

DEVELOPING MATHEMATICS MODULE USING SCIENTIFIC APPROACH ON POLYHEDRON MATERIAL FOR DEAF STUDENT OF CLASS VIII IN SMPLB - B

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ABSTRACT

Every citizen is entitled to educational services despite limitations such as lack of hearing resulting in obstacles in communicating with the environment or often called deaf. The availability of teaching materials for deaf students is not yet available. It is one of the inhibiting factors of efficient and effective learning, hence the need for innovative, varied, contextual, and by the needs of the students. The aim of this research is 1) to design the mathematics module with scientific approach on the flat side room facet for the deaf students of grade VIII SMPLB-B, 2) to know the feasibility of the mathematics module by scientific approach on polyhedron material for the deaf students of class VIII SMPLB B. This study was a Research and Development with development model of ADDIE (Analysis, Design, Development, Implementation, Evaluation). The subjects were three expert teaching materials, two expert media modules, and four students of class VIII in SLB Negeri 2 Bantul, and two students of class VIII in SLB Wiyata Dharma I Sleman. Data collection techniques used were interviews and questionnaires. The research instrument used in the form of a questionnaire to expert assessment modules, expert teaching materials, and student response. Data were analyzed using qualitative descriptive analysis. Results of research and development showed that the mathematical e-module developed in the excellent category based on questionnaire assessment by expert instructional materials included in the first category with an average score of 84,6—the questionnaire results assessment by expert modules included in the good with an average score of 82.5. The questionnaire results by the joint expert media modules and expert materials included a good category with an average score of 83,8. At the same time, the results of student responses questionnaire in classes of test products included in the excellent categories with an average score of 85. The assessment results indicate that the math module with a scientific approach on the polyhedron material that had been developed fit for use in the learning process.

Keywords: Deaf, Mathematics module, Scientific Approach, Polyhedron Materials

INTRODUCTION

Educational services are built to educate the life of the nation, explained in the 1945 Constitution (UUD 1945) article 31 paragraph (1) Every citizen has the right to get an education. For the realization of every citizen right, education must be able to serve all citizens including special or disabled children as derived from Law Number 20 of 2003 concerning the National Education System in article 5 paragraph (2) and Article 5 paragraph (1) states that citizens who have physical, emotional, mental, intellectual, and social disabilities entitled to special education. Like students with hearing impaired special needs. According to Haenudin (2013: 53), Deaf is a general term given to children who experience a loss or lack of ability to hear, so he has a disruption in carrying out daily life. Deaf can be divided into two, deaf and less hearing. Thus deaf students are entitled to education and feel the learning process so that problems in social, emotional, and mental aspects can be explicitly handled. According to the Law of the Republic of Indonesia Number 20 the Year 2003 concerning the National Education System that:

National education functions to develop capabilities and shape the classic character and civilization of the nation in the context of developing the intellectual life of the nation, aiming at developing the potential of students to become human beings who believe in and fear God Almighty, have noble, healthy, knowledgeable, capable, creative, independent, and be a democratic and responsible citizen. One of the factors inhibiting these objectives' achievement is the learning process that occurs in

the world of Indonesian education. The learning process is the core of education. Because the quality of education is measured by the learning process that occurs. Improving the quality of education can be done by improving facilities or facilities to facilitate the learning process. Teachers are the basic foundation for improving the quality of education. Therefore, a teacher must be able to develop learning material so that students readily accept the learning process. It is meaningful in changing student behavior due to the learning process that has been implemented. Interesting and effective learning requires a good medium to connect students with teaching material; therefore, teachers must be creative in creating learning innovations so that all students can well receive teaching materials. Innovations in learning include the innovation of teaching materials used in the learning process.

The independent teaching materials must meet the characteristics of 1) Self Instructional; through the module, a person or participant learns to be able to learn themselves, not dependent on other parties. 2) Self Contained; that is, all learning material from one competency unit or sub-competency learned is contained in one module as a whole. 3) Stand Alone (stand-alone); that is, the modules developed do not depend on other media or do not have to be used with other learning media. 4) Adaptive; the module should have a high adaptive power to the development of science and technology. 5) User Friendly; the module should be friendly with the user (Ministry of National Education, 2008: 3). Learning mathematics becomes a difficult job for students; this is due to abstract mathematical concepts, which is why teachers must be creative in presenting innovative teaching materials. Modules become one of the alternative innovative teaching materials that can be used in learning mathematics in class. According to Nasution (2011: 205), Modules can be formulated as a complete unit that stands alone and consists of a series of learning activities arranged to help students achieve some objectives that are specifically and formulated.

The preparation of mathematical modules with a scientific approach is designed to help students understand the material presented. According to Daryanto (2014: 51) Learning with a scientific approach is a learning process that is designed so that students actively construct concepts, laws or principles through stages of observing (to identify or find problems), formulate problems, propose or formulate hypotheses, collecting data with various techniques, analyzing data, drawing conclusions and communicating concepts, laws, or principles that are discovered.

From the results of observations and interviews with two schools namely SLB Negeri 2 Bantul and SLB Wiyata Dharma I Sleman obtained information that there is no reference teaching material in the form of a mathematics module with a scientific approach specifically for children with disabilities, learning is still centered on the teacher so that students become dependent on the teacher's presence. Based on the description above, what underlies the development of a mathematical module with a scientific approach through research entitled Development of a Mathematical Module with a Scientific Approach to Building Material Plyhedron for Deaf Students Class VIII SMPLB-B.

As stated in the background above, the problems formulated in this study are:

1. How to design a mathematical module with a scientific approach to the material to build a plyhedron appropriate for deaf students of class VIII SMPLB-B?
2. How is the feasibility of a mathematical module design with a scientific approach to the material to build plyhedrons for deaf students of class VIII SMPLB-B?

By the elaboration of the formulation of the problem, it can be stated the purpose of this development research as follows:

1. Make a mathematical module design with a scientific approach to the material to build plyhedrons for deaf students class VIII SMPLB-B
2. It knows the feasibility of a mathematical module design with a scientific approach to the material for building plyhedrons for deaf students of class VIII SMPLB-B.

METHODS

Research carried out includes the type of research and development or Research and Development (R&D) with the ADDIE development model (Analysis, Design, Development, Implementation, Evaluation). The product developed is a Mathematical Module. The stages of

development refer to the flow of development consisting of 1) Analysis/analysis, 2) Design/product design, 3) Development/product development, 4) Implementation/testing of the product, 5) Evaluation/evaluation of the product. The product was tested on deaf students of class VIII SLB Negeri 2 Bantul and SLB Wiyata Dharma I Sleman, which included field trials. Data collection techniques used were interviews and questionnaires. The research instrument used in the form of an assessment questionnaire for media experts, material experts, and student responses. Data analysis techniques using qualitative descriptive analysis.

RESULTS AND DISCUSSION

This research resulted in a product in the form of a mathematical module with a scientific approach to the material for building polyhedrons for deaf students of class VIII SMPLB-B. The product validation process involves two module experts, three instructional material experts, and students. The product validation results are as follows.

The results of data calculation from the assessment questionnaire by media experts can be seen in Table 1.

Table 1. Results of the Eligibility Questionnaire Calculation by Media Experts

No.	Evaluator	Score
1.	Anggit Prabowo, M.Pd.	81
2.	Maksum Mugi Laksono, S.Pd.	84
Average		82,5
Quality category		Good

Based on the table, it can be seen that the average score of the assessment results by media experts is 82.5. This shows that the developed mathematical module viewed from the aspect of media appearance is included in both categories.

The results of data calculation from the assessment questionnaire by teaching material experts can be seen in Table 2.

Table 2. Results of the Eligibility Questionnaire Calculation by Material Expert

No.	Evaluator	Score
1.	Drs. Suparyan, M.Pd.	76
2.	Septiana Anindya Jati, S.Pd.	79
3.	Suparlan, S.Pd.	99
Average		84,6
Quality category		Very Good

Based on the table, it can be seen that the average score of the assessment results by the teaching material expert is 84.6. This shows that the developed mathematical modules viewed from the material aspects are included in the first category.

The results of data calculation from the combined questionnaire assessment by module experts and teaching material experts can be seen in Table 3.

Table 3. Results of the Joint Questionnaire Calculation by Experts

No.	Evaluator	Score
1.	Media expert 1	81
2.	Media expert 2	84
3.	Material expert 1	76
4.	Material expert 2	79
5.	Material expert 3	99
	Average	83,8
	Quality Category	Very Good

Based on the table, it can be seen that the average score of the assessment results by media experts and material experts is 83.8. This shows that the developed mathematical modules viewed from the aspects of the display modules and materials included in the category very well.

The field trial involved 4 SLB Negeri 2 Bantul students and 2 SLyata Dharma I Sleman SLB students. The results of data calculation from the student response questionnaire can be seen in Table 4.

Table 4. Results of Calculation of Trial Questionnaire

Activity	School	Score	Qualitative Criteria
Product Trial	SLB N 2 Bantul	85,75	Very good
	SLB Wiyata Dharma I Sleman	83,5	Good
Average		85	Very good

Based on the table, it can be seen that the average score of the results of assessments by students on product trials is 85. This shows that the developed mathematical modules seen from the students' responses are included in the first category.

CONCLUSION

Based on the results of research on the development of mathematical modules with a scientific approach to the material for building polyhedrons for students of class VIII SMPLB-B that have been done using the ADDIE Research and Development method which is carried out through five stages to produce mathematical modules that are suitable for use, for several reasons.

- The feasibility level of the mathematics module with a scientific approach to the material on polyhedron for students of class VIII SMPLB-B in terms of aspects of the module display included the feasible category with an average score of media expert assessment results was 82.5.
- The level of feasibility of the mathematics module with a scientific approach to the material on the polyhedron for students of class VIII SMPLB-B in terms of aspects of the material included in the category is very decent with an average score of material expert assessment results was 84.6.
- The feasibility level of the mathematical module with a scientific approach to the material on the polyhedron for students of class VIII SMPLB-B in terms of aspects of the appearance of the module and the material included in the feasible category with an average score of results assessed by a combined expert is 83.8.
- The feasibility level of the mathematical module with a scientific approach to the material on the polyhedron for students of class VIII SMPLB-B in terms of student responses to the product trial included in the very feasible category with an average score of student assessment results is 85.

Mathematical modules on the material to build polyhedrons are still far from perfection because of the limited time and ability to think in making their compilation. Here are some suggestions from researchers for further research, namely:

- There is a need for a trial of mathematics modules in several schools with different qualities to strengthen the evidence.
- Modules that have been produced should be tested on students who have never gotten the material in the mathematics module so that the research conducted can be maximized.

3. There is a need for follow-up from other researchers to develop mathematical modules with other materials.

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