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# Module Development *Leaflet* Ethno Mathematics Based In Bamboo Woven Crafts Space Building Materials for Class V Students at Sdn Curahpoh 1 Bondowoso

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***Abstract**: This study aims to describe the module development process leaflet based on ethno mathematics in woven bamboo crafts and to determine the validity, effectiveness and practicality of the module leaflet based on ethno mathematics for fifth grade elementary school students. This research is a type of development research (research and development) Bord and Gall model consisting of 10 stages. However, this research only reached the 8th stage, namely testing the effectiveness of the product. The subjects of this study were fifth grade students at SDN Curahpoh 1 Bondowoso. Data collection techniques in this study used tests, student response questionnaires, and documentation. The data collection instrument used interview guides, test sheets, questionnaires and validation sheets. The data in this study were analyzed using product validation, relative effectiveness and practicality. Based on the calculation results of the validation test, relative effectiveness test through independent sample t-test and ER, as well as practicality test, it can be concluded that module development leaflet based on ethno mathematics on woven bamboo crafts, the spatial material has met valid, effective and practical aspects so that it is very suitable to be used as a compa nion teaching material in fifth grade mathematics learning in elementary schools.*

**Keywords:** *leaflet module, ethno mathematics, woven bamboo*

## 1. Introduction

Mathematics is a universal science that underlies the development of modern technology which has an important role in various disciplines (Winarso and Yuliyanti 2017). Mathematics learning is very important to be given to students starting from elementary school, this is so that students have the ability to think logically, critically, analytically, systematically and creatively and are able to work together. However, currently mathematics in education in Indonesia Students often do not understand well and become a science that seems to be separate from human life, so that various assumptions often arise that mathematics is a difficult and complicated subject so that this makes most students less interested in learning mathematics (Lestari, 2019). This problem is a challenge for an educator to regenerate students' interest in learning mathematics. Because in fact, an educator must have good skills so that the material presented can be well received by students.

In accordance with the facts found at SDN Curahppoh 1 Bondowoso, there are several problems that the implementation of learning mathematics in class is still less varied, teachers do not provide teaching materials that can foster students' interest in learning independently. In addition, teachers only use textbooks as the only source of learning so that students are less active in participating in the learning process. Students also cannot fully understand mathematical concepts, especially in geometrical material. The textbook used has not been able to encourage students' thinking skills, and the material presented in the book is also limited. This indicates that learning mathematics in class is not optimal and students' interest in learning is still low. Thus, it is very possible if the books used are not in accordance with the needs of students and do not foster student interest in learning.

Recognizing the importance of learning mathematics, a companion book is needed in the form of a module that can help students learn actively in understanding lessons, especially geometric material. The development of teaching materials in the form of modules can be used as an effective means and source of learning for 5th grade elementary school students. Module is a type of teaching material whose content is quite short and specific which is made to achieve learning objectives that can be used independently without or with teacher guidance (Lasmiyati 2014). This module is expected to be able to foster students' motivation to be active in learning mathematics, and to be able to give students the freedom to study actively both individuals and groups. To provide a new learning atmosphere for students, this module is designed using the concept of culture-based learning. Culture-based learning is contextual learning related to a culture in community groups, which can make teachers and students actively participate in learning so that the learning outcomes obtained by students are even more optimal (Ayuningtyas and Setiana 2019).

Student problems related to learning mathematics can be overcome by looking at the student's own environment. There are so many cultures that grow and develop in the student environment that can be used as material for developing mathematics learning (Reno, 2017). One of them is by utilizing an ethnomathematics approach. According to (Lakapu et al., 2020) Ethno mathematics is cultural integration in learning mathematics or it can be interpreted as mathematics which has cultural elements. The culture adopted depends on where and to whom mathematics is taught.

Mathematics can be explored from a culture that exists in society either in the form or habits that are often found in community groups. The application of ethnomathematics in learning mathematics is expected to improve students' mathematical abilities without having to abandon their cultural values, and to bring mathematics closer to the students' environment. Because actually ethno mathematics is an activity that delivers cultural values in mathematics.

Indonesia itself has a large variety of tribes and cultures. Each of these cultures and tribes has its own ethnomathematics, starting from the shape of the traditional house, the tools used in daily life, the cloth motifs used and many others. According to (Ayuningtyas and Setiana 2018) cultural assessment to be applied in learning is better to start with the closest culture in the student environment. Therefore researchers use woven bamboo craft as a topic in learning mathematics. Cultural elements that can be studied from woven bamboo crafts are from the shape of products made from woven bamboo crafts that have shapes resembling geometric shapes.

This ethnomathematics-based module is expected to be able to provide a new learning atmosphere for students, and can make mathematics closer to the student's environment and can broaden students' insight into the culture that surrounds them. Based on previous research (Setiyadi 2021) shows that the results of research on the development of ethnomathematics-based teaching materials obtained very valid results by obtaining a score of 4.77. For student learning outcomes, the score is more than the KKM, which is 69.5. For students' responses, they obtained a score of 93.33% so that it can be concluded that this ethnomathematics-based teaching material can be used as teaching material in elementary schools.

Based on the explanation above, the researcher is motivated to conduct development research entitled "Module Development *Leaflet* Based on Ethn omatematics in Bamboo Woven Crafts Building Materials for Class V SDN Curahpoh 01 Bondowoso".

## 2. Research Methods

The type of research used is development research*(Research and Development)* the Bord & Gall model in (Masyhud 2016). This development research model has 10 stages, namely: (1) preliminary research; (2) product development planning; (3) initial product design development; (4) product design validation; (5) initial product revision; (6) trial use; (7) product development revision; (8) product effectiveness trials; (9) final products and mass products; (10) product dissemination and implementation. This research was only carried out until the 8th stage because the main objective of this research was to determine the level of feasibility and effectiveness of the product that had been developed.

The location of the research was carried out at SDN Curahpoh 1 Bondowoso which takes place in the 2022/2023 school year even semester. The classes used were VA and VB classes with 21 students each.

Data collection techniques in this study used tests, student response questionnaires, and documentation. The data collection instrument used interview guides, test sheets, questionnaires and validation sheets. The validation sheet is used as a module validity assessment sheet *leaflet* based on ethno mathematics
to get suggestions and input on the development of this module. Validation was carried out by 3 expert validators namely, 1 PGSD lecturer as a design expert, 1 mathematics education lecturer as a material expert and a class V teacher as a practicing expert. The data in this study were analyzed using product validation, relative effectiveness and practicality. The assessment results of the three validators are then calculated using the following formula:

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

Information:

Valpro : Product validation

Srt : Real score reached

Smt : The maximum score that can be achieved

Analysis of the research data using *Independent Sampel T-test*, Relative Effectiveness and Practicality through student response tests.:

1) Test Effectiveness Through *Independent Sampel T-test*.

Independent Sample T-Test in this study using the t test*(t-test)* separate samples using two groups.

$$\boldsymbol{t = \frac{M_2 - M_1}{\sqrt{\frac{\sum x_1^2 \times \sum x_2^2}{N(N-1)}}}}$$

Information:

$M_1$ : The average value of the $X_{-1}$ (experimental group)
$M_2$ : The average value of the $X_{-2}$ (control group)
x-1 : Deviation of each value of $X_{-1}$ of the average X-1
x-2 : Deviation of each value of $X_{-2}$ of the average X-2
N : The number of subjects/research samples

2) Effectiveness Test Through ER

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

$$ER = \frac{MX_1 - MX_2}{\left[\frac{MX_1 + MX_2}{2}\right]} \times 100\%$$

Information:
ER : The relative effectiveness of the experimental group compared to the control group
$MX_1$ : The mean or average value in the experimental

class
$MX_2$ : The mean or average value in the control class

3). Practicality through student response tests

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

$$Sas = (\frac{st}{smt} \text{ x } 100)$$

Information:
Sas : *Student questionnaire score*
*St* : Score reached
*Smt* : *Maximum score that can be achieved*

## RESULTS AND DISCUSSION

The results obtained from the Module Development research *Leaflet* Based on Ethno matematics in Woven Bamboo Crafts Building Materials for Grade V Students at SDN Curahpoh 1 Bondowoso as follows.

**a. Module Development Process *Leaflet* Ethno mathematics Based**

The research was carried out with the initial step of visiting SDN Curahpoh 1 Bondowoso which was chosen as the location for the research. The purpose of the visit was to make observations. The researcher met the fifth grade teacher and conducted interviews to find problems and obtain information that could be raised in research. After getting some problems and information, the researcher also looked for some information from books, journals or articles related to the title of the research to be carried out. Next, the researcher contacts the supervisor to consult and discuss the title of the development research to be carried out in order 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 planning is done, the researcher carries out the initial stages of making product design including, preparation of applications to be used, preparation of drawing materials and material content in the modules to be made. The application used to create the module *Canva*. With this application, users can compose writing accompanied by image illustrations, various attractive module background colors and other supporting templates to suit their needs. The end result of the developed module is a module *leaflet* printed ethno mathematics. 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 design expert validation and material expert validation by Elementary School Teacher Education lecturers and Mathematics Education lecturers at the University of Jember and expert practitioners by class V teachers at SDN Curahpoh 1 Bondowoso. This is done to get input and directions regarding the strengths and weaknesses of the developed module. The following is a summary of the results of product validation by the three validators presented in Table 3.1.

Table 3.1 Data and Analysis of Product Validation Results

| No Questions | Validator 1 | Validator 2 | Validator 3 | Average |
|---|---|---|---|---|
| 1-20 | | | | |
| Amount | 95 | 91 | 83 | 89,6 |

$$Valpro = \frac{}{smt} \times 100\%$$

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

$$Valpro = 89,6$$

From these results it can be seen that the modules that have been developed fall into the criteria of being very feasible to try out because the final scores occupy the 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 module improvements after being validated.


Figure 3.1 Module cover after validation

The trial use was carried out in class V at SDN Curahpoh 2 Bondowoso with a total of 20 students. The trial use was carried out by filling out a student response questionnaire which contained 10 statements about the module *leaflet* that has been used with the answer criteria YES or NO. Based on the results of user trial calculations, the YES answer at each statement point obtained an average score of 89%. Whereas
for the answer NOT get a score of 10.7%. This means that the module is feasible for effectiveness testing because each statement point about the module has achieved an average value of above 80%.

**Test the Effectiveness and Practicality of Module Development *Leaflet* Based on Ethno mathematics of Bamboo Woven Crafts**

The effectiveness test was carried out using the experimental method *pretest* and *posttest*. The effectiveness trial was conducted in class VA and 5 B of SDN Curahpoh 1 Bondowoso. The relative effectiveness test is measured in 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

The effectiveness of the module *leaflet* ethnomathematics based can be calculated through *Independent Sample T-Test*. *Independent Sample T-Test* done

by comparing the learning outcomes of class 5 A as the experimental class with the learning outcomes of students in class 5 B as the control class. Data results from the test *pretest* and *posttest* the experimental class and the control class are then calculated using the t test formula *(t test)* for separate samples.

Based on the results of calculations using the formula *Independent sample t-test*, score is obtained *t-count* as big ±7,852. Results *t-count* then consulted with *t-table* with a significance level of 0.05. Mark *t-table* for a significant level of 0.05 with a df of 19 is 1.729. Then the result of *t-test* that has been calculated, value *t-count* greater than *t-table* (7.852>1.729). Therefore, it can be concluded that the experimental class is taught using modules *leaflet* based on Ethnomathematics on Bamboo Woven Crafts Building Materials, the learning outcomes were better than the control class which did not use modules *leaflet* based on ethnomathematics.

2) Effectiveness Test through ER

Calculating the level of relative effectiveness is carried out after the t test value is obtained, the aim is to determine the level of relative effectiveness of learning outcomes
by using modules *leaflet* based on ethno mathematics through a comparison of the learning outcomes of the experimental class and the control class.

Based on the calculation of the relative effectiveness test, it was found that 65.3% of the student learning outcomes were due to the use of the module *leaflet* based on ethnomathematics, while 34.7% of student learning outcomes are due to internal factors, namely in the form of a lack of interest in student learning and external factors due to the limited use of teaching materials used as aids during learning. Based on these data, it can be concluded that the learning outcomes of the experimental class using the module *leaflet* based on ethno mathematics woven bamboo craft is 65.3% more effective than the learning outcomes of the control class which does not use the module *leaflet* based on ethnomathematics

3) Practicality Test through Student Response Test

Test student responses to the module *leaflet* based on ethno mathematics tested by distributing questionnaires to students. The student response questionnaire includes 10 statements containing the components contained in the module both material, picture illustrations, use of language and ease of student interest in learning. The questionnaire was then filled in by the students at the end of the lesson and after working on it *posttest*. The scores obtained through the student response questionnaire are then calculated to determine the practicality of using the module *leaflet* based on ethnomathematics.

Based on the calculation results above, module development *leaflet* based on ethnomathematics on woven bamboo crafts, the result is 88, which is included in the very practical category, so that it can be stated that the module *leaflet* ethnomathematics based on woven bamboo crafts is feasible and practical to use in learning mathematics.

Based on the results of the Independent Sample T-Test, Relative Effectiveness Test through Independent Sample T-test, Relative Effectiveness Test through ER and Practicality Test Results, there is an increase in student learning outcomes by using the Module *Leaflet* Ethno mathematics Based on Material Bamboo Woven Crafts Geometry. This indicates that the use of the module *leafed* can attract students' interest in learning mathematics. Broadly speaking the development of the Module *Leaf flat* Based on Ethno mathematics in Woven Crafts is going well. Module *Leaflet* Based on Ethno mathematics on Bamboo Woven Crafts, Spatial Materials can be used as an alternative in choosing teaching materials, especially spatial materials. Although the process and results are good, this does not rule out the possibility of limitations in this study. The limitations of this research are the final product and mass product stages as well as product determination and implementation which cannot be carried out due to time and cost constraints.

## CONCLUSION

Module development process *leaflet* based on ethno mathematics using the Bord and Gall model which includes 8 stages namely; (1) preliminary research, (2) product development planning, (3) initial product design development, (4) product design validation, (5) initial product revision, (6) trial use, (7) product development revision, ( 8) product effectiveness testing.

Module validation results *leaflet* based on ethno mathematics obtained a score of 89.6, the effectiveness test through the independent sample t-test obtained a score of 7.852 and the relative effectiveness test obtained a result of 65.3% and the practicality test obtained a score of 88%. so module development *leaflet* Based on ethno mathematics, bamboo woven crafts are very valid, effective and practical to use in learning mathematics.

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