
DEVELOPMENT OF GAME-BASED MATHEMATICS STUDENTS' WORKSHEETS INTEGRATED WITH LOCAL WISDOM

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Abstract:

This study aims to determine the validity of procedures for developing game-based math students' worksheets that are integrated with local wisdom. The type of research is called Research and Development (R&D) with reference to the ADDIE model with five development steps, namely Analysis, Design, Development, Implementation, and Evaluation. The research was conducted at SMP Negeri 2 Burau with the research subjects of the seventh grade students. To find out the product validity, the researchers distributed a questionnaire to the material experts, media experts, and teachers. The results showed that the worksheet category was valid for use in learning, including the assessment of material experts (80.4%) in the valid category, media experts (91.3%) in the very valid category, and subject teachers (82.6%) in the valid category. The game-based worksheets can be implemented by utilizing them as supporting media for integer material and supporting the creation of a conducive atmosphere.

Abstrak:

Penelitian ini bertujuan untuk mengetahui prosedur validitas pengembangan LKS matematika berbasis games method diintegrasikan dengan kearifan lokal. Jenis penelitian ini adalah Research and Development (R&D) dengan mengacu pada model ADDIE dengan lima langkah pengembangan yaitu Analyze, Design, Development, Implementation, and Evaluation. Penelitian dilakukan di SMP Negeri 2 Burau dengan subjek penelitian yaitu siswa kelas VIII. Untuk mengetahui kelayakan produk, peneliti menyebar angket kepada ahli materi, ahli media, dan guru mata pelajaran. Hasil penelitian menunjukkan bahwa LKS termasuk kategori valid untuk digunakan dalam pembelajaran dilihat dari penilaian ahli materi (80.4%) dengan kategori valid, ahli media (91.3%) kategori sangat valid, guru mata pelajaran (82.6%) kategori valid. LKS berbasis games method dapat diimplementasikan dengan dimanfaatkan sebagai media pendukung pada materi bilangan bulat dan mendukung terciptanya suasana kondusif.

Keywords:

Worksheets, Games Method, Local Wisdom

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INTRODUCTION

The development of the globalization era is indeed surprising in aspects of human life, whether political, economic, cultural, or educational. Regarding education, the process cannot be separated from civilizing. The education process is carried out from elementary to high school and even to college. One of the educational processes is through mathematics. Mathematics is a universal science that underlies the development of modern technology today. Mathematics has an important role as a means of solving life's problems. Mathematics is important in learning from elementary school to university because it helps to develop reasoning power and thinking skills (Suandito, 2017).

Based on the results of interviews and observations from the previous studies, some students consider mathematics difficult to understand, and most mathematics learning still uses conventional learning methods such as lectures and questions and answers. This means that learning is centered on the teacher as a provider of information, so that the use of existing teaching materials is not maximized. In addition, the school has not used students' worksheets which were developed specifically for integer material. Responding to this problem, it is necessary to develop a learning device that can change the learning method of students' perception that mathematics is difficult to make it fun.

The teacher as the spearhead in packaging mathematics learning is very necessary, including the use of learning resources. According to Prastowo (2011), learning resources are sources of materials for the manufacture of teaching materials. One of the teaching materials that can be used is the students' worksheets, which contain assignments that must be done by students. Students' worksheets are learning media used in the learning process (Kaleka & Ika, 2018). Student's worksheet is needed as a guide so that learning can be more systematic and directed, so that it can train students' abilities (Aprilanti, Rahayu, & Indriyanti, 2019). Students' worksheets are usually in the form of instructions or steps to complete a task. A task ordered in the activity sheet must be clear about the basic competencies to be achieved. Student's worksheet is a student guide used to carry out research and problem solving activities (Sari, 2017). It needs to be developed based on methods, approaches, and learning models to be directed and structured and able to direct students to find new concepts in learning (Riyadi, Ertikanto, & Suyatna, 2018). The use of students' worksheets in learning makes students discover new things about the material being taught (Pratiwi, Parmin, & Widiyatmoko, 2014) and encourage increased student learning activities (Ismail, Arnawa, & Yerizon, 2020). It also can increase students' confidence in solving the problems given (Putra, Herman, & Sumarmo, 2017). Therefore, a game-based worksheet needs to be developed.

The material used in developing students' worksheets in this study is integer material. The whole number of materials was chosen because the material was studied by the 1st semester students of class VII junior high school, where at this level, students only studied mathematics at the junior high school level. The use of the game method in developing students' worksheets is linked or integrated with local wisdom.

Local wisdom is the result of a particular community's experience and not necessarily the experience experienced by other communities (Laksono, Supriyono, & Wahyuni, 2018). Local wisdom is the basis for achieving a life in balance with nature (Mungmachon, 2012). Local wisdom comes from people's thoughts, and each region has characteristics that distinguish one culture from another (Murwaningsih, Fadhilah, & Sholeh, 2020). Discussing the local wisdom could not be separated from local wisdom-based learning strategies, one of which is a method of learning while playing. The background of this integration is the games included in students' worksheets traditional games or Luwu that characterize the local wisdom of Luwu area, namely the games of Ma'ende - ende and Kotong diondo.

The game method is a learning method where students in groups playfully complete learning materials according to the basic competencies to be achieved. The use of the game method in learning helps students to understand the material (Hastuti, Mustikaningtyas, & Widiyatmoko, 2014), train students' abilities (Pusari & Karmila, 2018), and create a pleasant atmosphere (Ariawan & Pratiwi, 2017; Rahmawati, Leksono, & Harwanto, 2020). Learning combined with games will cause a positive response from students (Kismawardani, Muharrami, & Hadi, 2018). Games in learning are carried out to build a dynamic, enthusiastic, and enthusiastic learning atmosphere (Safitri, 2016) and impact on student performance, engagement, and student motivation (Vlachopoulos & Makri, 2017).

The researchers expect that the development of students' worksheets based on the games method can minimize the perception of students who think that mathematics is difficult and be fun, which can help students improve their competences in learning mathematics as well as liven up the classroom atmosphere when learning mathematics.

RESEARCH METHOD

The type of this research is research and development (R and D). The model in this development research uses the ADDIE development model, which consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluation (Mulyatiningsih, 2012). The selection of the ADDIE model is because it is simple and systematic, so that it is in accordance with the characteristics of the students' worksheets that will be developed on the integer material. However, this research only reached the development stage due to the pandemic conditions, which caused limitations in data collection. The product that was developed in this research was a student's worksheet based on the games method integrated with local wisdom for the eighth grade students of Junior High School as one of the media/tools to support learning.

The data obtained came from primary data sources, namely data taken directly from the research subjects of students, school principals, and math teachers at SMP Negeri 2 Burau, and in the form of a validation sheet of teaching materials that had been developed to be given to 3 validators. Then the secondary data source is through library research, in the form of reference books from offline libraries and online systems.

The data analysis technique used is descriptive qualitative and quantitative analysis. Qualitative descriptive analysis was conducted to obtain information in the form of input, feedback, criticism, and suggestions as the basis for product revision. The quantitative analysis was used to process the data obtained through a validation questionnaire. The validity data analysis technique is from tabulation by material experts and learning media. The percentage is sought. The percentage category can be seen in the following table.

Table 1. Categorization of Validation

Persentase (%)	Criteria
0-20	Invalid
31-40	Less valid
41-60	Quite valid
61-80	Valid
81-100	Very valid

Validity test was conducted to test the feasibility of the instrument to be used. the activity was carried out in the process of analyzing the validity of the product data of the students' worksheets by filling in the processed instruments to determine the valid level of the instrument to be used.

RESULTS AND DISCUSSION

This research was conducted on mathematics subject matter of integers taught to class VIII Junior High School. This development stage adapted the ADDIE model which was carried out only up to the development stage. Research and development of students' worksheets based on games method integrated with local wisdom for Junior High School level students was conducted at SMP Negeri 2 Burau. Local wisdom that is integrated in the students' worksheets is in the form of a traditional Luwu game, namely the ma ende-ende game. Respondents in this study were the seventh grade students.

The product of this development research is a book with a size of 21 cm x 19 cm and a thickness of 29 sheets consisting of 26 students' worksheets and 3 front and back covers, as well as a shadow cover, using magazine paper with a cover designed by the local wisdom of the Luwu region.

In this study, there are three stages of research. The first stage is analysis which was conducted through observation and interviews to find problems in the learning process and formulate solutions to the problems. The results of the observations showed that there are still many students who do not understand the learning of integers, especially integer arithmetic operations. This is because the use of textbooks is considered not really effective because it is too thick and less of exercises, so the students only focus on listening to the teacher when teaching and rarely open the textbook. At the analysis stage, it is known that in the mathematics learning process, students have not been supported by learning resources that can help students to learn independently in reviewing the material that has been received in the learning process. For this reason, a product is developed in the form of students' worksheets that are adapted to the syllabus

obtained from the results of the analysis of teaching materials. The second stage is the design which includes the design of students' worksheets and the preparation of product quality assessment instruments. The students' worksheets are designed as attractive as possible, using creatively designed covers, by combining colors, pictures (illustrations), matching shapes and font sizes, and using images of local wisdom from the Luwu area, so that students are able to be more interested in reading the worksheets, and using language that is simple and easy to understand by the students' worksheets users. Therefore, the students can clearly understand the contents or materials contained in the students' worksheets. In addition, at this stage, the preparation of the students' worksheets feasibility test instrument in the form of a validity questionnaire was also carried out.



Figure 1. Students' Worksheets Design

The final stage is development which includes making draft of students worksheets, validity test, revision of validity test, and printing the students' worksheets. The preparation of the students' worksheets draft is adjusted to the characteristics of mathematics learning so that it can be used independently by students. After the preparation of the students' worksheets draft, the researchers then conducted a validity test. The expert input is also used as a revision reference as well as for filling out a validation questionnaire that will determine the validity or feasibility of the worksheets to be tested on students. The revisions are made as the step to make a decent product.

Before testing the use of the worksheets by teachers and students, validation was carried out by the material experts. The validation by material experts is carried out to obtain information regarding the feasibility of the students' worksheets contents, criticisms, and suggestions, so that the students' worksheets developed by the researchers become qualified products.

Table 2. Expert Validation

Assessment Aspect	Average Score	Percentage (%)	Category
Material	3.2	80.4	Very valid
Media	3.6	91.3	Very valid

Validation was also carried out by education practitioners, namely the subject teachers at SMPN 2 Burau. The percentage of validation by education practitioners is 82.6% with a very valid category. From the aspect of the assessment of the validity test by two teams of material and media experts, each gave a score with a presentation of >80% in the very valid category, and one subject teacher gave a score with a percentage of >80% in the valid category. The validation results showed the benefits of the students' worksheets developed as the media in the learning process that help achieving educational goals (Yusuf, 2018). The use of students' worksheets as the tools in the learning process can help teaching and learning activities to be carried out properly (Bakri, Permana, Wulandari, & Mulyati, 2020). The students' worksheets can improve students' performance (Arafah, Bambang, & Saiful, 2012). By using worksheets, students can play an active role and can solve the problems they face (Antika, Zaini, & Arsyad, 2020). The students' worksheets help improving students' ability to interpret and explain the object being studied (Payudi, Ertikanto, Fadiawati, & Suyatna, 2017). In addition, the students' worksheets also allow students to learn on their own according to their abilities and allow students to master and achieve learning goals.

Based on the description presented above, it is inferred that the developed students' worksheets have met the criteria for valid teaching materials to be used in the learning process. The materials in the students' worksheets are delivered in easy-to-understand language with a systematic preparation of material.

CONCLUSION

The procedure for developing math learning students' worksheets based on games method are integrated with local wisdom starting from analyzing the needs of mathematics learning activities, then designing according to the results of the analysis. The students' worksheets based on games method integrated with local wisdom have been successfully developed with a very valid category based on the assessment of material experts and media experts with scores of 80.4% and 91.3%, respectively, in the very valid category, and subject teachers with 82.6% in the very valid category. This study implies suggestion for further research to test the product effectiveness and practicality. In addition, it is recommended that the students' worksheets design be made even more attractive while still integrating them with the local wisdom.

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