

The Effectiveness of Infrared Censor Development as an Automatic Electric Switch in Households in the Leadership Project Course II

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1. Abstract

The aim of this study to determine the effectiveness of the development of Automatic Electric Switch teaching aids using infrared sensors in leadership project courses. This type of research is development research which refers to the 4-D model according to Thiagarajan. This research was piloted in class 005 G2 PPG UST. Data collection was carried out using observation techniques, interviews, and questionnaires. Data analysis used is descriptive statistics. The results of this study obtained several findings including: (1). Products in the form of visual aids and guides for electric circuit props Automatic Electric Switch; (2). The results of the feasibility of teaching aids products obtained an average value of 3.60 included in the Very Good category; (3). Student response to teaching aids and teaching aids Automatic Electric Switch overall 86.65% with very good category.

Keywords: effectiveness, automatic, infrared, household

2. Introduction

Advances in science and technology in this era are very fast and inevitable. Various elaborations and innovations emerged to advance the quality of education. This is indicated by the birth of various concepts and learning methods so that students become a center during the learning process. So that a teacher is very limited if he only provides knowledge

to students but also includes information management, creating a conducive learning environment, as well as developing learning innovations to accommodate student teaching and learning activities (Badjeber, 2020).

It is hoped that the world of education can adapt so that teaching activities are carried out interesting and in accordance with developments (Winingsih & Hidayati, 2017). As the basis of natural science, physics has a function that influences the progress of science and technology. One of the most important factors when acquiring more knowledge through learning is the role played by learning resources (Fajra, 2020). Learning is very broad, the use of learning resources in the form of printed materials is only one aspect of learning (Dale, 1954). Knowledge that exists in humans is absorbed through the five senses. This is in accordance with Edgar Dale's concept of the cone of experience, the greater the use of the five senses to absorb something, the more understanding or knowledge is obtained (Dale, 1954).

Often students find it difficult to learn physics because the material is broad and complicated. Choosing the right learning model is learning that actively involves students is one way to overcome one of the weaknesses of learning physics (Syamsidar, 2018). Activity experiment as a way to develop student skills is still low in several schools (Nurfadilah, 2019). Besides that, practicum activities are also an important decision as a center in delegating ways of thinking and activities to obtain data in the discovery process.

3. Methods

The research method used in this study is research and development (research and development). The research and development used is the development of 4D models. The

4D development model consists of four main stages, namely: Define, Design, Develop and Disseminate (Thiagarajan, 1974).

In this study the data collection techniques used included observation, interviews, and questionnaires. The questionnaire used in this study included validation questionnaires and student response questionnaires. The feasibility test of the props used a validation instrument by three validators consisting of two physics lecturers and one physics teacher as examiners. Student response tests were used to measure student responses to teaching aids and their guides to 29 class students 005 G2 PPG UST. In this study used descriptive statistical data analysis techniques. This descriptive statistical analysis was carried out by changing the average score obtained into a qualitative criterion value using a Likert scale (Widoyoko, 2012).

4. Results and Discussion

Defining Stage

The effectiveness of developing teaching aids and teaching aids for electric circuits Automatic Electric Switches based on infrared sensors is carried out by defining the role of selecting and interpreting needs when the learning process also accumulates various data related to the product to be developed. From the definition stage through observation and interviews, information was obtained that in the physics laboratory there were several problems such as some practicum equipment that was still incomplete and some tools were damaged so that they were not suitable for conducting practicum, and there were no innovative and newest physics teaching aids that could be nailing student attention during the learning process.

Design Stage

Furthermore, after the defining stage, it enters the design stage to create a media design that will be developed. Making the design of this teaching aid is very simple by using infrared sensors, lights, and wattmeters so that the teaching aids are easy to understand and easy to use in supporting the learning process, and for teaching aids guidelines designed using A4 paper with writing sizes adjusting the appearance and design used in the teaching aids guide display. This teaching aids guide is composed of the front cover of the props guide, introductory page, preface, table of contents, list of pictures, core competencies and basic competencies, experimental objectives, basic theory, tools and materials, how to assemble, how to use, lamp application, questions understanding, bibliography, and author profile.

Development Stage

Teaching aids and teaching aids guides can be concluded as feasible to be used as physics learning materials in schools based on the results of validation by the three validators. The average result of the validation score for each component of the three validators listed in **Table 1** demonstrate the feasibility of this prop.

Table 1. The average result of the validation percentage of props for each component

Component	STS (%)	TS (%)	S (%)	SS (%)
Content quality	0	0	11	89
Execution	0	0	44	56
Display props	0	0	44	56
Ease of use	0	0	33	67
Average percentage	0	0	33	67

The feasibility of teaching aids guides can be assessed from the results of the percentage validation guide for each component of the validator in the validation guide props in Table 2.

Table 2. The average result of the validation percentage of the props guide for each component

Component	STS (%)	TS (%)	S (%)	SS (%)
Content quality	0	0	33	67
Execution	0	0	44	56
Display props guide	0	0	78	22
Average percentage	0	0	52	48

Sourced from the results of a limited trial of PPG class 0045 G2 students which was carried out with 29 participants, the average percentage results of student response questionnaires to teaching aids and teaching aids guides made using a Likert scale are as follows: 0% Strongly Disagree (STS) , 3% Disagree (TS), 43% Agree (S) and 54% Strongly Agree (SS). Then from these data the overall percentage results obtained from student responses to the teaching aids and teaching aids guide stated a percentage of 86.65% so that this percentage was included in the very good category.

5. Conclusion

The effectiveness of the development of an infrared sensor-based Automatic Electric Switch teaching aid along with its guidelines obtained a feasibility assessment with very good criteria. As well as student responses obtained by the assessment of responses with

the category of strongly agree so that it can be concluded that this teaching aid is appropriate as one of the teaching materials for learning project leadership.

6. References

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