The Effectiveness of Mathematic Learning Materials Based on Contextual Teaching and Learning

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Abstract. Learning material is a medium of learning source which stimulates students to learn something new. This study aimed at analyzing the effectiveness of mathematics learning materials based on Contextual Teaching and Learning. The research was a comparative study with pretest posttest only design. The research conducted at SMP Negeri 2 Gondang, Bojonegoro, East Java, Indonesia. The effectiveness of mathematic learning materials based on contextual teaching and learning was analyzed by comparing students’ achievement of mathematic. Data collected by mathematic test before and after implementing the learning materials. Data analyzed by using paired t test. The result of the study showed the score mean of pretest was 63.54, and score of posttest was 75.89. Paired t test of statistical test showed the significance level 0.000 < 0.05. It means that Mathematic learning Material based contextual teaching learning was effective to increase students’ achievement.

1. Introduction

Contextual Teaching and Learning is a learning concept that help teachers correlating the materials they taught with everyday life of students, in a family, school, society and nation (1). The picture of reality provided by existing learning material has not fully touched the lives of students related to basic social mathematics. Students living in downtown area have not been able to apply basic mathematics concepts in their daily lives and do not have good foundation on it. This continues during the curriculum implementation, even though changes often made to the curriculum itself.

The education today, the quality of learning material and learning methods is always improving and situations in the classroom need to be planned and built. The students get the opportunity to interact with each other (2). The implementation of education in reality that students are still not able to apply the knowledge from school. The problem that often occurs is the application of mathematical concepts in real life actually be solved with a simple concept. In the design of learning systems, teaching materials facilitates to achieve the learning objectives. The determination of learning resources must be in accordance with the characteristics of students and regional characteristics. The development of learning tools is important for educator to make learning more effective, efficient, and competence available. Development of mathematics learning tool an innovation to improve the quality of learning received by students so that mathematics is not just understand but able to solve problems related daily (3). Learning materials based on contextual teaching and learning will be a good solution to increase students achievement on mathematics.
2. Methods

2.1 Research design
This research design was comparative study, with pretest and posttest only group. Descriptive statistic involve the description scores on variable will be discussed before analyzing statistical test by paired t test.

2.2 Instrument
The instrument of this research is written mathematic test which was tested its validity and reliability. The instrument was given to the students for pretest and posttest.

2.3 Research Procedures
The respondent were given written mathematic test, after answering the test completely in pretest, the researchers collected the answer sheet, tabulated and scoring the data. The treatment was given by using teaching materials based on contextual teaching and learning for one semester. Then, students were given posttest. Data of each variable were analyzed and presented descriptively into categories. The hypothesis formulated to guide this study. It was tasted at 0.05 level of significance. The null hypothesis statement was “there is no different students’ achievement before and after using learning materials based on contextual teaching and learning.

3. Results And Discussion
The section contained of the result and discussion of the research obtained:

3.1. Result of descriptive analysis

| Table 1. result of descriptive analysis. |
|-----------------------------------------|
| Descriptive Statistics                  |
|                                        |
| N                  | Minimum | Maximum | Mean    | Std. Deviation |
| pretest             | 28      | 40      | 85      | 63.54          | 11.167 |
| posttest            | 28      | 60      | 90      | 75.89          | 7.704  |
| Valid N (listwise)  | 28      |         |         |                |        |

Table 1 indicates that the respondents were 28 respondents, the minimum score in pretest is 40, the maximum score is 85, mean is 63.54 and the standard deviation is 11.167. The result of posttest, the minimum score is 60, and the maximum score is 90. The score mean is 75.89 and the standard deviation is 7.704. The data showed, there is increasing score between posttest and pretest after implementing learning materials of mathematic based on contextual teaching and learning.
3.2 Statistical test analysis result

**Table 2.** result of paired samples test

| Paired Samples Test | Paired Differences |
|---------------------|--------------------|
|                     | Mean | Std. Deviation | Std. Error | Mean | Lower | Upper | t     | df | Sig. (2-tailed) |
| Pair 1 pretest-posttest | 12.357 | 6.657 | 1.258 | -14.938 | -9.776 | -9.823 | 27 | .000 |

Table 2 shows that the mean range between pretest and posttest is 12.357, the standard deviation is 6.657. The significance level is 0.000, the level of significance is lower than 0.05. it means H0 is rejected. There is significant different of student achievement before and after implementing learning materials of mathematic based on contextual teaching and learning. It implies that the learning materials are effective to be taught for grade VIII students of junior high school at SMPN 2 Gondang, Bojonegoro, Indonesia.

The result of this study supported by the research conducted by Fadillah, et all. The students who give teaching material have high achievement. According to their research, “The implementation of Contextual Teaching and Learning outcome of student experiment class is higher than the control class” (4). Contextual Teaching and Learning can give a positive effect to outcome learning social scene (5). Contextual Teaching and Learning can improving of mathematical commerce ability (6). Contextual Teaching and Learning was a significant effect between student who taught using Contextual Teaching and Learning and who taught by using conventional teaching (7).

The education process through the implementation of learning activities must provide the widest opportunity for students to develop a sense of interest, sense of curiosity, sense of reality, a sense of discovery in learning facts to find the truth. If someone is able to form a self-image or positive self-concept then gradually the students can develop themselves interpret what has been taught by adjusting to their experience.

From the description above, the authors assume mathematic learning materials should be taught following the steps below:
1. Form a group of students 4-5 students
2. Embedding mathematical concepts that are related to the actual conditions in everyday life.
3. Providing mathematics learning material based on CTL
4. Bringing students into the learning process.
5. Students discuss in groups
6. Students present the results in front of the class
7. The teacher gives an assessment and appreciation
8. Reflect of the activity

Learning activities from the preliminary, core and closing stages of activities are chosen and implemented so that students practice targeted values. As mentioned before, the principles of Contextual Teaching and Learning are suggested to be applied at all of learning because these learning principles can also facilitate the internalization of values.

4. Conclusion

The usage of mathematic learning materials is very effective in improving student learning outcomes in mastering mathematical material. This is evidenced. There is an increase in the average value of learning outcomes from pre-test to post-test. Thus proven Mathematics teaching materials effectively improve student learning outcomes.
References

[1] Komalasari K. Pembelajaran Kontekstual: Konsep dan Aplikasi. Bandung: PT. Refika Aditama; 2017.

[2] Anitah S. Media Pembelajaran. Surakarta: UNS Press; 2002.

[3] Nehe M, Siagiaan P, Mulyono. The Development of Learning Device Based Contextual Teaching and Learning (CTL) Assisted Autograph to Improve the Ability Problem Solving Mathematics Class X SMA Negeri 1 Teluk Dalam. Journal of Education and Practice. 2017;8(19):108-17.

[4] Fadillah A, Dewi NPLC, Ridho D, Majid ANK, Meidiana, Prastini NB. Application of Contextual Teaching and Learning. International Journal of Science and Applied. 217;1(2):101-8.

[5] Surdini. The Effect of Social Science of The Material of Form The Face of The Earth on Class VII of Junior High School. International Journal of Education. 2018;6(3):57.

[6] Contextual Teaching and Learning Approach of Mathematics in Primary School. Journal of Physics Conference Series. 2017;895(1):107.

[7] Rahma R. The Implementation of Contextual Teaching and Learning approach at college Student Akademi Kebidanan Keluarga Bunda. IJCR. 2018;2(1):201-8.

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