DAFTAR ISI

Analysis of The Students Number Sense on Integer Operations Reviewed From Cognitive Style

Baiq Filaily Komariani[1], Lalu Sucipto[2], Kiki Riska Ayu Kurniawati[3]

[1,2,3]Tadris Mathematika, UIN Mataram, NTB, Indonesia

baiqfilaily15@gmail.com[1], ciptobajok@uinmataram.ac.id[2], kikirak27@uinmataram.ac.id[3]

ABSTRACT

Keyword:

Number Sense;
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Cognitive Style.

This research aims to describe the number sense capabilities of students MTs. Islam Selaparang Putra on integer operations are reviewed from cognitive style. This research is a qualitative descriptive research. The subject of this study was 4 people, 2 field dependent subjects and 2 field independent subjects. The instruments used are group embedded figures test, number sense test sheets, and interview guidelines. Data analysis techniques are done by reducing data, presenting data, and drawing conclusions. The validity of the data is using the triangulation method. The number sense capability is analyzed based on the number sense indicator which is (1) understand the value and symbol numbers, (2) understand the relationship between numbers, (3) understand the decimal number system, (4) understand the meaning of number operations, (5) understand the relationship between number operations, (6) Perform calculations correctly, (7) have a wide range of settlement strategies, (8) have the ability to estimate the value of a calculation. The result of this research is the subject of field dependent less using the number of his sense in answering questions and only meet one indicator. While the subject of field independent uses the number of his sense to answer the problem and fulfill two indicators.

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A. INTRODUCTION

Number sense is a useful understanding of the logic intelligence of students in the field of mathematics, especially on numbers (Wagner & Davis, 2010). Number sense is an understanding that when trained and then developed correctly and in depth will be very beneficial for students, because it is very good to support the intelligence of logic in the field of mathematics especially on numbers (Setiana & Purwanto, 2016). Therefore, people who have a good number of sense can use their understanding of the numbers to solve a mathematical problem (Fahrudin Amirulloh, 2013).

Number sense is important in learning mathematics, because students are required to be sensitive to numbers to make it easier to solve problems related to numbers (Woods et al., 2018). Burton and Reys in Islam Al Amin said that number sense is a person's way of viewing a number and its calculations, to solve complex problems (Hidayat, et al., 2014). Number sense

must be owned by the student to make it easier to solve problems related to the number (Fitri et al., 2019).

Indicators and components of the number sense capability according to the NCTM 2000 are as follows (Oizumi & Kasuyama, 2016):
1. Have sensitivity to numbers or anything related to the number of
    a. Understand the value and symbol numbers
    b. Understand the relationship between numbers
    c. Understand decimal number system
2. Proficiency and mastery of the operations
    a. Understand the meaning of number operations
    b. Understanding the relationship between number operations
3. Ability to apply knowledge and expertise to numbers and operations on calculations
    a. Can perform calculations correctly and in a conceptual efficient time
    b. Have a wide range of settlement strategies and can choose one of those strategies that are most effective and efficient.
    c. Have the ability to estimate the value of a calculation

Students naturally solve a problem differently because students have cognitive style (Busari, 2018). The difference in cognitive style is differentiated based on psychological which is divided into two, namely the Cognitive Style field independent (FI) and field dependent cognitive style (FD) (Puspananda et al., 2017). Students who have a cognitive style of FI often prefer self-learning that allows responding better to fulfill the purpose of learning. Students who have cognitive style FD often learn mathematics with groups (Gani et al., 2019).

Rusty states that number sense as a big idea includes a numerical area of reasoning where the concept is difficult to explain precisely but recognisable when students use it (Ginanjar & Widayanti, 2018). A growing number of sense can be recognized when a student is given a problem then with a nimble he is looking for ways to break it (Purnomo et al., 2017).

According to Amstrong and Priola (Sasmita & Raihan, 2014), individuals who have cognitive-style field independent are more fond of analytic and dislike interpersonal relationships. This suggests that the individual field independent prefers to be alone and do something aloof when compared to field dependent individuals who like to engage in interactions with others. The cognitive students of field dependent are strongly influenced by the environment or are dependent on the environment (Lativa eva, 2013), while the cognitive student field independent is not or less affected by its environment. The difference in cognitive style field dependent and field independent can be seen in the following table (Cahyadi, 2019).

Table 1. Difference in Cognitive Style Field Dependent and Field Independent (Adibah, 2015)

No.	Cognitive style field dependent	Cognitive style field independent
1.	Tend to think globally, looking at objects as a whole with their environment, so that their perception is easily affected by environmental change	It has the ability to analyze to separate objects from the surrounding environment, so that the perception has no effect on environmental changes
2.	Tend to have difficulties in abstracting relevant information from supporting instruction about harder learning	Find it easy to abstract information from supporting instructions on harder learning
3.	Remembering from socially oriented parts	Given more significant, structural, and functional information on mathematical parts
4.	It would be better if given maximum guidance	Learning how to learn mathematics will be more effective if given minimum guidance and

		given maximum chance for discovery
5.	Often try to understand and learn such information as presented and without compromising it	Tends to impose structures that are rendered in ambiguous or unstructured formats
6.	Has social orientation	Learn more individually or tend to be more individualistic

Individual field dependent and field independent indicators are as follows.

1. When carrying out tasks or solving problems
    a. Individual field dependent will work better if it is given extra hints or guidance.
    b. Individual field independent will work better if given the freedom to be alone.
2. In its influence by environmental factors
    a. Individual field dependent has a tendency to be easily influenced by the environment.
    b. Field independent individuals have a tendency not to be influenced by the environment.
3. In completing tasks or solving a problem (problem solving) that require a skill
    a. Individual field dependent will produce good if given extra hints and resolve a problem within a long period of time.
    b. Individual field independent will generate good fast if given freedom and resolve problems quickly if he does it with his own.

Based on the preliminary study, so the importance of number sense in mathematics learning so that it needs to be reseached how to analyze students number sense ability, and the difference of cognitive style also has to explain the ability of someone to solve the problem. In resraerch this researchers intend to uncover the extent to which numbet sense ability of middle school students and students who have cognitive style field dependent and field independent their sense of numbers are equal or different. Then the researcher took the title of the analysis of number sense ability of students on the operation of integers reviewed from the cognitove style.

B. METHODS

The study uses a qualitative descriptive approach with descriptive methods (Sugiyono, 2017). This research was conducted at MTs Islam Selaparang Putra Kediri West Lombok. The subject of this study was 4 students from 25 students of the VII B class, 2 subjects with a cognitive style of field dependent and 2 subjects with a cognitive style field independent. The instruments used are group embedded figures test, number sense test sheets, and interview guidelines. Data analysis techniques are done by reducing data, presenting data, and drawing conclusions. Check the validity of data using triangulation methods. The type of triangulation used is method or technique (H. Mudjia Rahardjo, 2010), in this study using tests and interviews to get the data on the same source in different ways. The number sense capability is analyzed based on eight number sense indicators which are (1) understand the number and symbol values, (2) understand the relationship between numbers, (3) understand the decimal number system, (4) understand the meaning of number operations, (5) understand the relationship between number operations, (6) can do the calculation correctly, (7) have a wide range of settlement strategies, (8) have the ability to estimate the value of a calculation.

C. RESULT AND DISCUSSION

Based on the validity of data using triangulation technique pairing test result data and interviews, it can be known based on the number sense capability indicator on integer oration. Obtained data analysis result as follows:

1. Number sense test result student cognitive style field dependent one (FD1)

$$
\begin{array}{r}
5.881 \\
7.232 \\
\hline 13.113
\end{array} +
$$

Figure 1. Number Sense Ability Test Result FD1 Answer Number One

$$
\begin{array}{r}
7.0882 \\
6.882 \\
\hline 120
\end{array}
$$

Figure 2. Number Sense Ability Test Result FD1 Answer Number Two

$$
\begin{array}{r}
38 \\
85 \\
+90 \\
\hline 304 \\
\hline 3.230
\end{array}
$$ ×
+

Figure 3. Number Sense Ability Test Result FD1 Answer Number Three

$$
6 \overline{)366}
$$
$$
36
$$
$$
6
$$

Figure 4. Number Sense Ability Test Result FD1 Answer Number Four

$$
P = 12 \times 32 = \quad = 348
$$
$$
Q = 17 \times 23 = \quad = 381
$$
$$
R = 20 \times 19 = \quad = 386
$$

Figure 5. Number Sense Ability Test Result FD1 Answer Number Five

$$
\begin{array}{r}
77 \\
99 \\
\hline 703 \\
703 \\
\hline 7.733
\end{array}
$$ ×

Figure 6. Number Sense Ability Test Result FD1 Answer Number Six

2. Number sense test result student cognitive style field dependent two (FD2)

$$5.881$$
$$7.232 +$$
$$13.113$$

Figure 7. Number Sense Ability Test Result FD2 Answer Number One

$$7.002$$
$$6.882$$
$$1.000$$

Figure 8. Number Sense Ability Test Result FD2 Answer Number Two

Figure 9. Number Sense Ability Test Result FD2 Answer Number Three

$$366 : 6 =$$

Figure 10. Number Sense Ability Test Result FD2 Answer Number Four

Figure 11. Number Sense Ability Test Result FD2 Answer Number Five

Figure 12. Number Sense Ability Test Result FD2 Answer Number Six3

3. Number sense test result student cognitive style field independent one (FI1)

$$5.881$$
$$7.232$$
$$\overline{13.113}\, +$$

Figure 13. Number Sense Ability Test Result FI1 Answer Number One

$$7.002\, -$$
$$6\ 8\ 8\ 2$$
$$\overline{\ 1\ 2\ 0}$$

Figure 14. Number Sense Ability Test Result FI1 Answer Number Two

$$38 \times 85 =$$
$$85$$
$$\overline{490}$$
$$\underline{34}$$
$$3230\, +$$

Figure 15. Number Sense Ability Test Result FI1 Answer Number Three

$$6\overline{)366}\ ^{61}$$
$$\underline{36}$$
$$06$$
$$\underline{6}$$
$$0$$

Figure 16. Number Sense Ability Test Result FI1 Answer Number Four

$$\begin{array}{ccc}
12 & 17 & 20 \\
32 & 23 & 19 \\
\overline{29}\times & \overline{51}\times & \overline{180}\times \\
36 & 34 & 20 \\
\overline{384} & \overline{395} & \overline{380}
\end{array}$$

Figure 17. Number Sense Ability Test Result FI1 Answer Number Five

$$6 \times 79 = 735$$
$$12 \times 85 = 918$$
$$\left.\right\} 1653$$

$$735$$
$$918$$
$$\overline{1653}\, +$$

Figure 18. Number Sense Ability Test Result FI1 Answer Number Six

4. Number sense test result student cognitive style field independent two(FI2)

$$5.881$$
$$7.232$$
$$\overline{13.113} \, +$$

Figure 19. Number Sense Ability Test Result FI2 Answer Number One

$$7.002$$
$$6.882$$
$$\overline{120}$$

Figure 20. Number Sense Ability Test Result FI2 Answer Number Two

$$38$$
$$85$$
$$\overline{190}$$
$$304$$
$$\overline{3230}$$

Figure 21. Number Sense Ability Test Result FI2 Answer Number Three

$$61$$
$$6 \, \overline{)366}$$
$$36$$
$$\overline{0}$$
$$0$$
$$\overline{0}$$

Figure 22. Number Sense Ability Test Result FI2 Answer Number Four

$$P. \; 12 \times 32 = 384 \, . P$$
$$Q. \; 17 \times 23 = 381. Q$$
$$R. \; 20 \times 19 = 380 . R$$

Figure 23. Number Sense Ability Test Result FI2 Answer Number Five

$$77$$
$$99$$
$$\overline{7233}$$

Figure 24. Number Sense Ability Test Result FI2 Answer Number Six

Based on the validity of data using triangulation technique pairing test result data and interviews, it can be known based on the number sense capability indicator on integer oration. Based on the first indicator, the result that the subject of FD1 and FD2 is able to understand the value and symbol numbers in question number one and two views of the subject of the interview FD1 and FD2 able to read about thousands, hundreds, tens, and units. However, it does not understand the value and symbol of numbers in the third to sixth question, where the subject FD1 and FD2 read about the existence of unit values only. While the subject of FI1 and FI2 able to understand the value and symbol numbers in the number one to six question, namely, able to read about thousands, hundreds, tens, and units.

Based on the second indicator obtained the results that the subject of FD1 and FD2 have not been able to understand the relationship between numbers seen from the completion of numbers one to six, subjects FD1 and FD2 only operate units only, as well as the results of interviews FD1 subjects and FD2 did not perceive that there are units, tens, hundreds, even thousands. While the subject of FI1 has not been able to understand the relationship between numbers seen from the completion of the number one to six subjects FI1 only operate units only, but for the subject of FI2 able to understand the relationship between numbers, namely, the number of thousands operated by the number of thousands, the number of hundreds are operated with hundreds, the number of tens operated, and the number of units.

According to the third indicator the results of the FD subject and the FI subject are not contained in the data that the FD and FI subjects understand the decimal number system seen from the completion and the results of interviews number one to six there is no ten-based number which means that the number value is grouped in tithing.

Based on the fourth indicator obtained the result that the subject FD1 FD2, and FI2 seen from the completion and the results of interviews are able to understand the meaning of addition operations, subtraction, multiplication, and division. But not to question number six. While the subject FI1 seen from the completion and the results of the interview subject FI1 able to understand the meaning of operation on all the problems of addition operations, subtraction, multiplication, and division.

Based on the five results the resulting FD subject and FI subject were seen from the completion and the interviews did not record that the FD and FI subjects understood the relationship between the number operations in question number one to six. In the sixth problem FD and FI subject to use only one operation.

Based on the sixth indicator The result is that the subject FD1 the completion of the calculation is correct in question number one, two, three, and four only. Subject FD2 The completion of the calculation is correct in question number one and five only. The FI1 and FI2 subjects correctly calculated on the number one to five questions.

Based on the seventh indicator the results were obtained that the FD subject and the FI subject did not find data that the FD subject and the FI subject had a wide range of settlement strategies. The FD and FI subjects only use a procedural calculation strategy that is seen in the number one to six questions.

Based on the eighth indicator the results of the FD subject and the FI subject were not found as reference that the FD subject or the FI subject were able to estimate the value of a calculation.

D. CONCLUSION AND SUGGESTIONS

Based on the results of data analysis and the discussion that has been shown in this research is concluded that the field dependent subject is less using the number in answering the problem

and only fulfills one indicator in resolving the six problems that have been given. While the subject of field independent uses the number of his sensenya to answer the question and fulfill the two indicators in completing the six problems that have been given.

Advice to other researchers who will examine the ability of number sense of students based on cognitive style to examine on other levels, such as college, high school, or elementary school. Other researchers who will be researching about number sense should use other variables, because by using the student's cognitive style variables will answer the group embedded figures test with a long time, so that when researching requires insufficient time for a meeting of mathematical subjects.

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