Feasibility of E-Modul as Learning Media Based on Virus Material for Phase E of Senior High School

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***Abstract*--**This study aims to determine the feasibility of e-module learning media based on virus material. This type of research is a Research and Development (R&D) using the ADDIE development model which consists of *Analyze*, *Design*, *Develop*, *Implement* and *Evaluation*. The type of research data is qualitative and quantitative. The data collection instrument used was a validation questionnaire from material experts and media experts. The results of the study showed that the e-module that had gone through the material validation stage twice obtained a percentage of 80.26% with the category "feasible", the media validation stage was carried out twice, obtained a percentage of 89.13% with the category "very feasible". It is concluded that the *e-module* on virus material is feasible to be used in learning biology on virus material in phase E of high school.

Keywords-- Learning Media; E-Modules; Viruses

I. INTRODUCTION

The development of the 21st century is marked by various significant changes in almost all aspects of life, one of which is education. With education, humans can reach their maximum potential and contribute positively to society and the environment. However, not all individuals receive the same quality of education, which affects how they receive lessons. The use of good technology tends to provide a richer and more varied learning experience.

In the field of education, technology can be integrated into learning media. According to Nurdyansyah (2019), learning media is anything that can be used to convey messages (learning materials), so that it can stimulate students' attention, interest, thoughts, and feelings in learning activities to achieve learning goals.

Every subject certainly requires learning media to support student understanding, including biology. Biology is a branch of science that studies living things. According to Palennari, et al. (2016) biology is a part of natural science that studies matter and energy related to living things and life processes.

One of the materials in biology subjects is viruses. Viruses are pathogenic microorganisms consisting of genetic material in the form of DNA or RNA. According to Dewi (2020), students consider virus material to be very difficult material because viruses are difficult to imagine and observe directly, and use many terms that are difficult to understand, which affects the process of working on questions because students do not understand the questions .

Based on a direct interview with 1 biology teacher at SMA N 6 Batang Hari, it is known that the school has used the Merdeka Curriculum in grades X and XI, while grade XII still uses the 2013 curriculum. There are obstacles in the limited use of learning media as support in the learning process. The learning media used at the school are *PowerPoint* and charta. In addition, it was also conveyed that grade X students (Phase E) had difficulty understanding the virus material. This is known from the learning outcomes on the material being below the Minimum Completion Criteria (KKM) set by the school. The results of the cognitive assessment conducted by the teacher on the material showed that only 55% of students achieved KKM (≥ 72), while 45% had not achieved completion. Based on the teacher's statement, it is known that the difficulty experienced was that students did not understand the meaning of the virus material being studied. Another difficulty is that the level of student focus during learning is relatively low because the material is dense and complicated.

This is reinforced by the results of the distribution of needs analysis questionnaires to Phase E students of SMA N 6 Batanghari, it is known that as many as 81.6% of 98 students have difficulty learning virus material. The difficulties experienced are that students do not understand the terms in the virus material, the scope of the material is dense and complicated, it is difficult to distinguish viruses and bacteria, and viruses are abstract so they are difficult to imagine.

Based on information regarding the difficulties in understanding virus material, the solution to this problem is to develop alternative learning media that are innovative, practical, and easy for teachers and students to access, namely e-modules. E-modules are modules in digital form, consisting of text, images,

or both, which contain digital materials that are suitable for use in learning (Herawati & Muhfadi, 2018). The advancement of information and communication technology can enable the development of e-modules from various software. One of *the software* that can create e-modules is *Sketchware*. Khotimah & Hilyana (2019) said that *Sketchware* is *software* used in creating Android applications. This *software* can be accessed using Android, so the application created allows users to access it via *smartphone*.

Sketchware software- based e-modules can be an interesting choice in learning media because they can be used to learn anytime and anywhere without being tied to class schedules, allowing students to learn according to their pace and learning style, materials in e-modules can be easily updated or adapted to the latest developments in curriculum or scientific knowledge, reducing the need for printed materials so that they are more cost-efficient and environmentally friendly, can develop digital skills such as the use of technological devices and applications, encourage students to learn independently, and are free of licensing fees because *Sketchware software* is free development software.

Sketchware software- based e-modules as learning media are developed to meet students' learning needs, so a feasibility test is needed for the media developed. The purpose of this study is to determine the level of feasibility of *Sketchware software- based e-modules* as learning media on virus material for phase E high school students. The feasibility test is carried out to determine whether or not the media developed is feasible based on an assessment questionnaire by material experts and media experts.

II. METHOD

Research Design

This research was conducted using the research and development (R&D) method. According to Wahyuni & Handayani (2021) , Research and Development (R&D) is a type of research whose final result is creating or perfecting a product in the field of education, either in the form of materials, learning media, or quality strategies that can be accounted for. Donasari & Silaban (2021: 87) said that the product that is the final result of development is not always in the form of hardware, such as printed books, laboratory equipment, and modules but can also be in the form of software, such as learning applications, computer programs, and so on.

The model used in the development of e-modules as learning media based on Sketchware software is the ADDIE model. Branch (2009) said that the ADDIE model consists of 5 main stages, namely: 1) Analysis (Analyze); 2) Design (Design); 3) Development (Develop); 4) Implementation (Implementation); 5) Evaluation (Evaluation). This development research does not carry out the implementation stage because this research is only to test the feasibility of the product developed as additional learning media in the learning process.

Instrument

The Sketchware software- based e-module was carried out by material experts and media experts. The assessment aspects of material experts consist of pedagogical, readability, and multimedia. Meanwhile, the media expert assessment aspects consist of instructional design, technology, visual suitability, readability & ease of use, security & copyright. Below is a table of assessment indicators for material experts and media experts.

Table 1
Expert Validation Instrument Grid

No.	Aspect	Indicator
1.	Pedagogical	Suitability of materials to learning objectives
		Depth of material
		Material presentation structure
		Accuracy of material
		Material evaluation
2.	Legibility	Simplicity of sentences
		Sequence of material flow
		Clarity of text
		Use of terms
3.	Multimedia	Supporting material presentation

(Source: Suartama Modification, 2016)

Table 2
Media Expert Validation Instrument Grid

No.	Aspect	Indicator
1.	Instructional Design	Presentation structure
		Order of presentation
		Layout and navigation
2.	Technology	Platform compatibility
		Serving speed
		Stability
		Interactivity
3.	Visual Conformity	Use of color
		Typography
		Use of multimedia
4.	Readability & Ease of Use	Language
		Usage guide
5.	Security & Copyright	Data security
		The need for copyright

(Source: Suartama Modification, 2016)

Data Analysis Techniques

This study uses quantitative descriptive data analysis techniques. Data was obtained from expert material validators and media experts in the form of suggestions and comments. The results of the assessment by material experts and media experts are used as guidelines for revising the developed learning media products. Quantitative data produces measurable assessments through a Likert scale.

Table 3
Likert Scale Assessment Weight

Mark	Information
4	Very Worth It
3	Worthy
2	Not feasible
1	Totally Unworthy

(Source: Sugiyono, 2019)

Table 5
Category of Validity Level of Material

No.	Value Scale	Score	Percentage (%)	Category Level
1.	4	61.75 – 76.00	81.28% - 100%	Very Worth It
2.	3	47.50 – 61,749	62.52% - 81.27%	Worthy
3.	2	33.25 – 47.49	43.76% - 62.51%	Not feasible
4.	1	19.00 – 33.249	25% - 43.75%	Totally Unworthy

(Source: Riduwan, 2018)

Table 6
Media Validity Level Category

No.	Value Scale	Score	Percentage (%)	Category Level
1.	4	74.75 – 92.00	81.28% - 100%	Very Worth It
2.	3	57.50 – 74.749	62.52% - 81.27%	Worthy
3.	2	40.25 – 57.49	43.76% - 62.51%	Not feasible
4.	1	23.00 – 40.249	25% - 43.75%	Totally Unworthy

(Source: Riduwan, 2018)

III. RESULTS AND DISCUSSION

To find out whether a media is feasible, an assessment must be carried out which will later provide an overview that the learning media is feasible to be used in the learning process. Therefore, the feasibility must meet the expected criteria so that the media produced is appropriate (Maryanto et al., 2021).

Sketchware software- based e-module on virus material that has been developed is validated by material experts, the validation process takes place twice. The results of the validation by material experts provide suggestions for product improvement guidelines. The results of the material validation carried out are presented in Table 7 below:

Table 7
Material Expert Validation Results

Assessment Aspects	Validation Stage- … (%)	
	1	2
Pedagogical	73	78.8
Legibility	75	75
Multimedia	75	100
Average	**74.3% Worthy**	**84.6% Very Worth It**

The suitability of the material must meet the expected criteria so that the media produced will be appropriate. The assessment of the validity test of the material in learning media is seen from the objectives and standards of learning, the relationship between the media and the material concept, the knowledge value contained in the media, and the level of thinking of students (Farman & Chairuddin, 2020).

Based on Table 7, the validation of material experts was carried out twice. In the first stage of validation, the pedagogical aspect received an assessment of 73%, while in the second stage it received an assessment of 78.8 % . Then the readability aspect in the first and second stages both received an assessment of 75%. Then the multimedia aspect in the first stage got 75%, while the multimedia aspect in the second stage got 100%.

The results of the first stage validation obtained a product quality percentage of 74.3% which is included in the "Feasible" category. Then improvements were made to several imperfect parts based on comments and suggestions from material experts. Furthermore, the second stage validation was carried out which obtained a product quality percentage of 84.6% with the "Very Feasible" category. A high percentage of development products will produce a good quality product so that it can be tested in the field.

Table 8
Media Expert Validation Results

Aspect	Validation Stage- … (%)	
	1	2
Instructional Design	81	87.5
Technology	75	75
Visual Conformity	79.16	100

Readability & Ease of Use	81.25	93.75
Security & Copyright	87.5	100
Average	**80.78% Worthy**	**91.25% Very Worth It**

The appearance of the learning media must be declared valid because the appearance can support understanding of the material in the teaching materials. Some indicators for assessing media aspects can be the balance of images in the media that is filled, the balance of color display, the images contained in the media must be in accordance with the material, and the sequence of images and text must be interrelated (Elfeky et al., 2020).

Based on Table 8, media expert validation was conducted twice. In the first stage of validation, the percentage of product quality was 80.78 % which was included in the "Feasible" category. Then, revisions were made to perfect the development product. The revised things are some pages that have blank sections and the spacing between images and text. In the second stage of media validation, the percentage of product quality was 91.25 % which is included in the "Very Eligible" category. It can be concluded that the quality of the development product is high along with the percentage obtained for each aspect of the assessment. Therefore, the development product is worthy of being tested in the field.

IV. CONCLUSION

Based on the results of the research and discussion that have been described above, it can be concluded that the feasibility test of materials and media in the learning media in the form of e-modules based on Sketchware software on virus material is categorized as very feasible to use or be tested in the field. Media validation was carried out twice with the final result of material validation of 84.6 % which is categorized as very feasible and media validation of 91.25% which is categorized as very feasible.

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