Indonesia has a global impact, both within the country and abroad. The results of previous research at the national level by Anisa Amalia and Heni Pujiastuti (2020) show that students' high-level thinking abilities are still low with details of analyzing ability having an average of 33.33%, evaluating ability having an average of 44.44% and ability to create has an average of 0%. This is caused by students' lack of habit in solving problems that require high level thinking.

The results of research conducted at the international level can be reviewed from the results of surveys from several international institutions such as Trends in International Mathematics and Science Study (TIMSS) and the Program for International Student Assessment (PISA) (Wardono, 2018, p. 569). Based on the findings from the TIMSS survey which is held every 4 years and participated in by around 50 countries from 2000 until now, several survey results that can be considered are from 2003, 2007, 2011 and the most recent results from 2015. The following is the data from the TIMSS survey results Indonesia.

Table 1. TIMSS Survey Results

No.	Year	Rankings	Participant /Country	Average Indonesian Score	Average International Score
1.	2003	35	46	411	467
2.	2007	36	49	397	500
3.	2011	38	42	386	500
4.	2015	44	49	397	500

Source: Syamsul Hadi dan Novaliyosi (2019)

Based on the data above, it can be concluded that Indonesia is in a low position compared to other countries because the resulting score has not reached the average international score (Novaliyosi, 2019, p. 563). This data is supported by the results of the 2018 PISA survey, especially in the field of mathematics, which shows that Indonesia is in 73rd position out of 79 countries that participated in the survey (Shaleh, 2020, p. 35). Therefore, efforts are needed from educators to improve students' high-level thinking abilities in solving mathematical problems.

The type of research used is descriptive qualitative research. Qualitative research is a type of research whose activities aim to analyze and understand social

processes and behavior. Qualitative research focuses on process rather than results. The research plan is temporary and the research results are usually agreed upon by both parties, namely the researcher and the subject. Data obtained from the field are the results of written tests and interviews with students who use words, not numbers or pictures. The final result is in the form of an explanatory report, not statistical test data (Khoiron, Research Methods, 2019, p. 12)

The subjects who took part in the research were 30 students consisting of 14 male students and 16 female students. The instruments used were a written test based on Higher Order Thinking Skill (HOTS) and an unstructured interview guide, namely that the resource persons were given the freedom to express their opinions or responses in answering questions from researchers (Turmudi, 2012).

DISCUSSION

Higher Order Thinking Skills

Higher order thinking is a way of thinking that requires mental effort to express complex experiences in order to achieve the expected goals. Students' high-level thinking abilities in learning mathematics lie in the learning process. This ability can be developed through analytical and evaluative decision making and problem solving. High thinking abilities have a big influence on student academic achievement. Teachers need to pay special attention so that students are motivated to understand mathematics (Jamaludin, 2020, pp. 2-3).

High-level thinking abilities include critical thinking, logical thinking, reflective thinking, metacognitive thinking and creative thinking. This ability can be developed if students are faced with unknown, challenging and uncertain problems. According to Lewis and Smith, people with good reasoning abilities are able to store information in their memory and connect and develop this information to achieve a goal or obtain a possible answer. According to Underbakke, higher order thinking skills are the ability to use information to analyze, predict and negotiate problems (Sani, 2019, pp. 1-2).

Bloom’s Taxonomy

According to Krathwohl in A revision of Bloom's Taxonomy: An overview theory Practice, it is stated that the indicators for measuring HOTS can be classified as follows:

Analyze (C4): analyze and divide or organize incoming information into smaller pieces to identify patterns and split relationships, recognize and distinguish causal factors in complex scenarios and identify or formulate questions. Evaluate (C5): provide an evaluation of solutions, ideas and methods using appropriate or existing criteria to ensure their effectiveness or usefulness, formulate hypotheses, criticize, test them, approve or reject statements based on predetermined criteria. Create (C6): generalize an idea or point of view about something, design a way to solve a problem, and organize several elements or parts into a new structure that has never existed before (Abdullah, 2020, pp. 4-5).

The Ability To Solve Higher Order Thinking Skills Based Math Problems

Stages in solving problems are needed to get the correct answer. The following are four stages in problem solving: 1) determining understanding of the problem, namely by knowing what information is in the problem and what will be solved. often it is necessary to explain the information in the form of pictures, tables, diagrams. This understanding will help students determine the direction of problem solving goals and help develop problem solving plans with appropriate strategies. 2) planning problem solving, namely students need to provide alternative answers that can be used to solve the problem. 3) carry out a problem solving plan, that is, students only need to be patient in carrying out the plan made according to the applicable rules. The teacher's role is very important in guiding students to carry out the plan. The teacher can ask follow-up questions to determine the right direction in solving the problem. 4) review all problem solving steps taken. Students then connect one concept with another concept and gain new knowledge (Syahlan, 2017, pp. 359-360)

Geometry

A geometric figure is a set consisting of points, lines and planes or surfaces in three-dimensional space located in a limited area. The spatial shapes used as research material are flat-sided spatial shapes consisting of cubes, blocks and pyramids.

Research Results and Discussion

Based on the results of data acquisition and data analysis carried out by researchers, below are presented the results of the scores from the students' work on the questions along with the abilities of each student.

Table 2. Values and Categories of Students' Higher Order Thinking Abilities

No. Peserta	L/P	Skor	Kategori
1.	L	36	Rendah
2.	L	60	Sedang
3.	P	67	Sedang
4.	P	61	Sedang
5.	L	66	Sedang
6.	P	53	Sedang
7.	P	80	Tinggi
8.	P	30	Rendah
9.	P	44	Sedang
10.	L	61	Sedang
11.	L	36	Rendah
12.	L	73	Tinggi
13.	L	54	Sedang
14.	L	44	Sedang
15.	L	66	Sedang
16.	L	65	Sedang
17.	L	71	Sedang
18.	P	79	Tinggi
19.	L	52	Sedang
20.	P	71	Sedang
21.	P	79	Tinggi
22.	P	49	Sedang
23.	L	30	Rendah
24.	P	49	Sedang
25.	P	32	Rendah
26.	P	63	Sedang
27.	L	37	Rendah
28.	P	74	Tinggi
29.	P	72	Tinggi
30.	P	59	Sedang

In the results presented above, 6 students have high ability or get a score of 72 and above, 18 students have medium ability or get a score of 41 to 72, and 6 students have low ability or get a score of less than 41. The percentage is 20% for high ability students, 60% for medium ability students and 20% for low ability students.

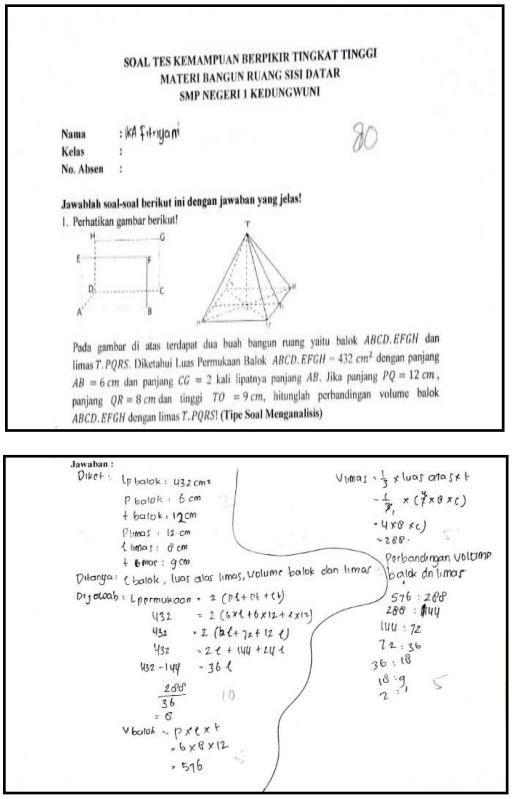
After the process of giving written tests to students, researchers conducted interviews with one representative from each category. Researchers use codes in

their writing, namely high ability students with the SBT code, medium ability students with the SBS code and low ability students with the SBR code. Below is presented the data on the subjects selected in the interview process.

Table 3. Selected Subjects and Codes used

No. Responden	Kode	Skor	Kategori
7.	SBT	80	Tinggi
4.	SBS	61	Sedang
8.	SBR	30	Rendah

After the interview process with the three subjects, the next step was to confirm with the subjects the results of the questions they had worked on. For the analyzing category (C4) or question number 1, SBT was able to complete the question according to the work steps included in the analyzing indicators and obtained good and satisfactory results. This analytical ability can be seen from the results of complete and perfect answers to questions. This means that students have the ability to differentiate and group information in a question and divide it into smaller parts. The following are the results of the students' answers.


SOAL TES KEMAMPUAN BERPIKIR TINGKAT TINGGI
MATERI BANGUN RUANG SISI DATAR
SMP NEGERI 1 KEDUNGWUNI

Nama : Ika Fitriyani
Kelas :
No. Absen :

80

Jawablah soal-soal berikut ini dengan jawaban yang jelas!

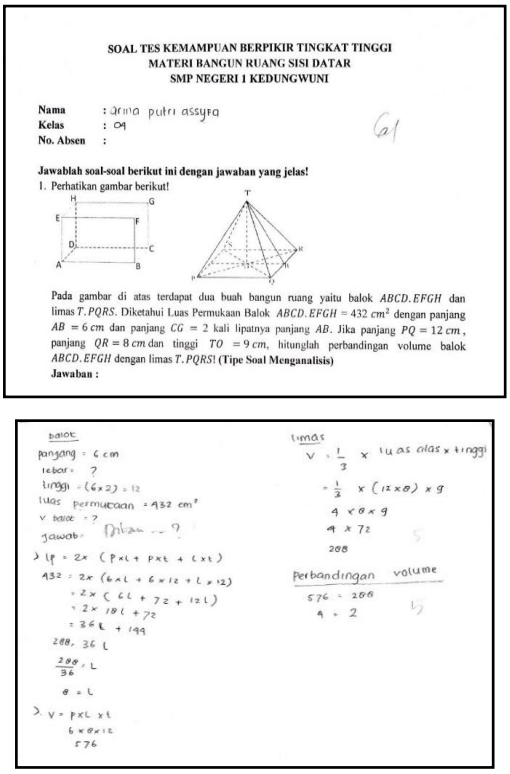
1. Perhatikan gambar berikut!

Pada gambar di atas terdapat dua buah bangun ruang yaitu balok $ABCD.EFGH$ dan limas $T.PQRS$. Diketahui Luas Permukaan Balok $ABCD.EFGH = 432\ cm^2$ dengan panjang $AB = 6\ cm$ dan panjang $CG = 2$ kali lipatnya panjang AB. Jika panjang $PQ = 12\ cm$, panjang $QR = 8\ cm$ dan tinggi $TO = 9\ cm$, hitunglah perbandingan volume balok $ABCD.EFGH$ dengan limas $T.PQRS$! **(Tipe Soal Menganalisis)**

Jawaban :
Diket : Lp balok : 432 cm²
P balok : 6 cm
t balok : 12 cm
P limas : 12 cm
t limas : 8 cm
t limas : 9 cm
Ditanya : L balok, luas atas limas, Volume balok dan limas
Dijawab : L permukaan = 2 (pt + pl + tl)
432 = 2 (6x12 + 6x12 + 12x12)
432 = 2 (72 + 72 + 12 ℓ)
432 = 2 ℓ + 144 + 24 ℓ
432 - 144 = 36 ℓ
288 / 36 = 8
V balok = p x ℓ x t
= 6 x 8 x 12
= 576
V limas = 1/3 x luas atas x t
= 1/3 x (12 x 8 x 8)
= 4 x 8 x 8
= 288
Perbandingan Volume balok dan limas
576 : 288
288 : 144
144 : 72
72 : 36
36 : 18
18 : 9
2 : 1

Figure 1. SBT questions and answers number 1 Analyzing Category

Meanwhile, SBS was able to solve the questions well and quite satisfactorily. SBS differentiates and groups existing information, making it possible to identify and explain it in smaller parts. SBS was able to connect known information from the problem, but in the process SBS experienced confusion and doubt in taking steps to resolve the problem. This can be seen from several scribbles on the students' answer sheets, but this is not a problem because the questions can be solved well. Following are the results of the students' answers.



SOAL TES KEMAMPUAN BERPIKIR TINGKAT TINGGI
MATERI BANGUN RUANG SISI DATAR
SMP NEGERI 1 KEDUNGWUNI

Nama : arina putri assyfa
Kelas : 09
No. Absen :

Jawablah soal-soal berikut ini dengan jawaban yang jelas!
1. Perhatikan gambar berikut!

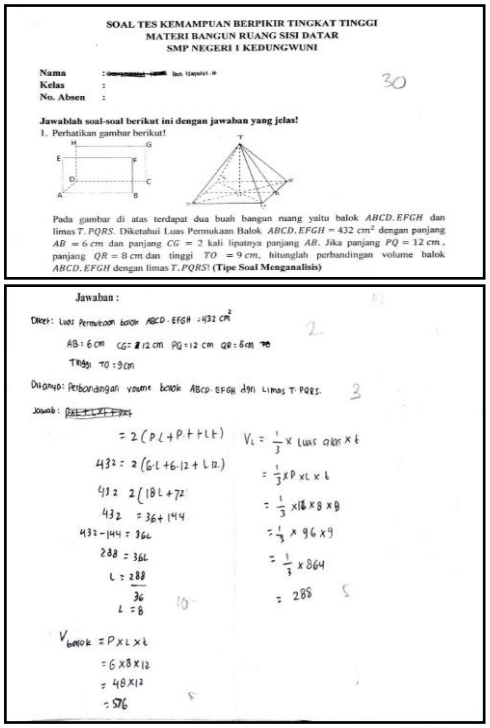
Pada gambar di atas terdapat dua buah bangun ruang yaitu balok $ABCD.EFGH$ dan limas $T.PQRS$. Diketahui Luas Permukaan Balok $ABCD.EFGH = 432\ cm^2$ dengan panjang $AB = 6\ cm$ dan panjang $CG = 2$ kali lipatnya panjang AB. Jika panjang $PQ = 12\ cm$, panjang $QR = 8\ cm$ dan tinggi $TO = 9\ cm$, hitunglah perbandingan volume balok $ABCD.EFGH$ dengan limas $T.PQRS$! **(Tipe Soal Menganalisis)**
Jawaban :

balok
panjang = 6 cm
lebar = ?
tinggi = (6x2) = 12
luas permukaan = 432 cm²
v balok = ?
jawab: Diketahui ... ?
lp = 2x (pxl + pxt + lxt)
432 = 2x (6xl + 6x12 + lx12)
= 2x (6l + 72 + 12l)
= 2x 18l + 72
= 36l + 144
288 = 36 l
288/36 = l
8 = l
v = pxl xt
6x8x12
576

limas
v = 1/3 x luas alas x tinggi
= 1/3 x (12x8) x 9
4 x 8 x 9
4 x 72
288
Perbandingan volume
576 : 288
2 : 1

Figure 2. SBS questions and answers number 1 Analyzing Category

Furthermore, SBR was able to solve the questions well according to the steps for completing the questions. SBR can differentiate and group information in a question. This information is broken down into smaller pieces to initiate a problem-solving plan. Planning begins by finding the width of the beam using the formula for the initial area of the beam, finding the volume of the beam and finding the volume of the pyramid. However, the steps taken by SBR do not reach the comparison step because SBR cannot calculate a number whose value is large enough. However, SBR was able to reach the analysis stage quite satisfactorily. Following are the results of the students' work.



SOAL TES KEMAMPUAN BERPIKIR TINGKAT TINGGI
MATERI BANGUN RUANG SISI DATAR
SMP NEGERI 1 KEDUNGWUNI

Nama :
Kelas :
No. Absen :

30

Jawablah soal-soal berikut ini dengan jawaban yang jelas!

1. Perhatikan gambar berikut!

Pada gambar di atas terdapat dua buah bangun ruang yaitu balok $ABCD.EFGH$ dan limas $T.PQRS$. Diketahui Luas Permukaan Balok $ABCD.EFGH = 432\ cm^2$ dengan panjang $AB = 6\ cm$ dan panjang $CG = 2$ kali lipatnya panjang AB. Jika panjang $PQ = 12\ cm$, panjang $QR = 8\ cm$ dan tinggi $TO = 9\ cm$, hitungilah perbandingan volume balok $ABCD.EFGH$ dengan limas $T.PQRS$! **(Tipe Soal Menganalisis)**

Jawaban :

Diket: Luas Permukaan balok ABCD.EFGH = 432 cm²

AB = 6 cm CG = 12 cm PQ = 12 cm QR = 8 cm

Tinggi TO = 9 cm

Ditanya: Perbandingan volume balok ABCD.EFGH dan Limas T.PQRS

Jawab:

$= 2(P.L + P.T + L.T)$

$432 = 2(6.L + 6.12 + L.12)$

$432 = 2(18L + 72)$

$432 = 36L + 144$

$432 - 144 = 36L$

$288 = 36L$

$L = \frac{288}{36}$

$L = 8$

$V_{balok} = P \times L \times t$

$= 6 \times 8 \times 12$

$= 48 \times 12$

$= 576$

$V_L = \frac{1}{3} \times$ Luas alas $\times t$

$= \frac{1}{3} \times P \times L \times t$

$= \frac{1}{3} \times 18 \times 8 \times 9$

$= \frac{1}{3} \times 96 \times 9$

$= \frac{1}{3} \times 864$

$= 288$

Figure 3. SBR questions and answers number 1 Analyzing Category

For the evaluating category (C5) or question number 2, SBT was able to complete the question and reach the final stage. SBT can provide an evaluation of the solution to a problem. SBT first divides the information in the problem into smaller parts and then determines the formula that will be used to solve the problem. Solving the problem begins by finding the original length of the wooden box and then carrying out a test by adding the length of the sides three times the original length to find out how many small cubes can fit into the wooden box. This solution step can be carried out until the appropriate answer is found among the existing answers, thus proving that the alleged answer in the question is the wrong answer and the answer given by SBT is the correct one. The following are the results of the students' work.

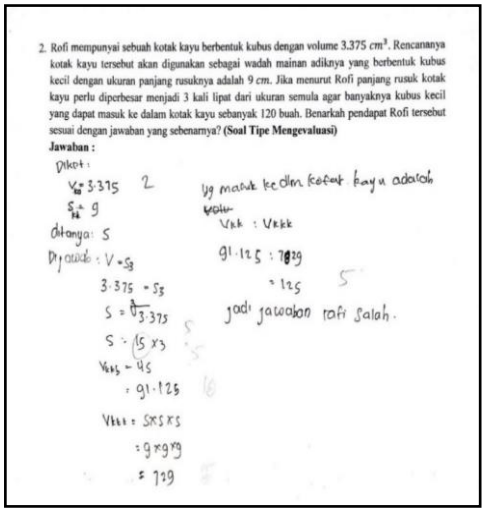


Figure 4. SBT Questions and Answers Number 2 Evaluating Category

Meanwhile, SBS has solved the questions quite well, but the process of solving the questions is still not perfect until the final step so that the questions have not received appropriate answers. SBS has not been able to provide an assessment or rejection of existing answers to questions with actual answers. The following are the results of the students' work.

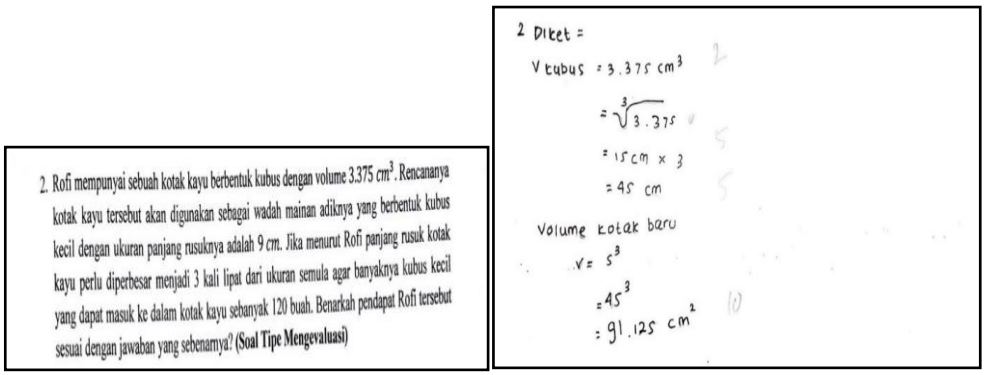
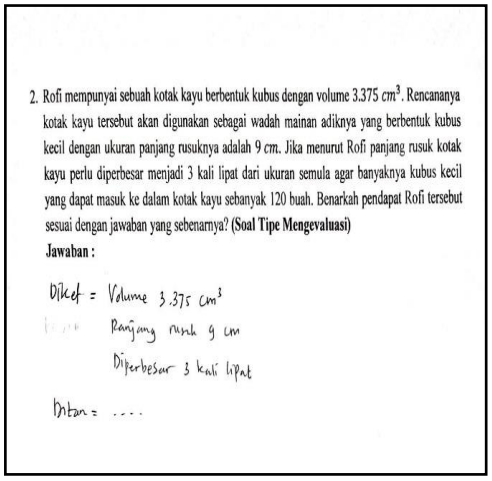


Figure 5. SBS Questions and Answers Number 2 Evaluating Category

Furthermore, SBR was not able to solve the problem until the final stage. To answer the question, SBR cannot provide an evaluation and hypothesis on the question, SBR has difficulty determining the formula that will be used to solve the problem, and SBR cannot connect known information with the appropriate formula so that SBR's ability to evaluate cannot be identified. The following are the results of the students' work.



2. Rofi mempunyai sebuah kotak kayu berbentuk kubus dengan volume 3.375 cm^3. Rencananya kotak kayu tersebut akan digunakan sebagai wadah mainan adiknya yang berbentuk kubus kecil dengan ukuran panjang rusuknya adalah 9 cm. Jika menurut Rofi panjang rusuk kotak kayu perlu diperbesar menjadi 3 kali lipat dari ukuran semula agar banyaknya kubus kecil yang dapat masuk ke dalam kotak kayu sebanyak 120 buah. Benarkah pendapat Rofi tersebut sesuai dengan jawaban yang sebenarnya? **(Soal Tipe Mengevaluasi)**

Jawaban :

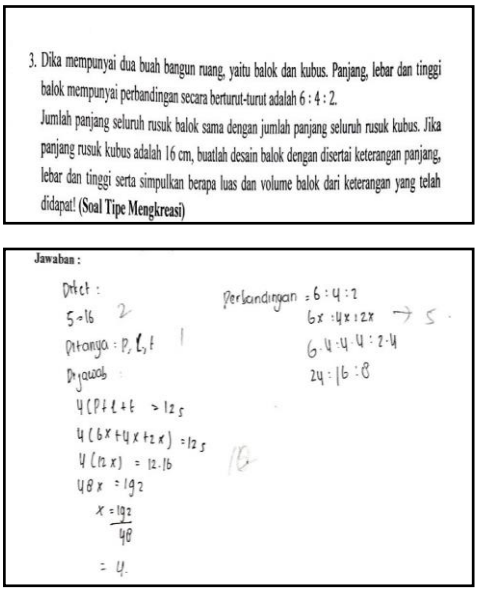
Diket = Volume 3.375 cm^3
Panjang rusuk 9 cm
Diperbesar 3 kali lipat

Ditan = ...

Figure 6. SBR Questions and Answers Number 2 Evaluating Category

For the creative category (C6) or question number 3, SBT was able to answer the question up to the final stage. SBT analyzes the problem by writing down what is known and what is asked, then solves the problem by first determining the actual length, width and height of the block using the formula for the sum of all the edges of the block and the edges of the cube with the aim of finding x. Length, width and height function as information on the design of the block being made. In addition, the area and volume of the beam must be determined as additional information in the beam design.

The following are the results of the students' work.



3. Dika mempunyai dua buah bangun ruang, yaitu balok dan kubus. Panjang, lebar dan tinggi balok mempunyai perbandingan secara berturut-turut adalah 6 : 4 : 2.
Jumlah panjang seluruh rusuk balok sama dengan jumlah panjang seluruh rusuk kubus. Jika panjang rusuk kubus adalah 16 cm, buatlah desain balok dengan disertai keterangan panjang, lebar dan tinggi serta simpulkan berapa luas dan volume balok dari keterangan yang telah didapat! **(Soal Tipe Mengkreasi)**

Jawaban :

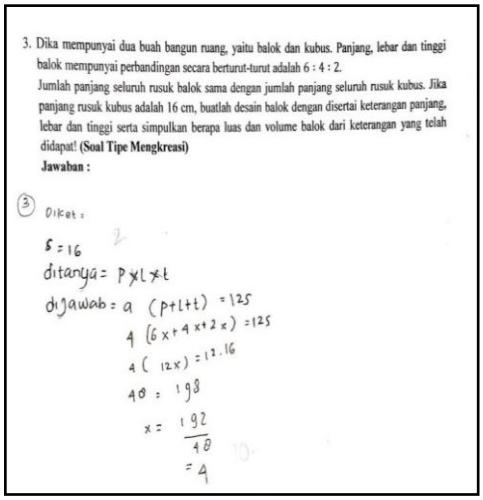
Diket :
5 = 16
Ditanya : P, l, t
Dijawab :
4(P+l+t = 12 s
4(6x+4x+2x) = 12 s
4(12x) = 12.16
48x = 192
x = 192/48
= 4.

Perbandingan = 6 : 4 : 2
6x : 4x : 2x → 5
6.4 : 4.4 : 2.4
24 : 16 : 8

Figure 7. SBT Questions and Answers Number 3 Creation Category

Meanwhile, SBS has not been able to solve the questions well, this can be seen in several steps to solve the questions which have not been carried out until

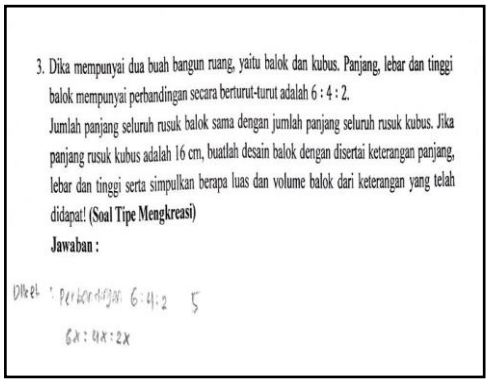
the final stage. SBS can formulate one of the problems into an equation and enter what it knows, but SBS cannot determine which formula suits the problem so the problem cannot be solved. SBS also has not been able to design a solution to the problem so that the spatial design will be created. The following are the results of the students' work.


3. Dika mempunyai dua buah bangun ruang, yaitu balok dan kubus. Panjang, lebar dan tinggi balok mempunyai perbandingan secara berturut-turut adalah 6 : 4 : 2.
Jumlah panjang seluruh rusuk balok sama dengan jumlah panjang seluruh rusuk kubus. Jika panjang rusuk kubus adalah 16 cm, buatlah desain balok dengan disertai keterangan panjang, lebar dan tinggi serta simpulkan berapa luas dan volume balok dari keterangan yang telah didapat! **(Soal Tipe Mengkreasi)**
Jawaban :

③ Diket :
s = 16
ditanya = P x L x t
dijawab = a (p+l+t) = 125
4 (6x + 4x + 2x) = 125
4 (12x) = 12.16
48 = 198
x = 192 / 48
= 4

Figure 8. SBS Questions and Answers Number 3 Creation Category

Furthermore, SBR was unable to solve the questions well. SBR can only write information about existing problems, but cannot solve any problems. SBR cannot design a new structure to answer this problem, so SBR's creative ability cannot be identified. The following are the results of the students' work.


3. Dika mempunyai dua buah bangun ruang, yaitu balok dan kubus. Panjang, lebar dan tinggi balok mempunyai perbandingan secara berturut-turut adalah 6 : 4 : 2.
Jumlah panjang seluruh rusuk balok sama dengan jumlah panjang seluruh rusuk kubus. Jika panjang rusuk kubus adalah 16 cm, buatlah desain balok dengan disertai keterangan panjang, lebar dan tinggi serta simpulkan berapa luas dan volume balok dari keterangan yang telah didapat! **(Soal Tipe Mengkreasi)**
Jawaban :

Diket : perbandingan 6 : 4 : 2
6x : 4x : 2x

Figure 9. SBR Questions and Answers Number 3 Creation Category

CONCLUSION

According to the explanation of the results and discussion, it can be concluded that of the 30 students who took part in the research, there were 6 students who had

high abilities, 18 students had medium abilities, and 6 students had low abilities. The percentage is 20% for high ability students, 60% for medium ability students and 20% for low ability students. The results obtained show that students' high level thinking abilities are quite good, this is because the percentage of high and medium level thinking abilities is greater when compared to the percentage of students with low abilities. Regarding the analyzing category (C4), both SBT, SBS and SBR were able to reach this stage. In the evaluating category (C5), only SBT was able to reach this stage, while SBS and SBR were unable to provide complete answers according to the answers they should have. Furthermore, in the creating category (C6), only SBT was able to reach this stage. SBS and SBR have not been able to utilize their creative abilities to solve problems because the two subjects were unable to formulate a plan.

REFERENCES

Abdullah, B. I. (2020). *Higher Order Thinking Skills (HOTS) Bagi Kaum Milneial Melalui Inovasi Pembelajaran Matematika.* Malang: CV IRDH.

Jamaludin. (2020). *Melatih Berpikir Tingkat Tinggi dengan Model Pembelajaran GO CAR.* Sukabumi: CV. Jejak.

Khoiron, A. K. (2019). *Metode Penelitian Kualitatif.* Semarang: Lembaga Pendidikan Sukarno Pressindo (LPSP).

Maulana. (2017). *Konsep Dasar Matematika dan Pengembangan Kemampuan Berpikir Kritis-Kreatif.* Sumedang: UPI Sumedang.

Novaliyosi, S. H. (2019). TIMSS INDONESIA (TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY). *Prosiding Seminar Nasional dan Call Paper*, (p. 563). Banten.

Pujiastuti, A. A. (2020). Analisis Kemampuan Berpikir Tingkat Tinggi pada Siswa SMP YPWKS Cilegon dalam Menyelesaikan Soal Pola Bilangan. *Wahana Didaktila*, 248.

Sani, R. A. (2019). *Pembelajaran Berbasis HOTS (Hihger Order Thinking Skills).* Tangerang: Tira Smart.

Shaleh, L. H. (2020). Refleksi Hasil Upaya PISA (The Programme For International Student Assesment: Upaya Perbaikan Bertumpu pada Pendidikan Anak Usia Dini. *Jurnal Golden Age*, 35.

Suyani, N. D. (2022). *Mengenal "HOTS" (Higher Order Thinking Skills) dalam Pendidikan.* Malang: Media Citra Kreatif.

Syahlan. (2017). Sepuluh Strategi dalam Pemecahan Masalah Matematika. *Jurnal Intenational Digital Journal Of Mathematics and Education*, 359-360.

Turmudi, Y. N. (2012). *Statistika Deskriptif.* Pekalongan: STAIN Pekalongan Press.

Wardono, M. d. (2018). Pentingnya Kemampuan Literasi Matematika untuk Menumbuhkan Kemampuan Koneksi Matematika dalam Meningkatkan SDM. *Jurnal PRISMA*, 569.