

# Development Of Ethnomathematics-Based Booklet Module On Batik Motif Simpang Lima Gumul Kediri On Learning Outcomes Of Square And Rectangular Subjects In Grade Iii Sdn Sukorame 2 Kediri

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**Abstract:** This study aims to describe the Development Process of Ethnomathematics-Based Booklet Module in Batik Motif Simpang Lima Gumul Kediri and to determine the effectiveness of ethnomathematics-based booklet module for Grade 3 elementary school students. This research is a research and development using the Bord and Gall model which consists of 10 stages, but this research is only up to the 8th stage, namely the effectiveness trial. The subject of the study was a 3rd grade student of SDN Sukorame 2 Kediri. The data in this study used product validation, Independent Sample T-test, Relative Effectiveness and Student Response Test. The results of product validation obtained a score of 91 in the very valid category, the Independent Sample t-test obtained a score of 6,750 and the relative effectiveness level obtained a score of 71% with a high level of effectiveness. The student response test obtained a score of 82% in the very effective category. The ethnomathematics-based booklet module on batik simpang lima gumul Kediri is categorized as very effective to be used in grade 3 mathematics learning in elementary schools.

**Keywords:** Booklet modules, ethnomathematics, Batik Motif Simpang Lima Gumul Kediri.

## 1. Introduction

Education is something that should be in line with cultural changes in life. Change in the sense of improving education at all levels in anticipation of future interests and the demands of modern humans to achieve an educational goal. Several efforts have been made by the government to improve the quality of education in order to improve the quality and quantity of education today. In the standard content of the National Education System Law Number 20 of 2003 which implies in the learning process, teachers must prepare contextual teaching materials in accordance with the needs and environment of the local community. According to (Riwu, Laksana, Dhiu, 2018), teachers must create innovations in the learning process by creating a fun learning atmosphere and teachers must be able to compile interesting and creative teaching materials so that students are interested in learning.

Mathematics learning is a learning process carried out by teachers to develop students' thinking skills, creativity, and can improve students' ability to build new knowledge as an effort to improve learning outcomes. Mathematics learning consists of two aspects of activities that cannot be separated, namely in learning and teaching activities. These two aspects are integrated into learning that can create an interaction between students and students, between teachers and students and between students

and the environment during mathematics learning. This learning goal will achieve maximum results if learning runs effectively, and efficiently.

Based on the results of interviews conducted with grade 3 teachers at SDN Sukorame 2, in the learning process, especially mathematics subjects, teachers only use lectures, discussions, and assignments because of the limitations on teaching material information sources so that students only focus on theme books, and package books. This method is suspected to lack convenience for students to develop students' ability to = receive material widely and creatively. So that the mathematics learning outcomes of grade III students of SDN Sukorame 2 Kediri are still low. This can be seen from the final semester test scores of students in mathematics learning, there are 7 students out of 28 students with a score of  $\leq 75$ , namely students who do not meet the Minimum Completeness Criteria (KKM) of SDN Sukorame 02 Kediri. Low student learning outcomes are due to the selection of inappropriate learning methods and media. Given the importance of learning mathematics, especially for lower grades, companion teaching materials are needed in the form of modules containing special materials for building squares and rectangles for grade III. Module design is an effort to improve students' understanding of the learning process. The use of modules will be more interesting if the material presented is integrated with the culture-based learning process. Education and culture are inevitable in daily life, because culture is a complete and comprehensive unity, which applies in a society, while education is a basic need for every individual in society. The mathematics learning process in elementary school must be in accordance

with the level of ability of elementary school students so that a more concrete presentation is needed, namely by presenting a combination of mathematics learning and realistic mathematics learning. One of the things that can bridge between culture and education is ethnomathematics. Ethnomathematics is a form of mathematics that is influenced or based on culture that is applied in the mathematics learning process to improve the quality of the learning process, learning outcomes, and love for local culture. Mathematics learning based on local culture focuses on creating a dynamic learning atmosphere, which is not far from the existence of students with all backgrounds, experiences, and prior knowledge of students, so that it can provide opportunities for students to freely ask questions, make mistakes, explore, and make conclusions about various things in their surrounding life, according to (Rohaeti, 2011). Good media will also be able to motivate and improve students' basic skills (Tinio, 2002). Learning using teaching materials in the form of ethnomathematics-based booklet modules is expected to improve solving math learning problems easily, loving local culture from an early age, so that student learning achievement results are better.

**2. Research Methods**

The type of research is development research (*Research and Development*) Bord & Gall model in (Masyhud 2016). This development research model has 10 stages. However, this research has reached the 8th step, namely the product effectiveness test because until this step it has been possible to draw conclusions about the feasibility and effectiveness of the products produced, and ends with an accountability report of what has been researched. The subject of this study is a grade V student of SDN Curahpoh 1 Bondowoso. The product in this study is an ethnomathematics-based module on bamboo weaving crafts for space building materials for grade V students of SDN Curahpoh 1 Bondowoso. The data in this study was analyzed using product validation, relative effectiveness and practicality. Module development validity *Leaflets* Based on ethnomathematics, this bamboo weaving craft was obtained from the results of validation tests carried out by three expert validators, namely design experts, material experts and practitioner experts to provide assessments on the modules developed.

The assessment results of the three validators are then calculated using the following formula:

$$\text{Valpro} = \frac{srt}{smt} \times 100$$

The results of the module design validation obtained are then confirmed into the product validation criteria presented in table 3.1 as follows:

Table 2.1 Product Eligibility Categories

Score Criteria	Product Eligibility Category
81 ≤ SP ≤ 100	Highly Worthy
61 ≤ P ≤ 80	Proper
41 ≤ CP ≤ 61	Quite Decent
21 ≤ KP ≤ 41	Less Worthy
0 ≤ SKP ≤ 21	Very Unworthy

Source: (Masyhud 2016)

ethnomathematics-based Booklet modules on batik motifs at the intersection of five gumul can be seen from the results of the effectiveness test through the Independent Sample T-test and the effectiveness test through ER obtained from the learning outcomes of students in the experimental class and the control class using the following formula:

- 1). Effectiveness Test Through Independent Sample T-test

$$ER = \frac{M_2 - M_1}{\sqrt{\frac{\sum X_1^2 \times \sum X_2^2}{N(N-1)}}$$

- 2). Effectiveness Test Through ER

The relative effectiveness level can be calculated using the following formula:

$$ER = \frac{MX_1 - MX_2}{\frac{MX_1 + MX_2}{2}} \times 100$$

Information:

ER = The relative effectiveness of the experimental group compared to the control group

MX<sub>1</sub> : Mean or average score in the MX experiment class

MX<sub>2</sub> : Mean or average of values

The results of the relative effectiveness are then interpreted based on the criteria table as in table 2.2 below:

Table 2.2 Criteria for Interpretation of Relative Effectiveness Test

Results of Relative Effectiveness Test	Categories Effectiveness
80% ≤ SP ≤ 100%	Very high effectiveness
60% ≤ P ≤ 80%	High effectiveness
40% ≤ CP ≤ 60%	Medium effectiveness
20% ≤ KP ≤ 40%	Low effectiveness
0% ≤ SKP ≤ 20%	Very low effectiveness

Source: (Masyhud 2016)

Practicality through student response tests can be analyzed using the following formula:

$$Sas = \left( \frac{st}{smt} \times 100 \right)$$

Information:

- Sas = Student questionnaire scores
- St = Score achieved
- Smt = Maximum score that can be achieved

### 3. Results and Discussion

The results obtained from the research on the Development of *Ethnomathematics-Based Booklet Module on Batik Motif Simpang Lima Gumul Kediri for Grade III Students of SDN Sukorame 2 Kediri* are as follows.

#### a. The development process of the *Ethnomathematics-Based Booklet Module*

The research was carried out with the first step, namely visiting SDN Sukorame 2 Kediri which was chosen as the place to conduct the research. The purpose of the visit was to make observations. The researcher met the third grade teacher and conducted an interview to find the problem and get information that could be raised in the research. After getting some problems and information, the researcher also looks for some information from books, journals or articles related to the title of the research to be carried out. Furthermore, the researcher contacted the supervisor to consult and discuss the title of the development research to be carried out to get suggestions and input. The next step is to make a development research design which is outlined in the form of a research proposal in accordance with the various information that has been obtained. After the planning is carried out, the researcher conducts the initial stage of making a product design including, preparation of the application to be used, preparation of drawing materials and material content in the module to be made. The application used to create the module is *Canva*. With this application, users can compose writing accompanied by image illustrations, various kinds of interesting module background colors and other supporting templates that suit their needs. The final result of the developed module is the module *Booklet* ethnomathematics-based in printed form. After the product design is implemented, the next step is the product validation stage.

Product validation in this study was carried out by 3 validators, namely the validation of design experts and material experts by lecturers of Elementary School Teacher Education and lecturers of Mathematics Education at the University of Jember and expert practitioners by third grade teachers of SDN Sukorame 2Kediri. This is done to get input and direction related to the shortcomings and advantages of the modules developed. The following is a summary of the results of product validation by three

The results of the calculation of the students' responses are then identified in the following table 2.3:

Table 2.3 Product Effectiveness Criteria Based on Student Questionnaire Results

No	Total Score Range	Categories Response
1	81,00% - 100%	Highly Effective
2	71,00% - 80,99%	Effective

Table 3.1 Data and Analysis of Product Validation Results

No Questions	Validator 1	Validator 2	Validator 3	Average
1-10				
Sum	95	91	83	89,6

Based on this data, to find out the feasibility value of the resulting product design using the following *valpro* formula:

$$Valpro = \frac{srt}{mrt} \times 100$$

$$Valpro = \frac{89,6}{100} \times 100$$

$$Valpro = 89.6$$

From these results, it can be seen that the modules that have been developed are included in the criteria that are very feasible to be tested because the final score occupies a value range of 81 – 100. So that the modules that have been developed can be used as learning modules in research trials. The following is an overview of the module improvements after validation.

Figure 3.1 Module cover after validation



The trial use was carried out to obtain a return on the *booklet* module that had been developed. This trial activity was carried out in grade III of SDN Sukorame 1 with a total of 25 students. User trials are conducted by distributing booklet modules to students to read and learn. Then, students are instructed to fill out a questionnaire sheet to assess the booklet modules. The questionnaire used was in the form of a *checklist* with a choice of YES and NO answers which contained 10 points of statements related to the *ethnomathematics-based* booklet module.

Based on the results of user trials that have been carried out, the answer yes at the statement point is 88%. The answer score of NO was 11.2%, which showed that the module was ready to be tested for

effectiveness without the need for revision because the answer YES at each point of the statement reached an average score of 80%.

**b. Test of the Effectiveness and Practicality of the Development of a Booklet Module Based on Ethnomathematics Batik Motif Simpang Lima Gumul Kediri**

The effectiveness test was carried out using *the experimental methods of pretest and posttest*. The effectiveness test was carried out in classes III A and III B SDN Sukorame 2 Kediri. The relative effectiveness test is measured through 2 ways, namely, the effectiveness test through the Independent Sample T-Test and the relative effectiveness test through the ER.

1) Effectiveness Test through Independent Sample T-Test

In this study, to determine the effectiveness of ethnomathematics-based leaflet modules, an Independent Sample T-Test was conducted. The Independent Sample T-Test was carried out by comparing the learning outcomes of *the posttest class III A as an experimental class with the learning outcomes of the posttest class III B as the control class*. The results of the *pretest and posttest* of the experimental class and the control class were calculated using the Independent Sample T-Test formula.

Based on the calculation results, a *t-count* score of  $\pm 6,750$  was obtained. The results of the *t-count* were then consulted with a *t-table* with a significance level of 0.05. The *t-table* value for the significance level of 0.05 with the degree of freedom for the value of N 54 (56-2) is 1.684. Therefore, *the calculated t-test* results show that *the t-count* is greater than the *t-table* ( $6.750 > 1.684$ ). Therefore, it can be concluded that mathematics learning using ethnomathematics-based booklet modules is more effective than mathematics learning using student books.

2) Effectiveness Test through ER

The purpose of conducting an effectiveness test through ER is to determine the relative effectiveness of learning outcomes by using ethnomathematics-based booklet modules through comparison of learning outcomes of students in the experimental class and the control class. The results of the effectiveness test through ER can be seen in the following calculation.

$$ER = \frac{MX_2 - MX_1}{\left(\frac{MX_1 + MX_2}{2}\right)} \times 100$$

$$ER = \frac{22,5 - 10,7}{\left(\frac{10,7 + 22,5}{2}\right)} \times 100$$

$$ER = \frac{11,8}{\left(\frac{33,2}{2}\right)} \times 100$$

$$ER = \frac{11,8}{(16,6)} \times 100$$

$$ER = 71 \%$$

Based on the results of the calculation of the effectiveness test through the ER, the result was obtained that 71% of the student learning outcomes increased due to the use of modules *Booklet* ethnomathematics-based while 29% of student learning outcomes are caused by internal factors, namely the lack of student interest in learning. Based on this data, it can be concluded that the learning outcomes of students who use the *Booklet* ethnomathematics-based batik simpang lima is 71% more effective compared to the learning outcomes of students who do not use modules *Booklet*.

3) Student Response Test

The student response questionnaire was given and filled out by 28 students in the experimental class after the end of the learning activity and after doing the *posttest*. The score results obtained through the student response questionnaire are then calculated as a percentage to determine the effectiveness of module development *Booklet* ethnomathematics-based batik simpang lima gumul Kediri. The results of the student response test are calculated using the following formula.

$$Sas = \left(\frac{st}{smt} \times 100\right)$$

$$Sas = \left(\frac{1157}{1400} \times 100\right)$$

$$Sas = (0,82 \times 100)$$

$$Sas = 82\%$$

Based on the results of the calculation above, it can be concluded that, the development of the module *Booklet* ethnomathematics-based batik junction lima gumul Kediri received a positive response of 82%. So it can be stated that the development of the module *Booklet* ethnomathematics-based batik junction lima gumul Kediri is categorized as very effective in learning activities.

Based on the results of the Independent Sample T-Test, the Relative Effectiveness Test through the Independent Sample T-test, the Relative Effectiveness Test through the ER and the Results of the Practicality Test, there is an increase in student learning outcomes using the *Booklet* Based on Ethnomathematics on Batik Motif Simpang Lima Gumul Kediri Square and Rectangular Materials. This indicates that the use of the *Booklet* can attract students' interest in learning mathematics. Broadly speaking, Module development *Booklet* Based on Ethnomathematics on *Booklet* Based on Ethnomathematics on Batik Motif Simpang Lima Gumul Kediri Square and Rectangular Materials went



well. Module *Booklet* Based on Ethnomathematics in Simpang Lima Gumul Kediri Motif Batik can be used as an alternative in choosing teaching materials, especially square and rectangular materials. Although the process and results are good, this does not rule out the possibility of limitations in this study. The limitations in this study are at the stage of final products and mass products as well as product destination and implementation that cannot be carried out due to time and cost limitations.

#### 4. Conclusion

Module development process *Booklet* Ethnomathematics-based on batik Simpang Lima Gubul Kediri in this study uses the type of development (*Research and Development*) Bord and Gall model which has 10 stages of research. This development research is only carried out until the eighth stage, namely product effectiveness testing, namely; (1) Preliminary research, (2) product development planning, (3) initial product design development, (4) product design validation, (5) initial product revision, (6) use trial, (7) product development revision, (8) product effectiveness test.

The validity, effectiveness, and practicality of the ethnomathematics-based booklet module of the intersection five gumul motif batik can be seen from the results of validation by validators, student learning outcomes, and student response test results. The results of the development product validation test obtained a score of 98.6 which is included in the very valid criteria. The user test score of each YES answer point scored above 88% while NO scored 11.2%, so the module is worthy of being tested for effectiveness. The effectiveness results measured through the Independent Sample T-test obtained a score of 6,750, which means that the use of ethnomathematics-based looklet modules in the intersection of five gumul motifs is better than that using old teaching materials. The effectiveness results measured through ER obtained the result that 71% of the student learning outcomes were caused by the use of ethnomathematics-based booklet modules, while 29% of the student learning outcomes were caused by internal factors, namely in the form of a lack of student interest in learning and external factors due to the limited use of teaching materials used as tools during learning. Meanwhile, the Practicality Test obtained from the results of the student response questionnaire obtained a score of 82% with the category of very practical. Based on the results of the validation, effectiveness and practicality obtained, the development of ethnomathematics-based booklet modules for batik motifs at the intersection of five gumul is very valid, effective and practical so that it is very feasible to be used in mathematics learning.

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