Development of E-Module-Based Learning Media to Improve Competence in Building Interior Design Practices

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ABSTRACT

Vocational High School is a level of education in Indonesia that prepares someone to be ready to work in the industrial world, so that the learning paradigm changes to become student-centered, in other words, teaching and learning activities refer to independent learning. The purpose of this research is to increase students' competency in building interior design practices through the development of valid and practical e-module-based learning media. This type of research is research and development. The development method used is the ADDIE model. This e-module is made using the Macromedia Flash 8 application which is presented in .swf format which contains material and competency tests so that students can use it as an alternative knowledge and source of independent learning. The results of the e-module practicality test in the "Very Practical" category have a score percentage of 95.81%. The validation results by media experts, material experts and language experts have a score percentage of 83.30% in the "Good" category.

Keywords: *Vocational Education, Learning Media, Building Interior Design, Practice Learning.*

1. INTRODUCTION

Learning media is an important component in delivering learning material to students. Because basically, learning media is anything that can be used to convey messages or information in the teaching and learning process so that it can stimulate students' attention and interest [1]. Teachers must be able to use interesting media so that they can focus students' attention on the material being taught because according to Law No. 20 article 40 paragraph 2 of 2003 concerning National Education System which states that educators and education staff are obliged to create an educational atmosphere that is meaningful, fun, creative, dynamic, and dialogic.

The teaching and learning process is inseparable from the learning component because it is determining the success or failure of the learning process. Learning is an activity carried out by teachers and students in a learning environment that requires learning components including: learning objectives, materials, educators or teachers, students or students, methods, learning media, environment or situation, and evaluation. Learning is also

a process of communication between learning resources and students to achieve learning objectives by utilizing a medium.

Through the use of media, it gives hope of increasing communication relations so that they can run smoothly and with maximum results [2]. Learning will be better understood and understood by students if it is supported by using learning media. The success of a learning can be achieved through the formation of effective communication between learning components. One way to form effective communication is to use learning media. Learning media has a role as an information carrier technology that can be utilized for the learning process.

Learning components are also inseparable from teaching materials. Learning that uses the demonstration method during the teaching and learning process takes place is of course also an influence on student understanding, this makes learning less interesting and boring. One form of learning media that can be used to support independent learning with an online system is electronic e-modules. E-modules are teaching materials that are presented systematically so that their use can be learned with or without a facilitator or teacher [3]. One of

the e-module criteria is self-instructional which makes the teaching materials usable by students to study independently [4]. E-modules can be used independently by students in learning because they contain clear instructions for their use, materials and all supporting material, learning instructions, practice questions to summaries.

However, the current situation, the application of e-module is still not optimal so that students are less motivated to explore learning material, especially regarding building interior design. While the application of e-modules is in accordance with the current curriculum, namely the independent learning curriculum. Students can work without having to miss school subject matter by utilizing e-modules. So, it is necessary to develop learning e-modules that can help students obtain information and develop knowledge related to building interior design. Therefore, the aims of this study are to develop learning media using Macromedia Flash 8 that are valid and practical in the competency of building interior design expertise.

2. METHODOLOGY

The type of this study is research and development (R&D) using the Analysis-Design-Development-Evaluation (ADDIE) development model. The steps taken are shown in Figure 1.
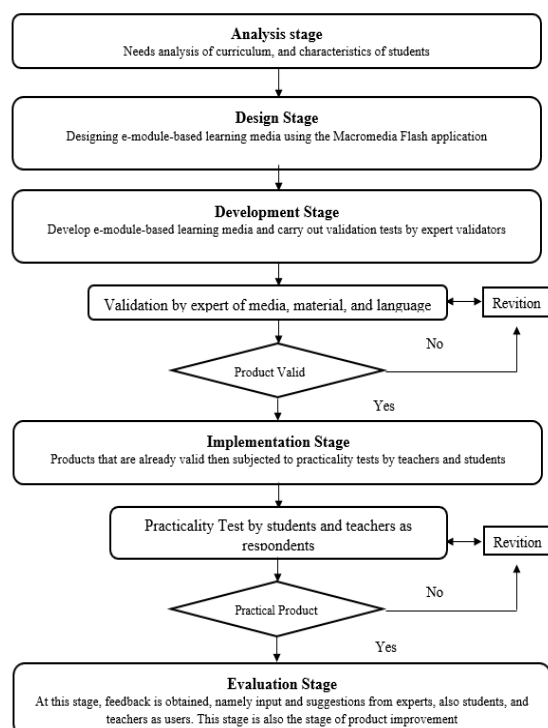

Figure 1 The product development implementation flow uses the ADDIE model

2.1. Analysis

At this stage an analysis of the problems that occur in the learning process is carried out by means of observation and interviews with teachers and students. In this stage, data collection using observation techniques and structured interviews. Observations and interviews were made to find out the learning activities in class, the use of teaching materials, the learning devices used such as the Learning Process Plan and Syllabus, then the learning media used, and student learning outcomes in the 2 previous periods. This observation was carried out to obtain data as a preliminary study on the development of e-module-based learning media in the subject of Building Interior Design Practice.

2.2. Design

At this stage, the thing done is to compile the e-module media design that will be developed. Starting from setting learning objectives, designing learning materials, and e-module-based learning media design, and has made a storyboard. In addition, at this stage, the creation of the instrument was also carried out. For assessment procedures, developers can use cooperative inquiry, namely through participatory assessment and contextual inquiry (through observation sheets on students and teaching staff), and or contextual formative evaluation, namely through validation sheets that have been designed based on products produced based on expert reviews (experts content, learning experts, test/evaluation experts, and teaching material design experts and learning media) [5].

2.3. Development

In the development stage, the development of e-module-based learning media is carried out based on the results at the analysis stage and then conducting tests related to the content and readability of the e-module to material experts, media experts, and linguists. The test results are then used as revision material for researchers so that the developed e-module can meet user needs.

2.4. Implementation

In this study, at the implementation stage, only product practicality tests were carried out. Questionnaires were given to teachers and students as respondents.

2.5. Evaluation

Evaluation is a process to see whether the e-module is ready for use and meets the requirements of a good e-module. The results of the validation carried out by material experts, media experts, and linguists at the development stage are used as revision material at this stage so that the e-module meets the requirements of a proper learning e-module.

The analytical method used in this research is the descriptive analysis method. The questionnaire will be

used to measure the value of the variable to be studied. Each questionnaire uses a Likert scale to produce accurate data. The Likert scale with five variations of answers is the scale used in this study. The Likert scale was chosen because it can measure a person's attitudes, reactions, opinions, and perceptions of something. Each answer from the respondent is converted into a number for later analysis. Calculation of assessment criteria can see on Table 1. Mi for Average, which is 1/2 (maximum score + minimum score). Sbi for Standard deviation, which is 1/6 (maximum score – minimum score). And x for Average score of implementation results. The feasibility category scores in Table 1 will be used as a reference for the evaluation results of material experts, media experts, linguists, and users. These results then show the level of feasibility and performance of the e-learning module.

The results of research through questionnaires on the practicality of research products for the development of e-module-based learning media were obtained from users, in this case, students and teachers. The data obtained are responses or opinions of students and teachers in determining the practicality of research products that are developed by providing alternative answers in the form of very practical, practical, moderate, impractical, and very impractical [6]. Determination of practicality using the respondent achievement level (TCR) formula. Then the values obtained are converted by looking at the practicality category table (see Table 2).

3. RESULTS AND DISCUSSIONS

The research and development resulted from a product in the form of an electronic module (e-module) Building Interior Design Practice in vocational education. This media was developed using the ADDIE development model with the results of each stage described as follows:

3.1. Analysis Stage

At this stage, the researcher analyses the problems that occur in the teaching and learning process where there is no learning e-module as teaching material on the subject of Building Interior Design Practice, the teaching

methods used by teachers still tend to use lectures and assignments methods, teachers do not utilize media learning, then student learning outcomes in the previous 2 periods, many of which had not yet reached the Minimum Completeness Criteria scores. The researcher found that there is a need for media assistance that students can use so that learning can be more productive and effective, the media the researcher chose is an electronic e-module because this media can be used independently which has a learning concept where students are more required to find out (discovery learning), in other words, teaching and learning activities refer to independent learning to achieve learning outcomes in the subject of Building Interior Design Practice, especially in basic competencies 4.20 and 4.22, namely the discussion of drawing interior designs with artificial lighting and drawing interior designs with elements, materials, models, and accessories in every room, students are required to able to explain, apply interior design drawings and be able to make interior design drawings with artificial lighting, elements, materials, models and accessories in each room.

Table 2 Product Practicality Level

No	Respondent achievement	Category
1	$80 < TCR \leq 100$	Very Practical
2	$60 < TCR \leq 80$	Practical
3	$40 < TCR \leq 60$	Pretty Practical
4	$20 < TCR \leq 40$	Less Practical
5	$TCR \leq 20$	Impractical

Products developed using media Macro Flash Professional 8 because it is a multimedia and animation program that is quite flexible in its use to create animations such as interactive animations, games, web, presentations, films, and so on [7]. Macro Flash Professional 8. can make interactive buttons so as to produce interactive electronic e-modules [8].

3.2. Design Stage

Before carrying out the preparation of the e-module, a design or module design is made first. The preparation of this e-module-based learning media design starts from:

Table 1. Calculation of Assessment Criteria on a Scale of 5 (Prof. Sukardjo (2008:53))

No	Criteria	Score	
		Formula	Value range
1	Very Less Good	$X < Mi - 1,8\ SBi$	$X < 1,8$
2	Not good	$Mi - 1,8\ Sbi < X < Mi - 0,6\ SBi$	$1,8 < X < 2,6$
3	Pretty good	$Mi - 0,6\ Sbi < X < Mi + 0,6\ SBi$	$2,6 < X < 3,4$
4	Good	$Mi + 0,6\ Sbi < X < Mi + 1,8\ SBi$	$3,4 < X < 4,2$
5	Very Good	$X > Mi + 1,8\ SBi$	$X > 4,2$

3.2.1. Setting Development Goals

The purpose of developing e-module-based learning media, namely by being given learning media based on electronic modules, Class XII of vocational education can study building design interior practice, especially basic competencies 4.20 and 4.22 regarding making interior design drawings with artificial lighting (artificial) and making designs interior with elements, materials, models and accessories in each space independently wherever and whenever.

3.2.2. Making Storyboard

The storyboard is a description of the description in making learning media that is made to facilitate the process of making a product which can be seen in the picture below:

3.2.2.1. Scene Loading

This scene will appear the first time the application is run. Scene loading view can be seen in Figure 2.

No	Scene	Information
1	Logo	Learning media emblem
2	Logo	UNIMED Logo
3	Box	Loading
4,5	Picture	Animation

Figure 2 Storyboard Scene Loading

3.2.2.2. Scene Opening

This scene will appear when the scene loading has finished. Scene opening view can be seen in Figure 3.

No	Scene	Information
1	Logo	Learning media emblem
2	Animation	Digital clock
3,5	Navigation key	"Out" "Start"
4	Text	Description to start

Figure 3 Storyboard Scene Opening

3.2.2.3. Scene Menu

This scene will appear when the start button is clicked on the scene opening. The view of Scene Menu can be seen in Figure 4.

No	Scene	Information
1	Logo	Learning media emblem
2	Animation	Digital clock
3	Navigation key	"Out"
4,5,6,8,9,10	Button	"Introduction" "Material" "Competence test" "Instruction" "Objective" "Profile"
7	Text	Module title
11	Picture	Animation

Figure 4 Storyboard Scene Menu

3.2.2.4. Scene Introduction

This scene will appear when the scene menu is clicked on the introduction button. The view of Scene Introduction can be seen in Figure 5.

No	Scene	Information
1	Text	Page Title
2,3	Navigation Key	"Menu" "Out"
4	Text	Contents of the introduction
5	Picture	Animation

Figure 5 Storyboard Scene Introduction

3.2.2.5. Scene Material Menu

This scene will appear when the material button is clicked on the scene menu. The view of Scene Material Menu can be seen in Figure 6.

No	Scene	Introduction
1,2	Button	"Basic competence 4.20" "Basic competence 4.22"
3,4	Navigation Key	"Menu" "Out"
5	Picture	Animation

Figure 6 Storyboard Scene Opening

3.2.2.6. Scene Content of Basic Competency Material 4.20

This scene will appear when the material menu scene is clicked on the material button 4.20. The view of Scene content of basic competency material 4.20 can be seen in Figure 7.

No	Scene	Information
1	Logo	Learning media emblem
2,3,5,6	Navigation Key	"Menu" "Out" "Next" "Back"
4	Text, Picture	Contents of the introduction
7	Text	Discussion title

Figure 7 Storyboard Scene Content of Basic Competency Material 4.20

3.2.2.7. Scene content of basic competency material 4.22

This scene will appear when the material menu scene is clicked on the material button 4.22. The view of Scene content of basic competency material 4.22 can be seen in Figure 8.

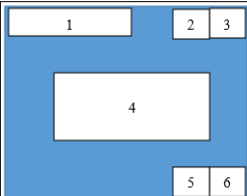| No	Scene	Information
1	Text	Discussion Title
2,3,5,6	Navigation Key	"Menu" "Out" "Next" "Back"
4	Text, Picture	Content of learning material

Figure 8 Storyboard Scene Content of Basic Competency Material 4.22.

3.2.2.8. Competency Test Menu Scene

This scene will appear when the competency test button is clicked on the scene menu. The view of Competency Test Menu Scene can be seen in Figure 9.

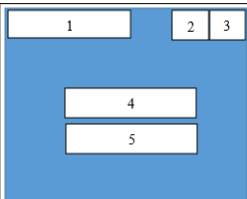| No	Scene	Information
1	Text	Page title
2,3	Navigation key	"Menu" "Out"
4,5	Button	"Competency Test 4.20" "Competency Test 4.22"

Figure 9 Storyboard Competency Test Menu Scene

3.2.2.9. Competency Test 4.20 Scene

This scene will appear when the competency test menu scene is clicked on the competency test button 4.20. The view of Competency Test 4.20 Scene can be seen in Figure 10.

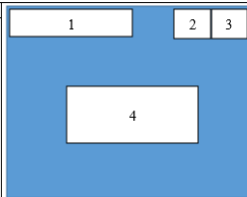| No	Scene	Information
1	Text	Page Title
2,3	Navigation key	"Back" "Out"
4	Text	Content of the competency test

Figure 10 Storyboard Competency Test 4.20 Scene

3.2.2.10. Competency Test 4.22 Scene

This scene will appear when the competency test menu scene is clicked on the competency test button 4.22. The view of Competency Test 4.22 Scene can be seen in Figure 11.

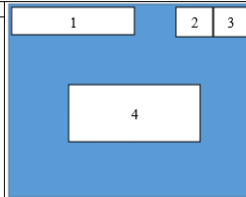| No	Scene	Information
1	Text	Page Title
2,3	Navigation key	"Menu" "Out"
4	Text	Content of the competency test

Figure 11 Storyboard Competency Test 4.22 Scene

3.2.2.11. Guidance scene

This scene will appear when the scene menu is clicked on the Guidance button. The view of Guidance Scene can be seen in Figure 12.

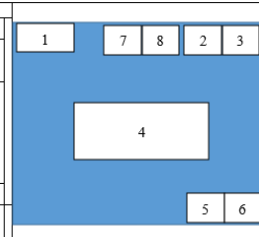| No	Scene	Information
1	Text	Page Title
2,3,5,6	Navigation key	"Menu" "Out" "Next" "Back"
4	Text	Contents of Guidance
7,8	Button	"Objective" "Profile"

Figure 12 Storyboard Guidance Scene

3.2.2.12. Scene Learning Objectives

This scene will appear when the scene menu is clicked on the learning objectives button. The view of Scene Learning Objectives can be seen in Figure 13.

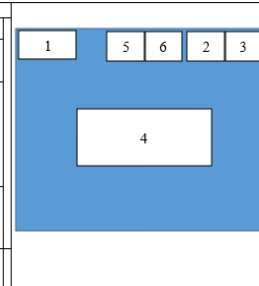| No	Scene	Information
1	Text	Page Title
2,3	Navigation key	"Menu" "Out" "Next" "Back"
4	Text	Content of learning objectives
5,6	Button	"Guidance" "Profil"

Figure 13 Storyboard Scene Learning Objectives

3.2.2.13. Scene Profil

This scene will appear when the scene menu is clicked on the profile button. The view of Scene Profil can be seen in Figure 14.

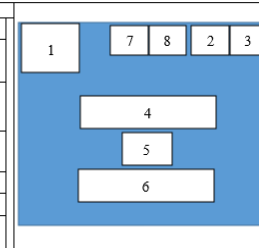| No	Scene	Information
1	Text dan picture	Developer name and image
2,3	Navigation key	"Menu" "Out"
4	Text	Modul title
5	Logo	UNIMED logo
6	Text	Profil developer
7,8	Button	"Guidance" "Objective"

Figure 14 Storyboard Scene Profil

3.2.2.14. Exit Scene

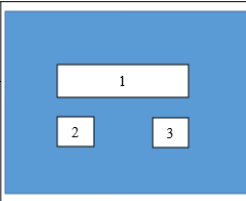This scene will appear when the exit navigation button is clicked. The view of Exit Scene can be seen in Figure 15.

No	Scene	Information
1	Text	Exit description
2,3	Navigation key	"Yes" "No"

Figure 15 Storyboard Exit Scene

3.2.3. Collection of Design Objects

The materials collection, content, and data needed to complete the manufacture of products from various sources. At this stage, the author utilizes sources from books, the internet, and other supporting documents. This is done so that the resulting product can be used or implemented optimally in learning. The material presented in this electronic module is obtained from relevant sources. Images and buttons are downloaded from various sources on the internet or made by yourself using the PowerPoint application which is then imported into the electronic module being developed. All objects are processed using Macromedia Flash 8 software.

3.2.4. Preparation of Validation Instruments

The instrument in this study was an instrument to measure the feasibility and practicality of the e-module which was designed in the form of a questionnaire with a Likert scale of 5 answers, namely Very Good (SB), Good (B), Fairly Good (CB), Not Good (KB) and Very Less Good (SKB). These answers are then converted into scores of 5, 4, 3, 2, and 1 in the order of the answer statements. The preparation of e-module validation assessment instrument items takes into account e-module eligibility aspects which include content feasibility aspects, linguistic aspects, and presentation aspects.

3.3. Development Stage

3.3.1. E-Module Development

The e-module was developed using the Macromedia Flash 8 application. The design of the learning media was in accordance with the storyboard that had been previously designed. The design result of the Macromedia Flash 8 software in the form of a file extension (*.fla) is then exported into an application in the form of a flash file, namely small web format (*.swf). For example, the form of the loading display is shown in Figure 16.
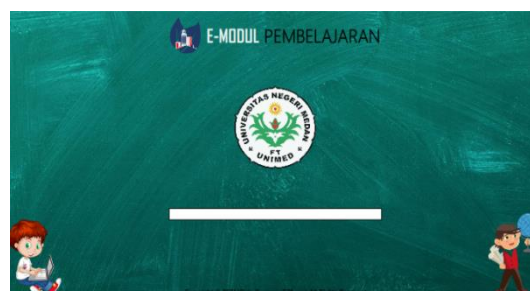

Figure 16 Screen Loading Display on intro page

The intro page is the opening page of the e-module before entering the main menu of the learning media application. The steps for making an intro page include: 1) Installing a background; 2) giving the text "Loading"; 3) Manufacturing of loading boxes; 4) Creating UNIMED animation and logo. Furthermore, the Menu display called Home is the main page of the e-module. Inside the Home, there is a title and buttons that will direct you to the page: Instructions, Learning Objectives, Profile, Introduction, Material, Competency Test, and there is a button to exit. Creating a home page has the following steps: 1) Creating a background; 2) Giving the text "Building Interior Design Using the Sketchup Application" as the leading title; 3) Digital watchmaking; 4) Adding a menu button consisting of instructions for use, learning objectives, profile, introduction, material, and competency test. Each button has its own explanation. 5) Adding a navigation button in the form of exit to exit the application; 6) Adding animation and using frame model layouts. The form of the Home page display can be seen in Figure 17.

Figure 17 Screen Menu Display on Home Page

On the material menu page, there is a sub-menu button (see Figure 18) that contains learning material. Creating a material menu page has the following steps: 1) Creating a background; 2) Using frame model layouts; 3) Creating exit and home buttons; 4) Creating a sub-menu button, 5) give the title text. On the material contents page, there is a material that has been made in accordance with the references that have been collected and in accordance with the basic competencies.

Figure 18 Material Menu Display

3.3.2. E-Module Feasibility Assessment

Validation from experts of content, media, and linguists aims to find out whether the e-modules made are suitable for use by users. The results of the validation are in the form of assessments and suggestions about learning media contained in the questionnaire provided by the researchers which will then be corrected according to the suggestions of experts. Before carrying out the product practicality test, several results of e-module improvements were obtained from experts. Some of the improvements according to the expert judgment can be seen in Table 3.

Table 3. Assessment Results and Expert Advice

No	Validator		Improvement
1	Expert of Media	a.	The exit button be directly out of Macromedia Flash.
		b.	The media display is still too stiff. Try to look more formal, elegant, and focused.
2	Expert of Content	a.	In the v-ray SketchUp explanation, explain what v-ray is used and its uses.
		b.	When using rendering, try using the escape plugin, because it's easier to use.
		c.	The theory should not be too long, just summarize and then give examples of pictures.
		d.	Add animation or SketchUp videos so that students understand and understand better.
3	Expert of Linguist	a.	There is an error in writing
		b.	In writing sentences there are still things that are not in accordance with tense.
		c.	In the use of language, the term is still not italicized.

Instrument analysis by media experts to determine the feasibility of learning media includes 6 aspects, namely: format, organization, attractiveness, shape and size of letters, space (blank space), and consistency. The data obtained from media experts can be seen in Table 4. The total score of the assessment by media experts as a whole gets a score of (x) 146 with a percentage of 79% getting a good criterion (see Table 5). So, it can be concluded that the developed e-module functions well as a learning medium in terms of media.

Instrument analysis by material experts to determine the feasibility of learning media includes 5 aspects, namely: self-instruction, self-contained, stand-alone, adaptive, and user-friendly. The data obtained from content experts can be seen in Table 6. The total score of the assessment by material experts as a whole gets a score of (x) 169 with a percentage of 91% getting a very good predicate (see Table 7). So, it can be concluded that the developed e-module functions well as a learning medium in terms of material. Analysis of instruments by linguists to determine the feasibility of learning media includes 5 aspects, namely: straightforward, communicative, and interactive, conformity with student development, conformity with language rules, and use of the term symbol or icon. The data obtained from media experts can be seen in Table 8. The total assessment score by linguists as a whole gets a score of (x) 40 with a percentage of 80% getting a good predicate (see Table 9). So, it can be concluded that the developed e-module functions well as a learning medium in terms of language.

3.4. Implementation Stage

Products that have been declared valid by experts are then applied to users to measure the practicality of the product. The practicality test of the module is carried out after validating the modules of material experts, media experts, and linguists who have been analysed, revised, and the modules have been declared fit for use with students. This trial was conducted to determine student assessment of the developed module. Product trial results data were obtained by using a questionnaire consisting of 11 questions. The total average score obtained from respondents is 52.7 out of an ideal score of 55. Based on practicality criteria, an overall percentage score of 95.81% is obtained so that it gets the title "Very Practical".

3.5. Evaluation Stage

The evaluation phase has been carried out at each stage. Product improvements according to recommendations from expert advice and user ratings, make the product better so that it is suitable for use.

Table 4. Media Expert Validation Result Score

No	Aspect	Total Point	Score (x)	Score Max.	Average	Percentage (%)
1	Format	4	17	20	4,25	85
2	Organization	9	36	45	4	80
3	Attractiveness	5	17	25	3,4	68
4	Font shape and size	6	24	30	4	80
5	Space (blank space)	5	20	25	4	80
6	Consistency	8	32	40	4	80
	Total	**37**	**146**	**185**	**3,95**	**79**

Table 5. Media Eligibility Criteria Score

No	Score	Percentage (%)	Category
1	X > 155,388	X > 83,99	Very Good
2	125,796 < X < 155,388	67,99 < X < 83,99	Good
3	96,204 < X < 125,796	52 < X < 67,99	Pretty good
4	66,612 < X < 96,204	36 < X < 52	Good
5	X < 66,612	X < 36	Very Good

Table 6. Content Expert Validation Result Score

No	Aspect	Total Point	Score (x)	Score Max.	Average	Percentage (%)
1	Self-instruction	26	116	120	4,46	89
2	Self-contained	3	15	15	5	100
3	Stand alone	2	10	10	5	100
4	Adaptive	2	8	10	4	80
5	User friendly	4	20	20	5	100
	Total	**37**	**169**	**185**	**4,56**	**91**

Table 7. Content Eligibility Criteria Score

No	Score	Percentage (%)	Category
1	X > 155,388	X > 83,99	Very Good
2	125,796 < X < 155,388	67,99 < X < 83,99	Good
3	96,204 < X < 125,796	52 < X < 67,99	Pretty good
4	66,612 < X < 96,204	36 < X < 52	Good
5	X < 66,612	X < 36	Very Good

Table 8. Linguist Expert Validation Result Score

No	Aspect	Total Point	Score (x)	Score Max.	Average	Percentage (%)
1	Straightforward	3	12	15	4	80
2	Communicative and interactive	1	4	5	4	80
3	Suitability with student development	2	8	10	4	80
4	Conformity with the rules of language	2	8	10	4	80
5	Use of terms, symbols, or icons	2	8	10	4	80
	Total	**10**	**40**	**50**	**4**	**80**

Table 9. Linguist Eligibility Criteria Score

No	Score	Percentage (%)	Category
1	X > 41,98	X > 83,96	Very Good
2	33,99 < X < 41,98	67,98 < X < 83,96	Good
3	26,01 < X < 33,99	52,02 < X < 67,98	Pretty good
4	18,02 < X < 26,01	36,04 < X < 52,02	Good
5	X < 18,02	X < 36,02	Very Good

4. CONCLUSSION

E-modules were developed using the ADDIE model was valid and practical to be used as learning media. Development begins with a needs analysis, e-module content, and display design. The developed e-module contains material for making interior design drawings with artificial lighting and creating interior designs with elements, materials, models, and accessories in each room that has been adjusted to the essential competencies and subject matter of the syllabus applied in vocational education. This e-module is made using the Macromedia Flash 8 application which is presented in .swf format and contains material and competency tests so that students can use it as an alternative knowledge and source of independent learning.

REFERENCES

[1] A. Arsyad, Media Pembelajaran, Raja Grafindo Persada Press, Jakarta, 2011.

[2] M. Taufiq, N.R. Dewi, A. Widiyatmoko, In pengembangan media pembelajaran IPA terpadu berkarakter peduli lingkungan tema "konservasi" berpendekatan science-edutainment, in: Jurnal Pendidikan IPA Indonesia, Semarang, 2014, pp. 140–145.

[3] A. Prastowo, Panduan Kreatif Membuat Bahan Ajar Inovatif, DIVA Press, Jogjakarta, 2008.

[4] A. Rayanda, Kreatif Mengembangkan Media Pembelajaran, Referensi Jakarta Press, Jakarta, 2012.

[5] Y.H. Rayanto, Sugianti, Penelitian Pengembangan Model ADDIE dan R2D2 Teori & Praktek, in: T. Rokhmawan (Eds.), Lembaga Academic & Research Institute Press, 2020.

[6] K. Wijaya, Model Pembelajaran Product Oriented Research Based (Prorised) Pada Pendidikan Vokasi, Padang, 2020.

[7] F. Syaiful, Membangun Media Interaktif, Building Nusantara Press, Yogyakarta, 2018.

[8] R.R. Winong, Menjadi Seorang Programmer Komputer, Wahana Komputer Press, Semarang, 2006.