JOVES (Journal of Vocational Education Studies)
VOL 5, No. 2, 2022, pp. 303-311
pISSN: 2614-7483 pISSN: 2614-7475 https://doi.org/10.12928/joves.v5i2.6997

Development of Basic Electrical Learning Video to Improve Student's Competencies

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ARTICLE INFO

Article history
Received Oct 25, 2022
Revised Nov 14, 2022
Accepted Dec 15, 2022

Keywords:
Learning video
Basic electrical
Learning media

ABSTRACT

In the digitalization era, the learning process has begun to use blended learning. Blended learning is carried out face-to-face directly or indirectly. Students are expected to be able to study independently. In basic electrical practice courses, students have difficulty learning independently. This study aims to develop learning videos to improve student competencies. The development model used is the ADDIE model. The stages of development carried out are Analyze, Design, Development, Implementation, and Evaluation. The feasibility test of the basic electrical learning video in terms of motivation is 90.29%, convenience is 88.50% and material is 86.75% The feasibility of basic electrical learning videos as learning media is included in the "very feasible" category. This learning media can be used to support the learning process of basic electrical practices.

Introduction

Yogyakarta State University (UNY) as an educational institution is committed to becoming a World Class University (WCU) in 2025, as stated in the UNY 2021 Strategic Plan. The curriculum is designed to ensure that each graduate has superior, creative, and innovative competencies based on piety, independence, and intelligence so that they can compete globally. All kinds of facilities, media, and learning instruments are provided optimally to support the process of learning activities. Learning is a process of transferring knowledge from teachers to students (Oemar. H, 2016). However, with the Covid 19 pandemic and now it is moving toward a new normal, learning activities have changed. Learning activities during the pandemic were carried out remotely using video conferencing. But now, in the new normal era, learning activities are directed in the form of blended learning. Blended learning is carried out by combining direct and indirect face-to-face (Castro, R, 2019). Zainuddin, Z., & Keumala, C. M, (2018), also explained that blended learning is carried out face-to-face and indirectly which is supported online. Of course, adjustments are needed both from the lecturer as a teacher and students in participating in

blended learning activities. Practical learning is carried out face-to-face, but it also requires students to study independently (heutagogy) outside of face-to-face hours. Heutagogy learning encourages students to study independently and seek sources of knowledge from various aspects (Moore, R. L., 2020). The obstacles that arise due to the pandemic and the new normal era make it difficult for students to achieve the competencies that have been set.

Based on observations in the basic electrical practice course, it was found that there were still many students who had difficulty using electrical measuring instruments. Basic Electrical Practice is a basic course that must be mastered by students of the Electrical Engineering Education Study Program. Competency in this course is a prerequisite for courses in the following semester. During the pandemic, practical learning was carried out using simulation software. At the beginning of the new normal era, students took part in blended practical learning. Students are also required to be able to learn independently (heutagogy). In this era of transition from normal, the pandemic to the new normal makes students unable to study optimally because they need adjustments. To overcome this, appropriate learning media is needed. Learning media is a means used to convey learning material (Damarwan, E. S., & Khairudin, M., 2017). Kusuma, W. M., Sudira, P., Hasibuan, M. A., & Daryono, R. W, (2021) explained that learning media has an important role in transferring information from teachers to students.

The author proposes to make a basic electrical practice learning video. Learning videos are live image recordings with the aim of conveying learning material so that students obtain learning objectives (Ario & Asra, 2019). Learning videos have a positive impact on student learning activities such as material demonstrations, motivation, tutorials, and time effectiveness (Agustini, K., & Ngarti, J. G, 2020). The choice of learning videos as an alternative solution is due to consideration of several factors including 1) class 2021 students are generation z which of course was born at the same time as the transformation of various technologies; 2) video has the advantage of being a guideline or demonstration example that can be paused, started, stopped, as desired so that the material can be more easily understood; 3) videos can help students when studying independently.

The basic electrical practice learning video focuses on discussing the use of an electric measuring instrument, namely a multimeter. This learning media consists of 3 videos covering: 1) an introduction to multimeter components and measuring resistance using a multimeter, 2) measuring DC voltage and current using a multimeter, and 3) measuring AC voltage using a multimeter. This learning video is integrated into UNY's Learning Management System (LMS), namely Besmart. The basic electrical practice course at LMS Besmart is supported by material in the form of lab sheets, learning videos, and power points. The author hopes that this learning media can be useful and contribute to the progress of the institution.

Method

The development of basic electrical learning videos to increase student competency is included in research and development (R&D). The carrying activity was carried out from 27 June to 29 July 2022. The purpose of this development research was to produce a product and find out the feasibility and response of users of the basic electrical practical learning video. This feasibility is reviewed from the material and media aspects as well as user responses. The development model used in this research is the ADDIE Approach. According to Robert M. Branch (2009), the ADDIE approach includes Analyzing, designing, developing, implementing, and evaluating. The research was conducted to produce a product in the form of learning videos that were integrated into LMS Besmart. A detailed research schematic drawing according to the ADDIE approach is shown in Figure 1 below.

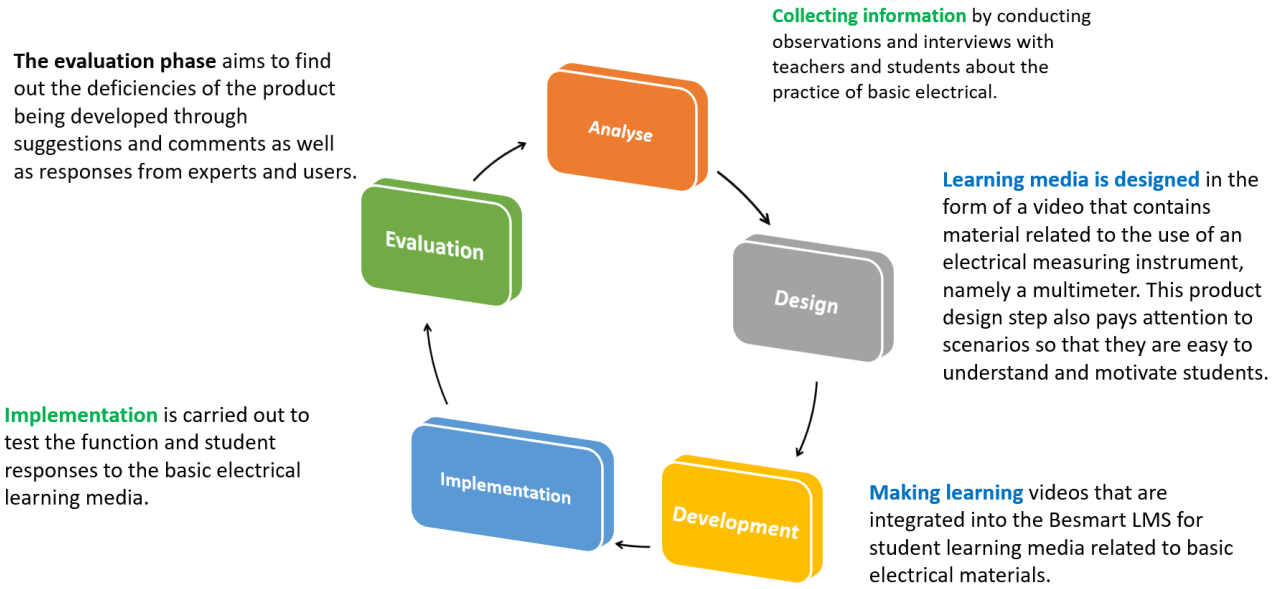

Fig 1: ADDIE Model

The steps taken based on the ADDIE approach are as follows:

1. Analyze

This stage is the stage of gathering information by conducting observations and interviews with teachers and students who follow basic electrical practices. Next, examine the charge on the basic electrical lesson plan.

2. Design

After doing the analysis the next stage is the design process. In this stage, the researcher makes a plan to be carried out after obtaining the observation data. This design process is focused on designing video scenarios that will be developed. Scenario videos are made by involving teachers and experts in the basic field of electrical. The video content plan to be developed is shown in Figure 2 below.

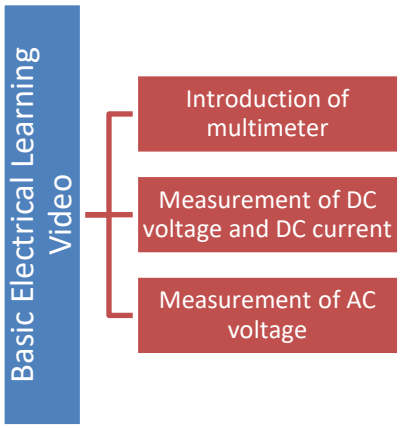

Fig 2: Video Content Scheme

3. Development

Development is the process of making or developing learning videos and validating them. This stage is a real stage in the development of basic electrical learning videos. The steps to develop in this study include preparing a video recorder, making videos, developing instruments, testing the feasibility of the instrument, testing the feasibility, and revising the video to get the results of the video revision. The videos that have been reviewed by media experts and the material are then declared appropriate by the experts so they are ready to be implemented.

4. Implementation

The implementation was carried out on students of the Electrical Engineering Education Study Program, Faculty Engineering UNY. The implementation was carried out to test students' responses to the LMS Be Smart integrated basic electrical learning video.

5. Evaluate

The evaluation stage aims to find out the shortcomings of the videos developed through suggestions and comments from experts and users. These deficiencies are used as material for analysis to carry out the process of redevelopment or refinement according to needs.

Result and Discussion

The analysis activity begins with identifying problems in the implementation of basic electrical practical learning. Look for differences between learning objectives and the reality of the learning process that has been implemented. Analyzing the urgency of whether or not the development of learning media is necessary and adapted to various supporting aspects of learning media. The results of the analysis show that: (1) there is no learning media that facilitates students in independent learning, especially related to basic electrical; (2) the need to increase the competence of students in the learning process of basic electrical practices. The next stage is

Design, which is the activity of designing learning media products that will be developed starting from scenario designs and also creating scenes according to scenarios.

The third stage of Develop is the stage used to realize the concepts that have been compiled in the design stage into learning videos that are ready to be implemented. At this stage, the researcher developed a basic electrical learning video that was integrated with the Be Smart LMS. The results of the development of a basic electrical learning video are shown in Figures 3, 4, 5, and 6 below.

Fig 3: Recording Video

Figure 3 shows the video recording process. The video is made based on a scenario that has been prepared. The video structure consists of opening, delivering learning objectives, delivering the theoretical basis, and finally demonstrating the use of a multimeter.

Fig 4: Editing Video

Figure 4 shows the video editing process. The recorded video is edited to meet the rules of learning media. The video editing process consists of sorting the video results recorded, adding music, and adding explanatory text to make it easy to understand.

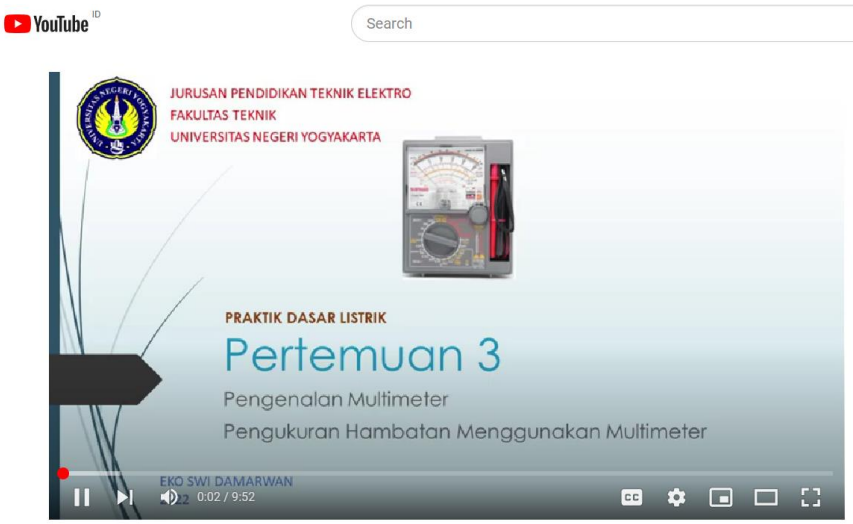

Fig 5: Screenshot of Learning Video

Fig 6: Learning Videos on Besmart

Figures 5 and 6 show the results of the basic electrical learning videos. Figure 5 shows screenshots of basic electrical learning videos. Figure 6 displays a linked learning video on Besmart. Basic electrical learning videos are used to help students learn independently related to basic electrical practice material. Through this learning video, students are expected to be able to increase their knowledge and skills.

Expert Validation Results and User Feasibility Test

After the video development is complete, the next step is to test the validity. The validity test is in terms of two aspects: media and material. The results media aspect validity test results include four things: benefit, appearance, duration, and visual communication. Test the validity of the material aspects includes two things, namely the suitability of the material and the quality of learning. The results of the media validity test are shown in Figure 7 below.

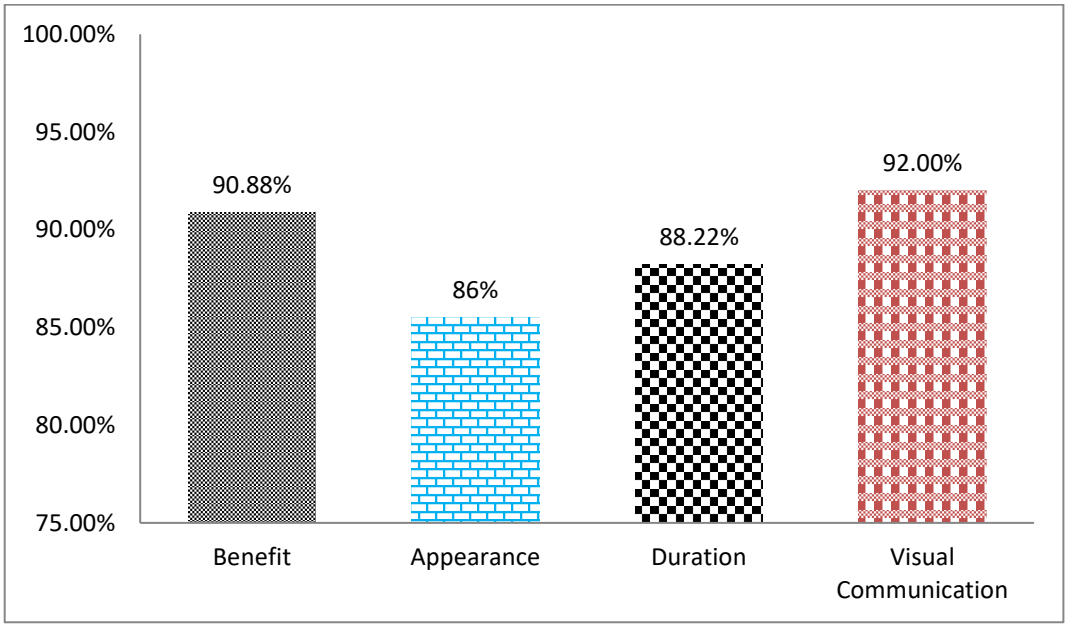

Fig 7: Media Expert Test Results

Based on Figure 7 it can be explained that the media aspect obtains a minimum value of 86% and a maximum value of 92.88%. This can be interpreted that the basic electrical learning video in terms of the media aspect is included in the "very feasible" category. The results of the material test are shown in Figure 8 below.

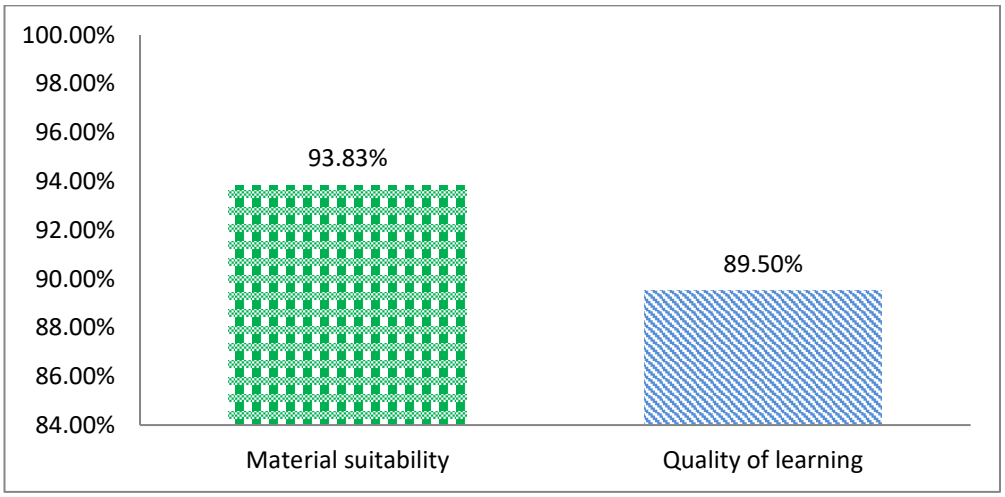

Fig 8: Material Expert Test Results

Based on Figure 8 it can be explained that the material aspect obtains a value of 93.83% on the suitability of the material. Meanwhile, the quality of learning obtained a value of 89.50%. So that it can be interpreted that the basic electrical learning video in terms of material aspects is

included in the "very feasible" category. The results of the validity test for both the media and material aspects of the basic electrical learning video are included in the "very feasible" category.

Next is the user feasibility test. The results of the feasibility test of learning videos from users are shown in Figure 9 below.

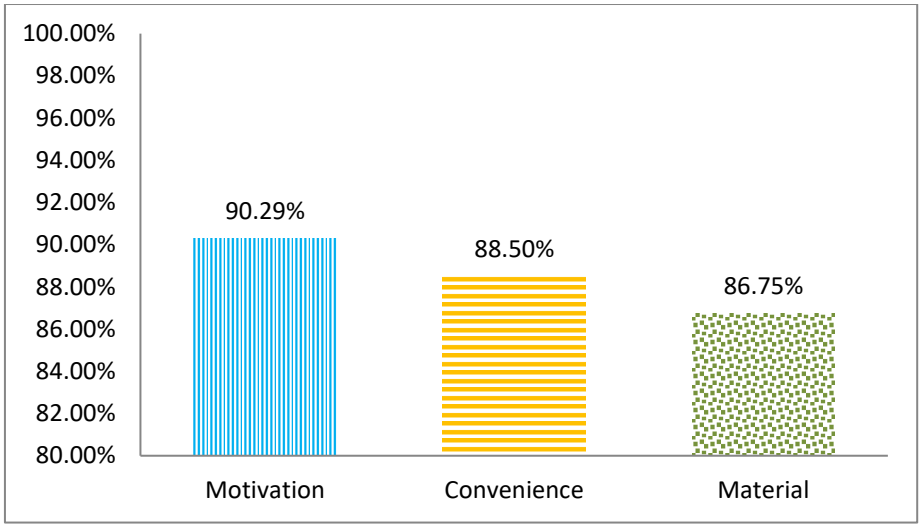

Fig 9: User feasibility test

Based on Figure 9 it can be explained that the feasibility test of the basic electrical learning video in terms of motivation is 90.29%, convenience is 88.50% and material is 86.75% or is included in the very feasible category.

Evaluations are the final stage. After implementation in real conditions, basic electrical videos are developed and evaluated to provide feedback on subsequent implementations. Learning videos are learning media that are precise and accurate in conveying messages and are very helpful for students' understanding. With learning videos, students will understand more about the material conveyed by educators through viewing an educational video that is played. Agreeing with that, Wahyuni, A., Utami, A. R., & Education, E, (2021) explain that the use of videos can improve students' ability to express opinions. Kafah, A. K. N., Nulhakim, L., & Pamungkas, A. S, (2020) also explained that the use of Powtoon-based video learning can help students understand learning material. Prasetyowati, D. (2020) explains that learning videos can help students learn. Based on this, the basic electrical learning video is considered appropriate to be used to assist the learning process in basic electrical practical courses.

Conclusion

Development of basic electrical learning videos using the ADDIE model. The purpose of developing this learning media is to overcome problems in the implementation of basic electrical practices. The stages of development carried out are Analyze, Design, Development, Implementation, and Evaluation. The feasibility test of the basic electrical learning video in terms

of motivation is 90.29%, convenience is 88.50% and material is 86.75%. The feasibility of basic electrical learning videos as learning media is included in the "very feasible" category. This learning media can be used to support the learning process of basic electrical practices.

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