PENGEMBANGAN MODEL PROBLEM BASED LEARNING BERBASIS ETNOMATEMATIKA DALAM MENINGKATKAN KEMAMPUAN PEMECAHAN MASALAH DAN KEMAMPUAN BERPIKIR KREATIF

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Abstrak

Tujuan penelitian ini adalah untuk mengetahui kemampuan pemecahan masalah matematis mereka saat belajar dengan pendekatan pembelajaran berbasis masalah berbasis etnomatematika, meningkatkan kemampuan pemecahan masalah matematis dengan menggunakan pendekatan Problem Based Learning berbasis etnomatematika dan membuat bahan ajar menjadi valid, praktis, dan efektif, dan meningkatkan kemampuan pemecahan masalah matematis melalui penggunaan pendekatan pembelajaran berbasis masalah yang berbasis etnomatematika untuk mengembangkan bahan ajar. Metode ini digunakan penelitian pengembangan R&D (Penelitian dan Pengembangan). Model pengembangan yang akan digunakan peneliti adalah model pengembangan ADDIE, yang merupakan singkatan dari Analisis, Desain, Pengembangan, Implementasi, Evaluasi. %. Hasil analisis data dari angket respon siswa diperoleh jumlah skor dan rata-rata skor kepraktisan bahan ajar dengan jumlah skor respos siswa diperoleh 3.485 dan rata-rata skor jumlah respon guru memperoleh skor 91,86%. Sehingga diperoleh bahwa respon guru dan respon siswa memberikan penilaian rata-rata skor 91.5% dengan kategori "sangat. praktis". Hasil analisis data dari hasil soal posttest diperoleh jumlah nilai rata-rata skor 90 dengan kategori "Tuntas" sehingga bahan ajar dapat dikatakan dengan kategori bahan ajar "Efektif".

Kata kunci: bahan ajar, etnomatematika, pemecahan masalah.

Abstract

The purpose of this study was to determine students' mathematical problem-solving abilities when learning using an ethnomathematics-based problem-based learning approach, improve mathematical problem-solving abilities using an ethnomathematics-based problem-based learning approach, and make teaching materials valid, practical, and effective. This study also improved mathematical problem-solving abilities through the use of an ethnomathematics-based problem-based learning approach to develop teaching materials. This study used the R&D (Research and Development) development research method. The development model used by the researcher is the ADDIE development model, which stands for Analysis, Design, Development, Implementation, and Evaluation. The results of data analysis from the student response questionnaire obtained a total score and an average score for the practicality of the teaching materials. The total score for student responses was 3,485 and the average score for teacher responses was 91.86%. Therefore, it was found that teacher and student responses gave an average score of 91.5%, categorized as "very practical." The data analysis results from the posttest showed an average score of 90, categorized as "Complete," thus categorizing the teaching materials as "Effective."

Keywords: teaching materials, ethnomathematics, problem solving.

1. INTRODUCTION

Mathematics is a very important subject in life. It cannot be denied that mathematics plays an important role at every level. The branch of mathematics that may be relevant to culture is called ethnomathematics. D'Ambrisio's definition of ethnomathematics, based on the prefix "ethno," is defined very broadly, involving language, symbols, and codes relevant to the sociocultural context (Rosa & Orey, 2011).Then, technically, we define ethnomathematics as:"Mathematics practiced

within cultural groups is defined as national communities, workgroups, children of certain ages, and professional classes."

Mathematics is an inseparable part of every activity or habit and is present in all Indonesian cultures. Three-dimensional shapes have certain properties, namely they have faces, edges, and vertices. The vertex is the corner of the three-dimensional shape. Students must be able to master the core competencies and basic competencies present in each educational unit during the 2013 curriculum learning (Dunne et al., 2023). Students must have problem-solving skills to solve mathematical problems (Liljedahl & Santos-Trigo, 2019).This is very important for mathematics teachers because students with low problem-solving abilities will find it difficult to process concepts and solve the problems given by the teacher (Nurrenbern & Pickering, 1987).

To solve this problem, teachers must use innovative and creative learning approaches that help students understand the lessons and apply them in everyday life (Awang & Ramly, 2008). To solve this problem, the researcher used the Problem Based Learning model, one of the learning models recommended by the teacher and proven to be effective (Phungsuk et al., 2017). Problem formulation and problem-solving. The formulation of the research problem, based on the background that has been previously presented, is as follows: 1. How do students improve their mathematical problem-solving skills when learning with an ethnomathematics-based problem-based learning approach? 2. How to improve mathematical problem-solving skills using the Problem Based Learning approach based on ethnomathematics? How can teaching materials become valid, practical, and effective? 3.

How is it possible to improve mathematical problem-solving skills through the use of a problem-based learning approach grounded in ethnomathematics to develop teaching materials? , 4. Students are able to improve their mathematical problem-solving skills when learning with an ethnomathematics-based problem-based learning approach. 5. Improving mathematical problem-solving skills by using the Problem Based Learning approach based on ethnomathematics and making teaching materials valid, practical, and effective. 6. Able to improve mathematical problem-solving skills through the use of a problem-based learning approach based on ethnomathematics to develop teaching materials (Setiyani et al., 2020).

Applied Research is a research activity that includes research and development prototypes or policy recommendations, proposals, concepts, models, and indices that encompass the stages of component/subsystem validation in a laboratory environment, component/subsystem validation in a relevant environment, demonstration of models or system/subsystem prototypes in a relevant environment, or monumental works (Brown, 2007).

2. RESEARCH METHOD

The type of research used is R&D (Research and Development) development research. The development model that the researcher will use is the ADDIE development model, which stands for Analysis, Design, Development, Implementation, Evaluation. The ADDIE model is one of the design models in learning systems, which is easy to learn and can be implemented in designing learning aimed at producing the development of an effective and efficient product. This research aims to develop Teaching Materials with the goal of producing valid ethnomathematics-based Teaching Materials.

The subjects of this research are lecturers, teachers, and all 33 students of class IX at SMA Negeri 2 Lubuk Pakam. The development procedure used by the researcher employs the ADDIE development model, which includes five stages.

This research was conducted in the Odd Semester of the 2023/2024 Academic Year.

3. RESULTS AND DISCUSSION

Analysis Stage (Analyze) At this stage the researcher conducts an analysis performance, needs analysis, and curriculum analysis. The techniques used in the analysis stage are observation, interviews and questionnaires. The interview was conducted at SMA Negeri 2 Lubuk Pakam with the resource person Mr. Agusman Tambun, S.Pd., as a mathematics teacher at SMA Negeri 2 Lubuk Pakam. The results of the questionnaire were conducted by lecturers mathematics, Indonesian language lecturers and mathematics teachers.

Design Stage At the design stage, it is very much needed in the development of teaching materials and expert validation stages. At the stage of making teaching materials, researchers begin to compile teaching materials, collect references related to the material of flat-sided space on cubes and cuboids, and by searching for and collecting images related to the material and compiling assessment instruments. At this stage, researchers design teaching materials based on ethnomathematics of Banjar snacks that will be used in learning. The planning stage includes several aspects, namely:

1. Design of Student Teaching Material Cover Figure 1. Cover of Student Teaching Material
2. Instructions for Using Student Teaching Materials can be seen in the draft
3. Learning instructions for several basic competencies, competency achievement indicators and objectives in learning flat-sided spatial structures (cubes and cuboids) can be seen in the following figure 3: Figure 3 Basic Competencies, GPA, Learning Objectives
4. Summary of Material The summary of the material contains brief material that will increase understanding and help students answer questions. The summary of the material can be seen in the following figure 3: Figure 3 Summary of Material
5. Practice Questions Practice questions contain questions regarding the understanding of previous material. practice

The questions can be seen in Figure 4 below: Figure 4. Practice Questions 5. Evaluation At the evaluation stage, the research creates questions for students to work on. To find out the level of student understanding, the evaluation consists of essay questions. The evaluation questions can be seen in Figure 5 below: Figure 5. Evaluation, 6. Competency Test At the evaluation and competency test stage, researchers create questions for students to work on to determine the level of students' understanding of the competency test.

The development stage is divided into two, namely the module development stage and the validation stage. At the creation stage, researchers begin to compile or develop teaching materials from beginning to end referring to the draft that has been made and after compiling or developing. Teaching materials will be validated by material experts, media experts, language experts through instruments that have been made by assessing the validity of teaching materials, so that the teaching materials developed are suitable for use.

This study uses validation by media experts, material experts, and language experts. The results of the percentage of expert validation values are shown in the following pie chart. Figure 8. Diagram of the Results of the Average Value of Expert Validation There are acquisitions from the validation results obtained from the percentage value of the validation value for the material aspect in Mathematics Lecturers, namely 96% with the validation criteria "very

valid", the percentage of validation value for the material aspect for teachers was 95% with the validation criteria of "very valid", for the media aspect it was 92% with the validation criteria of "very valid" while for the language aspect it was 95% with the validation criteria of "very valid".

2. Implementation Stage (Implementation) The implementation stage is the stage that conducted after the product is declared valid through the calculation of the level of product validity, then the researcher conducts the implementation stage and the researcher conducts a product trial on students at SMA Negeri 2 Lubuk Pakam CLASS IX and one of the mathematics subject teachers at SMA Negeri 2 Lubuk Pakam CLASS IX. The results of differences in student learning before and after using ethnomathematics-based teaching materials are presented in the Draft Posttest Results Diagram Based on the analysis of Diagram Figures 4.17 and 4.18, students' mathematics learning outcomes experience differences from the pretest and posttest results, which have shown significant improvements in student learning.

3. Evaluation Stage

Based on the results of the study, the last stage is the evaluation stage to assess the effectiveness of the Teaching Materials to improve students' mathematical problem solving abilities. The evaluation stage is the last stage of the ADDIE learning design model. This evaluation step aims to analyze the level of effectiveness of the developed Teaching Materials. The evaluation is carried out by providing a posttest test, namely a written test for students, the test is carried out after carrying out learning using Teaching Materials. The posttest consists of 5 questions that have been validated by a mathematics lecturer.

Teaching materials based on ethnomathematics material get up room side flat on cube and cuboid has validated by experts material , media expert , expert language . Expert validator material lecturer For evaluate developed teaching materials with the average score obtained by 98%. Expert validator teacher materials for evaluate developed teaching materials with the average score obtained by 97%. Media expert validator for evaluate developed teaching materials with the average score obtained by 94%.

Expert validator Language For evaluate teaching materials which is developed with the average score obtained by 97%. Based on results data analysis from instrument expert assessment material , media expert , expert Language to building teaching materials room side flat on cube and cuboid based on ethnomathematics average score obtained validity by 97% with "very valid" category . So the teaching materials are based on ethnomathematics material get up room side flat on cube and cuboid This said to be "very valid". After product declared valid, researcher do a trial teaching materials at SMA Negeri 2 Lubuk Pakam For assess and see practicality and effectiveness teaching materials to test subject to students of State High School 2 Lubuk Pakam class IX and one subject teacher lesson mathematics.

The results of data analysis from teacher questionnaire obtained amount score and average score practicality teaching materials with amount score teacher response obtained 96.5 and the average score amount teacher response obtained score 91.5%. The results of data analysis from questionnaire response student obtained amount score and average score practicality teaching materials with amount score response student obtained 3,485 and the average score amount teacher response obtained score 91.86%. So obtained that teacher response and response student give average score assessment 91.5% with "very. practical " category . The results of data analysis from results posttest questions obtained amount average score of 90 with " Complete " category so that teaching materials can it is said with category " Effective " teaching materials .

Building teaching materials room side flat based on ethnomathematics that researchers develop This own advantages and disadvantages teaching materials get up room flat side others . Advantages dai this teaching material namely : 1) presentation material in this teaching material in accordance with steps problem based learning which is learning started from real problems . 2) Presentation problems with teaching materials based on ethnomathematics real . 3) Related material with ethnomathematics and there is so Lots object culture that has connection with breadth of testing in a trial scale small .

4. CONCLUSION

From the results research and discussion development teaching materials with the *Problem Based Learning* Model based on ethnomathematics on material get up room side data on cubes and cuboids Class IX of State Senior High School 2 Lubuk Pakam . Can concluded that building teaching materials room side flat on cube and cuboid based on The ethnomathematics developed is valid, practical , and effective. The contribution or role of the team provided by an author in creating a written work and additional materials such as textbooks. Beneficial for State Senior High School 2 Lubuk Pakam or equivalent Senior High Schools.

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