DEVELOPMENT OF MATHEMATICS MODULE BASED ON ARIAS MODEL ON THE MATERIAL OF ALGEBRAIC FORM FOR GRADE VII

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ABSTRACT

Development of Mathematics Module Based on ARIAS Model on the Material of Algebraic Form For Junior High School Grade VII 1ST Semester. The problems that were found are limited availability of teaching materials causes the learning process to be less varied and teacher-centered, so the student's independence and activeness in building their knowledge below. This research aims to develop, test the modules' feasibility, and determine student responses to modules with the ARIAS model on algebraic form material. The research design used is Research and Development. The research subject is material experts, media experts, and students from Junior High School (SMP) Muhammadiyah 04 Yogyakarta and SMPN 03 Pleret. Data collection techniques were used through interviews and questionnaires with teachers and students. The instrument was tested through validation from material experts and media experts. Data analysis used questionnaire analysis and analysis of the feasibility of the mathematics module. The results showed that the module's assessment by material experts obtained an average score of 106,33 with very good. The module's assessment by media experts obtained an average score of 131 with thry good. The student's response obtained an average score of 114,83 with the category of very good. Based on the calculations' results, it can be concluded that the mathematics module was feasible to be used in the learning process.

Keywords: Mathematics Module, ARIAS, Research, and Development (R&D), Algebraic Form.

INTRODUCTION

Education has the most critical role in humans. Therefore education must get the most excellent attention and priority from the government, education managers, and society in general. The most important thing in education is the process because education does not only see the result, where students can understand the purpose of learning. Quality education cannot be separated from the teacher's role in the learning process in the classroom. Teachers must create learning situations that are active, creative, innovative, effective, and fun. Therefore, it requires competent teacher skills and teaching materials by the needs and the learning model used.

The learning model is significant for the teaching and learning process's effectiveness because a model that suits student needs, interests, and attention can increase student-teacher interaction. Students will feel interested in participating in learning activities. ARIAS (Assurance, Relevance, Interest, Assessment, and Satisfaction) is one of several learning models. Assurance contains self-confidence as an effort to influence one's performance. Relevance contains connection or relates to the life or experience of students. Interest is interest or concern. Assessment is an evaluation or assessment. Satisfaction is a sense of pride as a strengthening of the experience that has been gained. The ARIAS learning model is a modification of the ARCS model. The ARCS (Attention, Relevance, Confidence, Satisfaction) model was developed by Keller and Kopp, cited by Sopah (2001: 456) to answer how to design learning that can affect achievement motivation and learning outcomes.

Researchers found that the available teaching materials were not yet varied from the interviews with mathematics teachers and students at SMP Muhammadiyah 04 Yogyakarta and SMPN 03 Pleret. Student activeness in learning still lacks, especially algebra material, because students still have difficulty thinking semi-abstractly.

From the description above, the researcher wants to develop a module with the ARIAS model in mathematics, especially in algebraic form material with the 2013 curriculum, which is expected to

increase student motivation and learning independence, see the feasibility of the developed mathematics module and student responses when using the module.

METHODS

The type of research used is R & D (Research and Development) research. Sugiyono (2015: 407) states that development research is a research method used to produce specific products and test their effectiveness. This study's subjects were mathematics teachers and students of the research school and mathematics lecturers at Ahmad Dahlan University. Take as many as five students from each research school for small class trials. Take 20 students from each research school for large class trials.

In this study, data collection techniques were carried out using observation, interviews, and questionnaires. The questionnaire data analysis technique analyzes product assessment data by experts and data analysis based on student responses. The data obtained are in the form of qualitative values, which are then converted into quantitative values. Guidelines for scoring on qualitative data can be seen in the following table 1.

Table 1. Scoring Rules

Information	Score
SS (Strongly Agree)	5
S (Agree)	4
CS (Simply Agree)	3
KS (Disagree)	2
SKS (Strongly Disagree)	1

(Sugiyono,2015:135)

From the data that has been collected, the average is calculated using the formula:

$$\bar{X} = \frac{\sum_{i=1}^{n} X}{N}$$

Information:
$\bar{X}$: average score
$\sum_{i=1}^{n} X$: Total score
N: Number of evaluators

Furthermore, the data obtained from product assessment experts, mathematics teachers, and students are converted into qualitative scores based on ideal assessment criteria as in Table 2.

Table 2. Ideal Assessment Criteria

No	Qualitative Score Ranges	Qualitative Category
1	$\bar{X} > (M_i + 1,8\, SB_i)$	Very Good
2	$(M_i + 0,6\, SB_i) < \bar{X} \leq (M_i + 1,8\, SB_i)$	Good
3	$(M_i - 0,6\, SB_i) < \bar{X} \leq (M_i + 0,6\, SB_i)$	Enough
4	$(M_i - 1,8\, SB_i) < \bar{X} \leq (M_i - 0,6\, SB_i)$	Less
5	$\bar{X} \leq (M_i - 1,8\, SB_i)$	Very Less

(Widoyoko,2012:238)

Information:
M_i = average ideal
SB_i= ideal standard deviation
Ideal maximum score = $\sum$ item criteria $\times$ the highest score
Ideal minimum score = $\sum$ item criteria $\times$ the lowest score

RESULTS AND DISCUSSION

This development research was conducted at SMP Muhammadiyah 04 Yogyakarta and SMPN 03 Pleret. This research was conducted to develop teaching materials in an algebraic module with the ARIAS learning model. Based on the research development steps, the following research results were obtained:

1. Potentials and Problems. Observations and interviews with teachers and students of the school where the research is conducted are needed to determine the existing problems and potentials. The identification of the problem found was that students' creativity was still lacking. Learning was still centered on the teacher, and there was no special algebra form module.

2. Gathering Information. Collecting information through collecting various references related to the ARIAS-based math module on algebraic forms' discussion to be developed.

3. Product Design. The product design must be tangible or form. Is an initial product or a starting point that is still being perfected.

4. The preparation of learning modules according to the stages according to the Ministry of National Education (2008: 21-23), namely:

    a. Curriculum Analysis. Curriculum analysis is carried out as the basis for preparing module material. The material to be presented in the module can match the learning objectives to be achieved. Curriculum analysis is focused on the analysis of Core Competencies (CC) and Basic Competencies (BC).

    b. Determine the Module Title. The researcher's mathematics module is divided into five titles, namely: elements of algebraic form, addition of algebraic forms, subtraction of algebraic forms, multiplication of algebraic forms, division of algebraic forms.

    c. Module Code Giving. Module code is needed to facilitate module management. The code in the algebra form module uses codes A to E.

    d. Writing Modules

5. Product Design Validation. There are 2 product design validations, namely:

    a. Material expert

        Conduct a module assessment based on a questionnaire provided by the researcher on the material aspects contained in the module. The material expert validators were mathematics teachers of SMP Muhammadiyiah 04 Yogyakarta and SMPN 03 Pleret, and mathematics lecturers at Ahmad Dahlan University. Obtained an average score of assessment by material experts is 106.33 with a very good category.

    b. Media expert

        Conduct a module assessment based on a questionnaire provided by the researcher on the media aspects presented in the module. The media expert validator was a mathematics teacher at SMP Muhammadiyiah 04 Yogyakarta and SMPN 03 Pleret, and a mathematics lecturer at Ahmad Dahlan University. Obtained an average score of assessment by media experts is 131 in the very good category. Expert validation is carried out to determine the module's shortcomings and weaknesses in material and media aspects. Moreover, get advice and input from experts.

6. Design Revision. After the suggestions and input from material experts and media, experts are obtained, improve the module according to the experts' suggestions and input.

7. Product Trial. Product trials were carried out to determine the module's shortcomings from the students' point of view. Product testing was carried out with small class trials, namely by taking five students from each school where the research was conducted to assess the module based on a questionnaire distributed by the researcher. The small class trial at SMP Muhammadiyah 04 Yogyakarta and SMPN 03 Pleret obtained an average score of 104.9 in the excellent category.

8. Product Revisions. According to students' suggestions and input on small class product trials, product revisions are carried out to improve the module.

9. Trial Use. Testing this product's use is carried out to determine the product's weaknesses that still exist to be further refined. The use trial (large class trial) took as many as ± 20 students per research school. Students assess the module based on a questionnaire distributed by the researcher. The large class trials at SMP Muhammadiyah 04 Yogyakarta and SMPN 03 Pleret obtained an average score of 114.83 in the very good category.

10. Product Revisions. Conducted after a trial of use in order to improve module weaknesses according to student suggestions and input.

CONCLUSION

Based on the results of the research that has been done, the following conclusions can be drawn:

1. A mathematics module based on the ARIAS learning model on algebraic form material is achieved by producing a module using the Research and Development (R&D) development research step.

2. The feasibility of a mathematics module based on the ARIAS learning model for grade VII junior high school students on the subject of algebraic form is shown through the results of the material expert's assessment with a score of 106.33 in the very good category, the media expert with a score of 131 categories is very good.

3. When using a mathematics module based on the ARIAS learning model, student responses reached 114.83 in the very good category.

Based on the assessment of material experts, media experts, and student responses, it can be concluded that the mathematics module based on the ARIAS learning model on the subject of algebraic forms is feasible to use.

REFERENCES

Daryanto. 2013. Menyusun Modul: Bahan Ajar Untuk Persiapan Guru Dalam Mengajar. Yogyakarta: Gava Media.

Departemen Pendidikan Nasional. 2008. Panduan Pengembangan Bahan Ajar. Jakarta: Direktorat Jendral Manajemen Pendidikan Dasar dan Menengah.

Soekamto, Toeti. 1994. Teori Belajar dan Model-Model Pembelajaran. Indonesia: Dirjen Depdikbud.

Sopah, D. 2001. Pengembangan dan Penggunaan Model Pembelajaran ARIAS. Vol 21 no 31 September 2001. Jakarta: Badan Penelitian dan Pengembangan Depdiknas.

Sugiyono. 2015. Metode Penelitian Pendidikan Pendekatan Kuantitati Kualitatif dan R & D. Bandung: Alfabeta.

Widodo, Chomsin D dan Jasmadi. 2008. Panduan Menyusun Bahan Ajar Berbasis Kompetensi. Jakarta: Gramedia.

Widoyoko, Eko Putro. 2012. Evaluasi Program Pembelajaran. Yogyakarta: Pustaka Pelajar.

_____. 2012. Teknik Penyusunan Instrumen Penelitian. Yogyakarta: Pustaka Pelajar.