

THE DEVELOPMENT INTERACTIVE LEARNING MEDIA ON LINEAR PROGRAM WITH MACROMEDIA FLASH 8 HOTS EXERCISES FOR STUDENT OF SMA/MA IN CLASS XI

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ABSTRACT

This study aims to develop learning media on a linear program with Macromedia Flash 8 HOTS exercises for SMA/MA students in class XI. This research is included in the research and development using the development model of ADDIE consisting of five-phase, namely analysis, design, development, implementation, and evaluation. The research subject is media experts, material experts, and student response of State Senior High School (SMA Negeri) 1 Kasihan and SMA Negeri 1 Sanden Kabupaten Bantul. Data collection techniques in the form of questionnaires, observation, interviews, and exercises were done before developing the product. The research instrument used is observation sheet, interview sheet, and questioners to assess the interactive learning media that has been developed. The data analysis technique uses qualitative analysis that is converted into a Likert scale cumulative value. The results of the expert assessment of the media obtained an average score 4,58 very good category, by the expert assessment of the materials obtained an average score of 4,50 very good category, the student responses to the technical quality assessed in the small-scale trials obtained an average of 4,17 good category, and the student responses to the technical quality assessed in the classroom usage test scored an average of 4,44 very good category. Based on the average, the learning media of mathematics developed is a media of mathematics learning.

Keyword: Learning Media, ADDIE, Linear Program, Macromedia Flash 8, HOTS.

INTRODUCTION

Education is one of the most important things for a nation because a nation's progress reflects the quality of education. Education's function is to increase human resources and instill good attitudes and morals towards its successors. According to Ihsan (2011: 2), 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. According to Arsyad (2017: 2), the development of science and technology is increasingly pushing for renewal efforts in using technological results in the learning process. Mathematics is a science that is needed by everyone to manage all matters of life. According to Suherman et al. (2003: 18) that mathematics itself can enter all aspects of human life, from the simplest to the most complex. Mathematics is also a very important science for developing science and technology (Science and Technology). Therefore, mathematics is one of the subjects that must be studied at all levels of education. Mathematics is often considered frightening for students today. This was stated by Van De Walle (2008: 12), which states that for most people, mathematics is a collection of rules that must be understood, arithmetic calculations, mysterious algebraic equations, and geometric proofs.

The teachers have not realized the importance of using learning media in mathematics learning activities. The use of media in learning activities aims to facilitate teachers in delivering material. According to Sanaky (2013: 207), the use of computers as learning media must have the aim to motivate learners. Also, it must be able to stimulate learners to remember what they have learned and provide new stimuli for learners. Thus good media will have the ability to enable learners to provide responses, feedback and encourage learners to practice correctly.

Along with the implementation of the 2013 curriculum, it is expected that there will be a paradigm shift in the implementation of learning. Learning that was initially centered on teachers (teacher-centered) turned into student-centered (student-centered). Teachers are expected to be more

creative and innovative in presenting subject matter. Therefore, the researcher wants to develop interactive learning media by applying HOTS-oriented questions to mathematics. Development of interactive learning media based on Macromedia Flash 8 adapted the ADDIE development model by Personal (2009: 127). This development procedure includes analysis, design, development, implementation, and evaluation (ADDIE). Therefore, the formulation of the problem in this study is how the development of learning media and the feasibility of interactive learning media the subject of linear programming based on Macromedia Flash 8 is equipped with HOTS-oriented questions for grade XI students of SMA / MA and the purpose of this study is to develop learning media and the feasibility of interactive learning media the subject of linear programming based on Macromedia Flash 8 is equipped with HOTS-oriented questions for high school / MA grade XI students.

METHODS

Development of interactive learning media subject to linear programming based on Macromedia Flash 8 is equipped with HOTS-oriented questions for grade XI students of SMA / MA adapting Personal development models (2009: 127), namely analysis, design, development, implementation, and evaluation (ADDIE). This analysis phase consists of several activities, namely, curriculum analysis at the curriculum analysis stage. A literature study is conducted, including analysis of the subject matter, core competencies, basic competencies, and student analysis. The characteristics referred to here are the interests, attitudes, and motivations of students towards mathematics in particular. The design phase determines the elements that will be contained in the learning media that will be developed. The researcher makes a storyboard, an outline of general media content that includes the design of templates and material. It also determines the learning flow to be made and planning the content in the material presented. Do not forget to make a flowchart and collect components that will be used to develop instructional media. The design and storyboard that have been made will be consulted with the supervisor. Revisions and improvements will be made if the design is not appropriate. The making of the product is based on the design and storyboard that has been made. If the design has been assessed as good, the process of developing the media increases to the next stage, namely the development stage (product making). The development stage of this stage is the process of making learning media itself. At this stage, the researcher continues to make media based on the storyboard and the designs that have been made. Also, things to do include: typing material and manuscripts about practice, making animation, drawing, navigation buttons, and giving music. Also, do not forget, at the initial stage of making this media, the researcher consulted the supervisor to revise and follow up step by step. The compiled media was then reviewed by several reviewers, namely lecturers, who were appointed as media experts and material experts. This media review was conducted to obtain an assessment of the appearance and scope of the material presented.

The assessment results from reviewers are used to guide the revision so that later it will produce a test-worthy media both in terms of appearance and material. The implementation phase of interactive learning media that has been developed and declared worthy of testing by mathematics education lecturers appointed as media experts and material experts will then be tested on students and some mathematics teachers at SMA Negeri 1 Kasihan and SMA Negeri 1 Sanden. The students and mathematics teachers who followed the implementation filled out the media evaluation questionnaire and response questionnaire. It is intended to determine the practical aspects of instructional media's operation, the response of mathematics teachers and students to the media used, and the mathematics learning media's appropriateness to be produced and disseminated. The trial phase's evaluation phase will be assessed—the questionnaire results from the teacher and students participating in the implementation. The test results will be analyzed and evaluated so that the quality, value of the students' responses and responses from the learning media can be known. The analysis results, evaluation, and response of these students are used to reference whether or not the final stage of media revision is necessary. The test subjects in this research and development are media experts, material experts, and student responses. The types of data are qualitative and quantitative. The data obtained in this research

and development are (1) the results of research and development with the ADDIE model through interviews with teachers and students as well as questionnaires based on assessments by media experts, material experts, and students' responses, (2) the feasibility of interactive learning media through the average calculation of validation results and input from media experts, material experts, and student responses. Data analysis techniques include changing qualitative to quantitative.

RESULTS AND DISCUSSION

The first stage is the analysis. The aim is to provide an overview of the teaching material to be developed because the analysis results reference making teaching material. The first step in the analysis is an analysis of interactive learning media needs, conducted observations and interviews with teachers and students of SMA Negeri 1 Kasihan and SMA Negeri 1 Sanden. Before conducting interviews, researchers make interview guidelines as a reference to what information you want to get. The second step is curriculum analysis at this stage by consulting and discussing with the mathematics teacher. The material chosen is a linear program because this material is directly related to daily life. Furthermore, curriculum analysis is carried out by conducting a literature study that includes analysis of the subject matter, Core Competencies (CC), and Basic Competencies (BC).

The second stage is the design/planning stage to outline the contents of the initial learning media plan in making the contents of the learning media by writing what will be learned and how the material is presented. The second step in this stage is the design of learning media content. The developed learning media content design consists of several components.

The next step is the stage of preparing an assessment instrument for media experts, material experts, and students' responses to learning media. The assessment questionnaire consisted of five answer choices with a score of 5,4,3,2, and 1. Moreover, the score of the scoring was beside the five answers. The media expert assessment instrument consisted of 30 items, which included several aspects as follows: improving students' motivation, appearance, linguistic, interactive, conformity to characteristics, ease of navigation, and media integration. Material expert assessment institutions consist of 29 points that cover some aspects as follows: learning instructions, the suitability of competencies to be achieved, accuracy of the content or content of learning material, communicative, complete and systematic, correct language rules, readability—supporting information, HOTS-oriented exercises, and evaluation. Student assessment institutions consist of 26 items covering the following aspects: content of learning material, supporting information, HOTS-oriented exercises, student motivation, appearance, language, ease of navigation, and media integration. After all the instruments are finished, they are then consulted with the guiding lecturer and validated by the expert lecturer who studies the questionnaire.

The third stage is development (development). This stage processes the design / initial design on the actual display. The first step involves collecting data, which is done by reviewing some reference books that cover material by the learning media to be developed and writing learning media in outline the contents of the learning media developed into teaching materials using Macromedia Flash 8 with supporting programs Microsoft Word 2007 and Correl Draw X7 Writing in Indonesian with Adventure and Times New Roman. The results of the development of learning media there are several subparts, namely the beginning, the content, and the end. The initial part consists of offerings, covers, menus. The contents section consists of class menus including apperception, CC / BC, learning objectives, learning indicators, materials, and evaluations; canteen menus including profile makers, and library menus consisting of videos related to material, references, and history (puzzle games). The final part is the words of thanks.

Furthermore, after the learning model has been completed, it is consulted with the supervisor to determine the learning media's readiness to be validated by the media expert and material expert. The second step at this stage is the validation and assessment of the media expert. The material expert aims to ask for consideration of the learning media developed. After revising the learning media, the researcher then returns to validate and asks the validator for the learning media results. Suppose the results of the revision of the learning media are appropriate and appropriate. In that case, the researcher

asks for an assessment of the media expert and the material expert to assess the learning media that has been developed by filling out an instructional instrument development assessment sheet. The third step in this stage is a small class trial to determine the students' responses and input from students relating to learning media. The third step at this stage is a small class trial to determine the students' responses and input from participants relating to learning media relating to instructional media as a reference to students' views of learning media. This stage is carried out before large classes are implemented. Small class trials are conducted after learning media have been created and revised along with questionnaires for students' responses to randomly selected students. Involves 5 class XI students randomly selected at school. Students are selected by the teacher based on the characteristics of the students during class.

The fourth stage is implementation. The application of mathematics learning media will be applied to broad classes, so this condition of learning media will be used, namely in learning mathematics. Large class trials are conducted to determine the feasibility of instructional media after going through several stages. At this stage, it is the last trial in the process of developing this learning media. Large class trials are conducted by distributing learning media products and student questionnaires that have been made and have been revised to students. Questionnaire responses of students aim to get data and feedback in the form of values from students regarding the quality of learning media developed.

The final stage is the evaluation. This stage is carried out in research to determine the quality of learning media developed. Assessment is based on a skype in terms of media, material, and students' responses. The assessment is as a reference whether or not learning media developed for use. The feasibility of instructional media was assessed by three media experts, namely UAD mathematics education lecturers, mathematics teachers of SMA Negeri 1 Kasihan, and SMA Negeri 1 Sanden.

Table 1. Calculation Results of the Questionnaire Instrument Assessment of Media Experts

No.	Name of Material Expert	Average score	Quantitative Data Criteria
1	Dra. Sumargiyani, M.Pd.	4.36	Very Good
2	Sugiyanto, S.Pd.	4.40	Very Good
3	Muh Rusdi, S.Pd.	5.00	Very Good
	Total number	13.76	
	Mean	4.58	Very Good

Based on table 1, it is concluded that the overall calculation of the score of media expert judgment on the developed learning media is included in the excellent category.

The feasibility of instructional media was assessed by three material experts, namely UAD mathematics education lecturers, mathematics teachers of SMA Negeri 1 Kasihan, and SMA Negeri 1 Sanden.

Table 2. Results of Calculation of Questionnaire Instruments Expert Material Assessment

No.	Name of Material Expert	Average score	Quantitative Data Criteria
1	Dra. Sumargiyani, M.Pd.	4.36	Very Good
2	Sugiyanto, S.Pd.	4.40	Very Good
3	Muh Rusdi, S.Pd.	5.00	Very Good
	Total number	13.76	
	Mean	4.50	Very Good

Based on table 2, it can be concluded that the overall score calculation of expert material scores on the learning media developed is included in the excellent category.

Students' responses to the learning media developed were obtained based on the questionnaire assessment results that were distributed and filled out by students during small class trials and large class trials.

Table 3. Calculation Results of the Questionnaire Instrument Student Response Trial Small Class

No.	School	Average score	Quantitative Data Criteria
1	Dra. Sumargiyani, M.Pd.	3.87	Good
2	Sugiyanto, S.Pd.	4.47	Very Good
	Total number	8.34	
	Mean	4.17	Good

Based on table 3, it is concluded that the overall score calculation of the response scores of small class trial students in the developed learning media is included in either category.

The following results of the calculation of the response of students in large class trials to learning media can be seen in table 4

Table 4. Calculation Results of Questionnaire Instrument Responses for Large Class Student Trials

No.	School	Average score	Quantitative Data Criteria
1	Dra. Sumargiyani, M.Pd.	4.12	Good
2	Sugiyanto, S.Pd.	4.77	Very Good
	Total number	8.89	
	Mean	4.44	Very Good

Based on table 4, it can be concluded that the overall score calculation of the response scores of large-scale student trials in the developed learning media is included in the excellent category. Based on the results of calculations from small class trials and overall large class trials conducted in both schools, an average of 4.30 and included in both categories. Product revision is an important stage in developing and designing learning media. The revision process of learning media is done before the learning media is used by students with input/suggestions from the experts. The final product study is a revised learning module that has changed from the initial design / initial planning.

CONCLUSION

Development of interactive learning media subject to linear programming based on Macromedia Flash 8 is equipped with HOTS-oriented questions for grade XI students of SMA / MA developed with ADDIE development models with stages, namely Analysis, Design, Development, Implementation, Implementation (application), and evaluation. The feasibility of a mathematics learning media that was developed based on an assessment questionnaire by media experts with an average score of 4.58; material experts with an average score of 4.50; and student questionnaire responses with an average score of 4.30 included in the category of very good and fit for use in the learning process. It is expected to be utilized in learning mathematics in schools so that it helps students understand linear program material and efforts to produce other learning media that are better and better.

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