

Development of Interactive Learning Media Based on Adobe Flash to Improve Result of Learning Electrical Motor Installation (IML) Class XI TITL SMK Negeri 1 Merdeka Karo Regency

Tonny Hutagalung

Postgraduate Program, State University of Medan. 2021

Email: tonnyhutagalung001@gmail.com

ABSTRACT

This research is motivated by the importance of using interactive learning media in the learning process inside and outside the classroom. This research is a type of development research (Research and Development) which aims to determine the feasibility and effectiveness of the use of Adobe flash-based interactive learning media developed. The development of this interactive learning media uses the ADDIE model development procedure which includes 5 (five) steps, namely; analysis, design, development, implementation, evaluation. The subjects of this study were 36 students of class XI TITL SMK Negeri 1 Merdeka Karo Regency. The data collection instruments were in the form of assessment sheets for learning material experts, multimedia learning construction experts and vocational competency teachers for Electrical Motor Installation (EML) and questionnaires for students. Observation of the activities of students and test results of learning which first conducted empirical validation. The method used to analyze the data is a qualitative descriptive technique which is expressed in the distribution of scores and categories of the rating scale. Assessment of interactive learning media produces products that meet content validation by multimedia learning material experts 4.62 with a percentage of 92.4% with very good categories, 4.5 with a percentage of 90% for multimedia construction experts with very good categories and acceptance (users in this is the Electric Motor Installation Subject Teacher) 4.91 with a percentage of 98.20% with very good categories without revision. In this case it is included in the criteria of valid and feasible to use and effectively used to improve student learning outcomes including individual learning completeness reaching 85%. Classical learning completeness reached 82.91 with a percentage of N-gain reaching 0.714 and received a positive response from students reaching 88.88% with good criteria

Keywords: *Development of interactive learning media, Adobe flash and student learning outcomes.*

1. INTRODUCTION

Interesting and fun interactive learning multimedia makes the learning process fun and interesting too. With advances in technology and information, it is hoped that an interactive, fun and easy-to-understand teaching tool can be made. The use of multimedia for learning facilities is already a demand for the ability for educators to deliver subject matter to students.

Software (software) contained in the computer can be developed into applications, videos or tutorials, game applications and other interesting features. The development of computers is not limited for every educator to develop interactive multimedia learning in

learning activities. Educators can use their computers or personal gadgets for multimedia learning. With developments in technology, science and information, it is expected to facilitate learning activities.

To improve quality and quality learning with the help of interactive learning media relevant to skill competencies C.3.3. Class Electric Motor Installation (IML) several subject matter, especially the subject matter of running a 3-phase electric motor back and forth and running a 3-phase electric motor alternately. To improve the quality, quality and effectiveness of learning competency skills C.3.3. Electrical Motor Installation (IML) subject matter of three-phase motors and running

three- phase motors alternately requires an interactive multimedia learning that emphasizes skill procedures. By looking at the school's infrastructure, along with computer facilities, students can use 1 computer for 2 students and the available internet network. Then the selection of interactive learning media as an effort to improve the quality and effectiveness of the competence of expertise C.3.3. Electrical Motor Installation (IML) the subject matter of running a 3-phase electric motor back and forth and running a 3-phase electric motor alternately is expected to be the right solution.

1.1. Interactive Learning Media

The use of interactive learning media by educators in learning activities can be concluded as follows:

1. Interactive teaching media used by educators in learning activities should make the function of educators more efficient than conventional learning and students are directly involved in learning.
2. Interactive teaching media used by educators in the teaching and learning process should increase the involvement of students to have more learning experiences through the presentation of text, sound, video, and animation that are packaged well in the displayed images.
3. Interactive learning media used by educators in learning activities make students more active. so that the function of educators turns into motivators, facilitators, character building of students and consultants in learning activities.
4. Interactive learning media used in the delivery of teaching to students not only listen, but also give an active influence, and a positive influence on the subject matter.
5. The media used by educators in learning must be able to be fun and interesting so as to generate interest in learning for students. Aspects Assessed in Adobe

1.2. Flash Application Interactive Learning Media

Application-based interactive learning media is adobe flash above regarding the selection of design assessment aspects as follows:

1. Software, for the development of effective and effective adobe flash-based interactive learning media. The use and development of interactive learning based on adobe flash applications that are reliable (reliable), maintainable (can be easily maintained/managed), and reusable (easy to use and simple in operation).
2. Learning Design, the suitability of subject matter with lesson objectives in accordance with the

applicable curriculum as a guide for educators. Depth of subject matter, ease of understanding the lessons delivered by educators, systematic, organized, clear logical flow, suitability of descriptions, discussions, examples, simulations, exercises, consistency of evaluation with learning objectives.

3. Visual Communication, interactive teaching media based on adobe flash applications must be communicative, the content of the subject matter and acceptable. In relation to target desires, creative in ideas, pouring ideas, simple and attractive. Sound (narration, sound effects, backsound, music), visual (layout design, typography, color), moving media (animation, movie) and interactive layout (icons). navigation).
4. Quality of content and purpose. Adobe Flash-based interactive teaching media developed by researchers must have accuracy, importance, completeness, balance, interest / attention
5. Technical quality, adobe flash-based interactive teaching media must be readable, easy to use, quality, display/show quality, accountability quality and program management quality.

Procedure and Research Design

- A. Analysis Phase (Analyze)
- B. Stage Design (Design)
- C. Development Stage (Development)
- D. Implementation Phase
- E. Evaluation Phase

2. METHOD

In this study, the data obtained are qualitative and quantitative data. Both types of data are used in the process of evaluating and improving interactive learning media based on the Adobe Flash application. Quantitative data is obtained from the values obtained from the questionnaire questions given. The data analysis technique used in the research on the development of interactive learning media using the Adobe

Flash application is descriptive quantitative. Quantitative data obtained from learning media experts was then converted to qualitative data with a scale of 5 (Likert scale) to determine the quality of learning multimedia products with the following description.

Table 1. Description of multimedia products

Very Poor (SK)	is given a score of 1
Less (K)	is given a score of 2
Enough (C)	is given a score of 3
Good (B)	score 4
Very Good (SB)	Score 5

3. RESULT AND DISCUSSION

3.1. Material Expert Validation

Research on interactive development media based on adobe flash applications that were tested on learning multimedia material experts 1 and 2, is an interactive learning media based on Adobe Flash Cs 8 application subject matter C.3.3 Electrical Motor Installation (IML) subject matter of running a 3-phase motor back and forth and running a 3-phase motor alternately

Table 2. Material Expert Validation

	Validation	
	V1	V2
Average	4,66	4,62
P	93,3	92,5
Criteria	Very Good	Very Good

3.2. Learning Multimedia Construction Expert Validation

Learning media development products were tested on Multimedia Construction I experts and Multimedia Construction II experts. Is an interactive learning media based on the Adobe Flash application. Electrical Motor Installation Materials, the subject matter of running a 3-phase motor back and forth and running a 3-phase motor alternately.

Table 3. Learning Multimedia Construction Expert Validation

	Validation	
	V1	V2
Average	4,33	4,68
P	86,31	93,67
Criteria	Very Good	Very Good

3.3. Validator of Learning Multimedia Acceptance, namely Subject Teachers and Students

3.3.1. Electric Motor Installation (IML) Vocational Competency Teacher Assessment Sheet

Each stage of product validation is based on expert validation, the next step is to test interactive learning media products. The small-scale test involved 2 (two) teachers of vocational competence in Electrical Motor Installation (IML) Class XI TITL at SMK Negeri 1 Merdeka, Karo Regency by providing teacher assessment sheets for interactive learning media based on Adobe Flash, subject matter for running a 3-phase motor back and forth and running motor 3 phase vocational

competence C.3.3. Electric Motor Installation (IML) Assessment

Table 4. Learning Multimedia Acceptance

	Aspect	
	G.M.P 1	G.M.P
Average	4,91	4,88
P	98,90	97,80
Criteria	Very Good	Very Good

3.4. Feasibility Test Questionnaire for Students

Learning media development products were tested on Multimedia Construction I experts and Multimedia Construction II experts. Is an interactive learning media based on the Adobe Flash application. Electrical Motor Installation Materials, the subject matter of running a 3-phase motor back and forth and running a 3-phase motor alternately.

Table 5. Feasibility Test Questionnaire for Students

	Student				
	1	2	3	4	5
Average	4,90				
P	96,54				
Criteria	SB/SV				

This application-based learning media development research is a type of development research (Research and Development) which aims to determine the feasibility and effectiveness of adobe flash-based interactive learning media for the vocational competence of Electrical Motor Installation (IML) in the subject matter of running a 3-phase motor back and forth and running a 3-phase motor. alternating phases developed for use in SMK N 1 Merdeka, Karo Regency.

1. Feasibility of Adobe Flash-Based Interactive Learning Media at SMK Negeri 1 Merdeka, Karo Regency.

Data obtained from interactive multimedia experts and vocational competence teachers C.3.3. Electric Motor Installation (IML) in the subject matter of running a 3-phase motor back and forth and running a 3-phase motor alternately Class XI TITL SMK N 1 Merdeka Karo Regency in the form of qualitative data is converted into a Likert scale data score. Then analyze each aspect, namely the components and the number of indicators and the ideal highest score. The score is converted into the level of product feasibility by referring to the ideal assessment criteria. To determine the feasibility of adobe flash-based interactive learning media, a validity test was carried out by two experts on multimedia subject matter with a Doctorate title, two Multimedia Construction

experts with a Doctorate degree, two teachers of vocational competence C,3.3. Electrical Motor Installation (IML) with a bachelor's degree with more than 20 years of teaching experience, and five students. Where each learning multimedia expert and teacher gives an assessment of each indicator contained in the learning media validation sheet in the form of a quantitative descriptive assessment questionnaire that is expressed in the distribution of scores and rating scale categories. The validation used at the validity test stage is theoretical validity, namely the validity of those who are considered experts and competent to validate and are experienced in their fields based on theoretical or logical considerations. There are three parts of interactive learning media based on the Adobe Flash application that will be validated, namely Learning Multimedia Materials, Learning Media Construction and Learning Media Acceptance (assessment of vocational competency teachers). The learning media developed need to be validated to obtain valid adobe flash-based interactive learning media so that they are suitable for use in learning activities inside and outside the classroom. At the validity stage, the researcher conducted an assessment using discussion techniques by showing the initial design of adobe flash-based interactive learning media with subject matter experts, learning multimedia construction experts and teacher assessments. Researchers also provide validation sheets to validators in order to get authentic results. The experts gave an assessment of the same initial design, which was very valid with no revisions. Based on subject matter experts, multimedia material experts for lesson I based on aspects of content, assessment of motivation, presentation of material, exercises, tests, material content, examples, visualization and sentence clarity achieved an average score of 4.66 with a percentage of validity of 93.30% with very high criteria. good or very valid. In addition, the validator suggested that it be developed in other electric motor operations, the time allocation was considered and the material was good/appropriate. Based on multimedia learning material experts, the average score of 4.62 reaches 92.50% after adjusting to the feasibility table, then this score is included in the very good or very valid criteria, with input on other electric motor circuits that need to be added and material indicators that need to be added. will be achieved, the time allocation is considered, the material is good and in accordance with the learning material. Based on expert validation of Multimedia Construction 1 based on aspects of display, programming and has components of design, animation, navigation, visualization, interactive student training and language use, the content reaches an average score of 4.33 with a percentage of validity of 86.31% with criteria very good or very valid without revision, the media is suitable to be used for testing on students. Based on expert validation of Multimedia Construction 2 based on aspects of display, programming and has components of design, animation, navigation, visualization, interactive student

training and language use, the content reaches an average score of 4.67 with a validity percentage of 93.67% with very good criteria. good or very valid so that without revision the media is suitable for use as learning media. Furthermore, the developed adobe flash-based interactive learning media was tested on the teacher competency skills of electric motor installation (IML) class XI TITL1 (GMP1) the assessment was carried out before conducting a small-scale trial of the learning media developed by providing teacher assessment sheets and interactive learning media based on adobe flash that has been validated by subject matter experts, experts and learning multimedia construction experts. The teacher concerned gave an assessment based on aspects of use, subject matter, technique, communication and display with an average score of 4.91 with a percentage of validity of 98.90%. The teacher stated that it was feasible to use it as an interactive learning medium. The electric motor installation skill competency teacher (IML) class XI TITL (GMP 2) gives an assessment based on aspects of use, subject matter

2. The Effectiveness of Adobe Flash Interactive Learning Media at SMK Negeri 1 Merdeka, Karo Regency

The effectiveness of adobe flash-based interactive learning media in learning is seen through learning outcomes tests in the form of pre-test and post-test. Individual learning completeness, classical learning completeness by looking at the increase in gain scores, and student questionnaire sheets on adobe flash-based interactive learning media used in the learning that has been carried out. The effectiveness of interactive learning media based on the Adobe Flash application, subject matter of running a 3-phase motor back and forth and running a 3-phase motor alternately for professionals was measured using analysis of learning outcomes in the form of pre- test and post-test. Data from the results of learning tests given to students before using interactive learning media based on Adobe Flash in the form of a pre-test consisting of 20 (twenty) multiple-choice questions with five choices, namely, A, B, C, D and E. Pre-test data for participants According to table 4.10, it can be seen that student learning outcomes are still low with an average of 37 and a standard deviation of 15.98. This is seen by the minimum completeness criteria based on the minimum completeness of SMK Negeri 1 Merdeka for vocational competence, which is 75. After learning activities using interactive learning media based on Adobe Flash are completed, a post test is carried out to see the learning outcomes of students. From the implementation of the post test the results reached an average of 82 with a standard deviation of 7.9. Based on the reference to the school's minimum completeness criteria for vocational competence, which is 75, it can be seen that student learning outcomes have increased and it can be said that student learning outcomes reach the Minimum Mastery Criteria (KKM) on vocational competence C.3.3. Installation of an Electric Motor

(IML) class XI TITL on the subject matter of running a 3-phase electric motor alternately and running an electric motor back and forth Based on the classical learning mastery of students as shown in table 4.11, 82% of students who have achieved KB 65%. After the individual and classical student learning mastery is analyzed, the results of the pre test and post test are calculated with a gain score to assess the increase in learning outcomes and the effectiveness of interactive learning media based on Adobe Flash applications on vocational competence C.3.3. Electrical Motor Installation (IML) class XI TITL in the subject matter of running a 3-phase electric motor alternately and running an electric motor back and forth between before and after using interactive learning media based on Adobe Flash in the learning process, the gain score is calculated as a result of 0.714, so the score of students is very high. This high level indicates that interactive learning media based on Adobe Flash applications can be applied. Furthermore, judging from the completeness of individual learning which can be seen from table 4.11 there are 36 (thirty-six) students, it can be seen that there are 32 students who are "completed" and 4 students who are "unfinished". With individual learning mastery of students 82.91%, based on individual learning mastery compiled by students' abilities, the percentage is classified in the complete criteria. Previously, Naniek K (2015. *Premiere Educandum*, Volume 5 Number 2: 263 – 271) had conducted a study entitled Development of interactive learning media based on the Adobe Flash application, the direct instruction model in SMK. Based on the results of research that has been done to complete student learning outcomes after using macromedia flash animation learning media based on direct teaching models (direct instruction) based on data analysis of student learning outcomes, 36 (thirty six) students took the post test, 32 (thirty two) people and 4 (four) people. The classical students' cognitive learning mastery is 82.91%. This means that class XI TITL students have vocational competence C.3.3. The installation of an Electric Motor (IML) in the subject matter of running a 3-phase electric motor back and forth and running a 3-phase motor alternately has achieved classical learning outcomes. In addition to the above, it can also be seen that student questionnaires based on table 4.12 show that with a percentage of 86% of students strongly agree and 14% of students who disagree with interactive learning media based on adobe flash applications developed by researchers. Based on the students' responses, it can be concluded that the use of interactive learning media based on the Adobe Flash application in learning activities is said to be effective and efficient. Based on the results of the research carried out, students received very good enthusiasm in learning which further used Adobe Flash animation learning media as developed, obtained data of 36 (thirty six) or 100% expressed interest. Questionnaire data on student responses to the language used in textbooks and animation media

obtained data as many as 32 or 88.90% of students stated that it was easy to understand and 4 or 11.10% said it was difficult to understand. Students' questionnaire data on illustrations in textbooks and animation media obtained 35 or 97 data, 2% of students said they were happy and 1 or 2.7% of students said they were not happy. Based on the description in the learning outcomes data and student responses above, it is concluded that the interactive learning media based on the Adobe Flash application developed can be said to be effective. Because it meets the quality criteria that are very valid, very good and very suitable for use in learning activities. In addition to researchers conducting the basis of several studies that have been carried out by previous researchers, it can be concluded that there is a need for the development of interactive learning media based on Adobe Flash applications combined with learning models / methods that support quality learning so as to make students more active than teachers who provide subject matter. Based on the purpose of this development research, namely to determine the feasibility and effectiveness of interactive learning media based on the Adobe Flash application, the interactive learning media based on the Adobe Flash application can be said to be effective for teachers and students. Because based on the data obtained, it shows that interactive learning media based on the Adobe Flash application is effective for improving student learning outcomes in vocational competence C.3.3. Installation of an Electric Motor (IML) class XI TITL on the subject matter of running a 3-phase electric motor back and forth and running a 3-phase motor alternately.

4. CONCLUSION

4.1. Conclusion

This research on the development of interactive learning media based on the Adobe Flash application is based on research data on scientific systematic findings by formulating research objectives. From the data carried out during the research, input from learning media experts, input from learning multimedia validation experts, input from learning multimedia construction experts and input from learning multimedia users (apsetbansi). This research aims as follows:

1. Based on two validations of multimedia subject matter experts who hold S3 degrees, UNIMED electrical engineering lecturers obtained an average eligibility criterion of 4.63 with a percentage of 92.60%, two learning multimedia construction experts with S3 degrees, UNIMED graduate lecturers obtained the average eligibility criteria - an average of 4.50 with a percentage of 90.10%, and two teachers of vocational competence C. 3.3 Electrical Motor Installation (IML) with a bachelor's degree whose work period is more than 20 years obtains the eligibility criteria an average of 4.91 with a percentage of

98.20%. Based on the validation data from the experts mentioned above, it can be concluded that interactive learning media based on the Adobe Flash application entered the criteria of very good, very valid and very feasible to be used in learning activities on vocational competence C.3.3. Electrical Motor Installation (IML) class XI TITL subject matter is running a 3-phase motor back and forth and running a 3-phase motor alternately.

2. Based on the data of individual learning mastery, students reach an average of 86.78% classical learning completeness 82.35 5 with a gain score of 0.78 including high categories in other words learning indicators are achieved. Based on the learning completeness data, the interactive learning media based on the Adobe Flash application in this study was effectively used in vocational competence C.3.3. Installation of an Electric Motor (IML) class XI TITL on the subject matter of running a 3-phase motor back and forth and running a 3- phase motor alternately.

4.2. Implication

To improve the quality, quality and learning outcomes of students above the KKM on vocational competence C.3.3. Electrical Motor Installation (IML) class XI TITL in the subject matter of running a 3-phase motor back and forth and running a 3- phase motor alternately. Provide learning experiences from educators who are good, effective, characterized and meaningful from educators to students. By using interactive learning media based on adobe flash applications in learning activities on vocational competence C.3.3. Installation of an Electric Motor (IML) class XI TITL on the subject matter of running a 3-phase electric motor back and forth and running a 3-phase motor. Based on the conclusions in the research on the development of interactive learning media based on the Adobe Flash application, it has higher implications than learning media that uses books and conventional media used by teachers in learning activities so far. From the conclusion of this study, several implications are obtained as follows:

- (a) The use of interactive learning media based on the Adobe Flash application requires the readiness of students to use computers. With interactive learning media based on adobe flash applications on vocational competence C.3.3. Installation of an Electric Motor (IML) class XI TITL in the subject matter of running a 3-phase motor back and forth and running a 3-phase motor in order to obtain maximum results.
- (b) Using interactive learning media based on adobe flash applications, students are given the opportunity to develop their creativity to explore vocational competencies C.3.3. Electric Motor Installation (IML) subject matter of running a 3-

phase motor back and forth and running a 3-phase motor alternately.

- (c) Problems faced by students in vocational competence C.3.3. The installation of an Electric Motor (IML) class XI TITL on the subject matter of running a 3- phase motor back and forth and running a 3-phase motor alternately was resolved with interactive learning media based on the Adobe Flash Cs 8 application. Learners easily understand more clearly and increase their interest in learning. With interactive learning media based on the Adobe Flash application, it can be repeated several times so that students can learn effectively.

4.3. Suggestion

Research on the development of interactive learning media based on adobe flash applications used in learning activities on vocational competencies C.3.3. Electrical Motor Installation (IML) class XI TITL on the subject matter of running a 3-phase motor back and forth and running a 3-phase motor in teaching on vocational competence C.3.3. Electrical Motor Installation (IML) class XI TITL suggestions from researchers are as follows:

- (a) For educators, interactive learning media based on adobe flash applications on vocational competence C.3.3. The installation of an Electric Motor (IML) class XI TITL on the subject matter of running a 3-phase electric motor back and forth and running a 3-phase electric motor alternately does not have to be downloaded but can be made by the vocational competency teacher himself.
- (b) For school principals, providing support and motivation to educators to develop interactive learning media made by themselves that can be integrated with software/applications that support the quality and quality of learning activities.
- (c) For readers, research on interactive learning media based on adobe flash applications motivates them to work, do their best, take advantage of science and information technology in vocational competencies C.3.3. Electric Motor Installation (IML) on other subject matter.

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