

PROFILE OF UNDERSTANDING THE CONCEPT OF PYTHAGORAS THEOREM OF CLASS VIII STUDENTS IN TERMS OF COGNITIVE STYLE

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ABSTRACT

Students' concept understanding needs to be profiled so that teachers can find out the level of description and understanding of students' mathematical concepts. The purpose of this study was to describe how the understanding of students of SMP Negeri Model Integrated Madani Palu in understanding the concept of pythagorean theorem in terms of cognitive style Field Independent (FI) and Field Dependent (FD). This type of research is descriptive with qualitative approach. The subjects in this study were students of class VIII Kihajar Dewantra SMP Negeri Model Integrated Madani Palu consisting of one student cognitive style Field Independent and one student cognitive style Field Dependent selected based on the results of the GEFT test. The instruments used in this study were GEFT test, concept understanding questions and interview guidelines. The results showed that students with Field Independent cognitive style can solve problems well based on indicators of concept understanding compared to students with Field Dependent cognitive style. Based on these conditions, in the learning process the teacher should pay attention to the learning model used in learning activities

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1. INTRODUCTION

Mathematics is one of the important sciences in shaping attitudes calculations, symbols, requires reasoning skills, and understanding of concepts. According to (Sumardjan, 2017) states that "Learning mathematics will be more successful if the learning process is directed towards the concepts and structures contained in the material

being taught, in addition to the related relationships of concepts and structures. According to (Nurdin et al., 2019) learning mathematics requires preparation in a variety of innovative and creative teaching strategies, approaches or media so that students are interested in learning mathematics and students can understand concepts well and deeply. The ability to understand concepts is the most important aspect for the learning process, by understanding student concepts students find it easier to solve math problems that really require a lot of formulas and the material provided by the teacher can be carried out properly (Cahani & Effendi, 2019).

According to (Mulyani et al., 2018) that every student must have the ability to understand concepts because the ability to understand concepts is the initial foundation in building problem solving, critical thinking, representation, connection, communication, argumentation and creative mathematical skills. Each student needs to have the ability to understand good concepts in order to solve math questions because the main purpose of learning mathematics is to be able to understand good and appropriate concepts (Nurdin et al., 2019).

Concept understanding is one of the mathematical abilities that has an important aspect in learning mathematics and is a basic ability that must be possessed by students in providing explanations and arguments for the solutions that students have obtained, so that students are not confused about what they have solved. It can be concluded that understanding concepts is very important in the learning process, because understanding concepts will make it easier for students to learn mathematics. In learning mathematics, teachers must also know the pattern of learning behavior for or the characteristics of their students well. This can be seen from their learning style, there are students who only read can immediately understand the concept, there are students who have to repeat with practice problems before understanding the concept, and there are also students who take notes first and then the concept. According to (Wulandari & Muhandar, 2019). Learning styles affect a person's differences in terms of organizing, gathering information, processing information and experiences gained to be applied. Differences in learning styles are called cognitive styles.

Cognitive style in the aspect of psychologists is divided into two, namely cognitive style field dependent and cognitive style field independent. Where the two concepts of cognitive style Field Dependent (FD) and cognitive style Field Independent (FI) derived from field studies on perception by psychologists from America, namely H. A Witkin in (Yin, 2020). FI cognitive style students are characteristics of individuals who are able to analyze in separating elements from the context more analytic. FD cognitive style students are characteristic of individuals who process information globally so that their perceptions are easily affected by the environment. Each individual must have a different cognitive style background, so that the process of processing information when analyzing problem solving will also differ according to the cognitive style perspective.

Considering the importance of understanding mathematical concepts for students in learning mathematics, the researcher made preliminary observations at SMP Negeri Model Terpadu Madani Palu, class VIII Kihadjar Dewantara. Based on the results of interviews with one of the teachers who taught at the school, he said that there were still students who were not able to use the Pythagorean theorem, such as in writing the formula, and determining the length of the hypotenuse in a right triangle. Learning mathematics at school requires every student to be able to achieve learning objectives. Students' concept understanding needs to be profiled so that teachers can know the description of the understanding of mathematical concepts possessed by students. This knowledge can be

used by the teacher as a reference in developing appropriate strategies, approaches, models and learning methods when learning takes place.

Based on this information, the researcher concluded that it is important for teachers to know the profile of students' concept understanding. Therefore, the researcher was interested in conducting a study entitled Profile of Pythagorean Theorem Concept Understanding of Class VIII Students of SMP Negeri Madani Palu Integrated Model in View of Cognitive Style. The purpose of this study was to describe how the understanding of grade VIII students of SMP Negeri Model Integrated Madani Palu in understanding the concept of Pythagoras theorem in terms of cognitive style FI and FD.

2. METHOD

This type of research is descriptive research with a qualitative approach. This type and approach was used because this research was conducted to describe the understanding of the concept of students of class VIII SMP Negeri Model Integrated Madani Palu in the ability to understand the concept of Pythagoras theorem in terms of cognitive style naturally or in accordance with the facts found in the field and in the form of description. Data in this study were taken based on the cognitive style of students. In this study researchers took two students of class VIII Kihadjar Dewantara SMP Negeri Integrated Model Madani Palu consisting of 20 students as research subjects with the category of having cognitive style Field Independent (FI) and Field Dependent (FD). To determine the level of ability of students, researchers used cognitive style ability tests using the Group Embedded Figure Test (GEFT) instrument and conducted interviews. The interview technique used is unstructured interview. Interviews will be conducted who were selected from the GEFT test results, namely 1 student of FI cognitive style and 1 student of FD cognitive style.

Table 1 Cognitive Style Criteria

Type of Cognitive Style	Student Score
Field Independent	$10 \leq \text{Gaya Kognitif} \leq 18$
Field Dependent	$0 \leq \text{Gaya Kognitif} \leq 9$

Based on the research objectives, to determine students with FI and FD cognitive styles, researchers gave a written test on understanding the concept of Pythagoras theorem consisting of three items. The test questions were prepared based on indicators of concept understanding based on the 2013 curriculum. Data analysis used in this study refers to qualitative data analysis according to (Miles et al., 2014) conducted interactively through the process of data condensation, data presentation and conclusion/verification.

Based on the research objectives, the answers to the Pythagorean theorem concept understanding test of students with FI and FD cognitive styles. Therefore, to make it easier to see the understanding of the concept of students researchers used indicators of understanding of concepts according to the curriculum 2013, namely: restating concepts that have been learned, giving examples or not examples of concepts learned, developing necessary and sufficient conditions of a concept. The following is described about each indicator of concept understanding used.

Table 2 Indicators of Concept Understanding

Concept Understanding Indicator	Description
Restate concepts that have been learned	At this point learners are expected to be able to re-express what has been communicated/explained to them.
Identifying examples and non-examples	Learners are expected to be able to apply and select the correct concept in solving or resolving a problem with the correct steps.
Develop necessary and sufficient conditions of a concept	Students are expected to know a concept that we need to know the conditions first, whether it is a necessary or sufficient condition.

3. RESULTS AND DISCUSSION

a. Results

Selection of subjects in this study was done by giving a cognitive style test in class VIII SMP Negeri Integrated Model Madani Palu. Cognitive style classification test used is Grop Embedded Figure Test (GEFT) developed by Witkin (1971). This GEFT consists of three parts. The first part consists of seven items, the second and third part each nine items. In the GEFT if you answer correctly, then each question will be given a score of 1 and if wrong or do not answer will be given a score of 0. From the cognitive style test, the subjects taken are students with the category of FI and FD cognitive style.

The GEFT filling was carried out on Tuesday, December 12, 2023. The GEFT filling was carried out during free time, where the subject teacher did not have time to fill the predetermined schedule. So the researcher filled the free time for one lesson hour. This research was conducted with the approval of the math subject teacher. from the results of filling out the GEFT, the following data can be obtained:

Table 3 GEFT Results of Class VIII Students

No	Cognitive Style	Number of Students
1	Field Independent	2
2	Field Dependent	18
Total		20

Based on the results of GEFT known that students with cognitive style FI as many as 2 students and students with cognitive style FD as many as 18 students. From the results obtained and based on suggestions from mathematics teachers in this study, then selected ADR students with FI cognitive style and NKAAS with FD cognitive style.

1. Subjects with Field Independent Cognitive Style Ability

a. Restate the concept that has been learned

The written test results of FI subjects in restating concepts that have been learned can be seen in Figure 1.

.. ~~panjang~~ cara mencari panjang sisi dalam tersebut adalah, kita harus menjumlahkan kuadratnya dan masukkan ke rumus pythagoras

$$8^2 + 6^2 = c^2$$

$$64 + 36 = 100$$

$$\sqrt{100} = 10 \text{ m}$$

M1-FI-02

M1-FI-01

Figure 1 FI's answer in restating the concept that has been learned

Based on Figure 1, the FI subject uses words and then substitutes them into the pythagorean theorem formula to solve problem number 1. The following are the results of the FI subject's interview in strengthening the answer number 1

- PI-M1-02 : Explain what is meant and known from the problem?
- FI-M1-02 : It says here eee... the length of side A to R, the length of side B to S, the length of side C to P and the length of side D to Q are all the same right, the length is 8m. Now the length of the side from R to B, side S to C, side P to D and the length of side A to Q are also the same 6 right?
- PI-M1-03 : Then how to solve it?
- FI-M1-03 : For the solution, I used the pythagorean theorem formula, so I normalized each side. For example, if AR, BS, CP, and DQ are equal to 8 m I let's say a, the length of the sides RB, SC, PD, and AQ are equal to 6 let's say b and the length of the unknown side of the pool I let's say c.
- PI-M1-04 : After that?
- FI-M1-04 : I put it into the formula $a^2 + b^2 = c^2$. Then eee... $8^2 + 6^2 = c^2$ so here 8^2 is equal to 64 and 6^2 is 36, 64 is added to 36 which gives 100 and 100 is scaled which gives 10.

Based on the answer sheet and interview results, it shows that the FI subject understands the problem. FI subject explained how to solve the problem [M1-FI-01]. FI subject is able to work on the problem by using the right formula and the results of solving the problem with the right answer [M1-FI-02].

b. Identifying examples and non-examples

The written test results of FI subjects in identifying examples and non-examples can be seen in Figure 2.

.. ~~$25 + 64 = 89$~~

B. 5, 12, 13

$25 + 144 = 169$

M1-FI-03

Figure 2 FIs' Answers in Identifying Examples and Non-Examples

Based on Figure 2, the results of the FI subject's answers in identifying examples and non-examples by determining the shape of the Pythagorean triple. Furthermore, the researcher conducted an interview with the FI subject to obtain further information. The following are the results of the FI subject's interview in identifying examples and non-examples.

- PI-M1-05 : For question 2, what is the question asking and how do you answer it?
- FI-M1-05 : Problem number 2 asks for the form of a Pythagorean triple and the process is the same using the Pythagorean theorem formula, but the sum of

- the squares of the largest number is equal to the sum of the squares of the largest number is equal to the sum of the other squares.
- PI-M1-06 : How was it resolved?
- FI-M1-06 : eemm... I let $a=5$, $b=12$ and $c=14$. Then $5^2+12^2=13^2$ where 5^2 is equal to 25, 12^2 is equal to 144 and 13^2 is equal to 169. So the final result is $25+144=169$.
- PI-M1-07 : So which of parts a, b and c are pythagorean triples?
- FI-M1-07 : Part b, sis.
- FI-M1-08 : Why did you only say part b is a pythagora triple?
- FI-M1-08 : Yes, because the results of parts a and c, the sum of the most squared sides is not the same as the sum of the other two squared sides.

Based on the answer sheet and the results of the interview above, it can be seen that the FI subject understands problem number 2. ADR subject can know the meaning of the question from the problem and can explain the solution of the problem. FI subjects can work on problems by substituting into the formula correctly and choosing the right answer [M1-FI-03].

c. Develop necessary and sufficient conditions of a concept

he results of the FI subject's written test in developing the necessary and sufficient conditions of a concept can be seen in Figure 3.

The image shows handwritten mathematical work for developing necessary and sufficient conditions. The work includes the following steps and callouts:

- M1-FI-04**: Initial data: $DK = AB = 15 \text{ cm}$, $AC = 24 \text{ cm}$, $AD = 20 \text{ cm}$.
- M1-FI-05**: Question: $DK = BD?$
- M1-FI-06**: Calculation of AE : $Penye = AC = 24 \div 2 = 12$, $AB = 15$. Then $12^2 + x^2 = 15^2$, $144 + x^2 = 225$, $x^2 = 225 - 144 = 81$, $x = \sqrt{81} = 9$.
- M1-FI-07**: Calculation of ED : $penye = ED$, $20^2 - 12^2 = 400 - 144 = 256$, $ED = \sqrt{256} = 16$.

Figure 3 FI's answer in developing necessary and sufficient conditions

Based on Figure 3, the results of the FI subject's answers in developing necessary and sufficient conditions. Furthermore, the researcher conducted an interview with the FI subject to obtain further information. The following are the results of the interview with FI subject in developing necessary and sufficient conditions.

- PI-M1-13 : So, what are the working steps?
- FI-M1-13 : First, I looked for the length of eemmm ... this is the BE side first, right, we already know $AB = 15$ and the length of AE where AE is $\frac{1}{2}$ of AC so the length of AE = 12. So $12^2+x^2=15^2$ right...
- PI-M1-14 : Yes, then?
- FI-M1-14 : Then 12^2 is equal to 144 and 15^2 is 225. So 144 eemm... 225 plus 144 equals 81. Well, 81 is a root form so $\sqrt{81}=9$. So the length of BE is equal to 9.
- PI-M1-15 : After that, what next?

- FI-M1-15 : eeemmm... looking for the length of ED, it's already known that AE = 12 cm and AD was eeem... 20 cm. Still using the Pythagorean theorem, so $ED^2 = 20^2 - 12^2$ emm 20^2 is equal to 400 and 12^2 is equal to 144. Then $400 - 144 = 256$, because 256 is still in root form means $\sqrt{256} = 16$.
- PI-M1-16 : Is that the end of the process?
- FI-M1-16 : No, after that I added the results of BE and ED, the value of BE = 9 and ED = 16.

Based on the answer sheet and interview results above, it can be seen that subject FD understands problem number 3. Subject FD can inform and write what is known from the problem [M1-FD-08]. Subject FD explained how to find the length of side BD, first finding the length of side BE [M1-FD-09]. After subject FD found the length of side BE, then subject FD determined the length of side ED [M1-FD-10]. So it can be concluded that the FD subject is able to develop the necessary and sufficient conditions of a concept.

2. Subjects with Field Dependent Cognitive Style Ability

a. Restate the concept that has been learned

The written test results of subject FD in restating the concepts that have been learned can be seen in Figure 4.

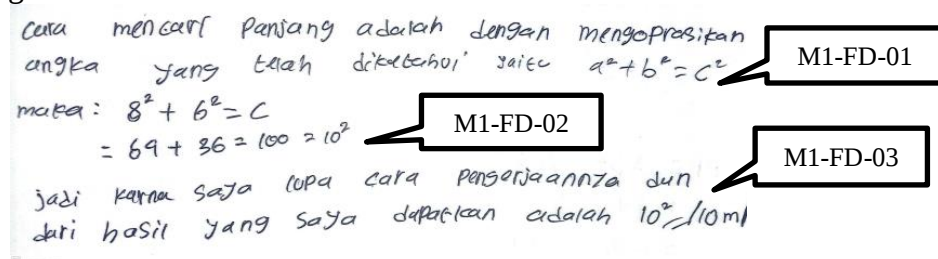


Figure 4 FD's answer in restating the concepts that have been learned

Based on Figure 4.4, it can be seen that subject FD explains using words and mentions the formula that will be used to work on M1 question number 1. The following are the results of the FD subject interview in strengthening the answer number 1 as follows.

- PI-M1-02 : Tell me what is known and what is asked from the problem?
- FD-M1-02 : What is known from this problem is AR, BS, CP, DQ = 8 cm and RB, SC, PD, AQ = 6cm. Then the question is ... hmm ... the length of the sides of the PQRS pool because the lengths of the sides are unknown.
- PI-M1-03 : Then how to solve it?
- FD-M1-03 : For the solution use $a^2 + b^2 = c^2$.
- PI-M1-05 : Okay. Try to explain how it's done
- FD-M1-05 : Here 8 I suppose a and 6 I suppose b, then I put it into the formula so it's $8^2 + 6^2 = c^2$. From this result, we can know the length of each side of the pool.

Based on the results of the interview above, it can be seen that subject FD understands the problem. Subject FD can inform what formula is used to work on the problem [M1-FD-01]. Subject FD then substituted the value into the formula [M1-FD-02]. Furthermore, subject FD concluded the answer to the problem correctly [M1-FD-03].

b. Identifying examples and non-examples

The written test results of subject FD in identifying examples and non-examples can be seen in Figure 5.

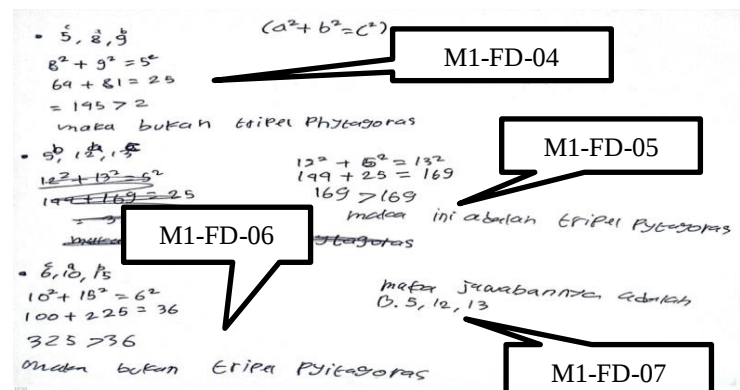


Figure 5 FD's answer in identifying examples and non-examples

Based on Figure 5, subject FD substituted into the pythagorean theorem formula to solve problem number 2. The following is the transcript of the FD subject's interview in strengthening the answer to question number 2.

PI-M1-06 : Explain how to work on number 3?

FD-M1-06 : For number 2, the work uses the Pythagorean theorem formula with the condition that the value of c is equal to a plus b. Part a) 5, 8, 9 I enter the formula $8^2 + 9^2 = 5^2$.

PI-M1-07 : Why is the c value 5?

FD-M1-07 : Hmm... (silence)

PI-M1-08 : Ok, next?

FD-M1-08 : For part b) 5, 12, 13 I suppose a =12, b= 5 and c=13 after that I put it into the formula $12^2 + 5^2 = 13^2$, the result obtained is $169 = 169$.

PI-M1-09 : Then part c?

FD-M1-09 : For part c, it's the same, I suppose a=10, b=15 and c=6.

Based on the answer sheet and interview results above, it can be seen that subject FD understands problem number 2. When conducting interviews with subject FD based on the results of the answers, subject FD can inform what is known and asked from the problem. Subject FD explained the formula used for problem number 2. In addition, subject FD can solve problem number 2 and explain the use of the pythagorean theorem formula used by normalizing each side with the condition that c must be equal to a plus b, where c is the longest side. Subject FD wrote the answers clearly in parts a, b and c [M1-FD-04, M1-FD-05, M1-FD-06]. although there were some mistakes in his writing. In addition, subject FD also chose the answer with the right option [M1-FD-07]. So it can be concluded that FD subjects are able to provide examples and non-examples of the concepts studied.

c. Developing necessary and sufficient conditions of a concept

The written test results of subject FD in identifying examples and non-examples can be seen in Figure 6.

$$\begin{aligned} \text{Dik: } AC &= 24 \\ AB &= 15 \\ AD &= 20 \\ BE^2 &= AB^2 - AE^2 \\ &= 15^2 - 12^2 \\ &= 225 - 144 \\ &= 81 \\ &= 9 \\ ED^2 &= AD^2 - AE^2 \\ &= 20^2 - 12^2 \\ &= 576 - 144 \\ &= 432 \\ &= 20.7 \\ BD &= 10.7 \quad (\text{hasil}) \end{aligned}$$

M1-FD-08 points to $AD = 20$
 M1-FD-09 points to $BE^2 = AB^2 - AE^2$
 M1-FD-10 points to $ED^2 = AD^2 - AE^2$
 M1-FD-11 points to $BD = 10.7$

Figure 6 FD's answer in developing necessary and sufficient conditions

Based on Figure 6, the subject substituted into the pythagorean theorem formula to solve problem number 3. The following is the transcript of FD subject's interview in strengthening the answer number 3.

- PI-M1-11 :Ok. Next question number 3, what do you understand about question number 3?
- FD-M1-11 :For question number 3, we are looking for the BD side, automatically what we need to find out is the AE side first, eee... the wrong BE, then the ED so that we can find the BD side or automatically what is known is first searched, starting with finding the BE side.
- PI-M1-12 :Then?
- FD-M1-12 :From the question, it is already known that $AB = 15\text{cm}$, $AC = 24\text{ cm}$ and $AD = 20\text{ cm}$. For that I looked for the value of BE first by using the Pythagorean theorem formula which is $BE^2 = AB^2 + AE^2$.
- PI-M1-13 :What is the length of AE?
- FD-M1-13 :For AE it is $\frac{1}{2}$ of the length of AC, because the length of AC intersects at point E where the value of AC is emmm.... $AC = 24$ so the value of AE = 12.
- PI-M1-14 :Ok, then after that?
- FD-M1-14 : After the BE value is known, then I look for the value of the ED length, using the same formula, namely the Pythagorean theorem formula $ED^2 = AD^2 + AE^2$. After I get the value of ED, I automatically add it to the value of BE and ED.

Based on the answers and interview results, subject FD can understand problem number 3. Before subject FD determines the solution method, subject FD first informs and writes down what is known from the problem [M1-FD-08]. Subject FD explained that to find the length of side BD first find the length of side BD [M1-FD-09]. After knowing the length of the BD side, subject FD then looked for the length of the ED side [M1-FD-10]. From the way of working, it can be seen that subject FD can understand problem number 3 well, so it can be concluded that subject FD is able to develop the necessary and sufficient conditions of a concept.

3.2 Discussion

After two research subjects were selected, the following is a discussion of the research results, namely the concept understanding profile of students with FI and FD abilities based on indicators of concept understanding. The discussion can be explained as follows.

1. Concept Understanding Profile of Field Independent (FI) Students

Indicators of restating concepts that have been learned. Based on the results obtained, the FI subject explained in words for working on the problem using the Pythagorean Theorem formula. Furthermore, the FI subject informs and explains what is known from the problem before starting work. This is in line with research conducted by (Khairunnisa & Setyaningsih, 2017) that if students are able to explain what information is listed in the problem, this information will later be used to solve the problem given by the problem. In addition, the FI subject explained how to work on using the Pythagorean theorem formula clearly and correctly, so that the results he got were also correct. This is also in accordance with research (Suparwati K, 2020) that someone is said to understand if he can explain again what he understands using his own language.

Indicator of giving examples and non-examples. FI subject identified examples and non-examples of Pythagorean triples. FI subject explained the use of the formula for solving problem number 2, after getting the result FI subject explained that part b of problem number 2 is an example of a Pythagorean triple. In addition, the FI subject stated that parts a and c of question number 2 were not examples of Pythagorean triples. This is in line with research conducted by (Amir, 2015) that a student has the ability to understand a mathematical concept if the student is able to do several things, one of which is to give examples and non-examples or illustrations related to a concept to clarify the concept.

Indicators of developing necessary and/or sufficient conditions for a concept. In line with (Fitrianti et al., 2016) that the subject identifies what is known to determine the purpose or outcome of the task. The FI subject determines the method of solution based on the known value of the problem, as explained by the FI subject who stated that to solve problem number 3 we must first find what is a necessary condition for working on the problem using the Pythagorean theorem formula. After getting these conditions, the FI subject continued the next step of work by using the same formula, namely the Pythagorean theorem. After the FI subject works according to the steps of working on problems that contain necessary and sufficient conditions, the FI subject adds up the results of his work. So that the FI subject can get the answer correctly and understand the steps of work done. This is in line with (Skemp, 2020) opinion that students who have a rational understanding can do a calculation consciously and understand the process carried out.

2. Concept Understanding Profile of Field Dependent (FD) Students

Indicator of restating a concept. The results of the FD subject were processed, namely the FD subject mentioned what was known from the problem and asked from the problem. This is in line with research conducted by (Achir et al., 2017) that FD subjects are able to express known and questionable information correctly and precisely. FD subjects normalized each side length of the square by substituting the values of a and b in the Pythagorean theorem formula and solving the given problem. This is in line with research conducted by (Khairunnisa & Setyaningsih, 2017) that if students are able to explain what information is listed in the problem, this information will later be used to solve the problem given by the problem.

Indicator of giving examples and non-examples. Subject FD identified examples and non-examples of pythagorean triples. Subject FD explained that to solve problem number 2 by using the Pythagorean theorem formula, but the condition is that the value of the highest side must be the same as the other two sides. In addition, subject FD mentioned what was known and asked from the problem. This is also in accordance with (Fajar et al., 2019) research that a person is said to understand if he can explain what he understands using his own language. Subject FD stated that part b number 2 is a form of triple Pythagoras while parts a and c number 2 are not forms of triple Pythagoras. Based on the answer of subject FD, the answer given is correct but there is a mistake in working on problem number 2 part a. This is because subject FD did not re-examine the answers that had been done. In line with the research of (Rahmatiya & Miatun, 2020) who said that the Subject will not recheck the answers he has answered, but will draw conclusions from the answers he has obtained.

Indicator of developing necessary and/or sufficient conditions of a concept. Subject FD was able to work on problem number 3 by developing necessary conditions and necessary conditions. Subject FD mentioned what was known and what was asked from the problem. Subject FD said that to work on problem number 3 we must first know the unknown part of the problem by using the known values from the problem as necessary conditions. In (Khairunnisa & Setyaningsih, 2017) that if students are able to explain what information is listed in the problem, this information will later be used to solve the problem given by the problem. In addition, the results of research by (Fitrianti et al., 2016) that the subject identifies what is known to determine the purpose or outcome of the task explains first looking for the unknown side of the problem. After the FD subject determines what is a necessary condition, then the FD subject determines the next result by using the same steps or solution, namely by using the Pythagorean theorem formula. The results of the FD subject's work obtained were not correct in working on problem number 3. This was clarified in the interview with subject FD where subject FD explained how to solve the problem. However, the actual answer of subject FD is not correct because there is an error in calculating. This is in accordance with research conducted by (Pratiwi, 2015) which says that FD subjects in solving problems are less structured and less precise.

Based on this description, there is a suitability of Field Dependent (FD) cognitive style characteristics that tend to be difficult to focus on one aspect and analyze patterns into different parts. It is also in accordance with the results of research (Nurmalia et al., 2019) that the FD subject in describing the answer is not in accordance with the problem.

4. CONCLUSION

Based on the results of research and discussion, it can be seen that students with FI and FD cognitive styles have differences in understanding the concept. It can be seen from the results of the concept understanding test that FD cognitive style students made more mistakes when compared to FI cognitive style students. FI cognitive style students are able to restate the concepts that have been learned, able to identify examples and not examples but only write answers that are examples, able to develop necessary and sufficient conditions of a concept. FD cognitive style students are able to restate the concepts that have been learned, able to determine examples and not examples but in substituting into the FD formula there are errors, able to develop necessary and sufficient conditions but the final result obtained is not appropriate.

The influencing Factors occur because Students with FD cognitive style use more passive approach in learning. Learning objectives tend to be followed as it is, so well-organized learning objectives are needed. In learning FD individuals want learning

materials that are well organized and stated externally, external motivation, external reinforcement, and teacher instructions. While FI cognitive style students are characteristics of individuals who are able to analyze in separating elements from the context more analytically. FI cognitive style students are characteristic of individuals who process information globally so that their perceptions are easily affected by the environment. Suggestions from this study are expected teachers should pay attention to the understanding of the concept of students who are cognitive style field independent and field dependent, because it takes a good understanding of the concept so that students do not experience difficulties in learning. In addition, teachers should develop strategies, models and learning methods that will be used in learning so that all students can achieve learning objectives.

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