



## Student's Junior High School Mathematical Connection Ability Based on The Big Five Personality

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### Abstract

Each individual has a diverse personality which is categorized by the Big Five Personality traits and it's important for a successful education. A successful education especially in mathematics major aimed at the good of student's mathematical abilities, one of which is good mathematical connection ability. This research aims to determine the mathematical connection ability of junior high school students based on the Big Five personality in Bekasi. This research used qualitative research case studies with data triangulation. Participants of this research were junior high school students in grade ninth. The instrument used in the form is a test description as many as four questions that refer to the indicators of mathematical connection ability and has been consulted with experts and the Big Five personality traits questionnaire that has been adopted. The results of this research describe: 1) mathematical connection ability of the student in Extraversion dimension on indicator 1 was 60%, indicator 2 was 0%, and indicator 3 was 0%, 2) the mathematical connection ability of students in Agreeableness dimension on indicator 1 was 60%, indicator 2 was 25%, and indicator 3 was 25%, 3) mathematical connection ability of students in Conscientiousness dimension on indicator 1 was 60%, indicator 2 was 35%, and indicator 3 was 25%, 4) mathematical connection ability of a student in Neuroticism dimension on indicator 1 was 20%, indicator 2 was 0%, and indicator 3 was 20%, 5) mathematical connection ability of students in Openness dimension on indicator 1 was 64.21%, indicator 2 was 27.37%, and indicator 3 was 34.21%.

**Keywords:** connections, mathematical connection, mathematical connection ability, big five, personality

## A. Introduction

If students can properly connect ideas in mathematics, mathematical ideas with other disciplines, or mathematical ideas to everyday problems, then they will have good mathematical skills. The mathematical connection is an indicator of a mathematical understanding because it relates to the ability to make connections between ideas, concepts, procedures, representations, and meaning in mathematics (Berry, J., & Nyman, 2003). The ability of mathematical connections plays a role in mathematical understanding which is the internal relationship between representations of mathematical ideas, procedures, and facts so that a stronger mathematical connection allows for increased mathematical understanding (Hiebert J, 1992). Students who able to connect mathematical ideas can complete tasks related to mathematics and make connections between new ideas and relevant things (Waynberg, as cited in Zengin, 2019).

Based on previous research, it's known that the connection as a critical thinking ability in Indonesian students is still low, one of which is due to the low quality of mathematics learning in schools (Listiani, 2016). Other research shows that the percentage of student's ability to connect between mathematical concepts is 58.33% (good enough), the ability of students to connect and apply mathematical concepts to other disciplines is 50% (less), the ability of students to apply mathematical concepts to solve the problem in daily life is 66.67% (good enough) (Wardina & Sudihartinih, 2019). This shows that the mathematical connection ability of students needs further research.

The difference in the processing of the given questions can affect the academic achievement of students at school. Student academic achievement can't be separated from the type of learning. Different types of learning are influenced by differences in their personalities (Vygotsky, Lave & Wenger, Wanger, as cited in Bhakta, Wood, & Lawson, 2010). The grouping of personality dimensions can be done through the Big Five. The Big Five traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness) have been associated with a variety of behaviors including job performance, academic performance, leadership, and well being (John & Srivastava, Heckman, Hakim, Jackson, Shaw, Scott & Rich, Fairweather, Singh, as cited in Nye, Orel, & Kochergina, 2013). Conscientiousness can predict academic success, performance on exams, and cumulative grade point index, openness and agreeableness are also related to academic performance, and Neuroticism is related to disrupted academic (Komarraju, Karau, & Schmeck, 2009).

Based on the description that has been described, the purpose of this research was to determine student's junior high school mathematical connection ability based on the Big Five personality. This research can be a source of information that would be studied more deeply by other studies regarding mathematical connection ability or other mathematical connection based on the personality traits so it can be a useful knowledge in mathematics subject.

## B. Literature Review

### 1. *Mathematical Connection Ability*

The mathematical connection is one of the characteristics of mathematics where mathematical ideas are interconnected with certain relationships and these connections can be identified a priori and independently from students (Businskas, 2008). The mathematical connection is part of the relationship between knowledge and other knowledge which consists of important concepts to understand and develop relationships between mathematical ideas, concepts, and procedures (Kenedi, Helsa, Ariani, Zainil, & Hendri, 2019).

Mathematical connection skills include: 1) recognizing and using connections among mathematical ideas; 2) understand how mathematical ideas relate to one another and build on one another to produce a coherent whole; 3) recognize and apply mathematics in contexts outside of mathematics, if students can connect, they will have a deep mathematical understanding and be able to last longer (NCTM, 2000). There are three indicators for the ability of mathematical connections: 1) to understand the relationship between one mathematical concept and another; 2) understanding the relationship between mathematics and other disciplines of science; 3) understand the relationship between mathematics and everyday life (NCTM, 2000).

### 2. *Big Five Personality*

Personality is an expression of the hierarchical integration of the dispositions and innate habits and habitual reaction tendencies of each individual socially (Walker, 2008). Personality is defined as a characteristic pattern of a person's behavior in a broad sense including thoughts,

feelings, and motivations (Uher, 2017). Personality is one of the non-cognitive factors that play an important role in the success of education or work (Rieger et al., 2017).

The Big Five model has been defined as an important and productive taxonomy for classifying personality structures (Bakker, Barrick & Mount, Roberts, Caspi & Goldberg, Soldz & Vaillant, as cited in Meyer et al., 2019). The Big Five personality types are classified into extraversion, agreeableness, neuroticism, conscientiousness, and openness which is based on the idea that the real difference that can be seen from someone is behavior (John & Srivasta, 1999).

The extraversion dimension (denoted by E) relates to individual engagement with the outside world and enthusiasm and other positive emotions, the agreeableness dimension (denoted by A) relates to individual cooperative values and social harmony, politeness, trust, and honesty, individuals with the Agreeableness dimension have a view that optimistic about other individuals, conscientiousness (denoted by C) is related to the value of individual planning, perseverance, and results-oriented (achievement), neuroticism (denoted by N) relates to individual negative feelings and excessive emotional stress, openness (denoted by O) is associated with curiosity, self-awareness, and individualism (Rossberger, as cited in Ali, 2019). Conscientiousness has good behavior in learning at every level, is ambitious, persistent, diligent, has learning rules, goals, systematic learning styles, and appropriate learning methods (Meyer et al., 2019). The neuroticism dimension is related to the poor self-concept and low self intelligence (Furnham, Chamorro-Premuzic, & McDougall, 2003). Openness is a personality type that describes individuals with high curiosity and motivation from within (Komarraju et al., 2009). Individuals with high scores of openness have higher critical thinking skills (McCredie & Kurtz, 2020).

## C. Methodology

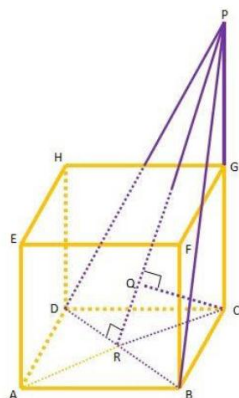
### 1. Research Design

This research is a qualitative case study which describes student's junior high school mathematical connection ability based on the Big Five personality on the topic of the polyhedron that using data triangulation (interviews, theory, and documentation). Participants of this research were 28 female students in class IX for answering the questionnaire of big five personality traits with a duration of 15 minutes and 26 female students for doing mathematical connection ability test with a duration of 30 minutes at one of the private junior high schools in Bekasi Regency which took place on August 6 and 28, 2020. Participants who were then selected in this research were 25 female students.

### 2. Instruments

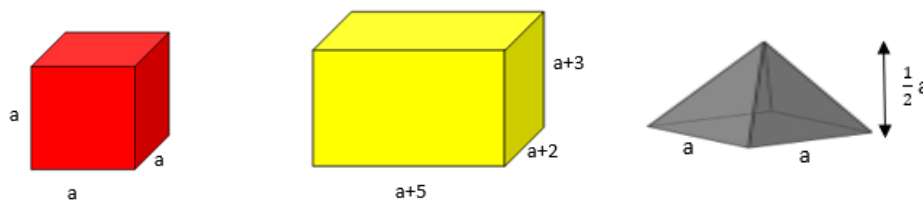
The instruments used in this research were a questionnaire of big five personality traits that have been adopted from the previous research and 4 questions of polyhedron topic that has been consulted to experts and arranged by the indicator of mathematical connection ability: 1) students can recognize and connect between mathematical ideas, 2) students can connect and apply mathematical concepts to other disciplines, 3) students can connect and apply mathematical concepts to everyday life. These indicators are listed sequentially in question number 1, 2, 3, and 4 with the following problems:

1. It is known that the length of the base of the PBD triangle on the cube is  $4\sqrt{2}$  cm. Calculate the volume of the  $ABCD.EFGH$  cube!

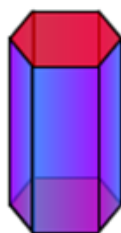


2. It is known that the following three objects are given the same force. Specify and provide the reasons:

- The object that exerts the least pressure
- The object which has the smallest volume



3. My father bought a prism-shaped aquarium with a hexagon-shaped base and a height of 50 cm. Father filled the aquarium with water until the water level reached 20 cm. Father again filled the aquarium with water as much as  $1.440 \text{ cm}^3$  until the water rose 5 cm from its height before. Calculate the base area of the aquarium!



4. Bookstore "X" plans to sell gift boxes in the shape of cuboids with a size of  $10 \text{ cm} \times 15 \text{ cm} \times 6 \text{ cm}$ . The bookstore buys wrapping paper with a size of  $60 \text{ cm} \times 100 \text{ cm}$ . If bookstore "X" plans to sell 150 gift boxes, then how much wrapping paper is needed to wrap the boxes?

**Table 1.** Mathematical Connection Ability Assessment Rubric (Wardina & Sudihartinih, 2019)

Indicators		Student responses to questions	Score
Students can recognize and connect mathematical ideas	can	Didn't answer at all	0
	and	The answer doesn't match the question	1
		Able to answer the question, not yet able to connect, and the final result is wrong	2
		Able to answer the question, not yet able to connect, but the final result is correct	3
		Able to answer the question and connect, but the final result is wrong	4
		Able to answer a question and connect, but the final result is correct	5
Students can connect and apply mathematical concepts to other disciplines	can	Didn't answer at all	0
		The answer doesn't match the question	1
		Able to answer the question, not yet able to connect, and the final result is wrong	2
		Able to answer the question, not yet able to connect, but the final result is correct	3
		Able to answer a question and connect, but the final result is wrong	4
		Able to answer a question and connect, but the final result is correct	5
Students can connect and apply mathematical concepts to everyday life	can	Didn't answer at all	0
		The answers don't match the question	1
		Able to answer the question, not yet able to connect, and the final result is wrong	2
	to	Able to answer the question, not yet able to connect, but the final result is correct	3
		Able to answer a question and connect, but the final result is wrong	4
		Able to answer a question and connect, but the final result is correct	5

Calculation of the total score proportion of each problem-solving indicator ( $P_k$ ) in Siregar &

Surya, 2017 used:  $P_k = \frac{\text{Student scores on each indicator}}{\text{Maximum score on each indicator}} \times 100\%$  with the qualifications below:

**Table 2.** Qualifications of Mathematical Connection Ability on Each Indicator (Siregar & Surya, 2017)

Percentage	Qualifications
$85 \leq P_k \leq 100$	Very Good
$70 \leq P_k \leq 84,99$	Good
$55 \leq P_k \leq 69,99$	Good Enough
$40 \leq P_k \leq 54,99$	Less
$0 \leq P_k \leq 39,99$	Very Less

### 3. The technique Data Analysis

The data analysis technique used in this research is 1) data reduction, at this stage the existing data are grouped based on the results of a personality trait questionnaire which is then scored on the mathematical connection problem, selecting samples that represent each of the Big Five personality dimensions (extraversion, conscientiousness, neuroticism, agreeableness, and openness), and summarizes the data that has been obtained, 2) data presentation by describing student's mathematical connection ability based on the Big Five personality grouping on the topic of a polyhedron, 3) withdrawal of all activities and results obtained from research that done.

## D. Findings and Discussion

### 1. Findings

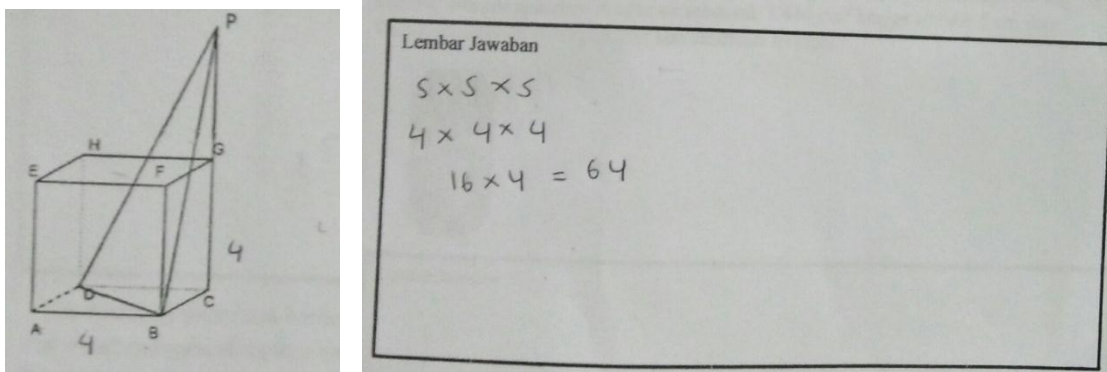
Based on the results of answering the Big Five personality questionnaire, there were 1 student (4%) has been categorized as extraversion, 2 students (8%) have been categorized to agreeableness, 2 students (8%) have been categorized to conscientiousness, 1 student (4%) has been categorized to neuroticism, and 19 students (76%) have been categorized to openness. The results of the student's mathematical connection ability based on the Big Five personality were shown in the following table.

**Table 3.** Student's Mathematical Connection Ability Based on The Big Five personality

The Big Five Personality Dimension	The Number of Students	Indicator 1		Indicator 2		Indicator 3	
		Percentage	Qualification	Percentage	Qualification	Percentage	Qualification
Extraversion	1	60	Good Enough	0	Very Less	0	Very Less
Agreeableness	2	60	Good Enough	25	Very Less	25	Very Less
Conscientiousness	2	60	Good Enough	35	Very Less	25	Very Less
Neuroticism	1	20	Very Less	0	Very Less	20	Very Less
Openness	19	64,21	Good Enough	27,37	Very Less	34,21	Very Less

The student worksheets that will be analyzed are students who have different category of The Big Five personality and their answer to the mathematical connection test that stands out the most. The author conducts interviews to complete the data and performs analysis on the answer sheets of selected students based on The Big Five personality, which is as follows.

## a. Worksheet and interviews of ZN who has categorized to extraversion



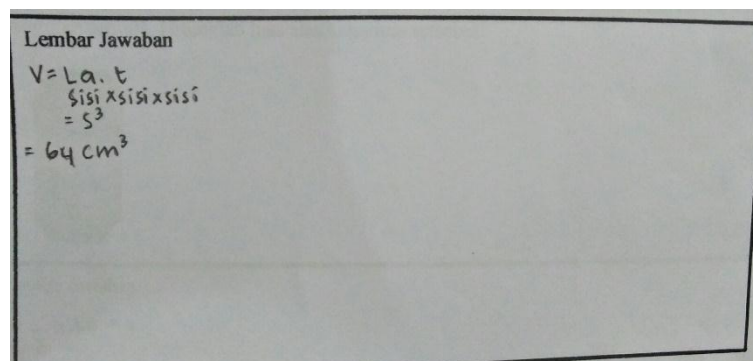
**Figure 1.** The Answer of ZN On Question Number 1

From Figure 1, it is known that ZN with extraversion tends to be easier to socialize, active, people-oriented, optimistic, fun, and full of affection. ZN has been able to connect between mathematical concepts, namely in identifying the length of the side of the cube, but she is not shown yet how to get the value 4 as the length of the side of the cube. ZN is still incomplete in writings  $s \times s \times s$  as the volume and unit volume used.

ZN did not answer question number 2, 3, and 4. This indicates that ZN has not been able to understand the problem well, to connect mathematical concepts related to the area of the base and the volume of several spatial shapes with the concept of science (physics) related to pressure on solids, to work on problems and finding the final solution to the problems given, and to connect mathematical concepts related to polyhedron with some examples of mathematical problems in everyday life.

- P : "When you answered the questions, what did you think?"  
 ZN : "The questions were difficult. I'm confused."  
 P : "What were the steps to answer question 1?  $s \times s \times s = 4 \times 4 \times 4 = 16 \times 4 = 64$  for what?"  
 ZN : "It was a volume of a cube."  
 P : "How can you assume that the cube edge is 4 cm?"  
 ZN : "I don't know, sist."  
 P : "What did you think to answer question 2? How?"  
 ZN : "At that time, I thought to use the formula that had been taught before, but I was confused so I didn't answer it."  
 P : "When you answered question 3, what did you think to answer it? What must you do first? How to find it?"  
 ZN : "A little bit. I gave up."  
 P : "When you answered question 4, what did you think?"  
 ZN : "I don't know, sist. Hehehe."

## b. Worksheet and interviews of KS who has categorized to agreeableness



**Figure 2.** The Answer of KS On Question Number 1

KS who has categorized as agreeableness tend to be kind, gentle, full of trust, forgiving, has altruistic, responsive, and empathetic traits, in figure 2 of the KS worksheet it is known that KS

was able to answer correctly, but it is not yet known how they connect between a mathematical concept in the form of a polyhedron (using the diagonal length of the plane known in the problem to find the side length of the cube). KS didn't answer sheet number 2 which indicates that KS has not been able to connect mathematical concepts related to the volume and area of the base from polyhedron with the concept of pressure on liquids in science material (Physics).

Lembar Jawaban

$$V = \frac{1}{2} \times Lp \times t$$

$$= \frac{1}{2} \times$$

**Figure 3.** The Answer of KS On Question Number 3

Based on Figure 3, it is known that KS is still wrong in understanding the concept of volume in a prism by writing the formula for the volume of the prism which is then multiplied by half. KS did not continue his work to find the results of the problems given, so it could be concluded that KS was still unable to connect concepts in mathematics to solve sample problems in everyday life.

Lembar Jawaban

$$2(p\ell + \ell t + p t)$$

$$2(10 \cdot 15 + 15 \cdot 6 + 10 \cdot 6)$$

$$2(150 + 90 + 60)$$

$$2 \cdot 300$$

$$= 600 \text{ cm}^3$$


---


$$= 4$$

**Figure 4.** The Answer of KS On Question Number 4

The final solution of question number 4 that has been written by KS is 4, in figure 4 shows that the KS has been able to find the surface area of the gift box in the form of cuboids, but she is still unable to connect the surface area of the gift box and the area of the wrapping paper that will be used to cover it. She is also not able to understand the related mathematical concepts that will be used to solve example problems in everyday life.

- P : "What did you feel when you do the test?"  
 KS : "It's so difficult. I'm confused and didn't understand."  
 P : "For number 1, how could you answer?"  
 KS : "I know the formula, sister."  
 P : "What is the formula about?"  
 KS : "The formula of a cube, sister."  
 P : "Why you answer 64 directly?"  
 KS : "I'll write 4 as a side before, but the time was over."  
 P : "How could you answer number 2?"  
 KS : "It didn't answer yet, because I'm confused."  
 P : "But, did you find the way?"  
 KS : "I must calculate it but it did not."  
 P : "How could you answer number 3?"  
 KS : "I forgot the volume of a prism, so it can't be solved."  
 P : "For number 4, what must we find?"  
 KS : "First, we have to find the area of surface, size of wrapping paper."

Then the surface area is divided by the number of gift boxes. But the result is not finished yet, sis”

P : “Okay, thank you. When studying the previous topic, was it effective in a pandemic like this?”

KS : “No, it was not. Because of that, I’m confused and not optimal yet.”

c. Worksheet and interviews of FA who has categorized to conscientiousness

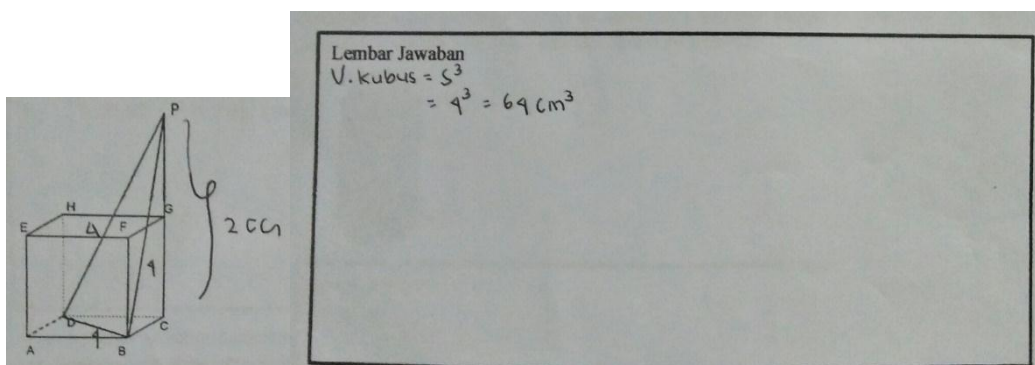


Figure 5. The Answer of FA On Question Number 1

FA who has categorized as conscientiousness tend to be organized, reliable, hardworking, independent, precise, conscientious, ambitious, and diligent. From Figure 5, it is known that FA has been able to answer the question correctly and determine the length of the edge on the cube, but has not shown in the worksheet the steps in obtaining the length of the edge using the diagonal length of the plane that is known in the problem.

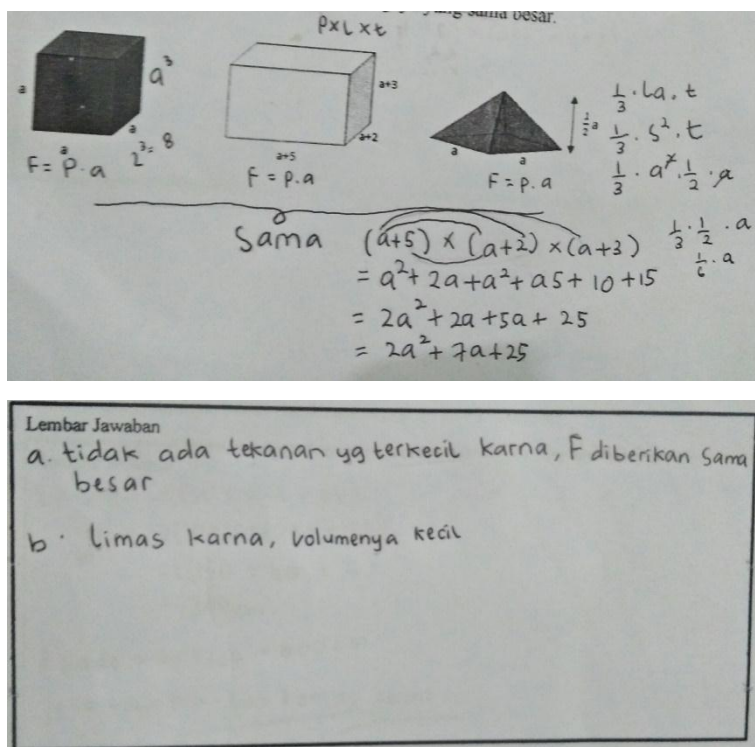


Figure 6. The Answer of FA On Question Number 2

From the student worksheet in Figure 6, it is known that the FA's answering question number 2a has not been able to relate the concept of the pressure formula to the area of the base which will later be used to compare the volume between the polyhedron. FA perceived all pressure to be the same because it is known that the applied force is equal. FA has been able to answer question number 2b correctly with the reasons written on the figure of the space where she has been looking for the volume of the spatial shape of the known edge but there are still errors in the algebraic concept of finding the volume of cuboids and pyramids. FA also got



around by calculating the edge in the shape with a number, there is 2 to find the volume of each shape.

Lembar Jawaban

$$l_a = \frac{V}{t}$$

$$= \frac{100}{50}$$

$$= 2 \text{ cm}$$

**Figure 7.** The Answer of FA On Question Number 3

Based on Figure 7, it is known that FA has been able to write the concept of prism volume correctly and can derive the formula to find the area of the prism base but FA still does not understand the volume and height of the prism that will be used to solve the given problem.

Lembar Jawaban

$$L.p \text{ balok} = 2(P \times l + P \times t + t \times l)$$

$$= 2(10 \times 15 + 10 \times 6 + 15 \times 6)$$

$$= 2(150 + 60 + 90)$$

$$= 300 \text{ cm}$$

$$k.kado = 60 \times 100 = 600 \text{ cm}$$

$$150 \text{ balok} = \underline{\underline{300 \text{ kertas kado}}}$$

**Figure 8.** The Answer of FA On Question Number 4

From Figure 8, it is known that FA already knows the steps they will use to find the final solution to the problems given, but in the process, there are still mistakes in the operation so that she is not able to solve the problems given.

- P : "How you answer question number 1?"
- FA : "First, it's confusing sis. From  $4\sqrt{2}$  then 4 as edge or sides. To find the volume, substitute the edge to the volume formula which it is obtained  $64 \text{ cm}^3$ ."
- P : "How could you answer question number 2?"
- FA : "Point a) there's no smallest pressure because the force that was given is equal, b) pyramid because I calculate one by one and then pyramid has the smallest volume."
- P : "How could you answer number 3?"
- FA : "I'm confused, didn't understand. I know the formula but when I substitute the number it's confusing."
- P : "How could you answer number 4?"
- FA : "Not accurate, not multiplied by 2, so the result is 300 wrapping paper. I thought 300 cm, 600 wrapping paper, 300 top-down, 300 right, and left. 600 only get 1 gift box so if for example 150 boxes of blocks are multiplied by 2. "

d. Worksheet and interviews of NI who has categorized to neuroticism

Lembar Jawaban  
 $V. \text{Kubus} = La.t$   
 $= s.s$

**Figure 9.** The Answer of NI On Question Number 1

NI was categorized as neuroticism where the personality shows emotional instability, self-control, and low motivation. This personality type is associated with poor self-concept and low self intelligence. The NI's answer to question number 1 in figure 9 shows that she already understands the question and knows the volume formula to be used but when deriving the formula, NI only writes that the volume formula for the cube is  $s.s$  and has not been able to determine the length of the edge cube from the length of diagonal that has been known from the question.

On the question number 2 and 3, NI can't answer the question given at all, thus indicating that NI has not been able to connect the concept of pressure on solids with the concept of volume and area of the base in polyhedron and has not been able to connect and apply mathematical concepts that have been studied previously to solve the question as an example of daily life problem.

Lembar Jawaban  
 $2. (Pl+lt+Pt)$   
 $2(10.15+15.6+10.6)$   
 $2(150+90+60)$   
 $2.300$   
 $600$

**Figure 10.** The Answer of NI On Question Number 4

In figure 10, it is known that NI is only able to write down the surface area of the base on cuboid and has not been able to relate it to other concepts to solve the problem given. NI has not been able to apply mathematical concepts to solve the problem of daily life.

- P : "What did you feel when you do the test?"  
 NI : "I thought that it was so difficult, I can't solve it and wanna give up."  
 P : "When you answer question number 1, how to do it?"  
 NI : "We have to find the volume of a cube with all of its sides is equal."  
 P : "How to answer question number 2?"  
 NI : "I did not know. I am confused. Unthinkable because I am thinking about another matter."  
 P : "How to answer question number 3?"  
 NI : "I'll divide it before, but I'm not confident with my answer so I answer another one."  
 P : "How to answer question number 4?"  
 NI : "I used the formula but I didn't know further so it was just a piece."

e. Worksheet and interviews of BHM who has categorized to openness

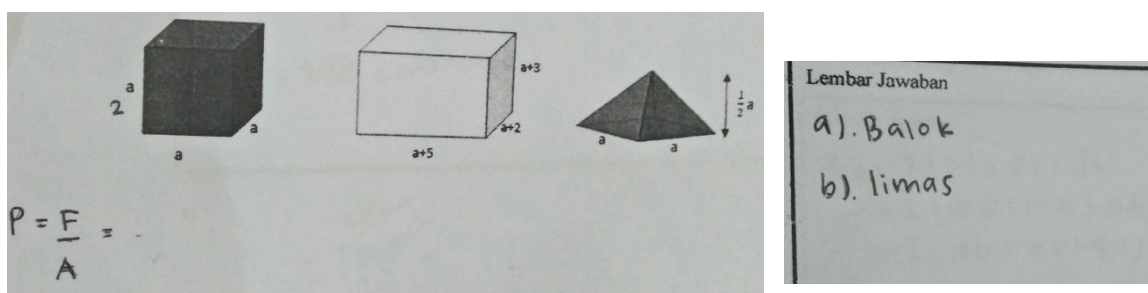
Lembar Jawaban

$$5^3 = 4^3$$

$$= 64$$

**Figure 11.** The Answer of BHM On Question Number 1

BHM was categorized as openness that describes individuals with a high sense of knowledge and gets motivation from themselves. An individual with high openness scores has higher critical thinking skills. The result of question number 1 that has been seen in figure 11 shows that BHM was able to answer the question correctly and was able to determine the edge cube to find the volume, but it has not been written in the worksheet how to work on getting 4 as edge cube by utilizing the diagonal length field known in the question.



**Figure 12.** The Answer of BHM On Question Number 2

From figure 12 it is known that BHM has been able to answer the question. On the worksheet, the pressure formula is written but it is not explained further about reasons and other work steps correctly.

Lembar Jawaban

$$V = La \cdot t$$

$$La = \frac{V}{t}$$

$$= \frac{1440}{5}$$

$$= 288 \text{ cm}^2$$

**Figure 13.** The Answer of BHM On Question Number 3

Figure 13 shows that BHM has written the correct answer to the question given. She has been able to find the area of the base of a prism by being able to determine the volume and height that will be used to answer the problem.

Lembar Jawaban

$$L_p = 2(pl + pt + lt)$$

$$= 2(10 \cdot 15 + 10 \cdot 6 + 15 \cdot 6)$$

$$= 2(150 + 60 + 90)$$

$$= 150 \text{ cm}^2$$

40 kertas kado

**Figure 14.** The Answer of BHM On Question Number 4

Based on figure 14, it is known that BHM has been able to find the surface area of the gift box in the form of cuboid, but she is still not precise in the numerical calculation operation. BHM has not been able to connect the concept of wrapping paper area to the surface area of the gift box which will be used to find a solution to the example of the problem given.

- P : "How was the test? How did you do it?"
- BHM : "I'm confused in the beginning like I am blank."  
 "I see the question, try to understand it. My mathematics teacher said that the formula in mathematics is not only one, using the logic instead."
- P : "When you answer question number 1, what did you do first?"
- BHM : "I already know the answer."
- P : "Why you think that the answer was it?"
- BHM : "Because mathematics is absolute, sis."
- P : "Why you know that the side is 4 cm?"
- BHM : "From the Pythagoras theorem to find cube sides and then to find the volume."
- P : "And then, what is 64?"
- BHM : "It was a volume of cube, sis, but it's not written yet."
- P : "How to answer question number 2?"
- BHM : "I just know the  $a$ . The pressure is inversely proportional to the base, if the pressure is large it means that it is getting smaller. I see there is an addition on the cuboid so it means the pressure is getting smaller because of the large base of the cuboid. For b) the volume is less than the pyramid because the pyramid is a piece of a cuboid."
- P : "Cuboid or cube?"
- BHM : "Cube."  
 "If the cube is small, then the pyramid is smaller than the cube."
- P : "How you answer question number 3?"
- BHM : "First, it was so tricky. When I read and try to understand I know that the water was  $1.440 \text{ cm}^3$ , height 5 cm and then it substitutes to the formula and we get the base area is  $288 \text{ cm}^2$ ."
- P : "How to answer question number 4?"
- BHM : "I calculate the surface area, it was  $150 \text{ cm}^2$  and then the size of wrapping paper is  $6000 \text{ cm}^2$  so  $6000/150$  we get 40 wrapping papers. 150 boxes can be wrapped in 40 wrapping paper."
- P : "Please, calculate it once more."
- BHM : "Uh, it was wrong, sis."  
 "There were  $600 \text{ cm}^2$  for gift boxes,  $6000 \text{ cm}^2$  is an area of 1 paper. 1 paper for 10 boxes so 15 wrapping papers for 150 boxes."



**Figure 15.** The Students are doing the test of mathematical connection in class room



**Figure 16.** The Students are doing the test of Big Five Personality traits in class room

## 2. Discussion

The author assesses 25 student's worksheet and classifies them based on the Big Five personality: 1) ZN is a student who has categorized to extraversion, 2) KS is a student who has categorized to agreeableness, 3) FA is a student who has categorized to conscientiousness, 4) NI is a student who has categorized to neuroticism, 5) BHM is a student who has categorized to openness, to determine the student's mathematical connection ability based on their Big Five personality types to solve problems about polyhedron topic.

Student's mathematical connection ability based on the Big Five personality 1) student who has categorized to extraversion on indicator 1 was good enough with the percentage of 60%, both on indicator 2 and 3 were very less with the percentage of 0%, 2) student who has categorized to agreeableness on indicator 1 was good enough with the percentage of 60%, both on indicator 2 and 3 were very less with the percentage of 25%, 3) student who has categorized to conscientiousness on indicator 1 was good enough with the percentage of 60%, on indicator 2 was very less with the percentage of 35%, and on indicator 3 was very less with the percentage of 25%, 4) student who has categorized to neuroticism on indicator 1, 2, and 3 were very less with the successive percentages of 20%, 0%, 20%, and 5) student who has categorized to openness on indicator 1 was good enough with the percentage of 64.21%, both on indicator 2 and 3 were very less with the successive percentages of 27.37% and 34.21%.

The results showed that agreeableness, conscientiousness, and openness had a fairly dominant percentage of each indicator, and neuroticism had the lowest percentage. This is in line that conscientiousness, openness, and agreeableness related to academic performance and neuroticism related to disrupted academic performance (Komarraju et al., 2009). Openness has the highest percentage of mathematical connection ability and neuroticism has the lowest percentage of mathematical connection ability. This finding is reinforced by previous research that individuals with high openness scores have higher critical thinking skills (McCredie & Kurtz, 2020), and individuals who were categorized as neuroticism are associated with poor self-concept and low self-intelligence (Furnham et al., 2003).

## E. Conclusion

From findings and discussion, it is known that the percentage of student's mathematical connection ability is different for each personality type. The personalities which have a lower percentage than the others are extraversion with the percentage of mathematical connection

ability on indicators 1, 2, and 3 were 60%, 0%, and 0% and neuroticism was 20%, 0%, 20%. The personalities with a higher percentage seen from each indicator with the percentage on indicators 1, 2, 3 are conscientiousness with 60%, 35%, and 25%, agreeableness with 60%, 25%, and 25%, and openness with 64.21%, 27.37%, and 34.21%. It is necessary to do further research related to the significance of student' mathematical connection ability based on the dimension of big five personality so it may be help the teacher to provide appropriate treatment for students in learning as an effort to improve student' mathematical connection ability.

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