

## DEVELOPMENT OF MATHEMATICS LEARNING MEDIA ON THE SET MATERIAL BASED ON MACROMEDIA FLASH 8

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### ABSTRACT

Mathematics is a basic science that is very important and beneficial to the development of science and technology. The use of learning media based on Information and Communication Technology (ICT) becomes one a tool alternative for teachers in presenting the subject of mathematics. The set subjects still considered difficult for some students. Learning media based on Macromedia Flash 8 is expected to be facilities that support learning. This research is a development that aims to produce instructional media using Macromedia Flash 8 in learning mathematics on the subject of a set of class VII SMP. This development study using the ADDIE development model that is Analysis, Design, Development, Implementation, Evaluation. Subjects were matter experts, media experts, and junior high SMP Muhammadiyah 5 Yogyakarta and SMP Muhammadiyah 7 Yogyakarta. The instrument used in this study is a questionnaire. The data analysis technique conducted qualitatively and quantitatively to calculate the results of the feasibility test score developed in instructional media. Based on the quality of every aspect of learning media, results of research-based math learning media development of mathematics learning media based on Macromedia Flash 8 is from materials experts with perfect category, an average score is 79,67, from media experts with perfect category, an average score is 105,33, and the response of students with perfect category with an average score of 66,50. Based on the assessments, then the media-based mathematics learning Macromedia Flash 8 is very feasible to use in learning.

**Keywords:** The set, Learning Media, ADDIE

### INTRODUCTION

The development of a country can be seen in the development of education. In this case, national education functions to develop capabilities and shape the classic character and civilization of the nation in the context of the intellectual life of the nation, aiming at developing the potential of students to become human beings who believe in and fear God Almighty, have good character, be healthy, have the knowledge, be capable, creative, independent and become democratic and responsible citizens (RI Law No. 20, 2003).

Education in Indonesia continues to be discussed by the community, education experts, and education practitioners. This is supported by Fahmi, Syariful, and Marsigit (2014) that there are still many complaints from the public regarding the low quality of educational outcomes and that the graduates are not ready to work. The issue of the quality of education is an exciting topic. This cannot be separated from the problem of learning because learning is the core of the process of improving the quality of education.

Communication that is established in both directions between educators and students will increase the level of student involvement in the learning process. Educators and students can alternately become communicators (deliver communication messages) and communicants (receive communication messages), so the learning process is more varied. This can be an effort to improve the quality of learning that can be done, especially in learning mathematics.

Mathematics is a scientific discipline that has a vital role in human life, including as a tool for solving problems both in simple and complex problems. Mathematics is also used in other disciplines such as physics, chemistry, biology, statistics, engineering, and even in non-exact sciences, and mathematics can still be found. As one of the subjects at primary and secondary education levels,

mathematics aims to prepare students to be able to deal with changing circumstances and skills and be able to react to it. In mathematics, students are taught and trained to think logically, rationally, and critically.

According to Fahmi, Syariful, and Marsigit (2014), the goal of learning mathematics has not been fully achieved. Various attempts were made, such as giving upgrading to educators and implementing curriculum changes. However, to date, it has not given satisfactory results. One of the problems in learning mathematics is the selection of learning media. Learning mathematics becomes exciting and fun so that the impression that mathematics is boring, scary, and complicated can be removed.

Computer devices have been developed and offer a variety of services that make it easier for educators to create a learning media that is more varied and attracts students. Even the computer is one of the facilities that must be owned by every education unit. With these facilities, the educator can maximize their use in teaching and learning.

Many schools already have computer laboratories and multimedia rooms to support the learning process, such as SMP Muhammadiyah 5 Yogyakarta and SMP Muhammadiyah 7 Yogyakarta. However, not all educators use it maximally in helping the learning process. Based on the results of interviews with mathematics teachers in class VII on September 16, 2016, at SMP Muhammadiyah 5 Yogyakarta, it can be concluded that mathematics is still a difficult subject to understand. Especially with the set material, students still find it challenging to perform sliced, combined, difference, and complement operations. SMP Muhammadiyah 5 Yogyakarta is a school that has a computer laboratory and multimedia room. However, this school is still lacking in the administration of computer-based mathematics. That is due to the incomplete learning media, especially on the set material that can help the learning process.

Based on the results of interviews with mathematics teachers in class VII on September 17, 2016, at SMP Muhammadiyah 7 Yogyakarta, it can be concluded that mathematics is a subject that is still difficult to understand. Especially with the set material, students still find it challenging to perform sliced, combined, difference, and complement operations on the set. SMP Muhammadiyah 7 is a school that has a computer laboratory and multimedia room. However, this school is still lacking in computer-based mathematics learning. That is due to the incomplete learning media, especially on the set material that can help the learning process; besides, it requires much time to prepare to learn.

Nowadays, computers have diverse functions, one of which is a manager in the learning process known as Computer-Management Instruction (CMI). There is also the role of the computer as an additional helper in learning, and its use includes the presentation of the information content of subject matter, exercises, or both. This is known as Computer-Assisted Instruction (CAI) or computer-based learning programs. One software that can be used to make computer-based learning media is Macromedia Flash 8. This software was chosen because Macromedia Flash 8 is software for creating animations, where animation is exciting and liked by many people. Macromedia Flash 8 has many advantages in its use, especially in the delivery of subject matter to students. That way, students are more interested in learning it. The advantages of Macromedia Flash 8 include the form of images, videos, animations, and sounds that have their charm and make it easier to learn the subject matter. With these advantages, Macromedia Flash 8 is very supportive of the development of mathematics learning media.

## **RESEARCH METHOD**

This research is development research. The media development model used is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). This study aims to produce learning media based on Macromedia Flash 8 on set material for seventh-grade students of SMP, packaged in Compact Disk (CD).

The trial design in this development consists of three stages: individual tests, small group tests, and field tests. In the individual test, the readability of the media is tested by the researchers themselves.

The next step is to enter a small group test which is tested by media and material validation by lecturers and teachers according to their respective fields of expertise and limited trials. After learning media is declared feasible, a field test will be conducted involving students of class VII in SMP Muhammadiyah 5 Yogyakarta and SMP Muhammadiyah 7 Yogyakarta.

Subjects in the research development of learning media are students of class VII SMP Muhammadiyah 5 Yogyakarta, SMP Muhammadiyah 7 Yogyakarta, expert lecturers, and teachers who can provide input on the development of learning media as media experts and expert lecturers and teachers who will provide input into the material can be loaded in learning media.

1. Data Types
  - a. Observation
  - b. Questionnaire
  - c. Interview
2. Data Collection Instruments
  - a. Media Evaluation Sheet for ExpertsMedia dan Ahli Materi
  - b. This evaluation sheet is used as consideration for the revision of learning media. The aim is to determine the media's visual readability, obtain input, and determine whether the media is suitable for use in schools. This evaluation sheet is prepared with alternative answers "very appropriate, appropriate, less appropriate, not appropriate."
  - c. Student Response Sheet
  - d. Response sheets for students are used to determine student responses and improve learning media prepared with alternative answers "very appropriate, appropriate, less appropriate, and not appropriate."
3. Data analysis technique
  - a. Descriptive Analysis Process
  - b. Questionnaire Analysis Process

## RESULTS AND DISCUSSION

This development research uses the ADDIE development model, which is an analysis of the situation, material, and technology, design, development of instructional media, the implementation by conducting two trials namely limited trials and large class trials, but before testing, the first used to be validated by material experts and media experts. The feasibility of the learning material was assessed by three material experts, namely Ahmad Dahlan University lecturer, a mathematics teacher at SMP Muhammadiyah 5 Yogyakarta, and mathematics teacher at SMP Muhammadiyah 7 Yogyakarta. The feasibility of instructional media based on media aspects was assessed by three media experts, namely Ahmad Dahlan University lecturer, SMP Muhammadiyah 5 Yogyakarta TIK teacher, and SMP Muhammadiyah 7 Yogyakarta TIK teacher. Students' responses to the learning media developed were known based on the results of the questionnaire given and filled out by students of SMP Negeri 5 Yogyakarta and SMP Muhammadiyah 7 Yogyakarta during limited trials and large class trials. The final step is the evaluation by looking at the questionnaire results that have been filled out by media experts, material experts, and student responses. When viewed from the material aspect, the feasibility of learning media has an average score of 79.67 from an average score of 90, so that it shows that the learning media developed in terms of material aspects are included in the excellent category. The feasibility of instructional media, when viewed from the aspect of the media display, has an average score of 105.33 from an ideal average score of 120 so that it shows that the developed learning media in terms of media display aspects are included in the excellent category. The feasibility of the learning media, when viewed from the response of students, has an average score of 66.50 from an ideal average score of 75, so that it shows that the learning media developed in terms of student response is included in the excellent category. Final assessment scores obtained for mathematics learning media that have been developed are 317.20 of the maximum score of 360 and have excellent quality. This learning

media is declared very feasible as a source of learning mathematics on the subject matter of the set for seventh-grade junior high school students.

## CONCLUSION

From the results of this development research, it can be concluded as follows:

1. Steps - the development of learning media based on Macromedia Flash 8 on the class VII SMP material set:
  - a. The way to gather information to develop mathematics learning media based on Macromedia Flash 8 on the material set of class VII SMP is by analyzing. The results of the situation analysis are that there are several classrooms and multimedia rooms that have LCD projectors, there are computer laboratories that are only used for ICT lessons, the use of LCD projectors in classrooms and multimedia rooms is not optimal, especially in learning mathematics, learning media in the form of learning CDs have not been widely used. Mathematics lessons, especially the set material, require learning media as an innovation in instructional media use. The analysis of the material consultations is conducted with grade VII mathematics teachers and choose the set material because this material requires a specific visualization in the learning process. Technical analysis is carried out to find out the software by the ability of researchers and media development needs to use Macromedia Flash 8 software as a means of developing learning media.
  - b. The learning media design begins with making a flowchart and storyboard first so that the learning media flow can be read. Then make the opening display design, main menu display design, display design instructions, display competency display design, material menu display design, question exercise display design, evaluation display design, and profile display design.
  - c. Researchers choose lecturers and teachers who are competent in their fields to validate the learning media. Learning media is validated by three material experts and three media experts to get an assessment in the form of input and suggestions regarding the feasibility of instructional media.
  - d. The researcher revised the learning media by looking at the input and suggestions provided by the validator.
2. The level of feasibility of learning media developed in support of learning set material:
  - a. Trials were conducted twice, namely limited trials and large class trials. Limited trials were given to 5 students of SMP Muhammadiyah 5 Yogyakarta and five SMP Muhammadiyah 7 Yogyakarta students with mixed or evenly distributed abilities from high, medium, and low. It is intended that the responses and input provided can represent all aspects of a class. Meanwhile, a large class trial was conducted on 30 students of SMP Muhammadiyah 5 Yogyakarta and 26 students of SMP Muhammadiyah 7 Yogyakarta. The researcher presented this learning media in the learning process. After completing using the learning media, researchers distributed student response questionnaires to determine students' responses to the learning process using learning media.
  - b. The data analysis technique used in this study is a qualitative descriptive analysis technique that describes the results of product development in the form of Macromedia Flash 8 based mathematics learning media—conducted by collecting data, displaying data, reducing data, and verifying data.
  - c. The feasibility of learning media, when viewed from the material aspect, has an average score of 79.67 from an average score of 90, so that it shows that the learning media developed in terms of material aspects are included in the excellent category.
  - d. The feasibility of instructional media, when viewed from the aspect of the media display, has an average score of 105.33 from an ideal average score of 120 so that it shows that the

developed learning media in terms of media display aspects are included in the excellent category.

- e. The feasibility of the learning media, when viewed from the response of students, has an average score of 66.50 from an ideal average score of 75, so that it shows that the learning media developed in terms of student response is included in the excellent category.

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