

Interactive learning multimedia based on Information Communications Technologies (ICT) in analyzing electrical circuits

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Abstract

Learning to Analyze Electric Circuit held at Public vocational high school 1 Pariaman, teachers still using conventional learning model with whiteboard and markers, this medium was only able to present the instructional in the one direction. It doesn't challenge students to understand instructionally well, so instructional goals not reached optimal. To overcome this, it needs to be developed that makes students learn interactively and independent. In the form of interactive learning multimedia based on ICT valid, practical and effective. This is Research and Development, with the 4D model that is Define, Design, Develop and Disseminate. Based on the research results obtained data validity of the validator, 1st validator 88.33%, 2nd validator 93.33%, and 3rd 88.33%, overall is valid. Test practicalities by teacher 80.31%, and student 87.50%, overall is practical. The effectiveness test result is 91.89% with practical category. This research has resulted in Information Communications Technologies media is valid, practical and effective.

Keywords: interactive multimedia, ICT media, research and development



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Introduction

Subjects Analyze Electric Circuits is one of the productive subjects given to the students of X Electric Power Installation Study Program in Public vocational high school 1 Pariaman. Learning to Analyze Electrical Circuits has a high degree of abstraction, such as analyzing the magnetism sequence, which explains the process of magnetism, so it is difficult to understand if using only ordinary lecture and presentation models causes passive students in the learning process.

Low level of student understanding and value of abstraction in subjects Analyze High Electric Circuits will make it difficult for students to understand what is delivered by the teacher. Differences in perceptions between teachers and students on the learning that is delivered leads to the goal of learning is not achieved optimally so that the impact on student learning outcomes.

To overcome these problems should teachers use learning media that can optimize the learning activities of students so that overall students get the opportunity to seek knowledge and solve problems or obstacles that exist in learning to analyze the series of magnetism. The right learning

media used is interactive multimedia learning based on Information Communication and Technology. When interactive multimedia learning is selected, developed and used appropriately and well, it will benefit the learning process more interesting, more interactive, the amount of teaching time can be reduced, the quality of student learning can be improved, and the learning process can be done anywhere and anytime, as well as student attitudes can be improved (Daryanto, 2016: 70)

The objective of this research is to produce Interactive Learning Multimedia Based On Information Communications Technologies (ICT) which is valid and practical and know the validity and practicality of Interactive Learning Multimedia Based On Information Communications Technologies On instructional Analyzing Electrical Circuits.

Method

In accordance with the problems studied, then this type of research is research development (Research and Development / RD). Research development approach (Research Development) is a research approach with the 4D model that is Define, Design, Develop and Disseminate. The 4-D development model has four stages in its development, that is phase 1 define, phase 2 design, phase 3 develop, and phase 4 dissemination (Trianto, 2012: 93).

Research procedure:

1. Phase Define aims to find aims to find out the problems at school, analyze the curriculum, analyze the concept, and how the characteristics of students, so that the media developed in accordance with learning objectives.
2. Phase Design Begin by creating test standards, selecting the right media, selecting media formats, and creating media prototypes.
3. Phase Develop produces the final form of the product, which is developed after a revision based on expert input and test results data. so as to produce valid, practical and effective test of Interactive Multimedia Learning Based Information Communication Technology (ICT).
4. Phase Disseminate, Interactive Multimedia Learning Based Information Communication Technology (ICT) is valid, practical, and effective promotion to be accepted and used by students.

Subject of Research

The subjects of research interactive multimedia Learning Based Information Communication Technology (ICT) is 37 students of class X Technical Installation of Electric Power Public vocational high school 1 Pariaman and one Analyze Electric Circuits subject teacher as respondent.

Results and Discussion

1. Define

Analysis front end (curriculum analysis)

The curriculum requirement analysis is intended to determine the materials that will be developed in the learning media. This stage begins by analyzing the Competency Standards and Basic Competencies. In this study, the Competency Standards selected for the development of interactive multimedia learning is to Analyze Electrical Circuits on the basic competencies of analyzing the magnetization chain. For more details can be seen in table 1.

Table 1. Learning Materials

Basic Competence	Learning Materials	Design in Interactive Media
Analyzing Electrical Circuits	1. Electromagnetic Concepts	1. Material in text form
	2. The laws of Magnetism	2. Video and pictures of various types of magnets.
		3. Animation of magnetic properties
		4. About practice and evaluation

Analisis Siswa

Student analysis done on student class X Power Installation Technique 3 Public vocational high school 1 Pariaman with average age of teen years, can be led to learn independently. Students also prefer to learn to use computers to enhance students' experience.

Analisis Tugas

In basic competence Analyze electrical circuits there are indicators that are electromagnetic concepts explained based on electromagnetic induction, the process of magnetism and various magnetism laws formulated based on the influence of currents on the magnet. The material about the concept of electromagnetism and the law of magnetism is a material that is abstract and difficult to understand by students.

2. Desain

Pemilihan Media

Based on the phase define, the right media to be developed in analyzing the electrical circuit is Interactive Multimedia Learning Based Information Communication Technology (ICT).

Pemilihan Format

The format of media development should be interesting and interactive packaged in the form of a compact disc with the form of a file in it is berekstensi. Exe or shaped an application. this file does not need to be installed because it can be directly opened and without having to use any additional software.

Prototype

Making interactive multimedia learning is done after the prototype is done. The initial design is the design of interactive learning multimedia designed including Intro Pages, Home Page, Competency Page, Page of Material, Simulation Page, Exercise Page, Evaluation page, and Reference. At this stage, researchers also make an instrument to the interactive learning module in the form of a student response questionnaire and validation sheet.

3. Develop

Validity

After Interactive Multimedia Learning Based Information Communication Technology (ICT) is validated by the validator, the validity data is analyzed using the following formula:

$$V = \frac{\sum S}{n(c - 1)} \times 100 \%$$

Source: Ridwan, 2012:21

Information:

$\sum S$: Scores gained

$n(c-1)$: Maximum Score

V : Validation Value

By validity criterion if $V \geq 0,60$ then declared valid, and if $V < 0,60$ then stated invalid. Based on data analysis from validator 1, 2 and 3 it can be concluded that the developed interactive multimedia is categorized as Valid. Recapitulation of results data as in table 2:

Tabel 2. Multimedia Validity Interactive Learning

No	Sub Item	Validator			$\sum S$	$N (c-1)$	V	Information
		1	2	3				
1	a	4	4	4	9	9	1	Valid
	b	3	3	4	7	9	0.78	Valid
	c	3	4	3	7	9	0.78	Valid
	d	3	4	3	7	9	0.78	Valid
	e	3	3	4	7	9	0.78	Valid
2	a	4	3	4	8	9	0.89	Valid
	b	4	4	3	8	9	0.89	Valid
	c	3	4	4	8	9	0.89	Valid
	d	4	4	4	9	9	1	Valid
	e	3	4	3	7	9	0.78	Valid
3	a	4	4	3	8	9	0.89	Valid
	b	4	4	4	9	9	1	Valid
	c	3	4	4	8	9	0.89	Valid
	d	4	3	3	7	9	0.78	Valid
	e	4	4	3	8	9	0.89	Valid

Practicality

The practice of interactive multimedia learning is derived from the responses of subject matter teachers and student respondents. The result of Praktikalitas obtained from subject teachers is 87.50% is categorized very practical. The result of practicality obtained from 37 students as interactive multimedia learning respondents in general can be categorized practical with percentage of 80,31%. Where of the 37 students 78.37% expressed in very practical categories, 18.93% is expressed in the practical category, and 2.7% expressed in fairly practical categories.

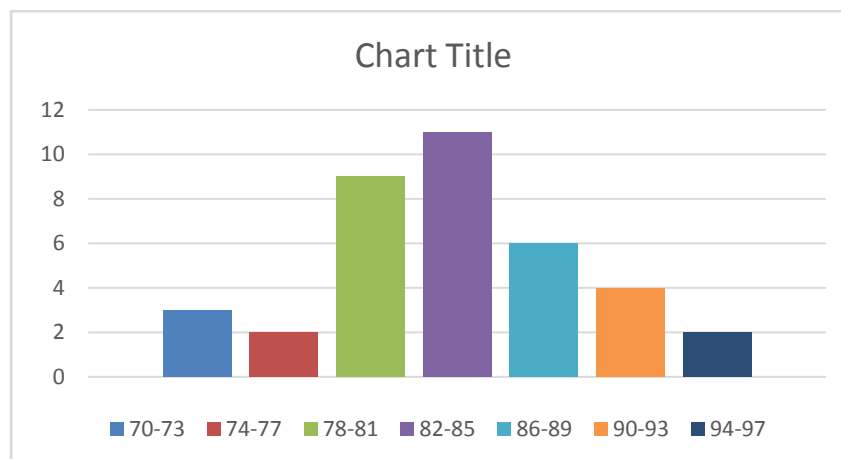
Efektiveness

Effectiveness of interactive multimedia learning is obtained from the results of students who have been using the multimedia mastery. Students who have used interactive learning multimedia is the students of class X Electric Power Installation Technique 3 Public vocational high school 1 pariaman with the results obtained obtained by 91% 89% of 37 students. This means that classical completeness exceeds 85% of the standard set by the Education Unit Curriculum. Student learning outcomes after using interactive multimedia learning as a test of effectiveness can be seen in the following table 3.

Tabel3 . Distribusi Frekuensi Uji Efektivitas

No	interval nilai	Frekuensi	Frekuensi Relatif	Frekuensi Komulatif
1	70-73	3	5,56	2
2	74-77	2	5,56	5
3	78-81	9	25,00	14
4	82-85	11	30,56	25
5	86-89	6	16,67	31
6	90-93	4	11,11	35
7	94-97	2	5,56	37
Jumlah	37	100		
Rata-rata	83,40			

From the table it has been shown that students' learning outcomes after using interactive multimedia learning are much above average. For more details can be seen in graph 1 below



Gragh 1.Student Efektifitas Test Results.

From the above exposure it can be concluded that interactive multimedia learning talah developed an effective multimedia to be used as one of the learning media on the subjects Meenganalisis Circuit of Electricity.

4. Disseminate

Interactive Multimedia Learning Based Information Communication Technology (ICT) which have been developed are valid, practical and effective then the media is worth to be disseminated. The stage of dissemination is done by disseminating interactive multimedia learning to the students of class X Electric Power Installation 3 and teachers in Electrical Power Installation Engineering Public vocational high school 1 Pariaman. Multimedia interactive learning is disseminated in the form of interactive multimedia Compact Disk.

Conclusions

Based on the research that has been done, it can be concluded that the development research conducted to produce an Interactive Multimedia Learning product for subjects Analyze the Electric Circuit. With details of Interactive Learning Multimedia development as follows.

1. The results of interactive multimedia validation validation obtained from three validator with validator details 1 of 88.33%, validator 2 of 93.33% and validator 3 of 88.33%. thus it is concluded that the developed medium is valid.
2. The result of the interactive multimedia learning practice test is obtained with the practical level of students is 80.31% in the practical category and from the teachers of 87.50% in the very practical category. Thus concluded interactive multimedia learning that has been developed otherwise practical.
3. The effectiveness of the use of interactive multimedia learning obtained from students' classical completeness level of 91.89% so that interactive multimedia learning developed has been effective for use in the learning process.

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References

- Abdul Majid. (2011). *Perencanaan Pembelajaran Mengembangkan Standar Kompetensi Guru*. Bandung: PT. Remaja Rosdakarya.
- Daryanto. (2016). *Media Pembelajaran*. Yogyakarta: Gava Media.
- Depdiknas. (2008). *Pengembangan Bahan Ajar*. Sosialisasi KTSP 2008. Jakarta: Departemen Pendidikan Nasional.
- Mohamad Ali. (2010). *Metodologi dan Apilikasi Riset Pendidikan*. Bandung: Pustaka Cendikia Utama.
- Riduwan. (2012). *Variabel-Variabel Penelitian*. Bandung: Alfabeta.
- Sugiyono. (2010). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta.
- Saifudin Aswar. (2015). *Reabilitas dan validitas*. Yogyakarta : Pustaka Pelajar
- Suharsimi Arikunto. (2013). *Dasar-dasar evaluasi pendidikan*. Jakarta: Bumi Aksara.
- Sukardi.(2008). *Evaluasi Pendidikan: Prinsip dan Operasionalnya*. Jakarta: Bumi Aksara.
- Trianto. (2012). *Model Pembelajaran Terpadu Konsep, Strategi, dan Implementasinya dalam Kurikulum Tingkat Satuan Pendidikan (KTSP)*. Jakarta: PT Bumi Aksara.