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**DEVELOPMENT OF TEACHING MATERIALS IN MATHEMATICS LESSONS
IN SEMESTER II IN CLASS IV STUDENTS OF ELEMENTARY SCHOOL**

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ABSTRACT

This study aims to develop teaching materials in mathematics lessons for fourth grade elementary school students. The method in this study uses a 4D Thiagarajan development model consisting of 4 stages, namely define, design, develop, disseminate. Meanwhile, the researchers only reached the development stage. The subjects of this study were fourth grade students of UPT SDN 302 Gresik and 2 material expert validators namely elementary school fourth grade teachers and 2 teaching material design expert validators namely lecturers of FKIP Muhammadiyah University of Gresik. The data collection method used is validation and student response questionnaires. Based on the result of data analysis from validation and trial result, it was found that the development of mathematics teaching materials produced quality teaching materials, namely a) mathematics teaching materials were categorized as valid on material expert validation (96,87%) and expert validation of teaching material design (94, 16%) ; b) mathematics teaching materials are categorized as effective with the percentage of student response questionnaire score of 90,4%.

Keywords: 4D model, mathematics teaching materials

L. INTRODUCTION

Teaching materials are an important part of the learning process. Teaching materials are the contents of the curriculum in the form of fields of study with topics / sub topics with details. The content of learning activities is reflected in the learning materials studied by students (Djamarah, 2006). Harjanto (2005: 225) explains several criteria for learning materials in the learning system that underlie the determination of learning strategies: according to the learning objectives to be achieved or what students can do at certain conditions and levels of competence, learning materials are described clearly and using language that communicative, relevant to the needs of students, conformity to the environmental conditions of students (contextual), contains ethical aspects, namely considering the moral development, knowledge, and skills to be acquired.

Based on an interview conducted on November 16, 2020 by the researcher with the homeroom teacher of class IV UPT SDN 302 Gresik in Ngemboh Village, stated that students have difficulty understanding the material presented by the teacher, this is because the teaching materials used in learning have not provided an appropriate description. with the environment (not yet contextual) so that students cannot practice it directly and in real terms because in general teachers only use government publications as a guide in learning. The book published by the Ministry of Education and Culture of the Republic of Indonesia is used as a standard for all of Indonesia, so the description is still simple and too general.

Research conducted by (Prastowo: 2012) suggests that there are several aspects that are used as a benchmark in developing teaching materials, one of which is the fact aspect which means that students must experience or do learning by involving themselves and their own environment to get real experience, but in reality the available book facilities do not involve objects around the student's environment, the available teaching materials provide examples of objects in general and provide a brief and simple explanation of the formula without being accompanied by a broad description. This makes it difficult for students to understand mathematics in a concrete way.

Learning and learning is a unity that is related to each other. The problems above are related to the teaching material facilities used by educators and students who do not facilitate their use as learning media because they are not in accordance with the characteristics of students in their living environment. This is not in accordance with the criteria for learning materials according to (Harjanto: 2005) that the teaching materials developed are to be relevant to the needs of elementary school students and to adjust the environmental conditions around which students live (contextual) so that students can relate them to everyday life. .

Based on the description of the background above, the researcher is interested in doing research with the title "Development of Teaching Materials in Second Semester Mathematics Lessons for Fourth Grade Elementary School Students". Based on the 2013 curriculum, the teaching materials in the second semester of mathematics lessons for fourth grade elementary school students include three main materials, namely: flat shapes, statistics, and angle measurement. Presented with contextual-based and interesting pictures that adapt to the environmental conditions students live in, so in addition to getting theory, students can directly practice in everyday life.

III. METHOD

The research design that will be used by researchers is to use a 4D or four-D development model. Thiagarajan's 4D research and development model consists of four stages, namely define, design, develop and disseminate. Meanwhile, the researchers only reached the development stage. The place of development research is carried out at UPT SDN 302 Gresik and the research time is in the 2020/2021 academic year. The researcher used the subject, namely students of UPT SDN 302 Gresik class IV which consisted of 15 students.

In the first stage define there are 5 stages, namely front end analysis by diagnosing early in the form of learning difficulties experienced and the media needed for listening skills, student analysis by studying the characteristics of students to find out the causes of difficulties

experienced during the learning process, task analysis by analyzing tasks that can achieve the basic competencies that will be given to students, concept analysis by analyzing the main concepts for achieving student learning outcomes indicators and analysis of learning objectives by writing the expected goals of learning that result in changes in student behavior. In the second stage of design (Planning) there are 4 stages, namely the preparation of test standards by conducting initial activities to understand the students' initial competencies and as an evaluation instrument after implementing the activities, selecting media materials according to the material and class conditions and student characteristics, selecting The format used is the validity sheet and student response questionnaires, and the initial design that will be produced by this researcher is teaching materials. In the third stage of develop, there are several stages of development, namely expert assessment to assess the feasibility of the design or validation accompanied by product revisions with the aim of the validator being able to provide suggestions/comments/conclusions to complete the teaching material, and testing the development section to make the final form. of the product after going through a revision by providing a response questionnaire to students on learning using teaching materials.

Data collection techniques used in this study were validation and student questionnaires. There are two forms of instrument in this study, namely a validation sheet consisting of two material experts and two teaching material design experts, and a student response questionnaire sheet.

The validation of learning media is given to material experts and design experts. There are aspects of material expert validation that are assessed, consisting of indicators of the suitability of the material with KI and KD, accuracy of the material, and up-to-date material, easy-to-understand language, clear language, communicative language, interactive language, concept coherence, contextual and systematic presentation. While the validation of teaching material design experts contained aspects of the suitability of chapter/sub-chapter titles, page alignment, typography, clarity of illustrations, cover images, cover colors, cover illustrations, appropriate spacing between texts, easy-to-read fonts, standard margins.

According to Sugiyono (2018: 93-94) on a Likert scale, indicators are used as the starting point needed to arrange the items in the instrument in the form of questions or statements. The measured variables will be translated into variable indicators.

Table 1 Qualification Level of Validity

Percentage	Criteria
75 – 100 %	Valid
56 – 74 %	Quite Valid (Revision)
40 – 55 %	Not Valid (Revision)
0 – 39 %	Invalid

by: Sugiyono (2012)

The score obtained from the validation sheet is then determined by a formula to determine the validity. Analysis of student responses was carried out by distributing

$$\text{Presentase \%} = \frac{\text{Skor yang diberikan validator}}{\text{Skor Maksimum}} \times 100\%$$

questionnaires after the learning process using teaching materials in learning.

$$\text{Presentase PD} = \frac{(5 \times SS) + (4 \times S) + (3 \times KS) + (2 \times TS) + (1 \times STS)}{(5 \times \sum n) \times \text{jumlah peserta didik}}$$

IV. RESULT AND DISCUSSION

In the first stage define (Defining) there are 5 stages, namely :

- a. In the end analysis, the researcher made an initial diagnosis in the form of learning difficulties faced and the teaching materials needed for the process of teaching and learning activities. Based on the results of the interview on November 16, 2020 with the fourth grade teacher, Ms. Zahrotul Ainiyah, S.Pd. UPT SDN 302 Gresik, the basic problem that exists in schools is that the teaching materials used in learning have not provided an appropriate description of their environment (not contextual yet) so that students cannot practice it directly and in real terms because in general teachers only use government publications as a guide in learning.
- b. Analysis of students, researchers studied the characteristics of fourth grade students at UPT SDN 302 Gresik to develop the media needed in the learning process. The researcher conducted an interview on November 16, 2020 with the fourth grade teacher, Mrs. Zahrotul Ainiyah, S.Pd., that there were 15 students. Students have different ways of learning, students like to associate lessons with concrete objects in the surrounding environment, students also like learning that is interesting, challenging, fun so that teaching materials are needed, so researchers use the development of mathematics teaching materials in the second semester of class IV.
- c. Assignment analysis, the assignment given is the flat material according to the achievement of basic competencies with the help of mathematics teaching materials for the second semester of class IV.
- d. Analysis of the desired learning objectives from the second semester of class IV mathematics learning process according to indicators, namely students are able to identify various flat shapes in the surrounding environment, calculate the perimeter and area of rectangular and triangular flat shapes, read and interpret data presented in the form of tables and bar charts , uses the concept of bar charts to solve problems in everyday life, identifies angles in objects around the environment, distinguishes types of acute, right, and obtuse angles, measures angles using an arc.

In the second stage of Design (Planning) there are 4 stages, namely :

- a. preparation of test standards, based on predetermined learning objectives. There are several test sheets that contain questions related to the basic competencies being taught. The systematic preparation of mathematics textbooks consists of several steps as follows: design of mathematics textbook covers, preparation of instructions for use of mathematics textbooks, preparation of flat material content, statistics and angle measurements, relevant concrete images, design of student test questions, finishing

textbooks.

- b. The selected teaching materials are mathematics textbooks for the second semester of class IV with the following criteria: presenting material for flat shapes, statistics, and angle measurements that facilitate students' thinking processes by using concept planting and contextual approaches by using depictions of objects around the environment, books the teaching materials presented can help focus the attention of students because of the attractive appearance equipped with clear instructions and communicative language so as to help students absorb the material provided by the teacher through the textbook, researchers in the selection of media materials are adjusted to student analysis, analysis assignments, concept analysis and analysis of learning objectives.
- c. The choice of format, after determining suitable teaching materials, was developed in class IV of UPT SDN 302 Gresik. The next step is the selection of the format of teaching materials. The selection of the teaching material format used is the validity sheet and student response questionnaires.
- d. Initial design, in this step the design or planning of mathematics textbooks for the second semester of class IV at UPT SDN 302 Gresik covers 3 main materials, namely: flat shapes, statistics and angle measurements. The steps taken by researchers in the preparation of mathematics textbooks are: compiling some material texts that are adapted to the material of flat shapes, statistics and angle measurements, preparing a laptop or computer capable of loading Corel Draw and Microsoft Word, compiling several images that support the making of textbooks. second semester of elementary school fourth grade mathematics, uniting the image and text components of the material that has been created with the help of Microsoft Word.

In the third stage of development, there are several stages of development, namely:

- a. Validation of mathematics teaching materials, teaching materials that have been designed are validated by the validator. The validator who gave an assessment of the second semester of mathematics textbooks for flat shapes, statistics and angle measurements for class IV was a lecturer who was an expert in the field of mathematics teaching materials, Mr. Syaiful Huda, M.Sc. and Mr. M. Luthfi Oktarianto, M.Pd. and a teacher at UPT SDN 302 Gresik Mrs. Dzikroh, S.Pd. and Mrs. Zahrotul Ainayah, S. Pd. 2 lecturers who support mathematics courses at FKIP UMG gave an assessment of the design of teaching materials while 2 teachers of UPT SDN 302 Gresik gave an assessment of the content of the teaching materials that had been developed. The results of expert validation are in the form of scores and suggestions for criticism of teaching materials as a reference for making improvements and improvements to second semester mathematics teaching materials.
- b. Revision of teaching materials for the second semester of class IV, based on the assessment of the validation of the material experts, received suggestions/comments/conclusions on the teaching materials. The following are some suggestions/comments/conclusions obtained from the validator towards the researcher.
- c. 1) The first and second validators provide an assessment of the design of teaching

materials, they provide input to be consistent in presenting the order of the material, put images or words first and are required to include the source of the images taken. As stated by (Soedjadi: 2007) that there are six main characteristics of mathematics, namely: (1) having an abstract object of study, (2) having a deductive mindset, (3) being consistent in the system, (4) referring to agreement, (5) has symbols that are empty of meaning, and (6) pays attention to the universe of conversation and gives suggestions/comments/conclusions in the form of material in the fable story is quite good and can be used for field trials.

- d. 2) The third and fourth validators provide an assessment of the content of the teaching material, they provide input for writing multiplication signs with a times sign (\times) instead of a period (.). In addition, the two teachers of UPT SDN 302 Gresik provided suggestions for re-checking the perimeter and area formulas of flat shapes in the teaching materials, as according to (Joko Sugiarto, et al: 2007) that the perimeter of a flat shape is the sum of the side lengths. which limits it so that to calculate the perimeter of a plane figure it can be done by adding up the lengths of all its sides.
- e. Development trials, this trial phase is in the form of a student response questionnaire to determine the effectiveness of mathematics teaching materials in the second semester of fourth grade elementary school.

V. REFERENCES

- Diba, F., Zulkardi, Z., & Saleh, T. (2009). Development of Numbers Learning Materials Based on Realistic Mathematics Education for Grade V Elementary School Students. *Journal of mathematics education*, 3(1).
- Djamarah, Syaiful Bahri, 2006. *Teaching and Learning Strategies*. Jakarta : PT. Rineka Cipta.
- Endayani, Henni. Development of social science teaching materials. *IJTIMAIAH Journal of Social and Cultural Sciences*, 2017, 1.1.
- Harjanto, 2005 : 225 *Teaching Planning*, Jakarta : PT. Rineka Cipta.
- Hasratuddin. (2015). Building Character Through Mathematics Learning. *Journal of Mathematics Education PARADIKMA*, Vol 6 Number 2, Pages 130 – 141
- Muslich, M. (2008). *KTSP, Competency-Based and Contextual Learning*.
- Pujiati & Sigit, T.G. 2009. Elementary School Mathematics Module Learning Quality Program Measurement of Flat Area Measurement.
- Sanjaya, Vienna. 2010. *Educational Process Standard Oriented Learning Strategy*. Jakarta : Prenada Media Group.
- Soedjadi, R. 2007. Contextual Problems as the Stone of School Mathematics. *Opportunity Journal*. Volume 1, Number 1, ISSN : 2302 - 5158.
- Thaiagarajan, S. S. (1974). *Instructional Development for Training Teachers of Exceptional Children*. Leadership Training Institute/Special Education, Minnesota: University of Minnesota, Minneapolis.