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# DEVELOPMENT OF CONTEXTUAL-BASED MATHEMATICS STUDENT ACTIVITY SHEETS (LKS) AT SMP N 11 YOGYAKARTA

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***ABSTRACT***

*The learning resources for grade 7 students of SMP N 11 Yogyakarta used are textbooks and worksheets containing a summary of the material. This study aims to create teaching materials in Mathematics LKS to facilitate student learning through contextual-based learning resources close to the student's environment. The test subjects in this study were 13 students of class 7B and 34 students of class 7A at SMP N 11 Yogyakarta. The LKS development method uses the ADDIE method, namelyanalysis, design. development, andimplementation. Data collection instruments using questionnaires and questionsposttest. The results of development research in the form of contextual-based math worksheets in the school environment are valid with a score of 72.86%, practical with a score of 4.02 from student responses and a percentage score of 92.31% implementation of learning, and effective with a score of 79%. So that LKS is suitable for use in learning mathematics on related material.*

**Keywords:** Development, LKS, Mathematics, Contextual

## INTRODUCTION

Sisdik Law No. 20 of 2003 article 1 (Ministry of Education, 2003), explains that education is a conscious effort to realize the learning process so that students actively develop the potential of religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state. For nation building, education is the most fundamental aspect. So that every human being needs to get formal and informal education in life.

Tilaar (2001: 77) stated "Education is one of the programs to prepare the direction of Indonesia's development in the future". The learning process as a form of education in schools involves two parties, namely teachers and students. Learning is considered as an effort to facilitate students to build an understanding of knowledge actively (Ratutaman: 2015).

In learning activities, students often face complex, abstract and meta-empirical things that are difficult to understand. The verbalistic method is often less effective if this is presented in learning. With teaching materials in the form of Student Activity Sheets which are used to overcome this. Learning can run effectively and efficiently by utilizing LKS that suits student needs, has a systematic description, and appropriate learning strategies. Therefore, a teacher must be able to prepare LKS and learning strategies needed by students.

The importance of LKS for the learning process requires teachers to be more creative and innovative in utilizing various media and learning resources, including in Mathematics learning. Mathematics learning is based on ways of thinking and reasoning conclusions, developing creative activities by involving imagination, intuition, and discovery by developing thought patterns. Mathematics plays an important role in scientific disciplines and advances human thinking. However, mathematics is a subject

that tends to be avoided because it is considered difficult by students. Therefore, the step to overcome this is to use LKS in delivering mathematics teaching materials.

Based on information from a grade 7 mathematics teacher at SMP N 11 Yogyakarta, learning was carried out remotely during the Pandemic through *zoom meetings*, google meet, and *whatsapp groups,* as well as google *classroom*. Learning uses BSE Mathematics books, LKS summaries of material and materials from teachers in PPT, LKPD and modules as learning resources. The obstacles encountered during *online* learning are unstable internet signals, devices that are owned are less supportive to carry out learning via *zoom meetings* and *google meet*.

Entering 2022, the transition from non-face-to-face learning to face-to-face learning is gradually due to the COVID-19 pandemic*.* One of them is educational facilities, especially schools, starting to carry out face-to-face learning gradually. Face-to-face learning is carried out while following health protocols and vaccination is required. Face-to-face learning at SMP N 11 Yogyakarta is carried out in stages, starting from 70% of students attending face-to-face, and 30% *online*. After making observations on mathematics learning in grade 7, it was found that the learning resource used was the BSE book. Teachers who teach students apply conventional learning with learning resources like package books.

Therefore, one alternative to facilitate students' learning ease during *online* learning is to create contextual-based LKS in a systematic, communicative and interactive school environment. This can instill in students the relationship between knowledge and problems in real life the need to develop contextual-based LKS in the school environment on flat geometry material.

Based on the description above, the researcher decided to conduct a research entitled "Development of Contextual Based Mathematics Student Activity Sheets (LKS) at SMP N 11 Yogyakarta" which aims to:

1. Do you know the stages of developing contextual-based mathematics LKS at SMP N 11 Yogyakarta?
2. Know the feasibility of the developed LKS regarding validity, practicality and effectiveness?

## METHODS

To create a product, the author conducts research and development. Research and development is a method to produce products and test their quality (Sugiyono, 2018). According to Mulyatiningsih (2011: 161) aims to create a product through the development stage. This research aims to develop contextual-based mathematics LKS in the school environment—stages of development with the ADDIE method. According to Hamdani, 2011: 169) ADDIE stands for *Analysis,* Design, *Development* , *Implementation , Evaluation*. Here is the description of the 5 stages of development:

Stage 1. *Analysis*

In the analysis stage, researchers conduct a needs analysis, analyze the applied curriculum, and analyze core and basic competencies. The results of this analysis are used to obtain information in the development of LKS.

Stage 2. *Design* (planning)

Based on the analysis, researchers prepared a plan including preparing the initial LKS, compiling questionnaire instruments for validity, practicality, and evaluation tests.

Stage 3. *Development*

In the development stage, steps were taken to develop the LKS design from the planning stage to produce LKS. In addition, the LKS validation stage was carried out by

material experts and media experts. If the validation test results meet the right category, LKS can be tested. Conversely, if it does not meet the correct category, the LKS must be revised and revalidated until it meets the valid criteria.

Stage 4. *Implementation*

After LKS is declared valid based on the assessment of material and media experts, LKS is used for student learning.

Stage 5. *Evaluation*

After LKS is applied to learning, students are asked to do evaluation test questions to find out the minimum percentage of completeness to measure the effectiveness of LKS. Then students fill out a response questionnaire to determine practicality quality. Then the researcher processed the data generated from evaluation tests and student response questionnaires.

The instruments used in this study include material expert validation questionnaires, media expert validation questionnaires, evaluation test questions, student response questionnaires. expert validation questionnaires and student responses using *the Likert* Scale level 5. The *Likert scale is a measurement developed by* Likert with four or more statement items combined. Here is a table of validity and practicality categories.

Table 1. *Categories of practicality and effectiveness assessment*

| Percentage (%) | Category | |
|---|---|---|
| | **Practicality** | **Effectiveness** |
| $P > 80$ | Excellent | Excellent |
| $60 < P \leq 80$ | Good | Good |
| $40 < P \leq 60$ | Enough | Enough |
| $20 < P \leq 40$ | Less | Less |
| $P \leq 20$ | Very Lacking | Very Lacking |

Source: Widoyoko (2019)

## RESULTS AND DISCUSSION

The results of this research are in the form of contextual-based mathematics LKS at SMP N 11 Yogyakarta. LKS material focuses on building flat, facets and rectangles in grade 7 junior high school. LKS presented 4 activities: (1) Determining the formula for the perimeter and area of a square. (2) Solve square contextual problems. (3) Determine the formula for the perimeter and area of a rectangle. Moreover, (4) Solve rectangular coontextual problems. LKS was developed using the ADDIE method, here is the explanation. The results and discussion contain analysis of research data, answers to research questions, and analysis of research findings.

### *Analysis*

The analysis stage in this study is carried out by analyzing the needs, curriculum, and selection of teaching materials. Based on information obtained from interviews with mathematics subject teachers, the learning resources used are limited to textbooks and student handbooks that contain an outline summary of the material. The teacher said that learning requires varied learning resources so that it is interesting and can motivate students to be actively involved in learning and be able to apply knowledge in everyday life. The curriculum applied at SMP N 11 Yogyakarta is the 2013 curriculum which positions teachers as facilitators, therefore researchers chose to develop teaching materials in the form of contextual-based mathematics LKS on square and rectangular materials.

***Design* (Planning)**

At the *design* stage, the initial design of LKS includes; cover, LKS identity, foreword, table of contents, concept map, LKS description, student activities, assessment tools, bibliography, and LKS author profile. In addition, researchers also collected documentation of objects in the environment of SMP N 11 Yogyakarta to be associated with the material presented. At this stage, researchers compile LKS assessment instruments and are validated by experts.

***Development***

After designing the LKS, the researcher develops a design based on the form of the design design. Design development using *Microsoft Word 2016 application and* corel draw application assistance. The finished LKS product is then assessed to validators to determine its validity. The following are the results of expert validators' assessment of LKS.

Table 2. *Material Expert Validation Results*

| Aspects | Average Score | Criterion |
|---|---|---|
| Content Eligibility | 4 | Good |
| Eligibility of Presentation | 4 | Good |
| Contextual in the School Environment | 4 | Good |
| Average Total Score | 4 | Good |

Source: Widoyoko (2019)

Table 3. *Media Expert Validation Results*

| Aspects | Average Score | Criterion |
|---|---|---|
| Language Eligibility | 3,462 | Good |
| Kelayakan Kegrafikan | 3,258 | Good enough |
| Average Total Score | 3,360 | Good enough |

Source: Widoyoko (2019)

***Implementation***

The implementation stage is a series of learning using LKS that has been declared valid. In the learning process, the teacher acts as a facilitator. During learning, teacher and student learning observations are carried out using observation sheets. The following are the results of the learning implementation observation questionnaire analysis.

Table 4. *Results of Learning Implementation Observation Analysis*

| Observation | Percentage | Criterion |
|---|---|---|
| Guru | 92,31% | Excellent |
| Student | 92,31% | Excellent |

Source: Widoyoko (2019)

After completing learning using LKS, students are asked to fill out a response questionnaire to LKS to measure practicality. The following are the results of the student response questionnaire.

Table 5. *Results of Student Response Analysis*

| Aspects | Average Score | Criterion |
|---|---|---|

| | | |
|---|---|---|
| Material | 4,000 | Good |
| Language | 4,093 | Good |
| Interest | 3,955 | Good |
| Average Total | 4,016 | Good |

**Source: Widoyoko (2019)**

At the end of the learning stage, students are given evaluation test questions that experts have validated. Evaluation tests are used to measure the effectiveness of LKS. In the following table are presented the results of the evaluation test analysis.

Table 6. *Analysis Results of Evaluation Tests*

| Data | Result |
|---|---|
| Top Rated | 100 |
| Lowest Value | 52 |
| Complete Students | 27 |
| Incomplete Students | 7 |
| KKM | 77 |
| Completion Percentage | 79% |

Source: Widoyoko (2019)

***Evaluation***

At this stage, LKS is assessed by reviewing aspects of validity, practicality, and effectiveness. Validity by knowing the assessment of material and media experts, practical aspects based on student responses and effectiveness based on student evaluation test results.

From the validity aspect, the assessment of material expert validators and media experts in tables 2 and 3 can be seen. The following are the results of the assessment of material experts and media experts.

Table 6. *Analysis Results of Material Expert and Media Expert Validators*

| Average Rating | Shoes | Criterion |
|---|---|---|
| Material Expert | 4,000 | Good |
| Media Members | 3,360 | Good enough |
| Percentage | 72,86% | Good |

Source: Widoyoko (2019)

From the assessment of the two expert validators above, the percentage of LKS assessment shows a good category, so LKS can be said to be valid and used for mathematics learning.

Based on the analysis of the observation sheet of learning implementation and student response in tables 4 and 6, it shows an average score of 4.016 out of a maximum score of 5 and the implementation of learning shows a percentage of 92.31% so that LKS is declared practical.

The effectiveness aspect of LKS is reviewed from the results of student evaluation tests, student evaluation test results show that 79% of students achieve the minimum completeness criteria so that LKS is declared effective for mathematics learning.

## CONCLUSION

From the results and discussion above, LKS is considered valid, practical and effective, so contextual-based mathematics LKS on square and rectangular subject matter can be declared suitable for use in mathematics learning. The feasibility of LKS is reviewed

from the validity based on the assessment of material experts and media experts which shows a percentage of 72.86%, practicality based on the results of student response analysis which shows a score of 4,016 out of a total score of 5. In comparison, effectiveness is based on the student evaluation test analysis results, which show that 79% of students achieve KKM.

The suggestion that researchers can give based on the research that has been done is that the LKS developed can be applied to mathematics learning on square and rectangular subjects. The developed LKS is limited to square and rectangular materials, to develop contextual-based LKS allows researchers to develop mathematical LKS with other materials.

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