

The validity of interactive instructional media on electrical circuits at vocational high school and technology

S. Sukardi, D. Puyada, R.E. Wulansari, & D.T.P Yanto
Universitas Negeri Padang, Indonesia

ABSTRACT: Media was everything about something that could be used to deliver a message from sender to receiver, so that it can stimulate mindset, treatment, feeling and the student interest that make the learning process was happened. It can influence the aim of learning that will be achieved. Based on observation, the researcher found that lack of innovative of instructional media, so that teacher had not found the way to teach about material beside with lecture method and notes. These phenomena can bring negative effect for student, so that the student must reply the material, and spend all time which should be used to discuss about next material that be able to improve student's knowledge. It makes students do not active in the learning process. This research aimed at develop interactive instructional media on Electrical Circuits at Grade X of Electrical Engineering. The model in this research was 4D (four-D) model that was developed by S. Thiagarajan et al. There were four steps: define, design, develop, disseminate. Validity was used with instrument of validity that had been validated. The result was obtained from this research are follows: (1) The validity of interactive learning media that was expressed valid for the validation of the content with total value were 0,89 and 0,91 with category of valid was very high, and value of validation of the design were 0,90 and 0,88 with category of valid was very high. So that, it was concluded that interactive instructional media for Electrical Circuits was valid to be used as a learning media.

1 INTRODUCTION

The quality of education needs to be improved with the renewal of education. One way is through improving the quality of learning that is by updating the approach or increasing the relevance of the method of teaching, the selection of methods and the appropriate learning media can support the material delivered to the students well. The importance of media that helps learning has begun to be felt by teachers and students. The management of teaching aids is much needed. One of the good learning media that is using interactive media. Learning media can be presented in textual, animation, video, and images. The combination of the presentation is expected to be more motivated students and feel not quickly bored.

Learning media is one component of learning that can help teachers in the learning process. The use of media should be the part that should receive the attention of the teacher/facilitator in every learning activity. Therefore, teachers/ facilitators need to learn how to establish learning media in order to

streamline the achievement of learning objectives in the learning process.

According to Sudjana (2008) learning methods using the media in learning is crucial to get success in the learning process. Selection of appropriate media will affect to the changes in teaching and learning orientation from teachers as a source of information toward the orientation of learning students actively seeking information from various media.

According to Djamarah (1997) in the process of teaching and learning media presence has a significant meaning. The vagueness of the material presented can be helped by presenting the media as an intermediary. The complexity of materials to be presented to the students can be simplified with the assistance of the media. The media can represent what the teacher has not submitted yet through certain words or sentences. Even material abundance can be concretized by the presence of media. Thus, students easier to understand and master the material than without the helping of media.

Media according to Ansyar (2011) is a tool or device that serves as an intermediary or channel in

the communication process between communicator and communicant. According to Seokidjo (2009) media also called props that help the process demonstrate something. So that, from the definition of media above, it can be said that the media as a liaison between the source of information to the recipient of information, the acceptance of such information will be understood if the recipient and the source is in the area of the same experience and knowledge. Messages that exist in a media can be understood by the recipient. Rusman (2011) argues that the learning media is a messenger technology that can be used for learning purposes, learning media is a physical means to deliver learning materials, learning media is a means of communication in the form of print and view by including hardware technology.

Computers are teaching aids that can provide interesting illustrations, graphics and animations. Computers are expected to be an alternative medium for streamlining learning because applications in computers are able to present a comfortable learning environment and the possibility of getting a positive response of students is large enough. In fact, the use of computer-based instructional media in schools is not in line with the development and advancement of information technology that can be used to support the delivery of instructional media. Submission of materials that require media, if delivered without the media will make students quickly bored in the learning process.

Based on the observations at a vocational high school in Lubuk Basung, Indonesia, among others; Limitations in the procurement of instructional media so that teachers have not found the right way in the presentation of material that cannot be presented with lecture and record methods. This phenomenon brings negative impacts to the students, so students have to repeat the material, also spend the time that should be used for discussion of the next material that can increase students' knowledge, and cause the students not active in learning because more activities to hear it.

Limitations of time in the delivery of the material in more depth so that the material is not entirely can be delivered to the students and the minimum means of supporting learning such as not optimal use of learning media causes less effective understanding of students on learning materials. The use of textbooks is limited due to the insufficient availability of textbooks and old editions, so that students do not have the latest books, especially in the field of instructional media.

The use of media that has not been maximal in learning, the use of existing learning media does not

support teaching materials, media power point used by teachers in the learning process as an additional media in learning in the classroom and self-learning of students. However, the media used has a drawback that only contains learning materials without supporting animation and exercises/quizzes in it so that the lack of student interaction in learning.

The learning process in the participated school is still done conventionally, where the learning process is still focused on the teacher, this is why the students are less motivated to find their own new things that can be used as experience in the learning process. This is resulted in less interesting and less optimal learning. Thus the learning process becomes impeded and effect on the value of student learning outcomes.

There are many basic competencies in electrical circuit subjects, one of which is described as the Concept of Electricity Circuits. Basic Competence Describe the concept of Electricity Circuit is a basic competence that must be understood by the students, so that students can more easily understand the basic competence then, then made an interactive learning media that contains animations. Then on the basic competence if only explained by the lecture method alone, then the students will not easily understand abstract concepts, for that it is necessary to made an interactive learning media that contains abstract animations from the basic competence.

There are so much instructional media that had been developed, such as development of Computer Assisted Instruction (CAI) for English (Keengwe 2012) and CAI for maths (Hawkins 2016). The interactive instructional media have abstract materials content that is animated, so that students can understand the abstract materials easily with interactive instructional media.

The use of Lectora software is expected to make the media of this Research Development is to see the validity of the interactive learning media in the learning of Electric Circuits, which can support the learning needs of students in improving the learning outcomes. Interactive learning so that the material can be responded positively responded by the students. Aim.

2 METHOD

This research is a Research and Development. In research aims to produce a product in the form of a valid learning media using software Lectora Inspire. According Sugiyono (2008 p. 297), "development research is the research used to produce a specific product and test the effectiveness of the product".

According to Putra (2012), research and development method is a deliberate, systematic research aimed at finding findings, formulating, improving, developing, producing, testing the effectiveness of products, models, methods/strategies/ Services, certain procedures that are superior, new, effective, efficient, productive, and meaningful.

This learning media development procedure uses 4-D (four-D) development model. The development process consists of 4 stages: (1) define (determination of material); design; (3) develop; (4) disseminate (Trianto 2009).

Test validity is in the third stage, namely the stage of development. After the prototype is finished, then the development stage is done. This stage aims to produce products that are valid, practical and effective test.

The validation process is accompanied by a discussion or direct interview with the expert on the improvement that must be done by the design of interactive learning media Electrical Circuits is consulted first to the experts and supervisor, then the design is assessed by the people who are competent (validator) who has understood the principle module development.

2.1 Questionnaire validity

The validation sheet contains some judgments and responses to the materials in the Basic Competency of "Describing Electric Circuit Concepts" consisting of material conformity to interactive media with the syllabus of the Grade X Electrical Circuit.

The instrument is a validation sheet used to obtain data on the level of validity of learning media developed. The questionnaire is submitted to a material expert and media expert or validator after completion of the design. Questionnaire validation contains responses and assessments (by expert in learning media) to the display interface, the composition of the display color, clarity, animation, video and sound effects of interactive learning media.

2.2 Validity analysis

The validator's assessment of each statement is analyzed using Aiken's V. So that for the range $\geq 0,6$ can be interpreted as a fairly high coefficient, so it can be categorized that the category of validity is in "valid" category. If the validity value is less than 0,6 then the media is declared invalid. The formula submitted by Aiken is as follows (Azwar 2014).

$$V = \sum s / [n (c-1)]$$

Where, $s = r - l_0$

l_0 = the lowest validity score (e.g., 1)

c = highest validity score (e.g., 5)

r = number given by the assessor

3 RESULT AND DISCUSSION

The interactive instructional media that developed is the instructional media that change abstract materials become animation, because there are so much abstract material concepts on Electrical Circuits course, so that the interactive instructional media is hoped can help students to understand the abstract materials.

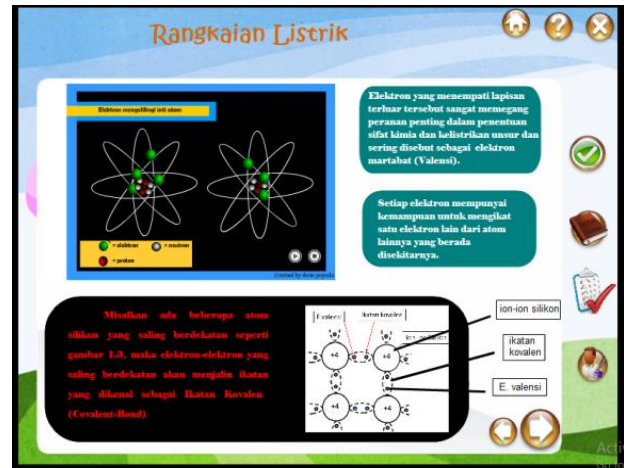


Figure 1. Animation of atom

Stage of media validation test conducted for interactive learning media developed can be known feasibility based on the assessment of material experts and media experts. The purpose of validation activities in this research is to obtain valid status from the experts. Validation test data is obtained through a validation instrument that is filled by several validators who are experts of instructional media and learning material experts. The result of input from the expert is made into revision material. Here is the questionnaire data analysis from the test results of expert validation.

3.1 Material validation

Validation of the material is done by two experts in the subject matter of Electricity Circuit. The purpose of material expert validation is to know the accuracy and conformity of the content aspects of the developed product whether it is in accordance with the needs of learning. The validation assessment data is obtained after the validator provides an assessment of the learning materials present in the interactive media. After that, the data is calculated validity value, the result of the validity of the material can be seen in the table below.

Table 1. Result of Media Material Validation

Aspects of Validation	Average of Aiken's V I	Cate gory	Average of Aiken's V II	Cate gory
Quality Content				
Quality of Learning	0,83	Valid	0,89	Valid
Quality Interaction				
Display Quality				

3.2 Media validation

Media validation is a validation of the resulting product design. Media validation is performed by two expert media validators. Media validation has three aspects of requirements, namely didactic requirements, construction requirements and technical requirements. Media validation is done twice.

After doing the first validation, the researcher must revise this interactive learning media based on the suggestion given by the media expert validator, after that the researcher can do the second validation to the validator of media expert. Then the validator will re-assess the interactive learning media and assessment of the validator. The result of the validation of media validation by the validator can be seen in the table below.

Table 2. Content Validation Validation Results

No	Aspect of Validation	Average of Aiken's V I	Cate- gory	Average of Aiken's V II	Cate- gory
1	Didactic requirement				
2	Construction requirement	0,84	Valid	0,89	Valid
3	Technical requirement				

Before performing a second validation, the researcher must make a revision in accordance with the suggestions of improvements that have been given by the expert media validator. The suggestions and feedback from the validators of interactive learning media are presented in the table below.

Table 3. Revised Interactive Media Instruction List by Media Experts

No	Before Revision	After Revision
1.	The use of buttons on the application must be clear function	Function button on the application has been clarified
2.	Evaluation must be interactive (wrong answers can be explained by the system)	The wrong answer has been explained by the system
3.	The problem should be randomized to the number of the problem and the option answer must also be tracked.	The problem has been randomized by making the problem in two types
4.	Fixed the statement sentence sent	The incorrect statement sentence has been fixed

Based on the data in the table above, it can be concluded that the interactive learning media on the subjects of Electric Circuits, especially on the basic competence describe the concept of electrical circuits is a "Valid" media.

4 CONCLUSION

The development result of this research is the product of interactive learning media on the subjects of Electricity Circle on Basic Competence Describe Electric Circuit Concept. The process of developing the interactive learning media refers to the 4-D development model of Define, Design, Develop, and Disseminate. The subject of this interactive media development trials were the students of Grade X of the participated school. After the development phase is completed and the interactive learning media developed has been declared valid, then the interactive learning media is ready to be tested.

5 REFERENCES

- Ansyar, R. 2011. *Kreatif mengembangkan media pembelajaran* [Creative to develop instrcutional media]. Jakarta: Gaung Persada.
- Djamarah, S.B. 1997. *Strategi belajar mengajar* [Strategy of learn and teach]. Jakarta: Rineka Cipta.
- Putra, N. 2012. *Research & development, penelitian dan pengembangan: suatu pengantar* [Research & development: an introduction]. Jakarta: Raja Grafindo Persada.
- Rusman, R. 2011. *Pembelajaran berbasis teknologi informasi dan komunikasi* [The learning based information and communication technology]. Jakarta: Rajawali Pers.
- Soekidjo, S. 2009. *Media pendidikan, pengertian, pengembangan, dan pemanfaatannya* [Education, definition, development, and utilization]. Jakarta: Rajawali Press.
- Sudjana, N. 2008. *Penilaian hasil proses belajar mengajar* [The result assessment of learn and teach process]. Bandung: Remaja Rosdakarya.
- Sugiyono, S. 2008. *Metode penelitian pendekatan kualitatif, kuantitatif dan R&D* [Research method of qualitative, quantitative and R&D]. Bandung: Alfabeta.
- Trianto, T. 2009. *Mendesain model pembelajaran inovatif progresif* [Design of progressive innovative instructional model]. Jakarta: Kencana.
- Hawkins, RO. 2016. Using computer-assisted instruction to build math fact fluency: an implementation guide. *Intervention in School and Clinic* 52(3): 141-147.
- Keengwe, J. 2012. Using computer-assisted instruction to enhance achievement of English learners. *Education Information Technology* 19(2): 295-306.