
Development of Students' Worksheet with Realistic Mathematic Education on Subject Triangel

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ABSTRACT

The research aims to produce students' worksheet validly and practically with Realistic Mathematic Education (RME) approach on the triangle lesson. This research was conducted at Junior High School 7 Bengkalis. The subject of this research are the experts and students class VII which 6 among them taken as small group trial and 30 students taken as big group trial. The development used the ADDIE method, namely: (A) analysis, including the curriculum analysis and the needs analysis; (D) design, including the preparation of students' worksheet; (D) development, to develop students' worksheet with Realistic Mathematics Education (RME); (I) implementation, in the small and big group; (E) evaluation, to analyze the data. The scores of results through the inquiry conducted by the media, the material, the small group trial, and the big group trial are 90%, 84,45%, 90,08%, and 89,14% respectively. The data shows that the development of the students' worksheet is appropriate and does not have to be revised, but needs to follow up on comments and suggestions to complete.

Keywords: Development of Students' Worksheet, RME, Ability of Mathematically Critical Thinking

Introduction

Mathematics, as one of studies growing from time to time, gets more theoretical and abstract. It implies many complaints from students when study mathematics so that the study becomes boring. Theory and concept seldom known and almost never used in the daily activities are always discussed in mathematics. It causes mathematics so dry and tasteless, and students does not know the benefits of mathematics. The students learning mathematics will be interested if they know the benefits of mathematics for themselves and their lives, because it links mathematics to the reality and the daily activity and is a way making students interested in learning mathematics (Fadillah, 2006). The teacher should give more additional study manuals, i.e. the students' worksheet, for students to understand and

strengthen the students' knowledge about mathematics. The student learning process needs the appropriate environment and the relevant study source so that it needs the instructional material (Wina, 2008). However, the school, past and present, just have bought the students' worksheets from the publishers and they tend to be not interested and not innovative in order that they cannot attract students to study mathematics.

The advantages of using the students' worksheet are to increase the student learning activity, motivate them working themselves and guide students wisely through developing concepts (Abdul, 2013). Taking this into account, using students' worksheet obviously can facilitate students in learning the lesson fundamental concepts. A teacher, according to the researcher interview to the teacher of junior

high school 7 at Bengkalis, said that student activities were low, because many students still considered that mathematics was a difficult and boring lesson. This problem appears that students difficultly calculate and memorize the formula, and less confidently express the ideas. It happens because the teacher only gives students the formula, but does not accompany them to elaborate the derivation of the formula so that students tend to forget it easily. It also occurs because the teacher seldom introduces students the fundamental concepts of mathematics in the daily activity. The teacher also said that students had difficulties in solving the geometry problem such as the triangle, whereas the triangle is important for students to understand correctly, because the triangle links directly with the daily activities. Beside the mentioned problem, the instructional material used in learning also influences the student interest. The usual instructional material used by the teacher in learning is the students' worksheet made by publishers. It often is not an interesting one to students because it tends only to conclude the formulas, the questions, and is not innovative so that students cannot elaborate their thinking. The instructional worksheet should be designed and developed by the teacher self, because only the teacher knows what is needed to students. A solution to solve this problem is to use the students' worksheet with RME approach. RME approach is the instruction begun with the contextual problem experienced by students. It also is a theory in learning mathematics founded at Netherland in 1970 by Freudenthal and friends with the Freudenthal Institute (Melly, 2013). In the view of Freudenthal, mathematics should have the human value so that learning mathematics should link with the reality, be close to student experiences and relevant to

daily activities (Mohammad, 2007). The main objective of RME is to learn mathematics with the contextual problem linking with the daily activities and to construct the knowledge of students. According to the mentioned problem, this research aims to produce students' worksheet validly and practically with RME approach on the triangle lesson.

Methodology

The methodology used in this research is the research and development. According to Sugiyono (2014), research and development is a method used to produce a certain product, and to test the effectiveness of the product. According to Nana (2011), research and development is a process to develop a new product or to complete an old product that has been made before. Taking these into account, research and development is a research method producing a new product or completing an old one. The model of research is ADDIE created by Dick and Carry in 1996. This model, suitable for its name, consists of five phases or stages, that are **A**nalysis, **D**esign, **D**evelopment, **I**mplementation, and **E**valuation.

The **analysis** phase consists of curriculum and needs analyses. The curriculum analysis is to find out and examine the curriculum used in the school, and to determine the competency for developing the students' worksheet. The needs analysis is to determine the ability or the competency that needs to be learned by students, and to analysis the student character who will use the students' worksheet.

In the **design** phase, we assemble the references as the foundation material to design the students' worksheet in the lesson of the triangle based on the conducted analysis. In the **development** phase, the design of the students' worksheet will be

validated by the validators who are the expert of the education technology and the expert of the instructional content. The validators' comments and suggestions are used as the revision for the developed students' worksheet.

In the **implementation** phase, we try the practicality of the developed students' worksheet in two trials, i.e. small group and big group trials. The small group trial is conducted to six students of seventh grade, whereas the big group trial is conducted to thirty students of seventh grade.

In the last phase the **evaluation** phase, we evaluate the students' worksheet which has been developed and implemented to detect its advantages and disadvantages. The data-collecting technique used to evaluate, validate and find out the practicality, toward the developed students' worksheet, is the use of validity and practicality questionnaires. The used scale is the rating scale and the interpretation based on Riduwan (2015). The data analysis techniques used to process the development results are qualitatively and quantitatively descriptive analyses.

Result and Discussion

According to the curriculum and needs analyses, the developed students' worksheet matched for adapting the RME approach which can link between the abstract lesson and the real life, and can facilitate the students to construct their own knowledges so that mathematics has significance for their own lives. The curriculum used in this research was the Education Unit Level Curriculum. The result of the analysis phase was the base in creating the design of the students' worksheet. In the design phase, we arranged the title of the students' worksheet, provide the source and reference books, identify the standard competency, design the appropriate form of learning activities,

identify the indicators of the competency achievement, design the form and the type of presented research, and design the form of writing the students' worksheet. In the development phase, we developed the mathematics students' worksheet in the triangle lesson. Then the developed students' worksheet was validated by the validators. The mentioned validations are the validation of the expert of the education technology and the validation of the expert of the instructional content. Herein Table 1 are the overall validation results.

Table 1. Overall Validity Resultson the Mathematics Students' Worksheet

No.	Assessment Indicators ofValidity	Validity Score	Criteria
1	The Expert of the Education Technology	90%	Very Valid
2	The Expert of the Instructional Content	85,45%	Very Valid
Mean		87,73%	Very Valid

Based on Table 1, the score of overall results of the developed mathematics students' worksheet, are very valid when the mean of validity score is 87,73%. But the comments and suggestions from each expert are also considered to revise the developed students' worksheet. So on, we moved to the implementation phase and we conducted the trials for the product.The students' worksheet was tried to students in two groups, small and big. Firstly, the small group trial was tried to six students. After the students' worksheet with RME approach was tried in the small group trial, we acquired the comments and suggestions and we revised it before continuing to the big group trial. The following results in Table 2

are the students’ responses from the small group trial.

Table 2. Students’ Responses from Small Group Trial on the Mathematics Students’ Worksheet

No.	Assessment Indicators of Practicality	Practicality Score	Criteria
1	Presentation/ Structure	91,11%	Very Practical
2	Use of Students’ Worksheet	89,22%	Very Practical
3	Consistent of Content	86,67%	Very Practical
4	Language	93,33%	Very Practice
Mean		90,08%	Very Practical

Based on Table 2, clearly that the score of the practicality percentages from the small group trial are very practical when the mean of practicality score is 90,08%. But also, the comments and suggestions from students was considered to revise the developed students’ worksheet. After it was tried in small group, we conducted the next trial in thirty students. The students’ responses from the big group trial are presented in the following Table 3.

Table 3. Students’ Responses from Big Group Trial on the Mathematics Students’ Worksheet

No.	Assessment Indicators of Practicality	Practicality Score	Criteria
1	Presentation/ Structure	86,89%	Very Practical
2	Use of Students’ Worksheet	88,35%	Very Practical
3	Consistent of Content	88,33%	Very Practical
4	Language	93%	Very

			Practice
Mean		89,14%	Very Practice

Based on Table 3, the score of the practicality percentages from the big group trial are very practical when the mean of practicality score is 89,14%. According to students’ questionnaire toward the students’ worksheet with RME approach, we got that it is very practical and students are interested in learning with it. The next phase was the evaluation when the students’ worksheet used in learning the triangle lesson was evaluated. This phase was conducted after we conducted the validation and field trial. The suggestions acquired from the validator were applied to the students’ worksheet, and they are showed in Table 4.

Table 4. Validators’ Suggestions on the Mathematics Students’ Worksheet

No.	Validators	Suggestions	Note
1	The Expert of the Education Technology 1	Add the title of the Student Activity	Already corrected
2	The Expert of the Education Technology 2	Improve the cover design	Already corrected
3	The Expert of the Instructional Content 1	Improve the use of real context	Already corrected
4	The Expert of the Instructional Content 2	Add the real context at the early triangle lesson	Already corrected

After the Students’ Worksheet was corrected, we conducted the small group trial. This trial is to find out whether there were any mistakes, disadvantages, and to acquire the suggestions as the improvement

material from any mistakes and disadvantages. The suggestions are showed in Table 5 below.

Table5. Students’ Suggestions on the Mathematics Students’ Worksheet

No.	Student Name	Suggestions	Note
1	S.1	Language is difficult to understand	Already corrected
2	S.2	There is the triangle figure which is not clear	Already corrected
3	S.3	The explanation in triangle perimeter lesson is not clear	Already corrected

Notes:

S.1 = Student-1 S.2 = Student-2
 S.3 = Student-3

The comments and suggestions from the students became the improvement material in revising the developed students’ worksheet and they were corrected. Taking these into account, we acquire that the research product, the students’ worksheet with RME approach in the triangle lesson is valid and practical.

Conclusion

Based on the assessment results from validators in each indicator on the validation sheet, the score of overall validity results of the developed students’ worksheet shows the percentage in interval 81% – 100%which includes the criteria of very valid. Despite that, the score of the practicality of the developed students’ worksheet shows the percentage in interval 81% – 100%which includes the criteria of very practical.

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