THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

The Effectivenes of Student Worksheet Based on Discovery Learning and Learning Sources From Batik Jambi

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Abstract:
The 2013 curriculum requires teachers to be more creative. One form of teacher creativity is developing teaching materials, including the student worksheet. Some teacher finds it difficult to do so for several reasons, so use student worksheets directly from the publisher. Based on the researcher's interview with one of the mathematics teacher, information was obtained that not all students were interested in the existing student worksheets, because it was incomplete from the explanation of the material, as well as the results of interview with some students who said that they often had difficulties when learning to use worksheets existing students, because the explanation is incomplete and the use of the background does not all suit the situation around them, this results in learning being less effective. There are many ways that students can be active in learning so that learning is more effective, including by connecting mathematics with daily life, such as student worksheets with learning resources from batik jambi. The purpose of this study is to explain the effectiveness of the use student worksheets based on discovery learning and learning resources from batik jambi to improve students' mathematical creative thinking skills. The method used is descriptive quantitative research, with the subject of grade 9th at muaro jambi 7 public middle school (SMPN 7, Muaro Jambi). The results of this study indicate the use of discovery learning-based student worksheets and learning resources from batik jambi effectively improve students' creative thinking skills and get positive responses from students and teachers.

Keywords: *Effectiveness, student worksheet, discovery learning, batik jambi, creative thinking skills*

1. Introduction

The 2013 curriculum is the latest curriculum in indonesia. The 2013 curriculum which was put in place by the government perfected the 2006 curriculum and was sufficient to provide fundamental changes, especially in the standard of the learning process(Wiyono, 2016). The learning process in the 2013 curriculu is student-centered learning to master basic and core competencies so students can understand all concepts. Therefore, teachers are required to be creative.

One form of teacher creativity in learning is developing teaching materials, including the student worksheet. The development of student worksheets is expected to be able to handle students who have difficulty in understanding a learning material. Student worksheets are sheets of assignments that students must do (Hidayati et al., 2019). Student worksheets contain a set of basic activities that must be carried out by students to maximize understanding so that the indicators designed can be achieved. Thus worksheets are known to help students gain scientific process skilss (Yildirim & Kurt, 2011). Use students worksheets so that students are active and learning is centered on the students themselves.

However, based on the author's interviews with a number of students at SMPN 7, Muaro Jambi, they often have difficulty following the steps of learning from existing student worksheets. If this continues to be applied in schools, it will be difficult for students to understand in learning becoming less effective and teachers tend to be less creative to make their own student worksheets. In addition, students often find it difficult to solve questions that are different from the sample question given by the teacher beforehand. This shows that the students' mathematical creative thingking skill is still low. The ability to think creatively is one of the skills that must be owned by 21st century generation (Mutia & Prasetyo, 2018). At the simplest level 'creative' means bringing into being something that was not there before and has been brought into being. The word 'creativity' covers a wide range of different skills. Creative skills needed to change concepts and perceptions (Awang & Ramly, 2008). Creative thingking ability in mathematics is an important component that should be posseassed by students dealing with their sensitiveness to mathematical problems, therefore they will be able to consider new information and ideas that enable them to make relations with open mind in solving mathematical problems and daily problems encountered (Puspitasari et al., 2018). This is reinforced by the opinion of Ginsburg that the essence of mathematics is not only determining the correct answer but thingking creatively (Singer & Voica, 2015). Based on this, the ability to think creatively is needed by students, especially to solve problems in real life.

The importance of connecting the real world with mathematics. Learning at the elementary school to tertiary level should integrate cultural aspects that enable students to learn and solve mathematical problems in the context of their lives (Samo, 2017). One type of culture that can be used to learn mathematics in real life is batik. The process of making batik there are ethnomatematics activities (Andriyani, 2017). The batik used as a learning resource in the student worksheets that are researchers made was batik from jambi province, Indonesia. Batik is a traditional fabric that became one of the nation's cultural richnes of Indonesia (Putra et al., 2011). In Indonesia, there are many types of batik that can e found, but what makes the difference between the many batik in Indonesia is the motif of batik. Batik jambi motifs applied in ancient times were decorative motifs as sees in carvings of jambi traditional houses and bridal wear, these motifs are still in limited numbers (Muslim, 2015). With the development of time, batik jambi motifs began to develop through small household industries that manage batik simply.

The student worksheet to be used was designed with batik jambi as a learning resource and integrated with the steps of discovery learning. Discovery learning is a process of acquiring scientific knowledge and skills based on contructivism learning theory (Siregar et al., 2019). The steps in discovery learning as: 1) giving a stimulus; 2) identifying problems; 3) collecting data; 4) processing data; 5) verifying, and 6) making conclusions (Hajar, 2017).

With this integration, it is expected that student worksheets based on discovery learning and learning resources from batik jambi will be effective in improving students' mathematical creative thingking skills.

2. Research Methods

This type of research is a descriptive study with quantitative and qualitative approaches. The population in this study were all grade nine in SMPN 7, Muaro Jambi, and the selected sample was class 9A. samples were randomly selected by the cluster random sampling method. Data collection uses tests of mathematical creative thinking questions that have been validated by experts in their fields.

The results of the test instrument validation assessment stated that the instrument was good and could be used in research. The implementation of learning at SMPN 7, Muaro Jambi, using discovery learning-based student worksheets and learning resources from batik jambi can be implemented properly and each student can participate in every learning with that student worksheet.

This test aims to measure the effectiveness of using discovery-based student worksheets and learning resources from batik Jambi by knowing the magnitude of the increase in students' creative thinking abilities. The test results were analyzed by comparing pretest and posttest scores. To find out the improvement in student learning outcomes by using the formula factor g (N-Gain) with the formula (Hake, 1998):

$$(g) = \frac{\%posttest - \%pretest}{100\% - \%pretest}$$

With additional criteria as following:

n-Gain Score	Interpretation
$g < 0{,}3$	Low
$0{,}7 > g \geq 0{,}3$	Medium
$g \geq 0{,}7$	High

Table 1: Interpretation of n-Gain Score

Student worksheets based o discovery learning and learning resources from batik jambi can be said to be effective if a learning result is obtained which is an increase in the ability to think creatively with a minimum limit in the medium category that is tested with the formula factor g (N-Gain).

3. Results and Discussion

The test instrument in the form of creative thinking skills was given to students of grade 9A at SMPN 7, Muaro Jambi, totaling 28 students. The questions consist of five in the form of descriptions with a maximum score for each question is 4, so the maximum number of scores that can be obtained by students is 20. The following are the results of data reduction:

Number	Pretest Score Range	The Number of Students	Post-Test Score Range	The Number of Students
1	$0 \leq Score \leq 4$	8	$0 \leq Score \leq 4$	2
2	$5 \leq Score \leq 9$	15	$5 \leq Score \leq 9$	6
3	$10 \leq Score \leq 14$	5	$10 \leq Score \leq 14$	13
4	$15 \leq Score \leq 19$	0	$15 \leq Score \leq 19$	7
5	$Score = 20$	0	$Score = 20$	0
Total Pretest Score of 28 Students = 178		28	Total Post-Test Score of 28 Students = 328	28

Table 2: Pretest and Postest Results Phase of Implementation for Transformation Geometry Materials

Based on the results of data reduction in table 2, the total pretest score is 178 and the total post-test score is 328, while to see the increase for each class of data can be seen in Figure 1

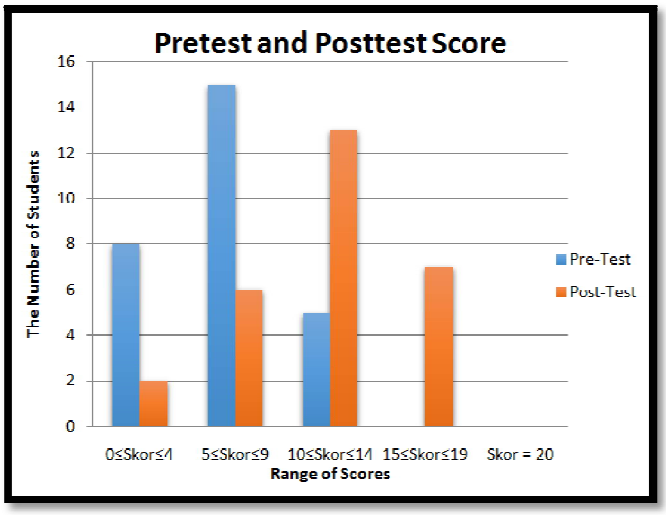

Figure 1: Diagram of Results from Pretest and Postest Score

Based on Figure 1, for students who score at 0≤score≤4 intervals there is a decrease in the number after learning to use student worksheets, as well as students who score at 5≤score≤9 intervals, but for students who score at other intervals an increase in the number after learning to use worksheets based on discovery learning and learning resources from batik jambi. This shows that after learning to use the student worksheet, the number of students who get high scores increases.

The effectiveness of instructional media is measured from student learning outcomes after learning to use learning media products (Nieveen, 1999). Learning outcomes in this study were measured based on the results of students 'mathematical creative thinking ability tests during the pretest and posttest as in table 2, then calculated with the n-Gain formula to determine the effectiveness of using student worksheets based on increasing students' mathematical creative thinking abilities, here are the results of calculations based on n-Gain formula:

n-Gain Score	Interpretation
0,392	Medium

Table 3: Gain Test Results for Improving Mathematical Creative Thingking Ability

Based on the results in the table 3, the n-Gain score for the pretest and posttest results was 0,392 with the medium category. This shows that the use of students' worksheets based on discovery learning and learning resources from batik jambi is effective for improving students' mathematical creative thinking abilities. This is in line with research by Yuliani et al., (2018) that worksheet based on discovery learning is effective to improve students' mathematical creative thinking ability, this can be seen from the improvement of mathematical creative thinking ability using the guided discovery-based worksheet in medium category.

Here is some student work sheet that are used to improve student's mathematical creative thinking skills:

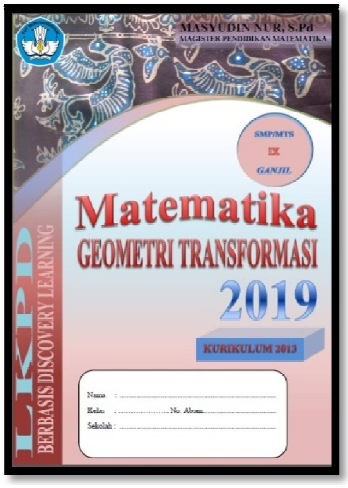

Figure 2: Cover of Student Worksheet

The appearance of the student worksheet is designed with inspiration from batik jambi with the angso duo motif, and other information, such as: the name of material, and the student's identity.

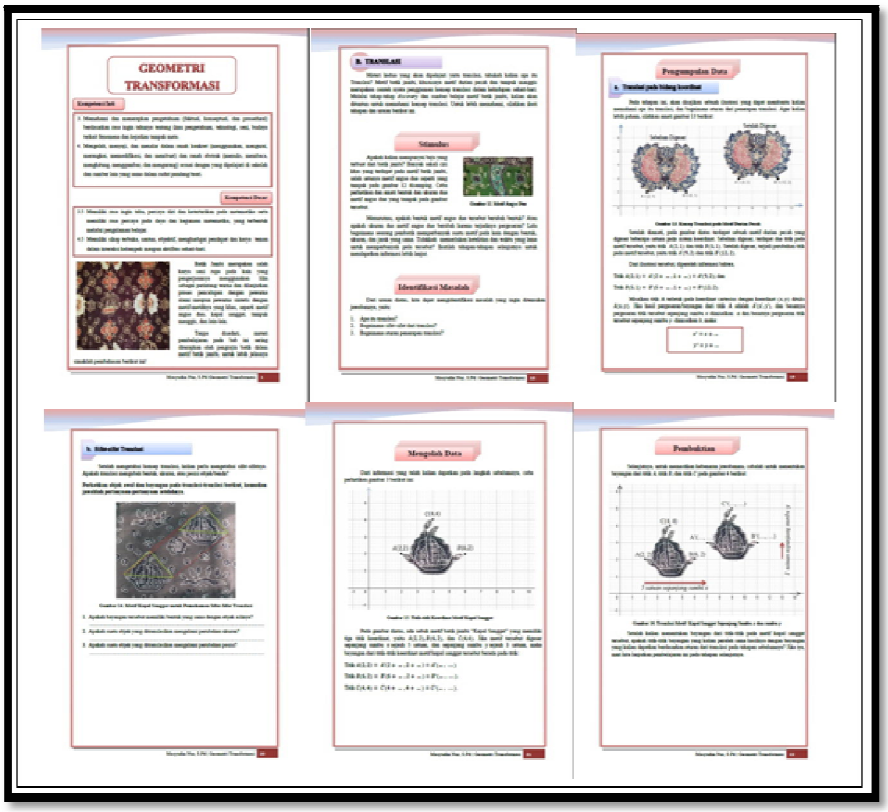

Figure 3: Some Student Worksheet Based on Discovery Learning and Learning Resources from Batik Jambi

In picture 3, the student worksheets are arranged with the steps of discovery learning. The jambi batik motifs in the student worksheet are used as media to make it easier for students to understand the concepts of transformation geometry material. The use of batik jambi as a learning resource in the student worksheet makes student more interested in learning, so learning is more effective. This is consistent with the results of research conducted by Imswatama & Lukman, (2018)which shows that ethno-mathematics is effective in improving student learning outcomes in mathematics.

Based on researchers' interview with several students, they said that the worksheets of the students were very good because of their attractive appearance, the use of language in accordance with the spelling that was justified, and the use of batik jambi which was very interesting, and they just realized that the batik they often saw was closely related to mathematics, especially transformation geometry material.

Based on the results of research and student opinion, teachers can make learning more effective by integrated students' regional cultures so that a more interesting learning atmosphere.

3. Conclusion

Based on the results of data analysis and discussion, the use of discovery learning-based student worksheet and learning resources from batik jambi is effective for improving students' creative thinking abilities, this is measured by comparing the results of the pretest and posttest scores and analyzed with the n-Gain test of 0,392 in the medium category.

For those who are interested in doing further research to improve making learning more effective, they are expected to able to integrate other learning models, or other cultures that students often encounter.

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