



Students' Mathematical Literacy Ability at Application of Besurek Learning Model

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Abstract

Based on the PISA assessment, the Mathematical Literacy ability of Indonesian students is still in the low category. Mathematical Literacy Ability includes how students are able to know and use basic mathematics to solve problems in real life contexts. Besurek Learning Model is a learning model that can solve problems in real-life contexts by facilitating the development of mathematical literacy for junior high school students. The main principle of the Besurek Learning Model emphasizes mathematical problems which are human activities and must be meaningful for students, being a motivator to improve mathematical literacy skills through learning stages. This article examines the mathematical literacy skills of students of SMP Negeri 12 Bengkulu City before and after going through the Besurek Learning Model. Prior to the application of the Besurek Learning Model, 7 students (43.7%) of the 16 students had completed mathematical literacy skills. In this initial test, the average score of students was 70.62. After learning with the Besurek Learning Model, individual post-test evaluation questions were given to students showing an increase in the results of students' mathematical literacy abilities from the previous meeting. The average score of students is 85.31 and has achieved classical learning completeness, which is 87.5% or as many as 14 students from 16 students. The results of inferential statistical analysis (Paired Sample T-test) obtained a significance value of $0.045 < 0.05$. This means that there is an increase in students' mathematical literacy skills after the application of the Besurek Learning Model in class VII students of SMP Negeri 12 Bengkulu City.

Keywords: *Mathematical Literacy; Besurek Learning Model*

Introduction

Mathematical literacy is a person's ability to formulate, apply and interpret mathematics in various contexts, including the ability to reason mathematically, use concepts, procedures, facts and mathematical aids to describe a phenomenon or event (OECD, 2019). Mathematical literacy is not only concerned with mastering the material, but also paying attention to mastering the use of reasoning, concepts, facts, and mathematical tools in solving everyday problems (Fathani, 2016). This is in accordance with the aspects of developing mathematical literacy, as formulated by the National Council of Teachers of Mathematics/NCTM (2000:7) is that students must have the ability: (1) mathematical communication, (2) mathematical reasoning, (3) problem solving, (4) mathematical connection, and (5) mathematical representation.

This PISA assessment framework shows literacy not only in language subjects, but also scientific literacy, mathematical literacy, including financial literacy. The 2018 Program for International Student Assessment (PISA) results show that Indonesian students have literacy skills with a low average score. PISA is carried out by the Organization for Economic Cooperation and Development (OECD) which tests students' literacy skills after attending basic education (15 years). Indonesian students ranked 72 out of 77 countries with an average score of 379. The mathematical literacy ability of Indonesian students only reached 28% at level 2 (OECD, 2019). The literacy that is assessed by PISA includes language/reading literacy, mathematical literacy, scientific literacy and financial literacy.

The results of observations at SMP 12 Bengkulu City, Mathematical Literacy Ability is still low, as evidenced by the inability of students to solve problems in the form of formulating, applying, and even interpreting mathematics into various contexts. Mathematical literacy skills are closely related to the demands of reading skills, being able to understand information analytically, critically and reflectively, including encouraging the ability to identify, determine, find, evaluate and create in an effective and organized manner, including the ability to communicate (Sari, 2015: 714). Literacy can be defined as the ability of students to read not only textbooks, but various phenomena in everyday life as an analytical, critical and reflective learning environment. Thus, literacy is very important for students to bridge learning activities at school with their application in everyday life. Mathematics is not just counting or doing calculations, but also a conversation (Carter, 2010:40). He believes that students can think deeply about mathematics if it is supported by a learning environment that provides a comfortable feeling to ask questions and try out mathematical ideas when trying to understand a mathematical concept, including through conversation. The implication of Carter's opinion on learning mathematics in schools is how teachers need to create a learning environment including math conversation topics that are in accordance with mathematical concepts as well as the level of students' cognitive development. According to Piaget, junior high school students are at the stage of concrete operational cognitive development (Schunk, 2012: 237-238), so that in the learning process mathematics still relies on concrete objects which in its development are directed towards something semi-abstract and abstract. Therefore, learning mathematics in junior high schools must examine or connect real contexts in everyday life in the mathematics problems being studied. This will help students see that mathematics is present in the student's world, including appreciating the usefulness of mathematics in life.

Mathematics is still considered a difficult subject and is a set of formulas that are independent of the context of students' real lives. This is indicated by the fact that most students master mathematics by memorizing without understanding, so that when given questions with different contexts, students have difficulty solving them. Mathematical literacy is the ability to understand and use mathematics in various contexts to solve problems, as well as being able to explain to others how to use mathematics. (Abidin, 2018:100). Therefore, it is necessary to study theoretically how Mathematical Literacy Ability can be facilitated or developed through learning in SMP. This stage is intended to achieve the ultimate goal of learning mathematics in junior high school, namely so that students are skilled in using various mathematical concepts in everyday life. However, in its development, learning often becomes an activity of memorizing formulas and does not vary using the real context around students. This results in students not understanding mathematical concepts thoroughly, and when given math problems in different contexts students often have difficulty. This situation creates a perception in students about mathematics that is difficult and cannot be used in the context of everyday life, which then becomes the trigger for the development of students' mathematical literacy skills. Therefore, it is necessary to develop learning that makes problems in real contexts to improve the quality of mathematics learning in junior high schools. One learning model that uses problems in a real context is the Besurek Learning Model (Read, Exploration, Arrange, Test, Review, Communication (Asmara, 2022: 67).

The Besurek Learning Model is a problem-based learning model and applies contextual problems so as to stimulate students to learn to solve real-world problems. The Besurek Learning Model has six steps which are presented in Table 1.

Table 1. Steps of Besurek Learning Model

Fase	Teacher's Role
Read	The teacher presents something related to mathematics and in everyday life
Eksplorasi	The teacher guides students in making hypotheses based on the problems given
Arrange	The teacher becomes a facilitator for students to compile problems into mathematical language and discuss to solve these problems.
Test	The teacher observes the students in testing the hypothesis.
REview	The teacher becomes a moderator in student activities to review (review) the problem solving that is done based on the results of group discussions, then guide students to conclude problem solving.
Communication	As a form of communication, the teacher asks students to make questions to be exchanged with other groups. The teacher checks students' understanding by giving open problem questions as evaluations

(Asmara, 2022: 70)

The results of the theoretical study proposed by Asmara (2022) concluded that the Besurek Learning Model can be used to train mathematical literacy because it facilitates students to carry out authentic investigations in solving real problems and can also improve mathematical literacy skills because processing students' thinking skills is optimized through the process of group work or group work. systematic team.

Method

This research is a Quasi Experimental research, this design form is a development of True Experimental Design, which is difficult to implement.

The quasi-experimental design aims to obtain information that is an approximation to the information that can be obtained by actual experimentation under conditions where it is not possible to control and/or manipulate all relevant variables. The research design used is One Group Pretest-Posttest Design. In this design, one group of subjects is used. First, a measurement (pretest) is carried out, then treatment is applied in this case the application of the Besurek Learning Model for a certain period of time, then the measurement is carried out a second time (posttest). The population referred to in this study were all grade VII students of SMP Negeri 12 Bengkulu City for the Academic Year 2021/2022 with a total of 124 people consisting of 5 classes. The sample that became the subject of the research was Class VII E students with 16 students selected as the research class. The instrument used in this research is a test of mathematical literacy ability. The test will be given in the form of an essay question. There are two kinds of statistics used for data analysis in research, namely descriptive statistics and inferential statistics. The prerequisite test in this study is the normality test, then the hypothesis testing.

Results and Discussion

The results of students' mathematical literacy abilities before being given the Besurek Learning Model were classified as very low, it was seen that the number of students who did not complete was

compared to students who finished learning. Many students who finished studying 7 people (43.7%) out of 16 students. In this initial test, the students' average score was 70.62.

After learning with the Besurek Learning Model, individual post-test evaluation questions were given to students showing an increase in the results of students' mathematical literacy abilities from the pre-test. The average score of students is 85.31 and has achieved classical learning completeness, which is 87.5% or as many as 14 students from 16 students.

Results of students' mathematical literacy skills at SMP Negeri 12 Bengkulu City before and after the Besurek learning model.

Table 2. Results of Students' Mathematical Literacy Ability

Number	Model	
	Pre Test	Post Test
1	80	90
2	83	92
3	73	85
4	70	80
5	80	88
6	60	89
7	58	85
8	83	90
9	80	88
10	60	80
11	60	68
12	74	92
13	58	73
14	73	85
15	80	92
16	58	88
	70.625	85.3125

The testing technique used is the Paired Sample T-test with a significant level = 0.05. Based on the calculation results of Statistical Package for Social Science (SPSS) 23, a significant value = 0.000 is obtained so it can be concluded that H0 is rejected and H1 is accepted because the value of sig < (0.000 < 0.05). Because the value of sig 0.045 < 0.05, there is an increase in the mathematical literacy ability of class VII E students of SMP Negeri 12 Bengkulu City before and after the application of the Besurek Learning Model. The research conducted at SMP Negeri 12 Bengkulu City aims to determine students' mathematical literacy skills before and after applying the Besurek Learning Model in class VII mathematics learning in the 2021/2022 academic year. The sample in this study was class VII E with a total of 16 students.

From this study, it was found that there was a significant increase in students' mathematical literacy skills after the application of the Besurek Learning Model.

Conclusion

The results of students' mathematical literacy abilities before being given the Besurek Learning Model were classified as very low, it was seen that the number of students who did not complete was compared to students who finished learning. Many students who finished studying 7 people (43.7%) out of 16 students. In this initial test, the students' average score was 70.62.

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The results of the research obtained, it can be concluded that there is an increase in the mathematical literacy ability of class VII Negeri 12 Bengkulu City students before and after the application of the Besurek Learning Model.

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