

# USE OF FLAT BUILDING BOARD MEDIA TO IMPROVE MATHEMATICS LEARNING RESULTS FOLD SYNTHETIC MATERIALS

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**Abstract:** This study aims to increase the learning outcomes of mathematics using flat board media for third-grade students. This study used a qualitative approach using a class action research design. The research procedure consists of four stages including planning, implementation, observation, and reflection. The results of the analysis of teacher activities, student activities, and learning outcomes in each cycle have increased. The results showed that the use of flat board media can increase the learning outcomes in third-grade students.

**Keywords:** mathematic, learning outcomes, flat board media

## INTRODUCTION

Mathematics is one of the fields of study that exists at all levels of education, ranging from elementary school to tertiary levels. Mathematics subjects need to be given to all students starting from elementary school to equip students with the ability to think logically, analytically, systematically, critically, and creatively, as well as the ability to cooperate (Ahmad, 2016). Ebbutt and Straker (in Yunita, 2015) stated that mathematics in schools is mathematics that functions as a communication tool. So that mathematics learning requires the existence of social interactions, both interactions between teachers and students, students and students, and students with the environment. With the interaction, students can find concepts independently. Brunner (in Heruman, 2014) revealed that in learning mathematics, students are expected to discover for themselves the various knowledge they need. Therefore, the material given to students is not presented in the final form, but students are required to find it themselves.

Based on the results of observations, it can be concluded that some of the causes of student learning difficulties include, students have difficulty understanding folding symmetry material, students do not use instructional media in learning folding symmetry material, and students are less actively involved in learning. Material symmetry folding one of the abstract material, if the teacher does not provide supporting facilities that will cause problems for students. To overcome the problem of student learning difficulties, it is necessary to make improvements in the learning process one of the alternatives chosen is the use of flat board learning media. In accordance with the opinion

of Nusantara et al, that in delivering abstract mathematical material, teachers need tools or visual aids to clarify a concept and to help achieve learning objectives (Kartika Dewi, 2013).

Flat board learning media is expected to help students learn folding symmetry material, because it is easy to use and easy to reach directly by students. In accordance with the results of research conducted by Antika (2011) at SDN 1 Tanggulangin Kab. Wonogiri regarding the use of board media on flat material, that the use of media in the form of a board on flat material can increase student activity, so that it can affect the increase in student learning outcomes. Based on the background description, a class action research was conducted under the title Improvement of Learning Outcomes Using the Media Flat Build Board in Folding Symmetry Material in Class III Students of Jeblog SDN Blitar Regency.

## **METHOD**

This study uses a qualitative approach and the type of research used in Classroom Action Research. The stages of the study followed the stages written by Kemmis & Taggart (in Arikunto, 2013) which consisted of 4 stages of research which included planning, implementing, observing, and reflecting. This research was conducted for 2 cycles with each cycle consisting of 2 meetings.

Research data includes process and outcome data. Process data in the form of teacher and student activity data when the use of flat board media in the learning process of the instrument folding symmetry material used is the teacher and student activity sheet, field notes sheet, and documentation. Learning outcomes data in the form of assessment of knowledge aspects related to student learning outcomes in folding symmetry material, instruments used in the form of evaluation questions, and assessment of skills aspects in the form of students' abilities in showing how to find folding symmetry on a flat figure, the instrument used is student observation skills sheets in showing how to find folding symmetry.

Analysis of research data includes data reduction, data presentation, conclusion drawing, evaluation, and reflection. In data reduction researchers select and focus the data that has been collected. Furthermore, the data presentation of the researchers conducted a review to organize the reduction results by compiling a narrative set of information obtained. The data presented include observations of teacher and student activity data and learning outcomes data which includes data on the completeness of individual learning outcomes (knowledge aspects and aspects of skills) and classical learning outcomes.

The next stage is concluding, the activities carried out namely concluding data that has been compiled. To determine the level of success of each meeting in each cycle carried out using student activity sheets, teacher activity sheets, student activity sheets, and evaluation questions. The success rate in teacher and student activities is set if it reaches 80%, individual completeness is said to be successful if it reaches the minimum completeness criteria  $\geq 74$ , and classical completeness is said

to be successful if 80% of students have reached the specified minimum completeness criteria. Then the evaluation stage is carried out to find out the successful use of flat board media in symmetry material in grade 3 students at each cycle. The next stage of reflection, carried out to determine what has been achieved, what has not been achieved, and what needs to be improved both in cycle I and cycle II.

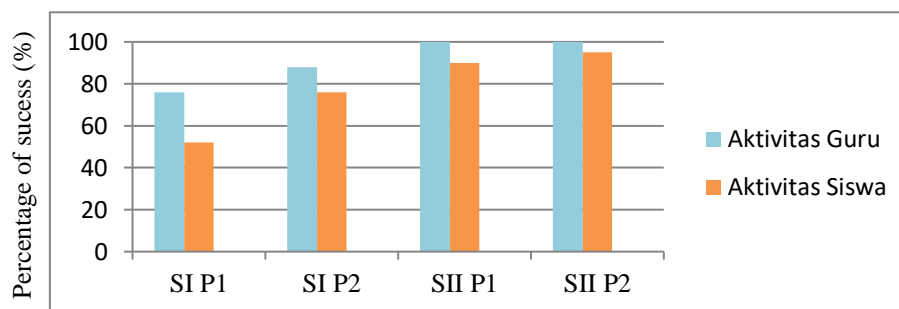
## **RESULT AND DISCUSSION**

The study was conducted in class III SDN Jeblog Kab. Blitar consists of the pre-action cycle, the first cycle, and the second cycle. When the teacher has not made lesson plans to teach, students have not been actively involved in learning, in mathematics subjects have not used the media for material preparation, and in the end the learning is evaluated. This causes difficulties in learning, just like students who are still experiencing difficulties in learning material and students who are still passive in learning. From intoxication of pre-action researchers make improvements to learning in cycle I.

In cycle I the use of board media has been applied in accordance with what has been approved, but the results obtained have not been maximized. Notes from the implementation of the first cycle, (a) the teacher still did not convey the learning objectives, (b) the delivery of the material was also not yet programmed, (c) some students were not actively involved in learning, and (d) the teacher still did not support the students. In the first cycle, the learning outcomes of grade III students at SDN Jeblog have improved from the learning outcomes in pre-action. First on the aspect of skills. students who get maximum marks in finding folding symmetry on getting flat there are 12 students. The number of students who get the maximum score has increased from the previous meeting, previously only 6 students. The rest in the aspect of knowledge from the average value of 48 pre-action increased to 67.1. In the first cycle, the average score had not yet reached the KKM in mathematics learning, namely 74. Classical completeness had not yet reached 80% completeness, while in cycle I classical completeness was still 61.9%, with less qualifications. Studying research continues in cycle II.

The implementation of learning in cycle II has been improved in the existing cycle in cycle I. Improvements made between (a) the teacher has done a coherent learning b) in the delivery of material that has been systematic, (c) the teacher has been questioned to students Learning, (d) students must be actively involved using flat board media. Learning in cycle II student learning outcomes increased significantly. The number of students who get the maximum score increases to 19 students. Students gain victory in finding folding symmetry on a flat figure. Furthermore, in the aspect of knowledge the average value increases the increase to 87.1, the average value has reached the specified KKM. In classical completeness also reached the specified completeness, classical

completeness increased to 90.4%. The following table and diagram are presented to clarify the results of the study.



**Figure. 1 Recapitulation of Observation Results for Teacher and Student Activities**

Based on Figure 1 shows that the activities of the teacher and third-grade students of SDN Jeblog in the implementation of learning using learning media flat board in each cycle have a better increase. Learning becomes conducive where students have been actively involved and the teacher has provided good facilities in learning.

**Table 1 Recapitulation of Student Learning Outcomes**

No.	Aspect	Cycle I		Cycle II		Increase from C1M1 to C2M2
		M1	M2	M1	M2	
1	Average Knowledge	57,1	67,1	75,7	87,1	30
	Classical Mastery Skills	42,5%	61,9%	76%	90,4%	
		6	12	15	19	13

### ***Use of Flat Build Board Learning Media on Folding Symmetry Material in Class III of SDN Jeblog, Blitar Regency***

Based on the data exposure of the research results it is known that the folding symmetry learning activities using flat board media in class III of SDN Jeblog Blitar Regency is carried out through three stages, namely the pre-action phase, the first cycle, and the second cycle. From the results of the study, learning activities and student learning outcomes experienced a good increase. The study conducted at the pre-action stage is not by the function of learning mathematics as a communication tool. According to Ebbut and Straker (in Yunita, 2015) states that mathematics in elementary school is mathematics that functions as a communication tool. So in mathematics learning, social interaction is needed. Because at the pre-action stage there is no good interaction between the teacher, students, and the environment which makes it difficult for students to understand the material. In line with Piaget's theory, elementary students range in age from 6 years to 13 years, they are in a concrete operational phase. Where the ability of the thought process is still concrete that can be captured by the senses, (in Ahmad, 2016) Thus, it is necessary to use learning media that can concretize folding symmetry material, be able to actively engage students, and media that can be reached by students to study the material, one of the media used is flat board media.

In cycle I students learn to build a square, rectangular, and trapezoidal shape. In learning activities, the teacher first introduces various types of flat shapes using flat board media. At the time of the introduction of a flat figure, students see and hold directly the flat shape in the media, therefore students quickly recognize the flat shape. Flat board media can display flat shapes that have been adapted to the needs of students, as students can see the flat shapes by the original shape and students can hold the flat shapes. By the characteristics of the learning media expressed by (Sumanto, 2010) manipulative features, namely the media can re-display objects with various changes by needs.

Furthermore, students with the group by following the instructions in LKPD find folding symmetry on a flat shape using a flat board media. Using media can make it easier for students to find folding symmetry because students can directly hold and fold up until they find the amount of folding symmetry. Flat board media can be reached directly by students in the discovery activities so that it can provide direct experience to students and students can know the knowledge or mathematical concepts of what they do. This is in line with the opinion of Yuniawatika (2015) students should be allowed to see and experience the usefulness of mathematics in daily life in the learning process, so students can know the mathematical concepts of what they see and experience independently. Then what students learn becomes more meaningful.

In the first cycle of the implementation of learning some notes is, the teacher has not conveyed the learning objectives, the teacher has not delivered material systematically, the teacher has not been firm in dealing with students, students do not understand the notion of folding symmetry well so that the discovery activities need intensive guidance, in discovery activities, some students are still not actively involved, and some students do not understand the evaluation questions provided. Based on the data in cycle I, researchers improved learning in cycle II.

Learning in cycle II applies the same steps as the steps in cycle I. In the use of instructional media flat board in cycle II students have been actively involved thoroughly in the discovery activities. Student attention is focused on the material being studied, so students are more active in group activities than busy with other friends. In studying the material the students were very enthusiastic because they not only listened to the teacher's explanation but also participated in the folding symmetry discovery activity using instructional media. This is consistent with the opinion of Sadiman et al., (2010), that learning media can increase student attention, stimulate and motivate students to learn, and allow for student interaction with the environment.

In cycle II the teacher has made improvements obtained from cycle I. So that learning becomes more conducive. The success of using flat board media in folding symmetry material because in learning the teacher has paid attention to the principles in the use of instructional media which include effective and efficient principles, relevance principles, and productivity principles. By paying attention to these principles the use of flat board media can activate students, assist students in learning folding symmetry material, and can achieve good results in mathematics

learning. In line with Russefendi, that the use of instructional media appropriately in mathematics learning will have a good effect on students (Sukayati & Agus, 2009)

***Improvement of Learning Outcomes Using Flat Board Learning Media on Fold Symmetry Material in Class III SDN Jeblog Blitar Regency***

Based on research on mathematics learning, student learning outcomes in folding symmetry material using flat board media increased significantly. The average value of the aspects of student knowledge at the pre-action stage 48 with a classical percentage of completeness of 28.5%, getting very poor qualifications. Furthermore, the average value in the first cycle increased to 67.1. In the first cycle, classical completeness reached 61.9% with fewer qualifications. Then in the second cycle, the average student learning outcomes increased to 87.1. The percentage of classical completeness reached 90.4% with very good qualifications. In cycle I 8 students were not yet finished, then in cycle II students who were not yet finished reduced to 2 students. This shows a gradual increase in the value of knowledge from cycle I to cycle II. The assessment of aspects of knowledge in the first cycle cannot be said to be complete, because classical completeness is 61.9%, then in the second cycle classical completeness increases to 90.4%, so this completeness is said to be complete because it has reached the specified completeness of 80%. This is according to what was written by (Nana, 2009) that it is said to be complete if the classical mastery level reaches 80% of the number of students who reach the KKM.

Furthermore, the value of skills in each cycle also increased significantly. The maximum value in the value of finding symmetry folding skills using flat board media is 6. In the first cycle of the first meeting, the number of students who got the maximum score was 6 students. At the second meeting, 12 of the 21 students had received maximum marks. Then in the second cycle, the first meeting of students who get the maximum value increases to 15 students. Then at the second meeting, the number of students increased again to 19 students. With the increasing number of students who get the maximum score, students have been able to find folding symmetry on a flat figure using the media "flat board" correctly, and with the appropriate results.

The increase in learning outcomes is due to the teacher's improvement in classroom management, where the classroom is comfortable for learning, as well as the interaction between teacher and students, students and students, and students with learning media have been going well. This affects student learning outcomes, comfortable classrooms and the presence of good learning interactions can improve student learning outcomes. The learning process undertaken by teachers and students influences student learning outcomes. inline with Slameto's opinion that learning outcomes are influenced by external factors, one of which is the school's factors which include the teaching methods of teachers, the relationship between teachers and students, and learning facilities (Juwariyah, 2015)

## CONCLUSION

Based on the results of research and discussion it can be concluded that the use of flat board media on folding symmetry material has been used very well. The use of flat board media as planned, the use of media can facilitate students in learning folding symmetry material and activating students in learning activities. This can be seen from the activities of teachers and students during learning activities. The percentage of successful teacher activities in the first cycle reached 88%, then in the second cycle increased to 100%. In the activity of students in the first cycle, the percentage of success was 52% and in the second cycle increased to 95%.

Furthermore, the results of student learning assessment, in the aspect of skills the number of students who get the maximum value has increased, in the first cycle students who get a maximum score of 12 students and increased in the second cycle to 19 students. Students have been able to find and count the number of folding symmetries on a flat shape using the correct method. Furthermore, the aspect of knowledge in the first cycle reached an average of 57.1 and increased in the second cycle to 87.1. The percentage of classical completeness in the first cycle reached 42.8% and the second cycle increased again reaching 90.4% with very good qualifications. Thus it can be concluded that the use of flat board media on folding symmetry material can improve student learning outcomes in class III SDN Jeblog Blitar Regency

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