E-Module Development on 3D Pageflip Professional Based Straight Motion Material

Evi Ramna Farni[1], Annisa Rahi[2]
[1]SMAN 10 Kota Jambi, Jambi, Indonesia
[2]SMKN 1 Padang Laweh, Dharmasraya, Indonesia
Corresponding author email: eviramnafarni22@gmail.com

Info Article	Abstract
	The research aims to produce a Discovery Learning-based electronic module on rectilinear motion material for class X SMA that is valid and feasible and to determine students' perceptions of the module developed. The model used is the ADDIE development model (analyze, design, develop, implement and evaluate). The test subjects were class X MIA 4 SMA Negeri 10 Jambi City. The instruments used were student needs analysis questionnaires, observation documents, expert validation questionnaires and student perception questionnaires. Data analysis techniques in the form of validation questionnaire scores and student perception questionnaires were carried out using descriptive statistics. Meanwhile, analysis of data from observations and validator suggestions was carried out in a qualitative descriptive manner. The results showed that students' perceptions of the module cover design were 13.89 (very good), the module content was 21.69 (very good), the module software was 12.91 (good), the module presentation was 3.23 (good), and the language component was 13. .37 (excellent). From these four aspects it can be concluded that the Electronic Module Based on Discovery Learning in Straight Motion for class X SMA is suitable for use in the good category. Keywords: 3D pageflip professional; Discovery learning; Electronic modules

INTRODUCTION

The development of information technology has entered various aspects of life, including the world of education. The development of science and technology increasingly encourages reform efforts in the use of technological results in the teaching and learning process. Utilization of communication technology for educational activities, educational technology and educational media is needed to support teaching and learning activities. According to the Association for Educational Communications and Technology (AECT) in Arsyad (2009), media is all forms and channels used for the process of distributing messages/information. According to Heinich in Susilana and Riyana (2007), media is something that carries information between the source and recipient of the information. In the learning process, learning media is the most important component in learning. The use of learning media in the teaching and learning process is very important because learning media has enormous benefits in facilitating teacher and student interactions so that learning activities will be more effective and efficient. This is supported by the statement of Arsyad (2014), Hayati (2015) that the use of learning media in the teaching and learning process can stimulate students' attention and interest in learning.

Based on the results of distributing questionnaires to three schools in Jambi City (SMA Negeri

5 Jambi City, SMA Negeri 10 Jambi City, SMA Negeri 11 Jambi City), information was obtained that students still had difficulty understanding physics subjects. This is in accordance with the results of the questionnaire which stated that 51.42% of students thought physics was a difficult subject and 41.90% of students thought it was not too difficult. To make it easier for students to understand physics material, it needs to be accompanied by learning media. Based on the distribution of questionnaires to physics teachers at the school, the teachers answered that they had learning media including: Power Point Presentations, Animation Videos and E-learning. This should be able to support teaching and learning activities. However, on the contrary, from the results of the student questionnaire distributed, 67.64% of students answered that teachers did not use learning media during the teaching and learning process. This proves that the use of learning media is less than optimal. One of them is that at SMA Negeri 10 Jambi City, it was discovered that there was still a lack of use of learning media by teachers, teachers mostly used textbooks as a guide in teaching and learning activities. This of course has weaknesses that must be corrected. To overcome this problem, it is necessary to innovate learning by developing independent learning media for students.

Thus, according to students' needs, the author developed an electronic module as an alternative to make it easier for students to learn physics. Electronic modules are learning media that can contain learning material that combines text, graphics, video, animation and sound in one module. According to Sugianto in Nurmayanti (2015) electronic modules are a form of presenting independent learning materials arranged systematically into units. According to Gunawan in Sugianto (2013), with this interactive electronic module the learning process will involve audio-visual displays, sound, movies and others and the use of the program is easy to understand so that it can be used as a good learning medium. In this development, the researcher chose to use a professional 3D pageflip program. This electronic module was previously developed by Perrianty (2016), but in its development it did not include answer keys from formative tests, did not attach a glossary, and the module background was too full making it difficult to read the material. The author will add this deficiency to the electronic module that will be developed and the author will also develop it further in terms of appearance to make it more attractive but easy to read and to make it easier for students to understand the material the author will develop a module based on discovery learning. Where the material presented in the module is given stages of discovery learning. Robert B. Sund in Nurdin and Adriantoni (2016), Bruner in Ansyar (2015) stated that discovery is a mental process in which students assimilate a concept or principle.

RESEARCH METHODS

Contains the type of research, time and place of research, targets/objectives, research subjects, procedures, instruments and data analysis techniques as well as other matters related to the method of research. targets/objectives, research subjects, procedures, data and instruments, and data collection techniques, as well as data analysis techniques and other matters related to the method of research can be written in sub-chapters, with sub-headings.

This research was carried out using methods and development (Research and Development). The development procedure for this research uses the ADDIE (analyze, design, develop, implement, and evaluate) development model (Branch, 2009). In this research the author conducted a small group trial, namely class X MIA 4 with a total of 20 students. The trial was carried out to determine students' perceptions of the electronic module being developed.

Data types are divided into two, namely qualitative and quantitative data. The instruments in this research were student needs analysis questionnaires, observation documents, expert validation questionnaires and student perception questionnaires. Data analysis techniques in the form of validation questionnaire scores and student perception questionnaires were carried out using descriptive statistics. Meanwhile, analysis of data from observations and validator suggestions was carried out in a qualitative descriptive manner. According to Sukmadinata (2013), a questionnaire is a technique or method of collecting data with responses. Data analysis

Qualitative is carried out descriptively qualitatively (data reduction, data presentation and verification). Quantitative data analysis was carried out using descriptive statistics (mean, median, mode, maximum and minimum standard deviation). The student perception questionnaire instrument uses a Likert scale in the form of a checklist with four scales. So that students' perceptions can be obtained by changing the average score into four criteria which are formulated as follows:

Table 2. Score Criteria Guidelines

Score range	Criteria
Mi + 1,5 SDi $\leq$ $M \leq$ Mi + 3,0 SDi	Very good
Mi + 0 SDi $\leq$ $M \leq$ Mi + 1,5 SDi	Good
Mi - 1,5 SDi $\leq$ $M \leq$ Mi + 0 SDi	Enough
Mi - 3,0 SDi $\leq$ $M \leq$ Mi - 1,5 SDi	Not enough

(source: Directorate of High School Development, 2010)

RESULTS AND DISCUSSION

The results of this research and development are electronic modules based on Discovery Learning on rectilinear motion material for class X SMA using the ADDIE model. The steps in the ADDIE model development research consist of 4 stages:

1. Analyze

At this analysis stage, a preliminary study was carried out in the form of distributing questionnaires to students and physics teachers at schools to collect data related to the problems faced by students. The purpose of the analysis is to determine the basic direction needed in the development of Discovery Learning-based electronic modules on rectilinear motion material for class X SMA. The analysis stage consists of validating performance gaps, formulating learning objectives, identifying student characteristics, identifying needed resources, determining appropriate learning strategies, and preparing development plans.

2. Design (Design)

Based on the results of the analysis, the next stage to be carried out is the design or product design stage. There are several tools and materials that researchers prepare before designing the electronic module, namely the syllabus for class X high school physics and the semester program for physics at school. After collecting the necessary materials, the next step is to design the module based on the design that has been made.

3. Develop (Development)

The process carried out at the development stage is creation and validation. In the manufacturing stage, what is done is to turn the designs that have been designed into multimedia that is ready to be used. The design results were carried out using the 3D Pageflip Professional application. After the design is complete, the electronic module is then validated. The types of validation carried out are validation by media experts and validation by material experts. The validators in the electronic module validation stage were two physics education lecturers at Jambi University, namely Mrs. Dra. Jufrida, M.Si and Mrs. Nova Susanti, S.Pd, M.Si. To produce a viable module, the validation process is carried out in several stages until the validator states that the electronic module is suitable for use without revision. At the validation stage, media expert validators and material validators averaged a score of 3 with good assessment criteria, so there were no suggestions or improvements to the electronic module. Based on the design that has been made in the storyboard, the results are as follows:
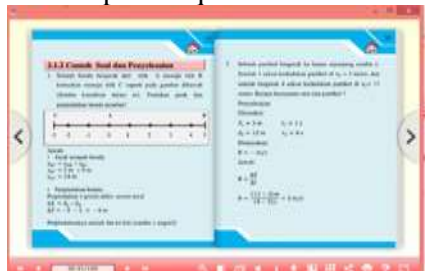
a. The material in this module is straight movement material which is presented with the stages of the discovery learning model.

b. The videos and animations in this module are presented with 3D effects and are equipped with explanations for each animation.

c. Examples of questions in this material are presented with complete stages of completion.

The next stage is to test the product in schools. The school chosen as the test site was SMA Negeri 10 Jambi City which was carried out in class X MI 4 where the data obtained was used to see students' perceptions of the electronic module being developed. The questionnaire used consisted of 5 indicators with 19 questions. Based on the student perception questionnaire, the following data results were obtained:

Table 3. Students' perceptions of learning media

No	Assessment Aspects	Average	Criteria
1.	Module Cover Design	13,89	Very good
2.	Module Content Design	21,69	Very good
3.	Module Software Design	12,91	Good
4.	Presentation Components	3,23	Good
5.	Linguistic Aspect	13,37	Very good

Based on the data shown in table 3, it can be concluded that the electronic module that has been developed can be categorized as having very good suitability so that the electronic module is suitable for use as a learning tool for teachers and students, especially high school class X in rectilinear motion material.

The resulting electronic module has .exe and 3DP formats that can be run on a computer. This electronic module contains material, animations, videos, example questions, summaries, formative tests and interactive quizzes at the end of learning. The material in this module is straight movement material which is presented with the stages of the discovery learning model. The videos and animations in this

module are presented with 3D effects and are equipped with explanations for each animation. Examples of questions in this material are presented with complete stages of completion. The formative test in this module contains 3 questions for each learning activity complete with an answer key in the closing chapter of the module. The advantage of this electronic module is that the electronic module is arranged with a simple and consistent appearance, making it easier to use when studying the module. The material presented in the electronic module refers to the syllabus so that it can help students achieve the expected competencies in physics lessons. The shortcomings of this electronic module are that there are no answer sheets for formative tests and it does not have interactive quizzes for each learning activity.

The resulting electronic module has been validated by two validators through three stages. In the final stage, this electronic module was declared valid with a media expert score of 68 and a material expert score of 42 in the good category.

Therefore, the resulting module is valid and suitable for use. Next, valid modules are used to determine students' perceptions of electronic modules. To determine students' perceptions of the electronic module being developed, a valid and reliable questionnaire was used. The validity used is logical validity, the questionnaire is prepared based on a grid that is consulted with experts so that the instrument is achieved in accordance with the desired validity. Then, to get students' perceptions of this electronic module, it was tested on 20 class X MIA 4 students. The researcher showed and explained all the material contained in the module, then respondents filled out a questionnaire regarding their perceptions of the electronic module they had seen. Based on the results of the questionnaire they have filled out, it can be concluded that the electronic module developed meets the very good criteria. As for the results of the analysis of student perceptions in the research that has been carried out, the results of student perceptions regarding aspects of module cover design are 13.89 (very good), module content design is 21.69 (very good), module software design is 12.91 (good), presentation module 3.23 (good), and language component 13.37 (very good). From these four aspects it can be concluded that the Electronic Module Based on Discovery Learning in Straight Motion for class X SMA is suitable for use in the good category. So it can be used as a learning medium at school or as an independent learning medium at home.

CONCLUSION

Based on the results of the development and trials that have been carried out, an electronic module based on discovery learning using 3D pageflip professional on rectilinear motion material for class The resulting final product has .exe and 3DP formats that can be run on a computer. This electronic module contains material with the stages of the discovery learning model, animation, videos, example questions, summaries and formative tests and interactive quizzes at the end of the lesson. The advantages of this electronic module are that the material is presented briefly, concisely and clearly referring to the stages of discovery learning, the videos and animations presented are able to explain the abstractness of the material, are equipped with explanations and are displayed attractively with 3-dimensional effects, and interactive quizzes directly include answer scores and corrections. automatic answer. The shortcomings of this electronic module are that it does not have trial simulations, there are no answer sheets for each formative test, it only has two example questions and it does not have interactive quizzes for each learning activity. From the trials that have been carried out, it is obtained the results of students' perceptions of the module cover design aspect were 13.89 (Very good), module content design 21.69 (Very good), module software design 19.21 (Good), module presentation 3.23 (Good), and language components 13 .37 (Very good). From these four aspects it can be concluded that the Electronic Module Based on Discovery Learning in Straight Motion for class X SMA is suitable for use in the good category. So it can be used as a learning medium at school or as an independent learning medium at home.

ACKNOWLEDGMENTS

REFERENCES

Abidin, Yunus., 2016. *Desain sistem pembelajaran dalam konteks kurikulum 2013*. Bandung: PT Refika Aditama.

Ansyar, Mohamad., 2015. *Kurikulum Hakikat, Fondasi, Desain dan Pembelajaran*. Jakarta: Pranadamedia Grup.

Arsyad, A. 209. *Media pembelajaran*. Jakarta. Raja Grafindo Persada

Arsyad, Azhar., 2014. *Media Pembelajaran*. Edisi Revisi. Jakarta: Raja Grafindo Persada.

Asyhar, Rayandra., 2012. *Kreatif Mengembangkan Media Pembelajaran*. Jakarta : Referensi

Branch, R. B. 2009. *Instructional Design: The ADDIE Approach*. USA: Springer.

Direktorat Pembinaan SMA., 2010. *Juknis Penyusunan Perangkat Penilaian Afektif di SMA*. Jakarta: Direktorat Pembinaan SMA.

Hayati, Sri, Agus Setyo Budi,Erfan Handoko, 2015. "Pengembangan Media Pembelajaran Modul elektronik Fisika Untuk Meningkatkan Hasil Belajar Peserta Didik". *Prosiding Seminar Nasional Fisika (E-Journal),* volume IX.

Nurdin, Syafruddin., Adriantoni., 2016. *Kurikulum dan Pembelajaran.* Jakarta: PT RajaGrafindo Persada.

Nurmayanti, Fitri., Fauzi Bakri, Esmar Budi. 2015. "Pengembangan modul elektronik fisika dengan pokok bahasan teori kinetic gas untuk kelas XI SMA". *Prosiding Simposium Nasional Inovasi dan Pembelajaran Sains 2015*. Bandung.

Perrianty, Fefri., 2016. *Pengembangan E-Modul berbasis 3D pageflip professional untuk pembelajaran hukum dasar kimia kelas X SMA Islam Al falah Kota Jambi*, skripsi, Universitas Negeri Jambi, Jambi.

Sugiyono, 2016. *Statistika Untuk Penelitian* . Bandung: Alfabeta.

Sugiyono, 2016. *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.

Sukmadinata. 2013. "modul virtual: multimedia flipbook dasar Teknik digital". *Jurnal INVOTEC,* Volume IX, No.2, Agustus 2013 : 101-116. Fakultas Pendidikan Teknologi dan Kejuruan Universitas Pendidikan Indonesia.

Susilana. 2007. *Menyemai Benih Teknologi Pendidikan*. Jakarta. Prenada Media