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Developing An Interactive E-Module as Multimodal Learning Strategy in Fostering English Proficiency for High School Students

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ABSTRACT

Outdated teaching styles often lead to monotonous English classes in high school and affect students' enthusiasm in the learning process especially if the class is not equipped with technological developments. To address this challenge, this preliminary study designed and developed an interactive e-module with Environmental Context using the Flip Builder application as learning media for Explanation Text material to support English learning through multimodal learning strategies in senior high school. This study employed Research and Development approach and implemented ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) as initial research techniques. Moreover, the final evaluation methods occurred to ensure the feasibility of the e-module. The result of this research was an interactive e-module that contains multimodal texts which include written texts, images, animations, videos and games to capture students' interest during the learning process. The validation results indicated that the e-module was valid for all aspects. Therefore, it can be inferred that the interactive e-module using the Flip Builder application on Explanatory Text material with environmental context for high school student was feasible to be implemented in schools.

1. Introduction

The fast pace and unpredictable of livelihood in 21st century demand the changes in all aspects of life including technology and education (Van Laar et al., 2020). Today, in the digital era of teaching and learning, both teachers and students are crucial to adapt with technology in education. Teachers and students need to adapt to educational technology as it allows them to access a wider and diverse range of educational resources, increases interactivity in the learning process, and enriches the learning experience (Ifinedo et al., 2020). For teachers, technology enables the

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presentation becomes more interesting and facilitates efficient classroom management. Meanwhile, for students, technology opens up access to personalized learning that suits individual learning styles and expands opportunities to develop digital skills that are crucial in this modern era (Mourlam et al., 2020).

Technology able to offer an interactive learning experience which is advantageous for English learning activity as it can increase students' active engagement in the learning process (ButarButar & Simatupang, 2020). Especially for high school students who have studied a variety of texts, they need learning media to improve their understanding. In explanation texts that contain explanations about natural phenomena, the use of only written texts can be ineffective. Therefore, a multimodal approach becomes very important. By utilizing this approach, such as the use of video, audio, animation, and interactive quizzes, students can gain a deeper and more thorough understanding of the material being taught (Reyes-Torres & Raga, 2020). This approach not only makes learning more interesting and relevant for students, but also assist the students overcome the potential difficulties in understanding complex concepts, such as natural processes in explanation texts (Reyes-Torres & Raga, 2020).

By applying multimodal approaches, such as using written text, video, audio and interactive quizzes, teachers can create a more dynamic and comprehensive learning experience for students (Qushem et al., 2021). This approach not only helps students understand the concepts taught in different ways, but also enables them to develop all-round English skills. Previous research shows that the use of multimodal texts can train students' metacognitive abilities, which play an important role in their thinking and learning success (Sharma et al., 2020), as well as impact reading (Jamil & Aziz, 2021), listening (Campoy-Cubillo & Querol-Julián, 2021), writing (Hafner & Ho, 2020), and speaking (Seftika et al., 2021) skills.

Unfortunately, although multimodal approaches have been proven effective in improving students' effectiveness and understanding in learning, many teachers still persist with traditional learning methods. Many students have difficulty in understanding complex concepts in explanatory texts, especially regarding natural phenomena, and often feel bored. When this is left unchecked, student boredom can hinder the learning process, as its effectiveness is strongly related to student interest. Students who learn with high motivation and enthusiasm tend to achieve more optimal learning outcomes (Alizadeh, 2016). Conversely, students who lack interest in English learning can have difficulty in achieving significant progress (Islami et al., 2019). Motivation continues to be a major concern in the context of English language learning, while learning strategies are influenced by self-efficacy and individual enthusiasm levels, which can be decisive factors in achieving good English skills (Klimova, 2011; Khodadad et al., 2016).

An additional problem that arises is the lack of media that adopt a multimodal approach to teaching explanation text to high school students. Previous research also shows that there are no studies that specifically examine the use of

multimodal approach in the context of explanation text for high school level. The lack of media that offers a combination of text, video, audio, animation and interactive quizzes on explanation text for high school students limits students' ability to respond to and understand the material thoroughly. This can result in low levels of student engagement and difficulty in internalizing and applying the information learned. In the face of this challenge, the development of learning media that uses a multimodal approach is needed to improve learning effectiveness and ensure better understanding for high school students in the study of explanation text.

Therefore, this research sees that the solution is to develop an interactive e-module that adopts multimodal learning strategies, such as the use of written text, video, audio, animation, and interactive quizzes on explanation text that contains environmental context. Research can fill the gap by leading to the development of e-modules that are more effective and adaptive to the needs of the curriculum and environmental context.

2. Methodology

E-module in this study was developed with Research and Development (R&D) approach that purposed to produce new products or improve existing products. The development process of this interactive e-module is according to the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). It is worth noting that this research only includes the development stage since the goal was to develop a product as the final result, hence the implementation stage was not conducted. This is possible because the ADDIE model can be adapted according to research needs (Sugiono, 2014).

Analysis

The analysis stage was carried out to explore the background and needs of developing multimodal text learning resources based on interactive e-modules for Explanation Text material in grade XI senior high school. This analysis includes several main aspects:

- a) Analysis of student needs: This involved analyzing through previous research and discussions in order to identify students' needs in studying Explanation Text, learning preferences, and the challenges they encounter in understanding and mastering the material effectively.
 - b) Curriculum analysis: The aim was to ensure that the development of this module was in line with the applicable curriculum in senior high school grade XI which was Kurikulum 2013, learning materials, standard of competency, and suggested learning approaches.
 - c) Learning media analysis: This included the selection and utilization of appropriate media to support the learning of Explanation Text materials. The process was proceeded by evaluating different types of learning media that have been tested in prior research.
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Design

The second stage was the design stage. In the design stage, there were two main points:

- a) Designing interactive e- module: At this stage, the researcher designed the e-module in accordance with the Explanatory Text Curriculum 2013 content, e-module framework, and quiz material. This design stage also included determining relevant images, audio, video animations, and quizzes to enrich the e-module material.
- b) Designing research instruments: Researchers compiled a validation sheet with evaluation criteria such as content aspects, content feasibility, presentation feasibility, language feasibility, and graphic feasibility.

Develop

The third stage is the development stage. In developing the interactive e-module, researchers used Canva to develop the display design and layout of the module and Flip Builder to convert PDF files into e-modules. The development stage is divided into two stages, namely stage 1 and stage 2. At development stage 1, the e-module was designed according to the initial design. Then, the e-module was assessed by experts to be validated. Media expert validation sheet indicators modified from Fonda and Sumargiyani (2018). The data analysis technique that will be utilized in this research is descriptive analysis (Sugiyono, 2014). The descriptive assessment on the validation sheet is converted into quantitative data using a Likert scale (Boone & Boone, 2012). For assessment purposes, the validators provide a range of scores using a Likert scale consisting of 4 categories or choices. The Likert Scale categories used in data analysis techniques can be shown as in Table 1.

Table 1. Likert Scale Category (Boone & Boone, 2012)

No	Score	Category
1.	4	Excellent
2.	3	Good
3.	2	Average
4.	1	Poor

The data were analyzed with specific analysis techniques using formulations by Linda et al. (2018).

$$P = (n/N) \times 100\%$$

Explanation:

P = Percentage score (%)

n = Number of scores obtained

N = Maximum score

The percentages obtained are then converted into qualitative values with the validity criteria in Table 2.

Table 2. Validity Criteria

Percentage Score (%)	Validity Criteria
75.00-100	Valid
50.00-74.99	Valid Enough
25.00-49.99	Less Valid
0.00-24.99	Not Valid

(Adaptation from Linda et al. (2018))

The interactive e-module was considered valid if the minimum percentage of validity achieved was between 50% and 100% (valid enough to valid criteria). If the level of validity achievement was under 50%, then revisions needed to be made until a valid interactive e-module was obtained. If the e-module has not reached the valid level, then stage 2 development will be carried out which aims to improve.

Implementation

This research only focused on the development stage since the flexibility of the ADDIE model enables modifications according to research needs (Sugiono, 2014). Implementation was not conducted as this research aimed to produce a product as the end result, without proceeding to the implementation stage.

Evaluation

The evaluation stage was an ongoing process applied to each development cycle of the multimodal text interactive e-module for Explanation Text Material in senior high school. Evaluation was carried out by collecting feedback from the validators.

3. Results and Discussion

Results

Developing E-Module

In this study, an interactive e-module was developed using the Flip Builder application for grade XI senior high school for Explanation Text material. This product can be accessed online through electronic devices such as computers, laptops, and smartphones. The research approach as Research and Development by applying the ADDIE development model. The ADDIE development process in this study included analysis, design, and development stages. The following is an explanation of the results of each stage of development:

A. Analysis

The first stage of developing the interactive e-module was the needs of students' analysis, the curriculum analysis, and the learning media analysis.

- Students' needs analysis:

The first stage of this interactive e-module development is student needs analysis, curriculum analysis, and learning media analysis. Based on the needs analysis through previous research literature study, it was found that learning is effective when students are active in problem solving with little teacher assistance and have high motivation Bremner (2021). Most students (72%) were familiar with internet-based learning Destianingsih (2017), which showed internet integration can increase learning motivation. Thus, the development of digital learning materials aims to support students' learning achievement with effective strategies. Teachers need to design modules that enable students to develop digital literacy, collaboration in problem solving, creativity, and other skills with innovative technologies. These findings support the need for practical, engaging and interactive learning media that students can access independently.

- Curriculum Analysis

Furthermore, at the curriculum analysis stage, an evaluation of the Explanatory Text material taught to grade XI high school students was carried out. This process includes an in-depth analysis of the Core Competencies and Basic Competencies contained in the Explanatory Text material. This analysis aims to ensure that the learning materials are in accordance with the established competency standards, which include students' ability to use English interpersonally, transactionally, and functionally in both speaking and writing contexts.

- Media Analysis

The development of learning media, there are four competency scopes of English language subjects in grade XI SMA which are in line with Canale & Swain (1980).

(1) Language Action Competency is manifested in the mastery of four language skills; listening, speaking, reading, and writing. The researcher has presented these four skills explicitly in this interactive module.

(2) Linguistic Competence is manifested by the ability to correctly apply and understand the elements of grammar, vocabulary, pronunciation, and spelling in the text. (3) Sociolinguistic Competence is manifested by the ability to use language appropriate to the social context. This competence is divided into two competencies as follows.

(a) Sociocultural Competence is the knowledge of the relationship between language use and its non-linguistic context. Researchers raised the theme of Climate Change as the main topic in supporting Language Action Competence.

(b) Discourse Competence is knowledge about the rules that regulate the cohesion and coherence of a number of discourses and form a meaningful series of utterances.

(3) Strategic Competence is the ability and skill to apply various strategies so that communication remains effective. This competence is also known as the ability to paraphrase what the speaker says and to ask probing questions. To improve this

competency, the researcher included some videos of real speakers in this interactive module. Furthermore, learners can identify strategies in presenting Explanatory Text and also the material presented in the videos.

B. The Designing Stage

The second stage in the development of interactive e-modules was the design stage, where the module was designed according to the needs by containing multimodal texts, such as written texts, audios, videos, and quizzes. The results of this design included a specific module concept, title, and outline. The concept of this module focused on the topic of climate change, including definitions, impacts, resulting disasters, and coping strategies. The title of this e-module is "Interactive E-Module Tell Me How and Why! Explanation Text Material for Grade XI High School", which is reflecting the interest in understanding the process of events, the core of explanation text material for high school. The e-module framework was adapted from the practical guidelines of the Directorate of High School Development of the Ministry of Education and Culture Indonesia in 2017, including the cover, table of contents, author profile, instructions for use, core and basic competencies, concept map, learning materials, evaluation, and attachments. This framework design was realized into an e-module using Canva software for display design and integrated with Youtube application. All components were compiled as an interactive e-module using Flipbook software.

C. The Developing Stage

The development process was carried out in accordance with the design. Following that, the e-module went through a validation process involving three experts who had expertise in content, presentation, language, and graphic display. The results of this evaluation determined whether this module has met the expected standards before being implemented in the learning process. Table 3 shows the display of "Interactive E-Module Tell Me How and Why! Explanation Text Material for Grade XI High School"

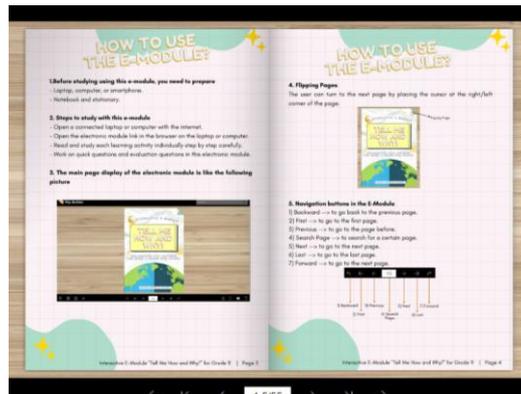
Table 3. The Screenshot of the E-Module Result

No.	E-Module Components	Display
1.	Cover	

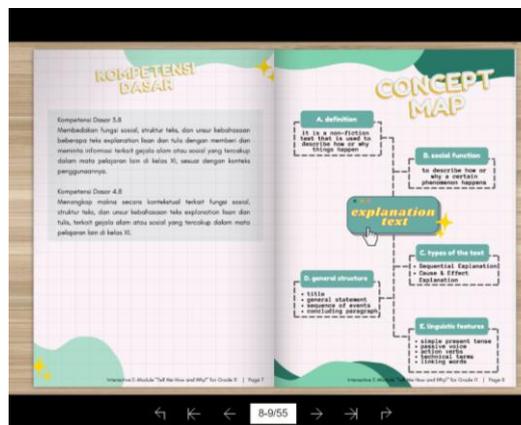
2. Table of contents and author profile



3. Direction for using e-module



4. Kompetensi inti, kompetensi dasar, and mind map



5. Learning material (Listening Section)

What is climate change?

Climate change is a long-term change in the earth's overall temperature with massive and permanent consequences. This phenomenon is causing a wide range of impacts today. Extreme weather such as hurricanes, floods, wildfires, heatwaves, and droughts are intensifying. As climate change worsens, dangerous weather events are becoming more frequent or severe.

The cause of current climate change is largely human activity, one of the examples is burning fossil fuels like natural gas, oil, and coal. Burning these materials releases what are called greenhouse gases into Earth's atmosphere. There, these gases trap heat from the sun's rays inside the atmosphere causing Earth's average temperature to rise. This rise in the planet's temperature is called global warming. The warming of the planet impacts local and regional climates.

listening!

Do you want to know more about Climate Change? Check out this video!

In this e-module, we will discuss various disasters related to climate change and also how to overcome climate change!

6. Learning material (Writing Section)

writing!

Activity B
Instruction:
Based on your understanding of the video, please rewrite "How A Tornado Forms" in 3 paragraphs! Follow the structure of the text below!

Title:

Opening Statement:

Series of Sequence Paragraphs:

Concluding Paragraph:

How to slowdown the climate change?

There are various ways to slow down climate change while improving our environment. One way is to plant more trees.

The following text is about the life cycle of plants. Let's read together!

7. Learning material (Reading Section)

reading!

As it is mentioned before, there is a lot of effects caused by climate change! The most serious effect of climate change is Indonesia is flood. Let see how it occurs!

How Does Flooding Happen in Urban Area?

Flooding is a condition when a lot of water is trapped in a normally dry area. This is a phenomenon that is detrimental to many people because it can cause material and health losses. There are 2 main causes of flooding. The first is due to natural phenomena such as heavy rainfall, overflowing water from rivers, seas, or lakes. While the second cause is due to human activities such as logging, poor drainage systems, and blockage of ditches due to garbage. Flooding is caused by the effects of human activities that often occur in urban areas. The following description will describe the process of flooding in urban areas due to extreme rain.

Each urban area is designed with a drainage scheme that will collect rainwater and allow it to flow into rivers or to certain locations which can later be absorbed by the soil. However, there are certain possibilities that can hinder this process from running perfectly. One possible factor is littering. Think of the city's underground drainage system as a long big pipe. When poured into a pipe, the water will come out at the other end of the pipe. This is how the plumbing system should work. But what would happen if something covered the other end of the pipe with something? For example, the other end of the pipe is covered with plastic or something to make sure that water doesn't get through. The water that has been poured into the pipe will begin to fill the entire pipe space to the brim and flooding occurs. That's what happens most in urban areas.

Unfortunately, littering is the main cause of it. People litter and when some water of the trash falls into the sewers and pile up somewhere inside. Until one day, a pile of garbage clogs the waterways, and as a result, floods occur when it rains heavily. For this reason, we must maintain the cleanliness of our environment by not littering so that we can avoid flooding especially in urban areas.

8. Learning material (Speaking Section)

speaking!

DARE TO SPEAK, GUYS!

Instructions:

1. These are some options for explanation text topics. Choose an explanation text topic then write an explanation text about it which consists of 3 paragraphs. You may do mini research of your topic on Google. You have 30 minutes to write it!

2. After that, do a presentation in a virtual classroom via video call!

Aims of Learning

1. Able to make short and simple explanation texts about natural phenomena
2. Present explanation text by writing and speaking

The Life Cycle of Butterflies.

How Do Rainbows Happen?

The Life Cycle of Frogs.

How Do People Get Infected by COVID-19?

9. Grammar

Second meeting
what is passive voice?

Aims of Learning

1. Understand the language features of explanation texts in giving and asking for information related to natural phenomena covered in other subjects in class XI
2. Able to use passive sentences in the correct tense

E. Linguistic Features

- present tense** → A tense expressing an action that is currently going on or indicates the certainty or generality of an action.
- passive voice** → A subject is a recipient of a verb's action. (This part will be discussed in detail on the next page)
- action verbs** → The verbs that describe actions. For example, run, jump, kick, and many more.
- technical terms** → A word that has a specific meaning within a specific field of expertise. For example, expansion, engine, and many more.
- conjunction of time** → A word that used to connect words or sentences and sign when something happens, for example, when, after, before, once, while, until, and many more.

Passive voice

Passive Voice is when the emphasis is on the action (verb) and the object of a sentence rather than the subject of a sentence.

It means that:

1. Action is more important than the subject.
2. Subject is unknown.
3. When the subject is known it is put at the end.

Examples

- A lot of water is trapped in dry areas.
- Flooding that is caused by the effects of human activities often occurs in urban areas.
- Each urban area is equipped with a drainage system.

Bob mailed the package.
The package was mailed by Bob.

The **subject** of an active sentence becomes the **subject** of a passive sentence.

The **subject** of an active sentence is the **object** of an active sentence in a passive sentence.

Form of all passive verbs:
be (am/are/was/etc.) + past participle

quick question 1.1

Instructions:
Answer the following questions based on the text of "How Does Flooding Happen in Urban Area?" on the previous page!

1. What is the text tells us about?
2. What are the causes of the phenomenon?
3. Have you ever experienced that phenomenon before?
4. The first paragraph tells us about...
5. The second paragraph tells us about...
6. The third paragraph tells us about...
7. What is the author trying to convey in the text?
8. What kind of tense does the text mostly use?

Based on the questions given, we can conclude that the type of text titled "How Does Flooding Happen in Urban Area?" is an **explanation text**.

first meeting | main activity

Learning materials

A. Definition

What is Explanation Text?
An explanation text is a non-fiction text that is used to describe how or why things happen. It usually includes a sequence of events (explaining how) and provides reasons for a process of phenomenon (why).

Some examples of explanation text:
-What Causes of Earthquakes?
-The Water Cycle
-How Does Tornado Happen?

B. Social Function

Explanation text is used to explain the process or how and why a certain phenomenon happens

10. Game

quick question 2.2

Activity A:
Based on the text titled "The Life Cycle of Plants" and find the meaning of these technical terms!
1. Germination is...
2. Seedling is...
3. Photosynthesis is...
4. Stamen is...
5. Poll is...

Activity B:
The following is an illustration of the life cycle of plants. Complete the blank spaces with the word choice provided below the illustration. Answer A is an example for you!

At this stage: seed

E1... stage: E2... stage:

D1... stage: C1... stage:

Second Young Plant Fruit Flower Mature Plant F1st

third meeting | post activity

games!

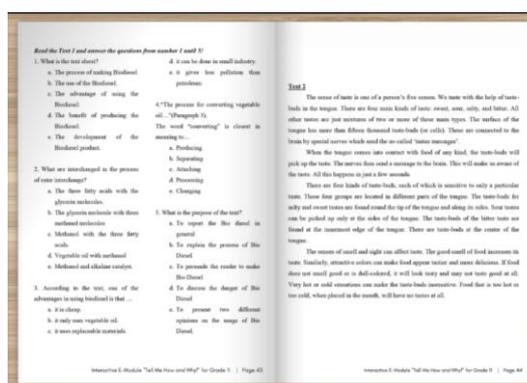
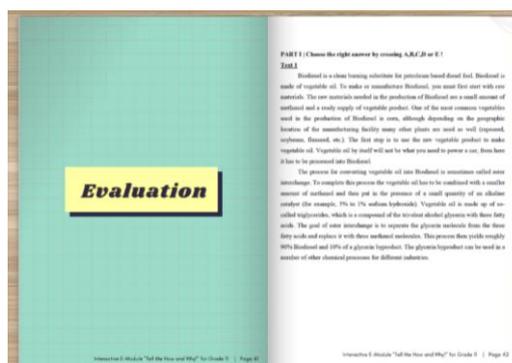
Instructions:
Look for 16 words that relate to what you have studied previously. Then, explain 5 words that you've found! Take a look to the example below.

U C L I M A T E C H A N G E

R H T R N O S R S M L E F L
B L G W I R E T T I L P E N
A P P R A E N C T R I N E T
N O E D T G A G L R T C U O
G L O I I A C N R O E O T R
N L D S N I E S L U S A N
I P I R I R I E T T O B A
G N I A A A R W G N O T E D
G A E R R R U O A G R R P O
O T R O E D H L S T R M A E
L I T O N S P F E L E O S
G N P I S T I L E T O S T E
O G F L O O D S D P R T U T

Example:
Climate change
→ Climate change is a long-term change in the earth's overall temperature with massive and permanent consequences.

11. Evaluation Test



12 Attachments

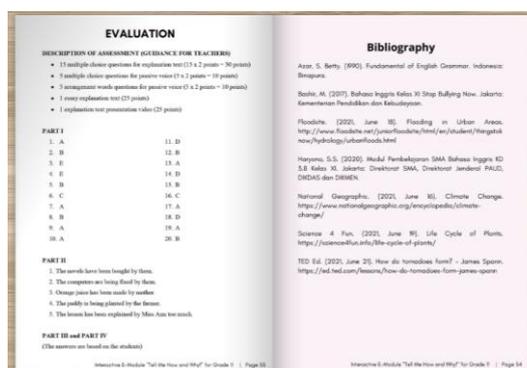
**Validation Phase**

Figure 1 shows the validation result of the module. Based on Figure 1, overall, the validation results show that the interactive e-module "Tell me How and Why!" qualifies as an effective learning media. In the Content Feasibility assessment, the percentages are 78.57%, 100%, and 96.42%. For Presentation Feasibility, the percentages are 87.5%, 87.5%, and 93.75%. Evaluation of Language Feasibility shows percentages of 75%, 100%, and 91.67%, while for Graphics Feasibility, the percentages are 78.57%, 98.21%, and 94.64%. Based on the Validity Criteria table adapted from Linda et.al (2018), it can be concluded that the Interactive E-Module "Tell me How and Why" is considered a valid module.

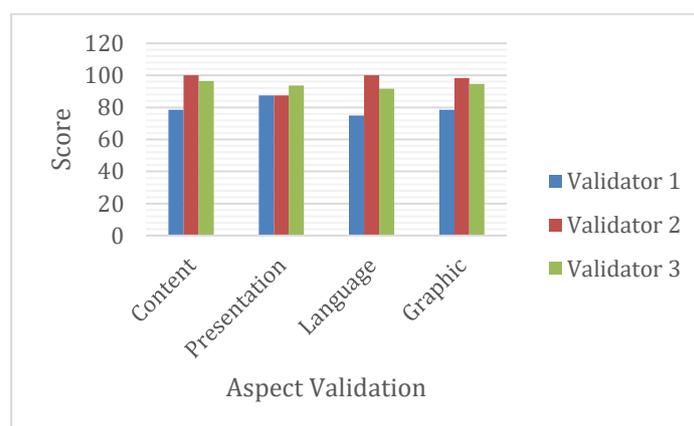


Figure 1. Validation Result from the Validators

Discussion

The process of developing an interactive E-Module in this study utilized the Research and Development approach with the ADDIE model. E-module "Interactive E-Module Tell Me How and Why! Explanation Text Material for Grade XI High School" was developed using the Flip Builder application. Using this application, the media display becomes varied since it can incorporate text, image files, pdf, swf, animation, audio, and video with FLV and MP4 formats (Sugianto, et al, 2017).

Learning media combined with the internet is indispensable in today's world of education. In 2017, Destianingsih and Satria found that 72% of students knew about internet-based learning. This means that education supported by the internet as a learning medium is not new to them. The combination of the internet and learning can actually increase student motivation in learning. The purpose of digital or multimedia technology-based learning materials is to help students achieve the best learning achievement through effective learning strategies applied in learning materials. This is in accordance with Groff's (2013) opinion that teachers should be able to build a good learning module where students can gain digital literacy, collaborative problem solving, creativity, and many other skills while interacting with innovative and interesting technology. The results of this study are a strong basis for the need to develop a practical, interesting, and interactive learning media that can be used independently by students anywhere and anytime.

One of the main benefits of multimodal e-modules is their ability to meet students' learning needs and preferences. Besides being able to accommodate various learning styles, multimodal e-modules also provide other advantages. Multimodal e-modules can increase learning motivation by making the learning process more interesting and fun. The use of interactive elements, gamification features and multimedia content can capture students' attention and increase their intrinsic interest and motivation to learn. This not only contributes to improved understanding of the material but also deepens student engagement in learning, making this e-module an effective learning resource.

This research produced a valid module that can support internet-integrated learning. This research contributes to the emerging literature promoting technology integration in meeting learners' expectations in 21st-century education. Although this research contributes profoundly to English language education, it also recognizes potential limitations. This E-Module has not been tested directly with students as it only reached the validity test stage. Therefore, further research is required to test the effectiveness of this e-module directly to students.

4. Conclusion

Based on the results of this study, it can be inferred that the Interactive E-Module "Tell Me How and Why" meets the eligibility criteria as a learning module that employs multimodal texts. This interactive e-module is suitable to support students' understanding of Explanation Text material for grade XI high school. However, further research is recommended to pilot this module directly to students.

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