

DEVELOPMENT OF COMIC LEARNING MEDIA OF SOCIAL ARITHMETICS MATERIAL BY HIGHER ORDER THINKING SKILLS ORIENTED

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ABSTRACT

This research was motivated by the lack of comic learning media on social arithmetic material in schools. This study aims to develop comic learning media in *HOTS* oriented social arithmetic materials for junior high school / MTs students. This research is included in research and development using the ADDIE development model, which consists of five stages: analysis, design, development, implementation, and evaluation. The research subjects were material experts, media experts, State Junior High School (SMP Negeri) 4 Sewon, and Muhammadiyah Junior High School (SMP Muhammadiyah) Sewon in Bantul regency. Data collection techniques used in this study are interviews used before product development. The research instrument used was interview guidelines to assess comic learning media that had been developed. Data analysis techniques use quantitative data analysis, converted into qualitative data with a Likert scale. Based on the results of the feasibility study of the product which was developed based on the calculation of the average score of the media expert obtained by 4.32 with very good criteria, from the expert material obtained at 4.29 with very good criteria, from the response of students in the small class test obtained at 4.38 with very good criteria, and from the students' responses to the trial of large class products obtained by 4.01 with good criteria. Based on these assessments, the mathematical comic learning media developed in social arithmetic is appropriate for the learning process.

Keywords: Learning Media, Comics, ADDIE, Social Arithmetic, HOTS.

INTRODUCTION

One of the Indonesian people's national goals in educating the 1945 Constitution of the Republic of Indonesia is to educate the nation's life. To achieve the intelligence of the nation's life is done through education. Education involves learning activities and learning processes. The learning process must be considered in education delivery in an educational institution at the basic education level, junior secondary education, senior secondary education, and tertiary education. The world of education will contribute significantly to developing creative human resources and have reliable problem-solving abilities to live a challenging future. According to Ihsan (2011: 2), that education for human life is an absolute necessity that must be fulfilled throughout life. Without education, a group of people cannot live in line with their aspirations (aspirations) to progress, prosper, and be happy according to their life concept.

Teaching materials are all forms of material that can help the teacher or instructor carry out the learning and learning process. The teaching material in question can be in the form of written or unwritten materials. Teaching materials enable students to learn competency coherently and systematically to accumulate a complete and integrated mastery of what is learned. Teaching materials are packaged in print/ visual, audio, audiovisual, or interactive multimedia forms (Ministry of National Education, 2008). In developing teaching materials, there are many factors, including the availability of teaching materials by the demands of an inadequate curriculum, the absence of teaching materials that fit the target's characteristics, and the absence of appropriate teaching materials to guide students to solving learning problems. Also, teaching materials must answer or solve problems or difficulties in learning, especially in mathematics. However, mathematics taught at elementary, junior high, high school, and at the tertiary level is always a matter of study. This can be seen from the phenomena that occur at the school education level. Many students have difficulty in learning mathematics.

Learning resources in the library of SMP Negeri 4 Sewon and SMP Muhammadiyah Sewon are also sufficient, and students are also active in using books and facilities in the library. Mathematics teacher

also states that using the assignment and discussion method in learning and the media used are projectors and LCD but only at certain times are used. The learning methods applied in SMP Negeri 4 Sewon and SMP Muhammadiyah Sewon are still conventional. The results of an interview with a mathematics teacher at SMP Negeri 4 Sewon held on January 20, 2018, that mathematics is considered a tricky subject because the object is abstract and requires the ability to think logically. Perseverance and students are not ready when facing mathematics learning due to inadequate facilities. While the interview with the mathematics teacher of SMP Muhammadiyah Sewon, which was held on January 23, 2018, was related to the mathematics learning process, that the lack of students' readiness in facing mathematics learning. It is generally assumed that mathematics is a complicated and dull subject. Some media in mathematics learning have been developed to increase children's interest in mathematics, such as pop-up books, e-modules, etc. Learning media interesting for children can change children who previously did not like mathematics to become interested in mathematics.

The objectives of this development include: (1) To produce comics learning media HOTS-oriented social arithmetic material for grade VII students of SMP / MTs. (2) Knowing the feasibility of HOTS oriented comic learning social media arithmetic materials for grade VII students of SMP / MTs. (3) Knowing students' responses to HOTS-oriented comic learning social media arithmetic material for seventh grade SMP / MTs students.

METHODS

This research is a type of development research-oriented to developing and implementing the resulting product. The product produced in the form of mathematics learning comic through Corel Draw X7 media on mathematics subject matter of social arithmetic for grade VII students of SMP / MTs is packaged in the form of an A5 sized book. To produce a good product, careful planning and planning need to be done. Therefore, in developing this learning media, researchers refer to the ADDIE development model, which includes five stages, namely; Analysis, Design, Development, Implementation, and Evaluation (Personal, Benny A:2009). The development procedure in this study follows the steps in the ADDIE model. The five stages carried out in this research development are:

1. Analysis

At this stage, the main activity is analyzing the need for new learning programs. The goal is to look for problems from learning activities that have been applied. This analysis step consists of 2 steps, as follows:

a. Performance analysis

Performance analysis in this study was carried out by analyzing the situation, which included observing the school library, students' learning process, and then conducting interviews with the mathematics teacher in the school concerned. The analysis is done to determine whether the performance problems encountered require a solution to implement a learning program.

b. Requirements Analysis

This needs analysis phase is related to assistance and what is needed by students to get out of various problems when teaching and learning activities (KBM) occur.

c. Curriculum Analysis

Curriculum analysis is the stage of analyzing related curriculum used in education units. Curriculum analysis contains the elaboration of learning objectives from core competencies and basic competencies.

2. Design

The design phase makes the design phase or makes plans to make products that fit the analysis stage conditions. The purpose of the design is to plan a form of learning tools. In this stage, planning is also carried out to define, decide, aim, and determine the order in which the material is presented.

3. Development

The development phase is carried out with four steps: reference collection, comic writing, validation, and small class trials. Collecting references and writing comics based on the outline of the design and

contents of the comic. Meanwhile, several experts carried out product validation, including material experts, media experts, and student responses. In the validation of this product, the product will be validated and assessed by experts by filling out a questionnaire that has been made by researchers. Meanwhile, small class trials were conducted for VII grade students in SMP Negeri 4 Sewon and SMP Muhammadiyah Sewon.

4. Implementation

After the manufacturing phase and all data have been made and are declared to be eligible for testing by material experts and media experts, a test is carried out to ascertain whether the media made has achieved its manufacturing goals. This stage is the stage where the implementation is a field trial that requires the product to be tested directly on students of SMP Negeri 4 Sewon and SMP Muhammadiyah Sewon class VII as research subjects. The purpose of this implementation is to obtain the practicality of HOTS-oriented comic learning media. Furthermore, students who participate in the implementation or trial II will fill in the student response questionnaire.

5. Evaluation

Evaluation is the final stage in the ADDIE development model. After the trial phase, the evaluation is carried out by analyzing the data or the questionnaire results obtained from the previous implementation stages. The output of the evaluation stage is in the form of data/assessment results from the entire process of developing the device/media carried out. The types of data in this study are qualitative data and quantitative data. Qualitative data were obtained from the questionnaire instrument assessment results from material experts, media experts, and students. Meanwhile, quantitative data were obtained from the questionnaire instrument assessment results from material experts, media experts, and student responses.

Meanwhile, technical data analysis is carried out with the following steps:

1. Collecting qualitative data from questionnaire instrument assessment results from material experts, media experts, and student responses.
2. Qualitative data obtained from the questionnaire assessment results will be converted into quantitative data using a Likert scale.
3. Furthermore, quantitative data obtained from material expert questionnaires, media questionnaires, and student response questionnaires will be calculated on average.
4. The average score obtained from the qualitative data calculation will then be classified according to the ideal rating category.
5. The average score that has been classified will be used to determine the feasibility of the comics developed.

RESULTS AND DISCUSSION

This development research has been carried out in two schools, namely SMP Negeri 4 Sewon and SMP Muhammadiyah Sewon. Small class trials and large class trials at SMP Negeri 4 Sewon were conducted on April 7, 2018 and May 05, 2018. Meanwhile, small class trials and large class trials at SMP Muhammadiyah Sewon were carried out on April 11, 2018 and May 9, 2018. Based on the research results, quantitative data has been obtained from the calculation of questionnaire instruments, including questionnaire instruments for material experts, questionnaire instruments for media experts, and questionnaire instruments for students. The following table is the result of the questionnaire instrument calculation:

Table 1. Instrument Calculation Results

Instrument Validator	Average Score	Quantitative Data Criteria
Material Expert	4,32	Very good
Media Expert	4,00	Well
Student	4,01	Well

The table above shows that HOTS-oriented mathematical comics' evaluation results from each validator include material experts, media experts, and students who get good criteria. The developed comics have also received advice and input from material experts, media experts, and students. Suggestions and input from material experts, media experts, and students have been used as material for product revision/improvement.

Products in comics were developed using Corel Draw X7 on HOTS-oriented Social Arithmetic material for seventh-grade junior high school students. This comic is divided into three parts, namely the initial section containing: front cover, title page, preface, pre-written content, comic description, learning instructions, core competencies, and basic competencies, learning objectives, concept maps, characters in comics. The contents / core section contains: chapter 1, chapter 2, chapter 3. While the final section contains: glossary, bibliography, and back cover.

CONCLUSION

Based on the research results of the development of mathematical comics social arithmetic material for class VII SMP / MTs based on the 2013 curriculum, the following conclusions are obtained:

1. This development is carried out based on the potentials and problems that have been collected. The problems found, among others, in teacher learning are still using textbooks from the government as the primary teaching material, not yet available, and there are no teachers who use and develop mathematical comics as a source of student learning. Thus, it has the potential to develop mathematics comics learning media with social arithmetic material.
2. The feasibility of HOTS-oriented social arithmetic mathematical comic products for grade VII SMP / MTs that were developed included in the excellent category based on the results of the calculation of the average combined score of material experts by 4.29 and very good categories also based on the results of the calculation of the average combined score from media experts by 4.32 and the right category of the average combined score of student responses is 4.01. The mathematics comics of HOTS-oriented Social Arithmetic material for class VII SMP / MTs are suitable for use in the classroom's learning process.
3. Student responses regarding the mathematics comics learning media HOTS oriented social arithmetic material for grade VII SMP / MTs both used responses provided through the student response assessment instrument, obtained by students motivated when learning mathematics using comic-based learning media, the learning media developed are exciting and easy understood, as well as being a source of independent learning for students.

Based on the evaluation of comics' feasibility, it can be stated that the development of comic learning media for social arithmetic materials oriented to HOTS for grade VII students of SMP / MTs is appropriate to be used by teachers in implementing learning or students in independent learning at home.

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