

Analysis of Understanding Concept in Solving Mathematics Story Problems using CRI in Terms of Personality Types

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Abstract

This research was aimed to determine the understanding concept of students in solving mathematics story problems CRI in terms of personality types. The research method was descriptive qualitative. Subjects in this research were as many as 4 students, each 2 students with Extrovert personality types and 2 students with intorvert personality types. Technique of Data collecting in this research using questionnaire instrument of personality type, about written story and interview. Based on the data analysis, the results of research indicate that: (1) the understanding concept of subject with extrovert personality type is at the level of ability of translation and interpretation. In solving the mathematical story problems, they are able to identify, present and apply the broad concept and circumference of the circle and provide a high CRI scale. Extrovert personality type shows that solving the subject matter is not careful, in a hurry as to dare to take risks from the work, done and to underestimate a thing, and to like the practical things. (2) the understanding concept of subject with intorvert personality type is at the level of translation ability. In solving the mathematical story, they are only able to identify and present the concept of circles and provide a low CRI scale. According intorvert personality type that shows in solving the subject matter are meticulous, careful, careful in solving the story problem, causing the subject with intorvert personality type to be shy and not confident with the answers they write.

Key Words: Understanding Concept; CRI; Extrovert-Introvert Personality Type.

INTRODUCTION

Mathematics understanding concept is one of the important goals in the objectives of learning mathematics, which is to give the understanding that the material taught to students is not just memorizing, understanding mathematics is also one of the goals of any material presented by the teacher, because the teacher is the student guide for achieve the expected concept (Prasetyorini, 2013). Mathematical problems in the form of stories understand better understanding than other problems. Solving math story problems is not an easy thing because story problems don't just depend on the final answer. Mathematics consists of various concepts that are related to one another. When a question is converted into a question, students must first look for what is known in the problem.

Based on an interview with one of the high school math teachers, it was stated that the problem that is often faced is the level of understanding of students' concepts in solving math story problems. The questions that have been presented only know what students still don't understand how to solve, especially when students have to solve questions in the form of stories. The cause of the low mathematics achievement of students may be problems in the level of understanding of students' concepts that are not optimal, low mastery of mathematics materials and low student interest in mathematics.

Jung classified personality types into two major groups based on how to focus their attention, namely the extrovert personality type and the introvert personality type. These two personality types, of course, the way students think in solving math problems is different, starting from how to find information on the questions, analyze questions, think about the process of solving them to how to solve problems and conclude them. According to Kudratullah's research results, "Research subjects with personality types who tend to be extrovert are less able to solve math problems well, so research subjects tend to need other people to influence their way of thinking in solving math problems they face and research subjects look nervous (tense) if influenced by people. Others and tend not to need other people to solve their problems, so that research subjects with personality types who tend to be introvert can solve the math problems they face well (Kudratullah, 2013). This means that the personality of each student has an influence on the ability of students to solve math story problems.

One alternative that can be used to analyze students' conceptual understanding is the Certainty of Response Index (CRI) technique developed by Saleem Hasan (Fitria, 2014). CRI is one way to differentiate students' understanding of concepts. At CRI students provide a level of certainty in utilizing knowledge of concepts, laws or principles in answering a question. Based on the description above, the researcher thinks it is necessary to research the "Analysis of Students' Understanding of Concepts in Solving Mathematical Story Problems Using the Certainty of Response Index (CRI) in terms of Personality Types".

Based on the background that has been stated above, the formulation of the problem in this research is "how do students understand concepts in solving math story problems using a certainty of response index (CRI) in terms of personality type?" The purpose of this research was to obtain a description of the analysis of students' conceptual understanding in solving math story problems using a certainty of response index (CRI) in terms of personality types.

RESEARCH METHODS

This type of research is qualitative research which aims to describe the analysis of students' conceptual understanding in solving story problems using the Certainty of Response Index (CRI) in terms of personality types. The location of this research will be carried out at SMA Negeri 8 Makassar for the 2020/2021 school year. Class XII students of SMA Negeri 8 Makassar for the 2020/2021 school year.

The stages of the research that will be carried out are as follows: In the initial activity, observations of the research location were carried out to obtain information from the school regarding research permits, information about class XII mathematics teachers, and the number of students. Designing instruments as a means of collecting data in this study consisted of story questions on circle material and personality type questionnaires. The main activity in this study is to provide a personality type questionnaire to students, then select students who have extrovert and introvert personality types. Provide written tests regarding story questions on circle material to students who have been selected based on personality types. In the final stage of this research, the researcher collected all the data that had been obtained, then the data obtained were analyzed qualitatively, then discussed the research results and drew conclusions and wrote a research report.

The data in this research were obtained from four students as research subjects. The four subjects were selected based on the student's personality type, namely the extrovert personality type and the introvert personality type. To determine the student's personality type, the researcher gave a questionnaire to class XII students then analyzed the questionnaire that the students had filled in, then selected four students, two students each with an extrovert personality type and two students with an introvert personality type. After determining the chosen research subject, then given a test and followed by an interview. Researchers obtained data on students' conceptual understanding in solving story problems on circle material, especially the subject of the area of the circle, the circumference of the circle, the area of the circle and the length of the arc. After obtaining the results of tests and interviews with four students, the researcher identified the students' understanding of the concept in solving the given story questions. To make it easier to analyze data in this section, each dialogue passage or chat is given a specific code.

Student personality type data used as a measuring instrument in this study is the Eysenck Personality Inventory (EPI) test. Subjects were selected based on the results of the researcher's analysis of the questionnaire that had been given to students. The higher the score obtained will lead to the extrovert personality type and conversely the lower the score obtained will lead to the introvert personality type. So that the subjects chosen for the extrovert personality type were students with a score of 22 and 19, while the subjects selected for the introvert personality type were students with a score of 11 and 10.

RESULTS AND DISCUSSIONS

Result

The data in this research were obtained from four students as research subjects. The four subjects were selected based on the student's personality type, namely the extrovert personality type and the introvert personality type. To determine the student's personality type, the researcher gave a questionnaire to class XII students then analyzed the questionnaire that the students had filled in, then selected four students, two students each with an extrovert personality type and two students with an introvert personality type. After determining the chosen research subject, then given a test and followed by an interview. Researchers obtained data on students' conceptual understanding in solving story problems on circle material, especially the subject of the area of the circle, the circumference of the circle, the area of the circle and the length of the arc. After obtaining the results of tests and interviews with four students, the researcher identified the students' understanding of the concept in solving the given story questions. To make it easier to analyze data in this section, each dialogue passage or chat is given a specific code.

Student personality type data used as a measuring instrument in this study is the Eysenck Personality Inventory (EPI) test. Subjects were selected based on the results of the researcher's analysis of the questionnaire that had been given to students. The higher the score obtained will lead to the extrovert personality type and conversely the lower the score obtained will lead to the introvert personality type. So that the subjects chosen for the extrovert personality type were students with a score of 22 and 19, while the subjects selected for the introvert personality type were students with a score of 11 and 10.

Students' understanding of the concept in solving story problems using CRI to be presented is one of the two subjects with an extrovert personality type. The understanding of the concept of AF subjects with extrovert personality types can be seen in the answers written along with the CRI given. The results of the subject's answers, it appears that the subject writes what is known from question number 1. The subject is able to identify the story questions given by the level of the subject's understanding ability, namely translation. The subject writes down everything that is known in the story problem, without paying attention to what is known which is not used in solving the story problem. In the known section, the subject gives the CRI scale it must be true. This shows that the subject mastered the concept well because the subject answered correctly and the level of confidence given was high. Next, the subject wrote the completion of the story problem.

The subject calculates the garden area and pond area correctly and the given CRI scale is sure. The subject is able to present the concept of solving the problem. This shows that the subject mastered the concept well in answering correctly by providing a high level of confidence. Furthermore, the Subject is able to apply known concepts in calculating what is being asked correctly, but the given CRI scale is uncertain. This shows that the subject does not know the concept of answering correctly with a low level of confidence. Furthermore, the results of the subject's answer to section 1b, it appears that the subject answered correctly, was able to present and apply the concept of calculating the area of a circle. The subject provides a sure CRI scale for the answer. This shows that the subject mastered the concept well and the level of confidence given was high. Overall, the subject gave a sure CRI scale for the overall answer to story question number 1. Based on the results of the interview, it was shown that the AF subject was able to explain what he knew and what was asked from the story questions by giving the CRI scale must be correct. The results of the interview also showed that the subject understood the concept of the area of a circle and was able to apply known concepts. Based on the results of the interview and the overall subject's answers to story question number 1, it shows that the subject mastered the concept well based on the correct subject's answers and the given high CRI scale.

The results of the subject's answer to question number 2, it appears that the subject writes what is known from the problem. The subject is able to identify a given story question with the level of the subject's understanding ability, namely translation. The subject writes down everything that is known in the story problem, without paying attention to what is known which is not used in solving the story problem. In the known section, the subject gives the CRI scale it must be true. This shows that the subject mastered the concept well because the subject answered correctly and the level of confidence given was high. Next, the subject wrote the completion of the story problem, the subject solved the problem by finding the circumference of the tire correctly and the given CRI scale was sure. This shows that the subject has mastered the concept well and is able to apply the concept of circumference with a high level of confidence.

Then, the subject calculated the product of the circumference of the tire with the number of turns of the tire. The method the subject did was correct, but the CRI scale given by the subject was a guess in calculating the product of the circumference of the tire circle with the number of tire rotations. This shows that the subject answered correctly with a low level of confidence. Next, the subject writes the conclusion that the answer is given correctly, namely changing the unit distance traveled by the car and the given CRI scale is sure. This shows that the subject is able to conclude the correct answer with a high level of confidence. However, on the whole the subject was not sure about the correct answer that had been written. Based on the results of the interview, it shows that the AF subject is able to describe what is known and asked from the story problem by giving the CRI scale it must be correct and the subject understands the concept well about the circumference of the circle. However, overall the subjects were unsure of the correct answer. Based on the results of the interview and the subject's overall answer to story question number 2, it shows that the subject does not know the concept with a low level of confidence in the correct answer about calculating the distance traveled by the car.

The results of the subject's answer to question number 3, it appears that the subject writes what is known from the problem. The subject is able to identify a given story question with the level of the subject's understanding ability, namely translation. The subject writes down everything that is known in the story problem, without paying attention to what is known which is not used in solving the story problem. In the known section, the subject gives the CRI scale it must be true. This shows that the subject mastered the concept well because the subject answered correctly and the level of confidence given was high. Next, the subject wrote the completion of the story problem, the subject solved the problem by finding the area of the pizza correctly and the given CRI scale was sure. This shows that the subject understands the concept well and is able to apply the concept of the area of a circle with a high level of confidence. Then, the subject completed what was asked from the questions. The way that the subject is done is correct without using the concept of wide breadth. However, the CRI scale the subject gave was guesswork. This shows that the subject answered correctly with a low level of confidence. Overall, the subject is unsure of the correct answer that has been written is not sure. Based on the results of the interview, it showed that the AF subject was able to explain what he knew and what was asked from the story problem by giving a CRI scale that must be correct and the subject understood the concept well about the area of a circle, however, overall the subject was not sure of the correct answer. Based on the results of the interview and the subject's overall answer to story question number 3, it shows that the subject does not know the concept with a low level of confidence in the correct answer about calculating the distance traveled by the car.

The results of the subject's answer to question number 4, it appears that the subject writes what is known from the problem. The subject is able to identify a given story question with the level of the subject's understanding ability, namely translation. The subject writes down everything that is known in the story problem, without paying attention to what is known which is not used in solving the story problem. In the known part, the subject gives the CRI scale it must be true. This shows that the subject mastered the concept well because the subject answered correctly and the level of confidence given was high. Next, the subject wrote the completion of the story problem, the subject finished the part a question correctly and the given CRI scale was not sure. This shows that the subject understands the concept well and is able to apply the concept of the angle between the two bars with a low level of confidence. Furthermore,

the subject writes the conclusion of the answer to part a correctly but gives a CRI scale not sure so that the subject can be concluded that the subject lacks concept in solving the given story problems.

The subject's answer to story question number 4 part b shows that the subject is able to write the formula for finding the arc length correctly with the given CRI scale is sure. This shows that the subject understands the concept of arc length with a high level of confidence. Furthermore, the subject resolves the problem by finding the center angle, but the answer is wrong and the CRI scale given is sure. This shows that the subject does not understand the concept with a high level of confidence. Then, the subject calculates the circumference of the circle. The way the subject is done is right, but the subject answers wrong because of the way the subject calculates the large center angle. This shows that the subject answered wrong with a high level of confidence. Overall, the subject is sure of the wrong answer that has been written. Overall the subject answered incorrectly the story questions given by giving a sure CRI scale. This shows that the subject has a misconception in calculating the arc length of a circle when answering wrongly with a high level of confidence according to the given CRI scale is sure.

Based on the results of the interview, it shows that the AF subject is able to explain what is known and what is asked of the story questions by giving the CRI scale it must be true and the subject understands the concept, however, overall the subject is not sure of the correct answer. Based on the results of the interview and the subject's overall answer to story question number 4 part a, it shows that the subject does not know the concept of arc length with a low level of confidence in the correct answer. The results of the interview also showed that the subject understood the concept of looking for arc length and was unable to identify what was being asked in the story problem but gave the CRI scale with confidence. This shows that the subject has a misconception in identifying what is being asked because it has given the wrong answer with a high level of confidence. Based on the results of the interview and the subject's overall answer to story question number 4, it shows that the subject has a low level of confidence in the concept understanding for the correct answer to the concept of calculating the distance traveled by the car.

Based on the description of students' understanding in solving the story problems above, the two subjects with the extrovert personality type were able to describe what was known and asked from the given story questions. The level of students' concept understanding ability based on the CRI scale is given at the level of translation and interpretation. This is in accordance with the aspect of assessing someone with an extrovert personality type which shows that in solving story problems the subject is not careful, is in a hurry to solve questions so that they dare to take risks from being done and underestimate things, and like practical things.

Students' understanding concept in solving story problems using the CRI to be presented is one of the two subjects with the Introvert personality type. An understanding of the concept of the RH subject with the introvert personality type can be seen in the written answers and the given CRI scale. The result of the subject's answer to the answer to question number 1a, the subject calculates the area of the garden and the area of the pond correctly and the given CRI scale is sure and must be correct for the product the subject has calculated. The subject is able to present the concept of solving the problem by writing a formula for finding the area of a circle. This shows that the subject mastered the concept well in answering correctly by providing a high level of confidence. Furthermore, the subject was able to apply known concepts in calculating what was asked correctly and the given CRI scale was sure. This shows that the subject understands the concept well in answering correctly with a high level of confidence.

The result of the subject's answer to question number 1 shows that the subject answered correctly and was able to present and apply the concept of calculating the area of a circle. The subject provides a sure CRI scale for the answer. This shows that the subject mastered the concept well and the level of confidence given was high. Overall, the subject gave an almost correct CRI scale for all answers to story question number 1. Based on the results showed that the RH subject was able to explain what he knew and what was asked of the story questions and the subject understood the concept of circle area and was able to apply known concepts. Based on the results of the interview and the overall subject's answers to story question number 1, it shows that the subject mastered the concept well based on the correct subject's answers and the given high CRI scale.

The subject's answer to number 2, the subject solved the question by answering it wrong and the given CRI scale was not sure. This shows that the subject does not understand the concept of circumference with a low level of confidence. Overall, subjects giving the CRI scale were unsure. Based on the results of the interview, it shows that the RH subject is able to describe what is known and asked from the story problem by giving the CRI scale it must be true and the subject does not understand the concept well about the circumference of the circle, and overall the subject is not sure of the correct answer. Based on the results of the interview and the subject's overall answer to story question number 2, it shows that the subject does not know the concept with a low level of confidence in the correct answer about calculating the distance traveled by the car.

Subject's answer to question number 3, the subject answered correctly without using the formula to find the area of the radius and the given CRI scale must be correct. This shows that the subject understands the concept well and is able to apply the concept of the area of a circle with a high level of confidence. Then, the subject completed what was asked from the questions. The way the subject is done is correct without using the concept of wide-spread. This shows that the subject answered correctly with a high level of confidence. Overall, the subjects gave a nearly correct CRI scale to the correct answers that had been written. Based on the results of the interview, it shows that the RH subject is able to explain what is known and what is asked from the story problem by giving a CRI scale it must be correct and the subject understands the concept well about the area of a circle without directly using the formula for finding the area of a circle. Based on the results of the interview and the subject's overall answer to story problem number 3, it shows that the subject understands the concept with a high level of confidence in the correct answer about calculating the distance traveled by the car.

The result of RH subject's answer to question number 4a, the subject answered correctly what was asked from the story question above without writing what was known and asked about the story question. However, in question number 4 part a the subject immediately writes the answer 120° with the given CRI scale is guessing. This shows that the subject does not know the concept of answering correctly with a low level of confidence and does not write down how to get the answer. Furthermore, the results of the subject's answer in part b provide a CRI scale of uncertainty but the subject has written the correct answer as well. This shows that the subject does not understand the concept of answering correctly with a low level of confidence. Overall, the subject's understanding in calculating the arc length is lacking because the subject has answered correctly with a low level of confidence, that is, they are not sure. Based on the results of the interview the subject is able to explain what is known and what is asked in the story questions, the subject guesses the answer asked in section a, but realizes that the answer written is correct which is followed by providing an explanation during the interview. Furthermore, subjects are always unsure of their own answers. Based on the results of the interview and the answer is correct with the CRI scale given by the RH subject in the story question number 4, it is not sure that the RH subject has a misconception about finding arc length.

Based on the description of students' understanding concepts in solving story problems, the two subjects with the introvert personality type were able to identify the concepts in the story problem. However, he cannot present and apply the concept properly. The level of students' concept understanding ability based on the CRI scale provided is only at the translation level. This is in accordance with the aspect of someone having an introvert personality type, which means that the subject is thorough, careful, careful in solving story problems, but causes subjects with introvert personality types to be shy and not confident in the answers they write.

Based on the description of students' understanding in solving the story problems above, the two subjects with the extrovert personality type were able to describe what was known and asked from the given story questions. The level of students' understanding concept ability based on the CRI scale is given at the level of translation and interpretation. The level of understanding the concept of translation in question is the ability to change certain symbols into other symbols without changing meaning. Symbols in the form of words (verbal) are transformed into pictures or charts or graphs, for example the subject is able to identify the intent of the given story problem by writing down what is known and asked correctly and the level of confidence given is high. The level of understanding of the concept of interpretation referred to in this study is the ability to explain the meaning contained in symbols, both

verbal and nonverbal symbols. In this ability, a person can interpret a concept or principle if he can explain in detail the meaning or concept or principle, or can compare, contrast, or contrast with something else.

The indicator of concept understanding achieved in solving math story problems by subjects with personality types is being able to identify, present and apply the concepts that the student already has. This is in accordance with the aspect of assessing someone with an extrovert personality type which shows that in solving story problems the subject is not careful, is in a hurry to solve questions so that they dare to take risks from being done and underestimate things, and like practical things. Based on the results of the research and discussion above, it is in line with the results of research conducted by several researchers, including research conducted by Elveliah Suaebah in 2016, which concluded that students experienced conceptual understanding, namely: (1) Understanding the problem, the cause is incomplete / wrong reasoning and low student ability; (2) Planning problem solving, the cause of understanding the concept in this aspect is the student's humanistic thinking; (3) Carry out problem-solving planning. Understanding of concepts in this aspect is caused by incomplete or wrong reasoning and students' humanistic thinking.

Students' understanding of the concept in solving story problems, the two subjects with the intorvert personality type were able to identify and present their concepts. However, it can't be applied properly. The level of students' concept understanding ability based on the CRI scale provided is only at the translation level. The level of understanding the concept of translation in question is the ability to change certain symbols into other symbols without changing meaning. Symbols in the form of words (verbal) are transformed into pictures or charts or graphs, for example the subject is able to identify the intent of the given story problem by writing down what is known and asked correctly and the level of confidence given is high. The indicator of concept understanding achieved in solving math story problems by subjects with an intorvert personality type is being able to identify and present the concepts that the student already has. This is in accordance with the aspect of someone having an intorvert personality type, that the subject is careful, careful, careful in solving story problems, causing subjects with intorvert personality types to also have shyness and insecurity with the answers they write.

Based on the above discussion, it is in line with research conducted by Ratna Dwi Susanti in 2014, it concluded that students with extrovert personality have a relational understanding when reading and exploring problems, while when making plans / strategies in solving problems the subject has a relational understanding. carry out plans to solve the problem of extorvert subjects having a relational understanding. However, when looking back and reflecting on the results obtained, extrovert subjects have instrumental understanding. The results of the description of the Intorvert subject when reading and exploring the problem, the Introvert subject has a relational understanding. At the stage of making plans / strategies to solve problems, Introverts have a relational understanding. At the stage of implementing a plan to solve the problem, the Intorvert subject has a relational understanding. Meanwhile, at the stage of looking back and reflection, the Intorvert subject has a relational understanding.

CONCLUSIONS AND SUGGESTIONS

1. Understanding concept of subject with extrovert personality types is at the level of translation and interpretation skills. In solving math story problems, subjects with the extrovert personality type are able to identify, present and apply the concept of area and circumference of a circle and provide a high CRI scale. This is in accordance with the aspect of assessing someone with an extrovert personality type which shows that in solving story problems the subject is not careful, is in a hurry to solve questions so that they dare to take risks from being done and underestimate things, and like practical things.
2. Understanding concept of subject with an introvert personality type is at the level of translational ability. In solving math story problems, subjects are only able to identify and present the concept of circles and give a low CRI scale. This is in accordance with the aspect of assessing someone with an intorvert personality type which shows that in solving story problems the subject is careful, careful, careful in solving story problems, causing subjects with the introvert personality type to have a shy nature and not confident in the answers they write.

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