

DEVELOPING MATHEMATICS STUDENT WORKSHEET BASED ON CONTEXTUAL IN MATERIAL TRIGONOMETRY ON THE X GRADE SENIOR HIGH SCHOOL

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ABSTRACT

The background study of this research is the school still at least worksheets based on contextual in the mathematics subject in the x grade of senior high school. This research uses design research to design a worksheet. The aims of this research are to develop a worksheet based on contextual and to know the validity criteria in material aspect, media aspect, and student's response. This research uses R & D research. The development of the worksheet includes: (a) gathering information, (b) design for worksheet, (c) doing validity in the expert, and (d) doing revision. For the proper of the worksheet includes: (a) tested, (b) analyze data, and (c) the proper of worksheet criteria. The subject of this research are the matter expert, media expert, mathematics teacher, and the students. This research using descriptive-quantitative data to describe the suggests from the matter expert, media expert, mathematics teacher, and the students through worksheets based on contextual which is developed. The result of this research can develop a worksheet based on contextual in trigonometry of x grade students. The mean of this result is 114,333 and the highest score is 130 in very good criteria for material aspect. In the media aspect, the mean is 101 and the highest score is 110 in very good criteria. In the student's response, the mean of the cluster score is 110,03 and the highest score is 130 in very good criteria. This result shows that the worksheet can be used for teaching and learning.

Keywords: development of worksheet, contextual, trigonometry.

INTRODUCTION

Mathematics is a branch of knowledge about calculations, logic, numbers, quantitative facts, quantities, and spaces that can help humans to solve a problem. According to Sujana (1989: 2) states that "Many people claim that mathematics is difficult to understand. As if mathematics divides humans into two groups, the first group consists of people who are interested and can do mathematics, while the second group of members are people who are not interested and cannot do mathematics".

One branch of mathematics is trigonometry. According to Rusgiyanto (2008: iii), the term Trigonometry comes from two Greek words, namely "Trigonom" which means triangle and "Metron" which means measurement. Therefore trigonometry means the study of triangular elements as objects of scientific study.

According to the results of interviews with the mathematics teacher resource X Grade L 1 SMA Lendah and SMA N 1 Srandakan, it was found that there was still a lack of interest in students to study mathematics. The lack of interest in learning mathematics in these students certainly cannot be separated from several problems. The problem, according to observations in the two schools, was found that there are still not many variations of mathematics learning books to foster students' interest in learning.

To increase the variety of learning resources available, research on the development of contextual worksheets based on trigonometric material of Class X Senior High School was carried out. According to the Ministry of National Education (2008: 13), Student activity sheets are sheets of assignments that must be done by students. The contents of the worksheet are learning instructions, a summary of learning material, assignments that students must complete, and practice questions.

According to the Ministry of National Education (2008: 24), the LKS structure is generally divided into titles, student learning instructions, competencies to be achieved, supporting information, tasks and work steps, and assessment.

Contextual based is used to give students experience of real-life problems that can be solved using trigonometry. According to Komalasari, Kokom (2010: 7) contextual learning is a learning approach that links material learned with real-life students' daily lives, both in the family, school, community and citizen environment, with the aim of finding the meaning of the material for their lives. According to the Directorate General of Primary and Secondary Education (in Komalasari, Kokom 2010: 11) mentions seven main components of contextual learning, namely (a) constructivism, (b) discovering, (c) asking, (d) learning communities. (e) modeling, and (f) reflection. Using this contextual basis is expected to increase students' interest in learning mathematics.

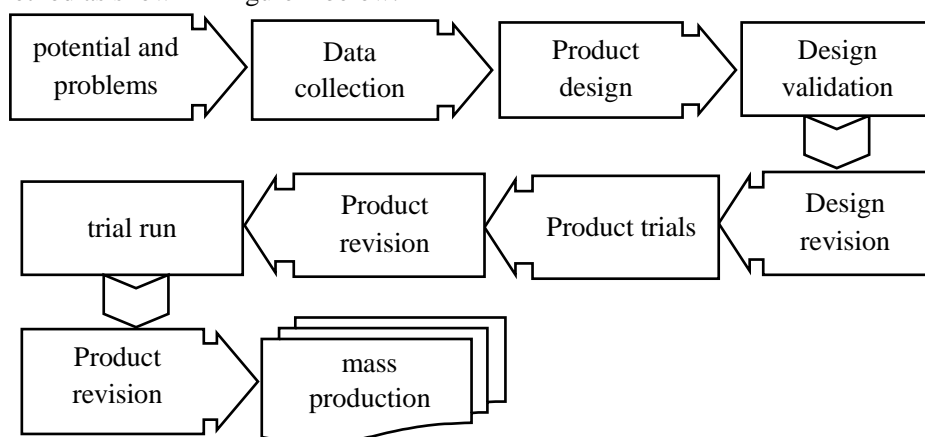
Based on the description above, the goal in developing contextual based mathematical worksheet trigonometry of Class X SMA is to make a prototype and test the feasibility of the worksheet.

METHODS

The subjects of this study were material experts, media experts, Class X high school mathematics teachers, and Class X high school students. Data analysis uses descriptive qualitative analysis to present input from material experts, media experts, teachers, and students.

The feasibility of LKS can be known after data analysis. After analyzing it can be seen that the worksheet is included in the feasible or improper category. If it is feasible, then it can be tested on students. After the trial is conducted the students give a response to the worksheet that has been used by using the assessment sheet that has been provided. Then an analysis using Sukarjo's ideal assessment criteria (2006: 53). The steps of LKS testing are in accordance with research conducted by Dian Suci Endaryani (2013). Whereas to develop worksheets with trigonometry material, teaching materials are described in accordance with the Competency Standards (SK) and Basic Competencies (KD) of the Education Unit Level Curriculum (KTSP) 2006 used at the school.

This research includes research and development (Research and Development). According to Sugiyono (2016: 407), research and development which is often abbreviated as R&D is a research method used to produce certain products and test the effectiveness of these products. The product, in this case, is contextual based LKS mathematics trigonometric material Class X SMA. The steps to use the R&D method as shown in Figure 1 below:



Picture 1. Steps for using the Research and Development (R & D) Method (Sugiyono, 2016: 409)

Based on Figure 1, the first step in this research is to look for potential and problems by observation in SMA N 1 Lendah and SMA N 1 Sragkap. The second stage is collecting data such as collecting data from observations and collecting data from curriculum analysis.

The third stage is product design where researchers begin to create contextual-based LKS products that begin by determining Competency Standards (SK) and Basic Competencies (KD), and

Indicators of achievement. Furthermore, arranging a series of worksheets starts from the front page cover design, worksheet identity design, content design worksheets, cover design, and backyard worksheet designs. After compiling a series of worksheets then create worksheets by applying these designs to the actual appearance using computer software namely Microsoft Office Word 2007 and Corel Draw X6.

The fourth step is design validation by consulting LKS products with material experts and media experts. In this validation stage, there are still many errors in this contextual-based worksheet. These errors include the cover page that does not include the basis used, the learning instructions are still confusing, the concept map with writing letters too small, SK, KD, and teaching material that is not appropriate, the understandings and definitions contained in the material in the worksheet still exist inappropriate, problems or problems in the worksheet do not meet the criteria of the contextual approach, and there are writings and images in the worksheet that are not clear.

The fifth stage is the revision of LKS products from the advice given by material experts and media experts. The sixth stage is product trials which in this study involved 10 students from each sample class in SMA N 1 Lendah and SMA N 1 Srandakan.

The seventh stage is the revision of LKS products after the product trials are carried out. Product revision at this stage was not carried out because there were no deficiencies found during the product trial. The eighth stage is the use of tests conducted in one sample class in each of the two schools. This trial use involved all 56 students.

The ninth stage is the revision of LKS products at a glance because there were no shortcomings or negative input from students in the trial use. The tenth stage is mass production which in this study only produced 18 LKS.

The steps to use the R&D method are also in accordance with research conducted by Gunawan Budi Utomo (2016).

RESULTS AND DISCUSSION

The research practice that has been carried out has succeeded in developing a contextual mathematics LKS based on the trigonometric material of Class X SMA This research development is carried out based on the steps of using research and development (R&D). After the LKS Product has been finished, the product is validated by expert lecturers who are divided into material experts and media experts and mathematics teachers of Class X High School. Furthermore, after the product has been validated, the product is assessed according to technical analysis of the data where the assessment data is obtained from material experts, media experts, mathematics teachers of Class X High Schools, and Class X High School students in both schools. Assessment is done by giving an assessment questionnaire to material experts and mathematics teachers in Class X in the form of material assessment instruments. Giving an assessment questionnaire to media experts and mathematics teachers of Class X High School in the form of media aspects assessment instruments. Finally, giving an assessment questionnaire to Class X high school students in the form of student response test instruments. Analysis of the Assessment of Material Aspects is carried out by one material expert lecturer and two Class X mathematics teachers. The results of the product quality assessment calculation from the material aspects can be seen in Table 1 below:

Table 1. Results of Calculation of Product Aspect Evaluation Products

No.	Evaluator	Score
1.	Expert Material 1 (Lecturer)	109
2.	Expert Material 2 (Teacher)	107
3.	Expert Material 3 (Teacher)	127
Total		343
Average		114,333
Quantitative Data Criteria (Positive statement)		Very good

Based on the results of the product quality assessment above, it shows that the LKS product based on the context on trigonometric material of Class X SMA was assessed from the material aspects included in the very well used criteria.

The Assessment Analysis of the Media Aspect is carried out by one media expert lecturer and two mathematics teachers. The results of product quality research calculations from the media aspects can be seen in the following Table 2:

Table 2. Results of Calculation of Product Aspect Assessment of Media Aspects

No.	Evaluator	Score
1.	Media Expert 1 (Lecturer)	104
2.	Media Expert 2 (Teacher)	94
3.	Media Expert 3 (Teacher)	105
Total		303
Average		101
Quantitative Data Criteria (Positive statement)		Very good

Based on the results of the product quality assessment above, it shows that the LKS product based on the context of trigonometry material in Class X SMA was assessed from the aspect of the media included in the very well used criteria.

Assessment Analysis of Student Response to Contextual-based LKS products is known from the results of a questionnaire that has been filled out by students when testing the use of LKS trials takes place. Students who responded were 56 students from the two schools. The results of students' response calculations can be seen in the following Table 3:

Table 3. Results Calculation Calculation of Student Questionnaire Responses

No.	Evaluator	Score
1.	Class X - A SMA N 1 Lendah	58,125
2.	Class X - 2 of SMA N 1 Srandakan	51,905
Average amount		110,03
Quantitative Data Criteria (Positive statement)		Very good

Based on the calculation results of students' responses questionnaire, showed that the product in the form of student worksheets based on contextual trigonometric material Class X SMA included in good criteria.

The Joint Assessment Analysis is carried out after the results of the calculation of aspects, media, and students' responses are known, then the results of the assessment are combined to determine the feasibility of contextual based LKS products produced as a whole. The results of the combined valuation calculations can be seen in the following Table 4:

Table 4. Results of Combined Assessment Calculations

No.	Evaluator	Score
1.	Material Aspects	114,33
2.	Media aspects	101
3.	Student Responses	110,03
Average amount		325,36
Quantitative Data Criteria (Positive statement)		Very good

Based on the results of the combined calculation of the assessment of material experts, media experts, and student questionnaire responses, it shows that the LKS products based on contextual trigonometric material Class X SMA included in the criteria are very well used in the learning process.

The results of the assessment of the contextual worksheet based on Class X trigonometry material in this high school are also in accordance with the results of research conducted by Semadiartha, I K. S. (2012) which is included in the criteria very well.

CONCLUSION

After conducting the research and development process, an assessment was obtained from material experts, media experts, mathematics teachers, and students. From this assessment, an average score of 114.333 from the material aspects included in the criteria was very well used. An average score of 101 from the media aspect included in the criteria is very well used. An average score of 110.03 from the student response test and included in the criteria is very well used.

Furthermore, the assessment of material aspects, media aspects, and responses of these students are combined. Merging these judgments obtained a combined average number of 325.36 which is included in the very well used criteria. Therefore contextual based LKS can be used for learning in schools.

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