The Development of Mathematic's Learning Tools of VIII Grade Based on Curriculum 2013 on The Quadratic Equation Subject

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ABSTRACT

The purpose of this research is to develqo the learning tools of mathematic on VIII grade based on curriculum 2013 in order to make a bridge of communication between teacher and student.The background of this research was based on unavailable the clear example about the development of learning tools based on curriculum 2013. The design of this learning tools consist of four meetings on quadratic equation subject.This study following the steps of the research development those are defining, planning, and developing. The technique of collecting data was descriptive qualitative, where the researcher revised based on the notes given by validator. After obtaining a valid criterion that was given by validator, then conducted trials on small groups of 6-8 students.After being tested on small groups, the researcher revised the product to be the reasonable final product. The result of this research showed that the learning tools of mathematic that was developed had the good quality. Based on the result of the questionnaire, the respons of the students on using Student activity sheetswas good. According to the result of the research. The researcher can conslude that the learning tools of mathematic which had been developed was valid and practical

Keyword: *Research and Development, Learning tools development, Curriculum 2013*

Introduction

Education is one of the important sectors in development. In this case, mathematics is one of science that has a considerable role in the development of a nation, especially the development of science and technology. For that reason, there should be efforts to anticipate more complicated and complex future challenges, one of them is by increasing the attention of education and mathematics learning, so as to equip learners in the application of mathematics and math skills to answer the existing problems. Mathematics is an important tool for improving intellectual skills and skills. Mathematics is also a science that underlies the development of modern technology, has an important role in various disciplines and advances the human mind. According to Sudjono (Suhermi and SehattaSaragih, 2006: 4) "mathematics is an exact and systematically organized branch of science, mathematics is a part of human knowledge of numbers and calculations, mathematics helps people in correctly interpreting ideas and conclusions."

Curriculum 2013 is a relatively new curriculum. The curriculum 2013 is a refinement of the KTSP curriculum that has been almost seven years implemented as a standard of education in Indonesia. One of the schools in Riau province appointed to implement the 2013 curriculum in the academic year 2014/2015 is SMP Negeri 1 Pekanbaru. The appointment of SMP Negeri 1 Pekanbaru as

one of the test schools of curriculum implementation in 2013, then all teaching device of academic year 2014/2015 used in the learning process must be adjusted to the demands in the curriculum 2013.

Based on interviews with several mathematics teachers at SMP Negeri 1 Pekanbaru, the teacher said that all the subject teachers at SMP Negeri 1 Pekanbaru are still trying to develop learning tools in accordance with the syllabus and information obtained from teacher training (PLPG). This is because there is no clear example of device development. Teachers also said that RPP has been made by the teachers themselves, but the syllabus used by the teacher still uses syllabus prepared by the service so there is no material restriction in every meeting. Teachers also said that teachers have used LKS in the learning process but the LKS used by teachers is not LKS made by the teacher, but LKS published by the book publishers.

From the results of the above interviews, it can be seen that to carry out the right process of mathematics learning required proper planning as well. The design of learning tools is one of the planning that must be prepared by teachers to achieve the learning objectives. Learning planning is summarized in a learning device. The learning tool according to Suhadi (Tawalla, 2014: 90), "is a number of materials, tools, media, instruction and guidelines to be used in the learning process."

From the description can be stated that the learning tool is a set of media or means used by teachers and learners in the process of learning in the classroom. Therefore, the authors are interested in doing research on the development of learning devices with the title Development of Mathematics Learning Tool Class VIII Based

Curriculum 2013 On Material Principal Equation Square. The development that will be carried out in this research includes: Learning Implementation Plan (RPP), Student Activity Sheet (LAS), and assessment with the subject of Quadratic Equation. Quadratic Equation is one of the main subjects taught in SMP / MTS.

Methodology

The method used in this research is the method of development research by testing a product then consider it. The researcher conducts a development research to produce learning tools (RPP, LAS, Assessment) of grade VIII mathematics based on the curriculum 2013 on the subject matter of valid and practical quadratic equations.

The learning device development model that was developed in this study refers to the type of development of 4-D model (four D model), which consists of 4 stages. The four development stages are define, design, development, and deployment (desseminate). The define stage is defining and defining the learning conditions. Planning stage is to prepare prototype of learning device. The development stage is to produce a revised learning tool based on input from experts. The deployment stage (desseminate) is the stage of using the device on a wider scale (Trianto, 2007: 65).

In this development research which is the subject of research is the students of class VIII or learners who have received the material of Quadratic Equation. At the development stage, the production of a mathematical learning device that will be validated by the validator.While the test phase is held in class VIII SMP Negeri 1 Pekanbaru. The time of its research is on March 23 - April 25, 2015

Data analysis technique in this research is anilisis validity of learning device of mathematics and analysis of mathematics learning device practicity. In the analysis of the validity of learning devices mathematics, the data obtained are analyzed descriptively qualitative. Researchers revise based on records from validators. Validation of assessment instruments is determined by the average score given by the validator. According Akbar (2013: 158) the formula for descriptive analysis of the level of validity as follows:

$$Va_{1-5} = \frac{TSe}{TSh} \, x \, 100\%$$

Note:

Va_{1-5} : Expert Validator 1,2,3,4, and 5

Tse   : number of empirical scores

(validation resultsfrom the

validator)

TSh   : the maximum number of scores

             expected

Researchers can calculate the combined validity of the results of the analysis into the following formula:

$$V = \frac{Va_1 + Va_2 + Va_3 + Va_4 + Va_5}{5}$$
$$= \cdots \%$$

Note:
V   : Combined validity

Va_1 : Validity of the expert 1

Va_2 : Validity of the expert 2

Va_3 : Validity of the expert 3

Va_4 : Validity of the expert 4

Va_5 :Validity of the expert 5

The validity criterion according to the validator rating is divided into four criteria (Akbar, 2013: 158) with the criteria as follows:

Table 1: Validity Criteria by Validator Rating

No	ValidityCriteria	Level of validity
1	85,01% - 100% (A)	Very valid
2	70,01% - 85% (B)	Quite valid
3	50,01% - 70% (C)	Less valid
4	01,00% - 50% (D)	Invalid

In the analysis of mathematics learning tool practicality according to Arikunto (Giantara, 2013: 38) that is by giving practicality value by:

$$\frac{averange \, score}{maximum \, score} \times 100\%$$

Criteria of practicality is divided into five criteria as follows:

Table 2: criteria of practice

No	Criteria of practice	Level of practice
1	90% - 100% (A)	Very Practical
2	80% - 89% (B)	Practical
3	65% - 79% (C)	Quite Praktical
4	55% - 64% (D)	Less Practical
5	0% - 54% (E)	Not Practical

Research Results and Discussion

Research Result

For RPP the average validation percentage of 5 validators can be seen in the following table:

Table 3: Average RPP Validity of Each Dimension

Assessed dimensions	Average percentage of combined validity	Criteria
Material Aspects a. RPP I b. RPP II c. RPP III d. RPP IV	83,75 %	Quite Valid
AspectsPresented a. RPP I b. RPP II c. RPP III d. RPP IV	89,16 %	Very Valid
RPP Format a. RPP I b. RPP II c. RPP III d. RPP IV	90,3 %	Very Valid
Rpp as per the curriculum 2013 a. RPP I b. RPP II c. RPP III d. RPP IV	87,03 %	Very Valid
Use of language and legibility a. RPP I b. RPP II c. RPP III d. RPP IV	92,50 %	Very Valid

Of the overall dimensions assessed, the average validity of RPP can be categorized as valid. But there is input from the validator for the aspect presented this is the presentation of the material in the RPP not too much and enough only the point. In the aspect of the input RPP format of the validator is to re-examine the KD in the RPP and add some indicators in the first meeting RPP, outlining what motivation, apperception given by the teacher in each meeting in the RPP. The validator also suggests adding strengthening in the final activities and describing what kind of reinforcement the teacher provides so that it is clearly visible in the RPP. In addition to the assessment of knowledge in the RPP validator suggests on alternative answers should be more clear scores in each step of workmanship. The validator also suggests that the attitude assessment takes just 2 attitudes that are observed and then changes the students 'words into learners' words.

Furthermore, the validation data validation result of 4 validator to Student Activity Sheet (LAS) can be seen in the following table:

Table 4: Average LAS Validation of Each Dimension

Assessed Dimensions	Average percentage of combined validity	Criteria
Format a. LAS I b. LAS II c. LAS III d. LAS IV	94,92%	Very Valid
Content a. LAS I b. LAS II c. LAS III d. LAS IV	91,79%	Very Valid

Language and legibility		
a. LAS I b. LAS II c. LAS III d. LAS IV	92,50%	Very Valid

From the overall dimensions assessed on the LAS can be seen LAS is very valid. But there are some letters that are not clear due to typing so the validator suggested to be revised. In addition, the validator also asks to check the truth of KD and add some indicators, revise some of the problems in the LAS that are not in accordance with daily life so that researchers are advised to find the problems in accordance with the daily life of learners. Furthermore the guidance in answering the LAS should be more systematic again, so no steps of workmanship are left behind.

Discussion

After learning device is declared valid, then conducted small group test on class VIII students. After the students do the LAS researchers distributed questionnaires that aim to know the opinions and responses of learners to the products they use and to determine the level of product success assessed by the learners. Here are the results of questionnaires obtained from students of class VIII.

The first dimension the practicality is to see is the LAS dimension of attraction. the average yield obtained for the attractiveness of LAS 1 to LAS 4 was 95.19% and the category is very practical. The second dimension that is practiced is the dimension of LAS language and readability obtained an average of 96.63% and categorized very practical. The third dimension is practical

dimensions of LAS usage dimension with an average of 96.63% and very practical category. The fourth dimension is practical dimensions evaluated LAS evaluation with an average of 96.47% and categorized very practical. The last dimension is practical dimensions of learning process dimensions obtained 95.83% and very practical categorization. It can be concluded that for the practicality of all dimensions can be stated very practical.

From small group trials and interviews conducted to learners, three conclusions are obtained. First, learners love the color of LAS made by researchers. This is seen in the results of interviews conducted by researchers on learners. Secondly, there are some indications that are lacking in LAS. This is evident when small group trials still have less clue in the LAS. Thirdly, there are some less systematic answers. This is seen when small group trials of learners look confused due to lack of steps to answer.

Conclusion

Based on data analysis, it can be concluded that the learning tool has been developed in the form of RPP, LAS and assessment on the subject matter of quadratic equation in class VIII based on the curriculum of 2013 which has been tested its feasibility and fulfill the valid and practical category.

In this research, the researcher suggested that before being tested to small group, the researcher should try to do LAS first not once but repeatedly for the guidance of the workmanship and the answer made more systematic so that when tested to small group not many more mistakes happen and reduce the revision of the product already made.

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