DEVELOPMENT OF MATHEMATICS LEARNING MEDIA WITH SNAKE AND LADDER GAME ON THE CIRCLE MAIN DISCUSSION

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ABSTRACT

The mathematic concept can be presented in a game snake and ladder to make it more interesting, more interactive. It can increase the students' quality of study, yet learning media used in school is minimal. Minimal research aims to develop mathematic learning media with snake and ladder game on the circle main discussion central circle in the third grade of junior high school that is proper for the mathematic learning process. This research is counted as research and development using the ADDIE model consisting of five phases: analysis, design, development, implementation, and evaluation. The research subjects The specialist subjects media specialist, students of Junior High School (SMP) Muhammadiyah 1 Minggir Sleman Regency, and State Junior High School (SMP Negeri) 3 Gamping Sleman Regency. Data analysis technique The qualitative data analysis is changed to be quantitative values using a Likert scale. Data collection technique The data this research used observation, interview, and questionnaire. The product of learning media developed is in the form of a compact disk (CD) that has gone through scoring and validating by three mathematic learning subject experts and three experts of mathematic learning media. The result from the subject experts is in the category of very good. The result from the media experts is in the very good category, and the result of students' responses is in a suitable category. Based on the results, it can be concluded that the learning media that is developed is proper to be used in the mathematic leering process.

Keywords: Learning Media, ADDIE, Circle Main Discussion.

INTRODUCTION

The development of science and technology is increasingly advanced. This influences the world of education, especially in using technology results used to deliver learning material. One of the products of the development of technology that is very familiar is the computer. Computers can be used as learning aids and have considerable potential to be utilized in the learning process. The computer has exciting applications that can display various media components such as images, animation, text, video, and sound to stimulate more senses. With the rapid development of technology, many computer and smartphone-based games have sprung up. Children, especially middle school kids, prefer games like this. Technological developments such as this can be utilized in the learning process because learning activities occur while playing. Rahina Nurahani in Noka Setya Maharani (2012: 4) argues that in general visual-based learning media in the form of snakes and ladders games is an effective medium for increasing students' absorption and understanding of learning.

Mathematics with abstract nature often causes students' anxiety, so mathematics tends to be feared and avoided by students. Mathematics Teacher of SMP Muhammadiyah 1 Minggir also mentioned that material such as algebra, building space, and circles is difficult for students to understand. He also said that there was a need for new ways that could increase interest in learning mathematics. To deliver messages between teachers and students, learning media needs to be packaged and as interestingly as possible to feel comfortable following the learning. In his book, Arief S Sadiman (2014: 1) states. The learning process can occur anytime and anywhere, regardless of whether there is teaching or not. The learning process occurs because of individual interaction with the environment. To accompany student learning, one of them is with learning media. Through instructional media and facilitating teachers in various teaching processes, students can repeat lessons in school due to differences in learning styles, interests, intelligence, and limited student senses that cause the material to be less acceptable. Therefore, learning media are needed that students can use for independent learning at home.

The use of computer-based learning media is still minimal. Based on interviews with mathematics teachers at SMP Muhammadiyah 1 Minggir and SMP Negeri 3 Gamping, it is known that the learning methods applied are very diverse such as lectures, questions and answers, assignments, discussions, and a combination of learning methods. Many computer application software that can help support mathematics learning media are Macromedia Flash Professional 8. Macromedia Flash Professional 8 is an animation maker software, from an image or text to make it more interesting. This software has many advantages, including image animation, text animation, graphic animation, and sound, produced in presentations, games, films, and learning Compact Disks.

This development research's objectives are as follows: 1) Describe the development of mathematics learning media by playing snakes and ladders on the circle for students of class VIII of SMP. 2) It was knowing the feasibility of mathematics learning media by playing snakes and ladders on the circle's subject for students of class VIII SMP.

METHODS

The research applied in this research is research and development (Research and Development). According to Sugiyono (2010: 407), research and development methods are research methods to produce specific products and test these products' effectiveness. This study's method uses the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The steps taken in this study include (1) Analysis, which is carried out in the form of curriculum analysis, analysis of learning media needs, analysis of the material, analysis of supporting technology, analysis of learning situations. (2) Design, the design stage is carried out to create a design from learning media based on the analysis that has been done. The design includes covering the outline of media content, creating storyboards, compiling material, and creating scenarios in flowcharts. (3) Development, there are two stages, namely the production and post-production stages. The production stage is the making of learning media based on the design of the media display that has been designed, which is then learning media packaged in the form of Compact Disk (CD) pieces. The post-production stage is the media that has been consulted with a supervisor to evaluate media experts and material experts to improve. (4) Implementation, this stage of learning media is tried out or used in learning. The media is implemented for two mathematics teachers, two laboratory teachers, and eighth-grade junior high school students, where the tests will be conducted. (5) Evaluation is conducted to find out the learning media that have been developed according to initial expectations or not. The results of evaluations conducted by media experts, material experts, teachers, and students are used to know the quality of learning media developed. In this study, researchers used data collection techniques in the form of interviews and questionnaires/questionnaires. The questionnaire in the form of a Likert scale with 5 rating categories strongly agree (score 5), agree (score 4), doubt (score 3), disagree (score 2), and strongly disagree (score 1). In this study, data analysis techniques include quantifying data, determining averages, converting data using guidelines for ideal eligibility criteria, and determining instructional media feasibility.

RESULTS AND DISCUSSION

By the ADDIE development model, the procedures carried out in this study go through several stages:

1. Analysis

   The analysis carried out in the form of (a) Analysis of the VIII grade junior high school mathematics curriculum includes essential competencies and core competencies adjusted to the 2013 curriculum. The analyzed part is about competencies in learning circles. (b) Learning media needs, interviews were conducted with mathematics teachers at SMP Muhammadiyah 1 Minggir and SMP Negeri 3 Gamping. Based on interviews, it is known that the learning methods applied have varied. However, of all the methods and methods applied, it turns out that the teacher still does not apply the learning method by utilizing the computer so that learning is more varied with the game and more motivated to participate in learning. (c) Material analysis, carried out in consultation with both schools' mathematics teachers, found that the availability of teaching aids for circle material was still limited.

(d) Technical analysis is carried out, including the availability of software that helps with media development. One multimedia software that can help in learning media is Macromedia Flash Professional 8, which can produce animation, presentation, game, film, or CD. (e) Situation analysis, SMP Muhammadiyah 1 Minggir, and SMP Negeri 3 Gamping have adequate laboratory facilities.

2. Design

Several steps are taken at this design stage: (a) the outline of the learning media contents includes intro, instructions for use, homepage or main menu, competencies, material, evaluation, game, profile, and outro. (b) the creation of a learning media storyboard explains the layout design of the media display, which is equipped with an explanation containing text, images, animation, audio, and navigation. Storyboarding is intended to simplify the process of developing learning media in combining existing media components. (c) Creating a learning media scenario is arranged in a flowchart describing the learning media workflow or process to be developed.

3. Development

The development phase uses Macromedia Flash 8 software. The production process begins with creating templates, animations, images, text, materials, navigation buttons, narration, and music using tools. Mathematics learning media will be produced from this stage. It will be consulted with the media expert lecturers and material experts to get suggestions and input in learning media development before being tested. The developed media contains various learning activities for students. The learning activities consist of menus, namely manuals, competencies, materials, evaluations, games, and profiles.

4. Implementation

Preparations for implementing learning media include mathematics learning media that have been evaluated by media experts and material experts copied on every computer or laptop. After preparation, the learning media is implemented for the teacher and students. In the next stage, the learning media were tested on students of class VIII of SMP Negeri 3 Gamping and students of class VIII of SMP Muhammadiyah 1 Minggir.

5. Evaluation

The evaluation is carried out at each stage by the researcher and the supervisor. Evaluations in product development are carried out by media experts and material experts at the development stage. The evaluation in the form of a review and input to the learning media provided by media experts and material experts both through questionnaires and delivered directly to researchers.

The results of the questionnaire calculations from material experts are as in Table 1.

Table 1. Expert Data Trial Material

No.	Evaluator	Total score
1	Expert Material 1	85
2	Expert Material 2	86
3	Expert Material 3	91
	Average score	87,33

From the material expert test data, the learning media with the snakes and ladders game after going through the analysis process is included in the very good category when viewed in terms of the material.

Based on the results of the assessment of the material, the learning media with the ladder snake game that was developed was worth testing with several things that need to be improved:

1. Add the word to the plane on the definition of a circle.
2. Changes in the composition of the explanation of the bowstring first and then the explanation of the diameter.
3. Appropriate image with a known angle.
4. Pictures taken from the internet are given source information.
5. Added the answer key to the questions in the snakes and ladders game.
6. Giving examples of problems must be logical.

7. Writing large angles or using large angles () is justified.
8. Added an explanation of the agreement that what is used is a small jar and the tin that is agreed is the small jar.
9. Animation around the corner is added so that it moves in a circle.
10. In the explanation of finding the circumference, the same circumference size is made.

The results of the questionnaire calculations from media experts are as in Table 2.

Table 2. Media Expert Trial Data

No.	Evaluator	Total score
1	Expert Material 1	83
2	Expert Material 2	79
3	Expert Material 3	80
	Average score	80,67

From the media expert test data, it can be concluded that the learning media with snakes and ladders game after going through the analysis process is included in the very good category when viewed in terms of the media.

Based on the results of the media assessment, the learning media with the snakes and ladders game developed was worth testing with many things that need to be improved:
1. The UAD logo arrangement has been improved.
2. Disabling the button when you first enter the intro.
3. Add the description of exercise questions.
4. Add information when the answers to the snakes and ladders game show right and wrong.
5. Increasing the volume of the size of the sound regulator.
6. Laying the answer key on the evaluation, placed on the page after students click the correction button.

CONCLUSION

Based on the results of research and discussion can be concluded as follows:
1. Development of mathematics learning media with the snake and ladder game on the subject of the circle for class VIII junior high school through five stages, namely:
   a. Analysis
      The analysis included: VIII grade junior high school curriculum analysis, learning media needs, material analysis, technology analysis, situation analysis
   b. Design
      The design phase includes: preparing an outline of the content of learning media, making storyboards, making scenarios,
   c. Development
      The design of instructional media is developed through two stages: production, which is the stage where the media are developed by the appearance of the media that has been designed, and post-production is the stage where media experts and material experts evaluate the learning media that have been developed.
   d. Implementation
      This learning media was applied to two mathematics teachers, two ICT teachers, and two VIII class students from two schools, namely SMP Muhammadiyah 1 Minggir and SMP Negeri 3 Gamping.
   e. Evaluation
      Learning media developed are evaluated on content and objectives, technical aspects, and instructional aspects by material experts and media experts. The evaluation is used as a reference to determine whether or not the learning media developed.
2. The feasibility of mathematics learning media products with the snakes and ladders game on the subject of the circle for the eighth grade of junior high school that was developed included in the

excellent category based on the calculation of the average score of material experts at 87.33 and from media experts at 80.67 and included in the good category of student responses by 114.53. So that the mathematics learning media with the snake and ladder game on the subject of the circle for class VIII of junior high school is proper to be used in the learning process

As an additional study material, in this study, researchers only measured instructional media's feasibility by playing snakes and ladders on circle material. Researchers can then develop the same in a broader scope, of course, with the concept of a better programmer and with the same or different material.

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