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DEVELOPMENT OF EXPONENT AND LOGARITMH FUNCTIONS WITH MICROSOFT EXCEL

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ABSTRACT

This study aims to: (1) produce teaching materials Exponent and Logarithm Functions in SMA/MA valid and practical with Microsoft Excel Software; and (2) to know the effectiveness of instructional materials that are developed on the learning outcomes and the response of learners in the class X MAN AekNatas. The method in this research is development research using ADDIE model. The procedure in this research is divided into 5 stages: 1) Analysis (Analysis); 2) Design (Designing); 3) Development (Development); 4) Implementation; And 5) Evaluation (Evaluation). Subjects in this study were students of class X MIPA MAN AekNatas.This research concludes that the media of exponent and logarithm function developed with Microsoft Excel is categorized well, that is fulfill the valid, practical, and effective criteria. Valid illustrated from the validation assessment based on content, constructs and language. Practical means students can use teaching materials and easily reproduced. Effective on student learning outcomes and responses. A total of 26 students (100%) reached KKM for knowledge aspect and 17 people (65,4%) reached KKM for skill aspect. Then based on result of analysis of questionnaire data as many as 18 students (69,2%) give response strongly agree, and 8 people (30,8%) give response agree.

Keywords:*Teaching materials, exponent function, logarithm function, microsoft excel, and ADDIE model.*

INTRODUCTION

The US National Research Council (NRC) in the Mathematics Instruction Manual of SMA 2015 states the importance of Mathematics with the following statement: "Mathematics is the key to opportunity." That is, for a student the success of learning it will open the door of a brilliant career. For citizens, mathematics will support the right decision-making.

For a country, mathematics will prepare its citizens to compete in economics and technology.

Permendikbud 22/2016 on the standard process of primary and secondary education suggests that the learning process in educational unit is held interactively, inspiration, fun, challenging, motivate learners to participate actively, and give enough space for initiative, creativity, and independence according to talent , Interests, and physical and psychological development of learners. Therefore, approaches, strategies, models and methods are needed to enable such activity to occur.

With the above understanding of learning mathematics should be carried out appropriately, so that these goals can be achieved. One of the efforts that can be implemented is by applying mathematical learning with constructivist insight. In addition, application of learning media is needed to support learning activities. This is because, learning media have benefits (Sudjana and Rivai, 1991) as follows. (1) The lesson will attract students' attention so they can grow the motivation to learn, (2) the learning materials will be more clear meaning so that they can be better understood by the students, and enable the students to master the learning material better, (3) the learning method will be more varied, Eye verbal communication through the words by the teacher, (3) more students do learning activities.

One of the basic competencies in SMA/MA mathematics learning is the Exponent and Logarithm Functions. In this material is discussed determines the exponent function of a known function image as well as describes the graph of the exponent function and understands the properties in the graph as representations of the properties of the exponent function. The basic competence not only fosters the thinking process of the students but also develops the students' potential optimally in solving problems in daily life. In this case the role of a teacher as a facilitator in the effort of teaching materials that can guide the students to understand the material.

One of the targets of the Kemendikbud Strategic Plan Program 2015-2019, the increased utilization of ICT for education, which targets program performance indicators to increase the number of ICT-based learning materials. Therefore, it is necessary to utilize ICT in learning. One of them is developing computer-based learning on the material of Exponent and Logarithm Function using Microsoft Excel.

METHODS

The study was conducted in the academic year 2017/2018. The subjects of the study were students of class X MIPA MAN AekNatas. The type of this research is development research by using ADDIE model. The research development model used in this research is the ADDIE model consists of 5 steps: (1) Analysis, this stage includes the analysis of teaching materials of Exponent and Logarithm Functions in accordance with the Curriculum 2013. (2) Design, designing of teaching materials include Designing and peyusunan, then researchers designing teaching materials. This design is called the first prototype. (3) Development, at this stage the designed prototype is validated and tested. (4) Implementation, at this stage the researcher uses teaching materials in classroom learning. The third prototype trial was conducted on the real research subject of the students of class X MIPA MAN AekNatas. (5) Evaluation, the evaluation stage is not solely intact at this stage alone but evaluation may also occur in the previous stages. This stage aims to determine the effectiveness seen from the potential effects that arise from the experimental test of learning outcomes and the response of learners.

The data collected in this study is carried out by (1) Walk through, Nieven (1999) in Lestariningsih (2011), walk through is a way to evaluate or validate a prototype or design done by an expert in the field directly so that interaction is formed Guide on prototype improvement or discussion. So, researchers provide teaching materials to experts and peers, then experts and peers to observe and review any content, constructs and language that exist in teaching materials. Expert advice / comments are recorded on the validation sheet and used as input to revise the teaching materials. (2) Document analysis, the results of the students' work on teaching materials are analyzed to see the strategies used by the learners to solve the contextual problem. (3) Questionnaires, questionnaires are used to determine the response of learners to teaching materials. Questionnaire used is a closed questionnaire. Learners are given 10 statements about the use of teaching materials on learning mathematics. (4) Written test, written test is used to know the learners' learning outcomes on the aspects of knowledge and skills. The results of the study were obtained from the analysis of the students' answers to the exercises contained in the teaching materials and the final test. (5) Performance / practice, This technique is used to determine the learning outcomes of learners on skills aspect. Assessment is done by observing the answers of learners so that can be known skills in solving problems.

Learning result data consist of value of knowledge and skill. The value of knowledge is derived from the assessment of the results of exercise 1 contained in teaching materials and final tests. While the skill value is derived from practice appraisal in exercise 2 and completion of exponential and logarithmic functions with determinant and final test methods. The data is analyzed to determine the achievement of basic competence of each learner. The average value of knowledge is obtained by averaging the daily value of each KD. The value of knowledge is written in the form of numbers on a scale of 0-100 and the predicate and equipped with a brief description of knowledge has been achieved.

For the same valuation technique selected the optimum value. While the value obtained by different techniques obtained by means of averaging. Thus, the average score of skills is obtained by averaging the value of the practice and the value of the final test. The KKM standard of mathematics subjects set by teachers in the classroom is 80. The KKM 80 standard becomes the reference for determining the predicate of learning outcomes. Skill values are written in numbers on a scale of 0 - 100 and predicates and are equipped with a brief description of the accomplished skills

In this study, questionnaire data will be analyzed using Likert scale. On a Likert scale, the proposed statements are judged by the respondent to strongly agree (4), agree (3), disagree (2), and strongly disagree (1). Questionnaires will be given at the end of the mathematics learning process with 10 statements.

RESULT AND DISCUSSION

Figure 1.Prototipe

The teaching materials produced in this research are electronic media with Microsoft excel. There are two main points outlined that yaiutu understands exponential functions and understands logarithmic functions with graphic images and compares them.

After going through 3 meetings of learning using electronic media media with Microsoft excel, at the fourth meeting of students follow the final test and filling the questionnaire. Learning outcomes of learners based on KKM can be seen in the following diagram.

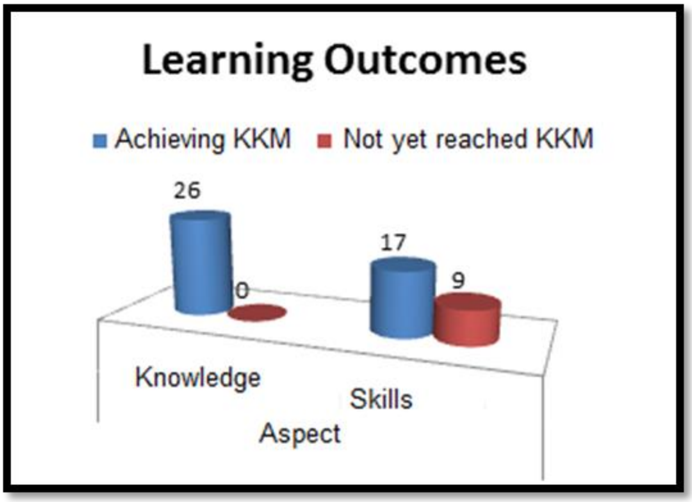

Figure 2. Bar chart Learning Results Learning Learners Based on KKM

Based on data analysis of learning outcomes and observation of researchers during the learning took place, 9 students who did not reach KKM had difficulty predicting the intersection of the y-axis on the graph of exponent function. The use of ICT media with excel micsosoft is not optimal because learners are not accustomed to using it. Then the differences in the skills and skills of learners should be accommodated with remedial teaching materials and enrichment. However, due to the limitations of the developed media does not contain remedial or enrichment materials.

CONCLUSION

This research concludes that the media of exponent and logarithm function developed with Microsoft excel is categorized well, that is fulfill the valid, practical, and effective criteria. Valid illustrated from the validation assessment based on content, constructs and language. Practical means students can use teaching materials and easily reproduced. Effective on student learning outcomes and responses. A total of 26 students (100%) reached KKM for knowledge aspect and 17 people (65,4%) reached KKM for skill aspect. Then based on result of analysis of questionnaire data as many as 18 students (69,2%) give response strongly agree, and 8 people (30,8%) give response agree.

Based on the results of research that has been obtained then it is recommended that students use the media function exponents and logarithms developed with microsoft excel so much easier to understand the material that will ultimately have an impact on learning outcomes. While the teacher can use the media produced as an alternative source of learning in the classroom.

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