International Journal of Engineering and Collaborative Learning (IJECL)
ISSN 3046-6601, https://ijecl.ppj.unp.ac.id/index.php/ijecl

Designing an Animation Video on Basic Electrical Concepts Powerpoint and AI based

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***Abstract* - In the Basic Electricity and Electronics course, there is a problem where there are still many students who do not understand the basics of electricity and electronics. This can be seen from the low interest in learning, which has resulted in students' midterm exam scores dropping and remedial measures being held several times. In this case, if students are less interested in learning, it will take time for them to understand the learning provided by the lecturer. The aim of this research is to overcome student understanding, which is considered to be still lacking, by designing animated videos of basic electricity concepts based on PowerPoint and AI in Basic Electricity and Electronics courses so that it can increase student interest, make students more active in learning, and improve student learning outcomes. This research uses the Research and Development (R&D) research method with several procedures, including define, design, develop, and disseminate. From the results of the practicality test by 98 students, they got an average score of 86.01% in the very practical category, and the assessment from the validator after several revisions was in the very feasible category.**

***Keywords*— Learning Media, Animated Video, Powerpoint, Electrical and Electronics.**

I. INTRODUCTION

Education is a planned and conscious effort to create an atmosphere and learning process in which students actively develop their potential to acquire a religious spirit, self-control, personality, intelligence, dignity and skills necessary for themselves, society and the nation. Learning media includes everything that can help teachers convey information to students during the learning process [1].

Learning media is anything that is used as an intermediary to convey lesson material during the learning process. In the beginning, learning media only used learning aids such as pictures, models, graphs and real objects, but as technology advances, they now utilize music, videos and animations, as well as other elements [2]. Learning media are tools, approaches and strategies used for interaction and communication between educators [3].

Learning media helps a sustainable learning process between educators and students, increases students' interest and enthusiasm, increases interaction between students, educators and learning resources, and overcomes limitations of space, time, energy and sensory power. Most people believe that instructional videos are a more effective learning method because they allow students to review material they have not yet understood without having to repeat the lesson [4]. Interactive learning media is media that combines several elements such as images, photos, text, audio and video which are arranged in an interesting way and have interactive features that allow users to interact with the media [5]. The methods and media used in the teaching and learning process also influence the level of student achievement in PBM. The use of learning media in the teaching and learning process can motivate students to learn and help them understand the material [6]. Media in the learning process can help students' understanding because it changes abstract ideas into more real things [7].

All the procedures that take place during a person's lifetime to learn or acquire new information in order to realise a dynamic educational experience and enhance others' and one's own potential are included in education. Planning instructional media can make the use of technology in education in the contemporary globalised era a reality. The quality of engagement throughout the learning process may be improved with the thoughtful application of instructional media [8]. Media in the form of animated videos is more useful for the learning process than other types of media. Animated video is a type of audio-visual media that combines moving animated images with a soundtrack that matches the animated characters. Some forms of animated videos include 2D animation, stop motion, infographics, isometric animation, and 3D animation [9].

The device used to create animated videos is using PowerPoint. Powerpoint is an expressly designed application that makes it possible to display multimedia programs in a very attractive, easy to create, easy to use and affordable way. This application has quite complete and interesting features, such as the ability to process text, insert images, audio, animation,

DOI: https://doi.org/10.24036/ijecl.8
Received : 30 September 2024
Revised : 26 October 2024
Accepted : 08 November 2024
Published : 08 November 2024

video and effects that can be adjusted to make the appearance more attractive [10].

Basic electricity and electronics is a course that studies electrical circuits and electrical components. This course is in the automotive engineering department, so students must know basic electricity and electronics in order to understand the electrical systems in automotives. Based on interviews conducted with lecturers related to learning basic electricity and electronics courses, there are still many students who do not understand the basics of electricity and electronics. This can be seen from the mid-semester exam scores which tend to be low so that lecturers carry out several remedial measures. Based on these problems, researchers wish to design an animated video of basic electricity concepts based on PowerPoint and AI. The aim of this research is to increase understanding and fulfill students' learning interests.

The use of animation-based powerpoint learning media can increase students' learning motivation on competency standards for creating and maintaining archives to ensure integrity in class X Office Administration based on student responses [11]. There is an increase in students' understanding of the material by using learning videos/animations and has great potential to increase students' learning motivation, involvement, creativity and personalized learning. However, it is important for educators and researchers to pay attention to good animation design as well as the role of educators in facilitating the effective use of animation [12].

The results of the research above show that by developing animation media, students can better understand the subject matter, therefore efforts are needed to increase learning understanding in basic electricity and electronics courses, one of which is through making learning videos. The learning video will be delivered directly by the lecturer, in collaboration with students, and according to previous research, a feasibility test will be carried out using the Macromedia Flash 8 application in basic electricity and electronics subjects. Experts and students were asked to answer the questionnaire. An examination of the validity and practicality of the media was carried out. The research results show that learning media is categorized as very useful and suitable for use. His research is entitled Designing Interactive Learning Media Basic Concepts of Electricity in Electrical and Electronics Courses. Judging from this research, the researcher intends to create learning media that is easier to use, namely by designing animated learning media based on PowerPoint and AI.

II. METHODS

This research uses the R&D (Research and Development) research method. Research and development (R&D) is a series of actions or stages taken to create new products or improve existing products so that they can be accounted for [13]. The research development process consists of 4 stages: (1) Define Stage: At this stage, analysis of the material, curriculum and student characteristics is carried out. This analysis was carried out to determine the reasons why the research was limited. (2) Design Stage: At this stage, a design or framework for the media to be developed is created, including flowcharts and storyboards. (3) Development Stage: At this stage, you need to create videos, program materials, and prepare supporting components. After the media we develop is complete, a validity test is carried out for teachers, tutors and students. (4) Dissemination Stage : This stage is completed by distributing learning material about vehicle body electricity through videos that have been developed for teachers and students [14].

This method uses a questionnaire to collect information about the level of validity of learning media. Questionnaires are an effective data collection method because they allow researchers to identify the variables to be measured as well as additional responses from participants. Questionnaires or questionnaires can be closed or open questions, and can be given directly to respondents or sent via the internet or post [15]. The data used to determine the suitability of learning media comes from students, material experts and media experts.

Researchers in this study used the Aiken V validity coefficient to analyze the results of expert assessments by formulating the V formula, which can be seen as follows [15]:

$$V = \Sigma\, S/\,[n(c-1)]$$

TABLE. I
MEDIA ELIGIBILITY CATEGORY

Mark	Eligibility Category
0.00 – 0.25	Not feasible
0.25 – 0.50	Not Worth It
0.50 – 0.75	Worthy
0.75 – 1.00	Very Worth It

Practicality data was obtained from a questionnaire given to lecturers and students regarding the model created. Practicality is seen from the product's ease of use and easy understanding. To measure the level of practicality of the media, the following formula can be used:

$$Practical\ value(\%) = \frac{(score\ obtained)}{(maximum\ score)} \times 100$$

Practicality is determined by descriptive statistical analysis through conversion from quantitative to qualitative data.

TABLE.II
MEDIA PRACTICALITY CATEGORY

Achievement Level	Category
75 – 100	Very Practical
50 – 75	Practical
25 – 50	Less Practical
0 – 25	Impractical

III. RESULT AND DISCUSSION

A. Definition Stage (Define)

Researchers will look for sources of problems, main issues, as well as analysis of needs. This stage was carried out by researchers at the Department of Automotive Engineering, Padang State University by conducting observations and personal interviews with the lecturers concerned. After

conducting observations and interviews, a problem was discovered, namely that there were still many students who did not understand the basics of electricity and electronics. This can be seen from the mid-semester exam scores which tend to be low so that lecturers carry out several remedial measures.

B. Design Stage (Design)

At the design stage, material preparation will be carried out. In preparing the material, we will first consult with the lecturers who teach electricity and electronics courses. In this step, the researcher designs animations and inserts them into the material that will be taught by the lecturer, so that students can more easily understand the material they are studying.

C. Development Stages (Development)

At this stage, media production will be carried out, validation by validators and if there is still something missing or improvements are needed, the media will be revised again. The following stages in development include:

1) Open the Microsoft PowerPoint application.

Fig. 1 Opening Steps

2) After opening Microsoft PowerPoint, then click blank presentation.

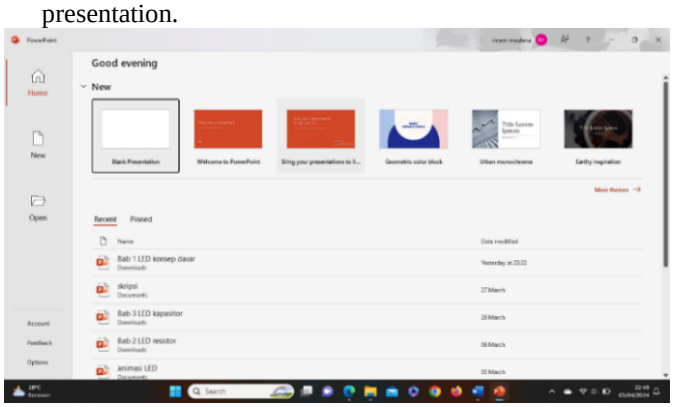

Fig. 2 Application Start Page

3) To make it look more attractive, we change the color then add shapes and images.

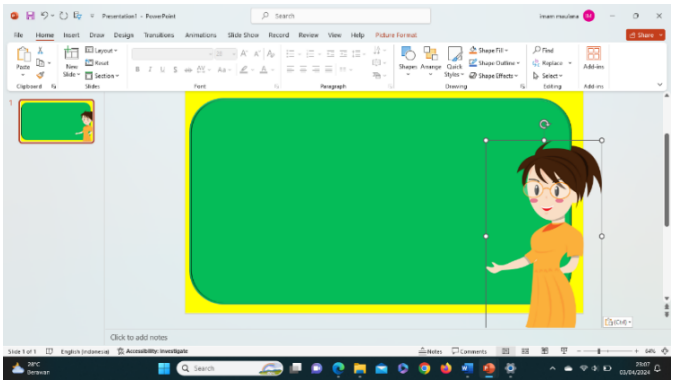

Fig. 3 Media Creation Process

4) After designing the background, next we design the material, one of which is about Ohm's law.

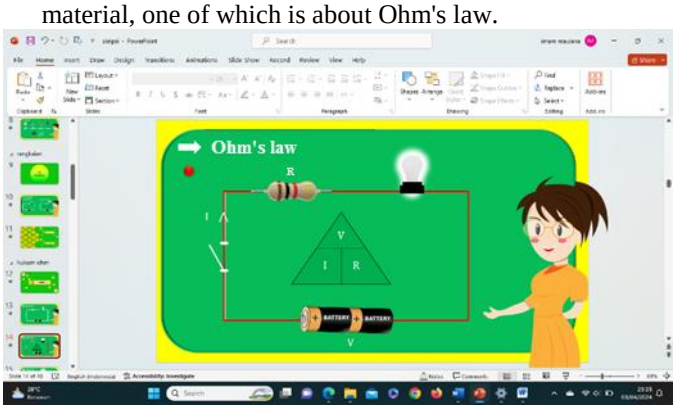

Fig. 4 Display of Learning Media

5) Then we add the animation to the animations feature.

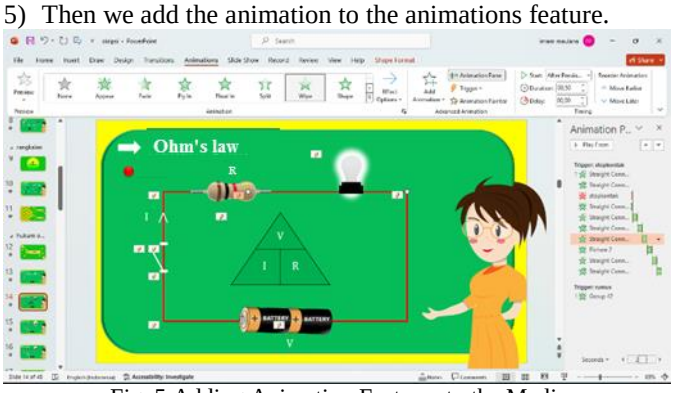

Fig. 5 Adding Animation Features to the Media

6) So that the animation we want can move if we press the button we created, we use the trigger feature.

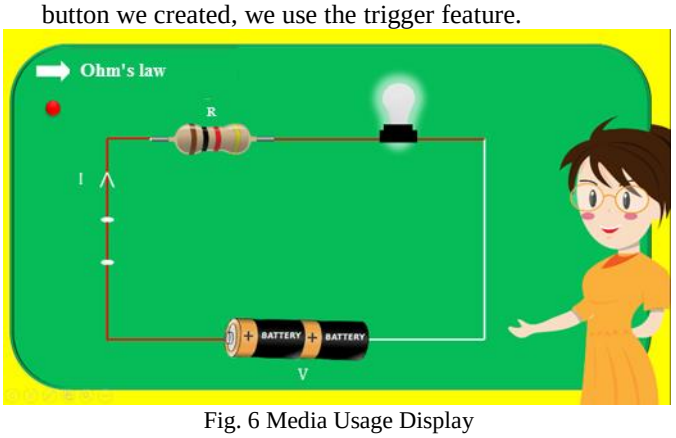

Fig. 6 Media Usage Display

7) After that, the animation is ready to use.

D. Validation Test

After the media has been produced, the next step is validation to find out whether the animated video is suitable for use or not. If not, revisions will be made to improve the media produced. There are several revisions which can be seen in the table below:

TABLE. III
VALIDATOR SUGGESTIONS

	Information
Validator	Making animated videos tailored to learning outcomes. To make it more interesting, animations are displayed such as pictures of people who seem to be teaching about the concept of electric current.
	Previously, the animated videos that had been made used symbols and images in one series, so they were deemed less interesting, therefore an animated video was made that separated the symbols and images. For example, in one series only the symbols are displayed, after that a picture version is also created.
	Changing the background color in the animation which is still considered less attractive
	Video is added, so this media can be in the form of video and can also be in the form of animated slides that can be interacted with
	Improved animation video script

From the table above, it can be concluded that after several revisions given by the validator to the media created, the final result of developing an animated video on basic electricity concepts based on PowerPoint and AI is already in the very feasible category. Therefore, this animated video is suitable to be applied to learning electrical concepts.

E. Practicality Test

At this stage, practicality tests were carried out on 98 students studying Basic Electrical and Electronics courses, Department of Automotive Engineering, Faculty of Engineering, Padang State University.

TABLE. IV
FEASIBILITY LEVEL RESULTS

Media	84.5%
Material	85.9%
Use	86.8%
Benefit	85.8%

The following figure shows the percentage of each component of the expert due diligence:

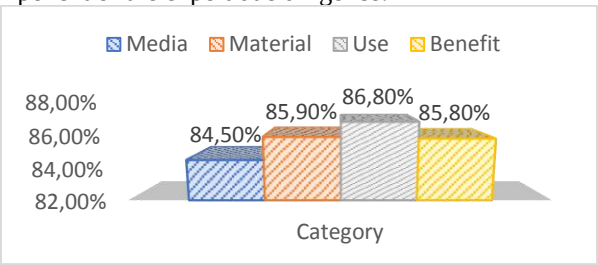

Fig. 7 Eligibility Percentage

Based on data obtained after distributing the practicality questionnaire, an average score of 86.01% was obtained in the very practical category.

F. Dissemination Stage (Disseminate)

At this stage, researchers will distribute the animation media that has been created to students through lecturers to use as a reference in learning basic electricity and electronics.

IV. CONCLUSION

Powerpoint and AI-based animated video learning media for basic electricity and electronics courses developed have been validated by validators in the very feasible category and from the practicality test results obtained from distributing questionnaires to 98 students, they obtained an average score of 86.01% in the very practical category.

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