Journal of Education Technology
Volume 6, Number 3, 2022 pp. 410-422
P-ISSN: 2549-4856 E-ISSN : 2549-8290
Open Access: https://ejournal.undiksha.ac.id/index.php/JET

Scientific Approach based E-Module on Vibration, Waves, and Sound Using Canva Design

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ARTICLE INFO

Article history:
Received June 28, 2021
Revised July 05, 2021
Accepted May 12, 2022
Available online August 25, 2022

Kata Kunci:
E-Modul, Scientific Approach, Canva Design

Keywords:
E-Modul, Scientific Approach, Canva Design

DOI:
https://doi.org/10.23887/jet.v6i3.36133

ABSTRAK

Perubahan kebiasaan pembelajaran pada masa pandemi ini mengakibatkan menurunnya minat belajar siswa. Guru memiliki peran penting dalam menciptakan pembelajaran yang bermakna selama masa pandemi. Tujuan penelitian ini adalah pengintegrasian teknologi berupa e-modul dan menggunakannya dalam pembelajaran selama masa pandemi. Jenis penelitian kali ini adalah penelitian pengembangan dengan model Sadiman yang diadaptasi dengan validasi Sugiyono terdapat 6 tahapan yaitu, menganalisis kebutuhan, merumuskan butir tujuan, merumuskan butir materi, pengembangan media, memproduksi media, mengadakan validasai dan uji coba. Validasi dilakukan oleh 2 ahli dan uji coba e-modul diterapkan pada 10 siswa SMP kelas VIII. Data yang diperoleh selanjutnya akan di analisis menggunakan metode deskriptif kuantitatif. Berdasarkan hasil validasi ahli materi memperoleh rata-rata 16 dengan kategori sangat baik dan validasi dari ahli media memperoleh rata-rata 14.5 dengan kategori sangat baik. Hasil uji coba produk diperoleh respon diperoleh rata-rata kecenderungan Sangat Setuju sebesar 60%. Hasil yang diperoleh menunjukan bahwa isi materi dan konten yang terdapat dalam e-modul membuat siswa memahami konsep, tampilan e-modul membuat siswa lebih termotivasi belajar, dan siswa lebih mudah belajar dengan e-modul karena bisa dibuka dimana saja.

ABSTRACT

Changes in learning habits during this pandemic have resulted in a decrease in student interest in learning. Teachers have an important role in creating meaningful learning during a pandemic. This research aims to integrate technology in the form of e-modules and use it in learning during the pandemic. The type of research this time is development research with Sadiman's model adapted with Sugiyono's validation. There are 6 stages: analyzing needs, formulating goals, formulating material items, developing media, producing media, and conducting validation and testing. 2 experts carried out validation and the e-module trial were applied to 10 SMP class VIII students. The data obtained will then be analyzed using quantitative descriptive methods. Based on the validation results, material experts obtained an average of 16 in the very good category and validation from media experts obtained an average of 14.5 in the very good category. The results of product trials obtained responses obtained an average tendency of Strongly Agree of 60%. The results show that the contents of the material and content contained in the e-module make students understand the concept, the display of the e-module makes students more motivated to learn. Students find it easier to learn with the e-module because it can be opened anywhere.

1. INTRODUCTION

Indonesia is currently facing the challenges of the industrial revolution where the ability and skills of human resources (HR) are required to understand the technology field and have more complex thinking. Education has an important role in supporting the progress of Indonesian human resources quality. Education in the industrial era 4.0 needs to be viewed as developing 21st-century competencies consisting of thinking, acting, and adapting skills (Devi et al., 2020; Kuper, 2020; Rahmawati et al., 2017). Various efforts have been made, including inquiry-based learning to improve student competence in the 21st century, including the discovery model (Anugraheni et al., 2018; Wulandari et al., 2019). Some solutions that can be done to make education a success in this industrial revolution era are 1) the suitability of curriculum and policies in education, 2) the readiness of human resources in utilizing ICT, optimizing the abilities of students, and developing the values (character) of students, as well as 3) the readiness of educational facilities and infrastructure (Reflianto & Syamsuar, 2019). The solution to the problems in this era, especially in education, is still unresolved. The problem has occurred along with the Covid-19 Pandemic, which occurred in various countries and broadly impacted important sectors, such as education (Rahayu & Wirza, 2020; Wiryanto, 2020). The education system at various levels of education has changed from face-to-face to online. Even in limited conditions due to the

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COVID-19 pandemic, they can still do learning online (Kartimi et al., 2021a; Qualified et al., 2021). Online learning is often constrained by internet networks that are difficult to reach (Mishra et al., 2020; Rahayu & Wirza, 2020). This results in online learning activities not being smooth.

Online learning that is not smooth is also caused by other problems that come from students and teachers. One of the problems also experienced by students, teachers, and parents is the provision of the internet and other technological facilities (Almonacid-fierro et al., 2021; Gjerde et al., 2021; Sadikin & Hamidah, 2020). Some parents also have difficulty in using technology and limited time because they have to work while working. Meanwhile, many students complained about difficulty understanding the material and difficulty solving problems in practice questions (Anugrahana, 2020; Sadikin & Hamidah, 2020). Problems in conducting online learning can decrease the quality of education and reduce the meaningfulness of a learning process (Abdullah et al., 2021; Klein et al., 2021; Sadikin & Hamidah, 2020). If supported by proper awareness and direction, online learning can train student responsibilities independently, such as training students to continue collecting assignments even without teacher supervision (Dewi et al., 2022; Rahmawati et al., 2021). The learning process requires integrating technology that functions as access to student flexibility (Rahmayanti et al., 2021). One media that supports independent learning and makes student output results according to competence is the e-module (Rahmatunisa et al., 2022). The preparation of teachers as coordinators of learning activities must be mature in online situations like this. Careful planning and technology in this shift in study habits will help students be more independent in learning. Effective learning can positively affect learning achievement, communication and self-regulation skills.

Learning that is expected to influence learning achievement positively and effectively and other abilities requires the right strategy to achieve the desired expectations. However, the teacher's strategic preparation for learning has obstacles from the internal factor of the teacher himself (Juanda et al., 2021; Kartimi et al., 2021). The internal fa k tor in question is psychological. Careful strategy preparation affects saturation and even stress on teachers (Anas, 2019). Not only caused by this, but teachers also experience stress due to changes in the system, communication with students, parents or guardians of students, administrative systems and learning scenarios (Handayani et al., 2017). Therefore, support from various parties is needed, including parental support for students' education and adequate technological facilities (Chinedu & Kamin, 2015; Khuluqo et al., 2021; Pressley, 2021). Science teachers are no exception to also experiencing this. Based on research that has been carried out, it is stated that science teachers are still not ready to face this challenge (Pressley, 2021; Sadikin & Hamidah, 2020). The interviews with parents and students show that they prefer in-person activities over online. Many concepts are not well conveyed to students. So it is felt that a change in the strategy of science lessons is needed during a pandemic. One strategy that can help solve problems that exist during a pandemic is the use of media. Media commonly used in online learning are WhatsApp, google form, google classroom, google meeting and zoom (Anugrahana, 2020; Kusuma & Hamidah, 2020; Suhroh & Cahyono, 2020). Through this platform, teachers can instruct how learning activities are carried out. Students who pay attention and have good facilities will respond well to these instructions but vice versa for students with limitations. However, learning through the platform has only gone one way. Based on research that has been carried out, students want to learn videos and discussions when conducting face-to-face learning with some of these platforms (Abdullah et al., 2021; Almonacid-fierro et al., 2021; Kusumaningrum & Wijayanto, 2020). This incident adds to the evidence of the importance of technology literacy, especially for education actors.

Technological literacy is one of the literacy materials packaged in digital form. Literacy materials in the form of electronics can be used as reading material during online learning (Mumpuni et al., 2021; Suni Astini, 2020). The media that can facilitate students, in this case, is the E-Module. E-module is a book display or is a form of literacy material that is packaged electronically and is more practical in its use. Students do not need to bring thick books anymore. With the e-module, students can study anywhere and anytime. This electronic book is currently widely packaged with various methods and technologies such as videos, animations, and images that can increase student learning motivation (Oktaviara & Pahlevi, 2019; Surjono, 2017). In some studies, it is stated that Problem Based Learning-based E-modules can improve science process skills. This e-module is equipped with practice questions that test students' understanding and process skills in each chapter (Perdana et al., 2017; Serevina et al., 2018). E-modules can be used as a means of independent learning because they are equipped with materials that are integrated with the application of daily life and are also more practical to use and can be accessed through laptops, computers and smartphones (Darmayasa et al., 2018; Pratiwi et al., 2021). E-modules can be used in learning during a pandemic, with the right learning model combined when making e-modules will have a positive impact on teaching and learning activities (Palgunadi et al., 2021; Sofyan et al., 2019). An e-module can be said to be interactive when there is the interaction between the user and the e-module, such as paying attention to images, moving writing and varying colors, sound, animation and even video. E-modules have self-instructional, self-contained, stand-alone, adaptive and user-friendly (Asrial et al., 2020; Musdi et al., 2019).

The characteristics on the E-module can facilitate science learning which requires more exploration from the students. In this case, science that studies the symptoms of nature requires a scientific process to produce products in the form of a, concept or idea. It is in line with the method being intensified by the 2013 curriculum, namely the Scientific Approach. The scientific approach plays an important role in training language, literacy and numeracy skills (Rahardjo, 2014; Sabirin et al., 2016; Wakhidah, 2018). Integrated Science is a subject that becomes a compulsory subject in the national final examination at the junior high school / MTs. Integrated Science itself consists of various disciplines, namely biology, physics and chemistry, which are interconnected (Linda et al., 2021; Salta et al., 2020). It turns out that students have their own views on concepts about physics. Some students think learning physics is fun, but some say physics is difficult. This assumption also influences students. Students who like and think physics is easy to learn will feel more optimistic and interested in learning than those who think physics is a difficult concept to learn. Awal and interest in education can affect the achievement of learning physics (Astuti, 2015). One of them is in the vibrational matter, waves and sounds, where there are many physical concepts. As much as 65% of elementary school students in Samsun Turkey experienced misconceptions about the sound transmission (Sözen & Bolat, 2011). Misunderstandings also occurred in MTsN Rukoh Banda Aceh students. Vibrational material and waves averaged 32.67%. The highest misconception in the amplitude material reached 85.7%. Misconceptions caused by the incompatibility of students' initial knowledge and understanding of concepts during the teaching process can also be caused by the incompatibility of the delivery of concepts presented by teachers to students (Liza, Soewarno, 2017). Following these problems, it is necessary to improve teaching strategies because the chances of students not understanding the concept of science and losing interest in learning science are greater in times like this.

Based on the description above, a learning media is needed, namely a scientific approach-based e-module for vibration, wave, and sound materials. The research that has been carried out shows that modules based on scientific approaches to acid and base materials get very good categories to be worthy of use in the learning process (Marpaung & Pongkendek, 2021). This module is recommended for teachers to make it easier for students to learn independently and have an impact on improving student learning outcomes. The design of special e-modules follows the material and can be used easily by educators. The practicum e-module for chemistry students can be packaged by uniting audio-visual and audio-visual media using canvas design. Based on the acquisition of surveys conducted by this media, it can be a tool for teaching chemistry practicum and increasing knowledge related to implementing practicum in the laboratory. However, it cannot completely replace practicum directly. Based on field surveys and interviews, it is stated that there has not been a scientific approach-based science e-module. Especially on vibration, wave, and sound material that can be integrated directly with video, animation, and other article sources and facilitate students to conduct online practicum. So that this study has the objectives to 1) Produce a scientific approach-based e-module on vibration, wave, and sound materials using the canvas application. 2) Evaluate the feasibility of a scientific approach-based e-module in science learning 3) Describe students' responses to e-modules.

2. METHOD

This research was a type of research and development (Research and Development). Development research itself is research that aims to produce products (Sadiman et al., 2014; Sugiyono, 2013). The development was carried out using the method of the Sadiman model development. Sadiman's development model, namely 1) Analyzing the needs and characteristics of students, 2) Formulating instructional objectives, 3) Formulating material items, 4) Developing media, and 5) Producing media 6) Implementing validation, revision, and trial. The research flow is presented in Figure 1.

The developed product was validated. Media validation is carried out by 1 material expert and 1 media expert. Assessment of media by validators based on indicators that have been compiled in the grid of material experts showed in Table 1. The research subjects used by class VIII students were as many as 10 students who had participated in learning activities for vibration, waves, and sounds. The trial in this study used instruments in the form of questionnaires and interview guidelines, while the response questionnaire grids used showed in Table 2 and Table 3.

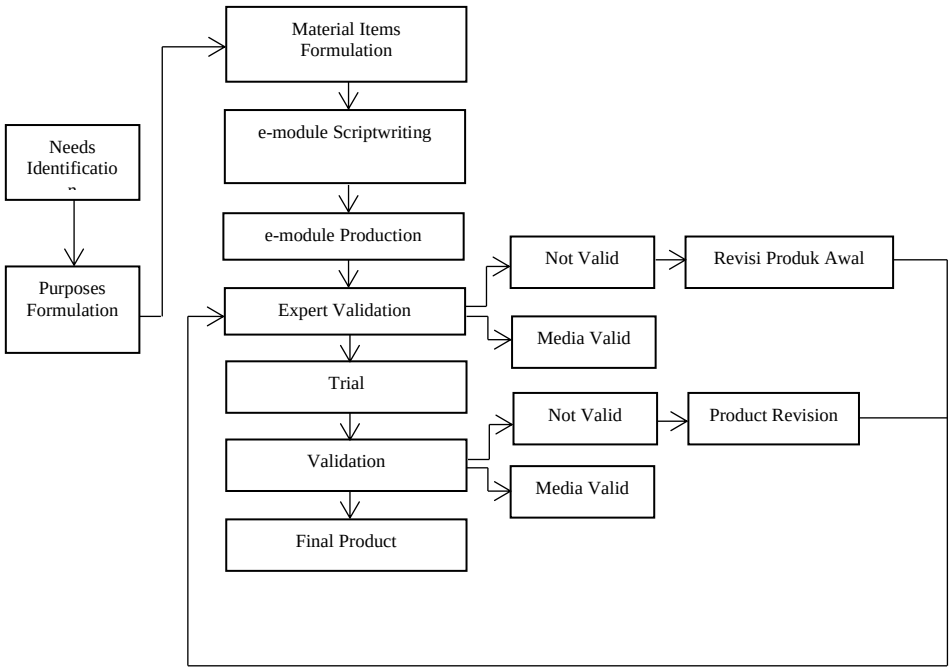

Figure 1. Instructional Media Development Procedure Chart in Order with Researcher Modifications

Table 1. Media Expert Validation Instrument Grid

Assessment Aspect	Indicator	Number of Items
Serving	Presentation of e-modules	3
	Clarity of learning objectives	4
	Presentation of linked e-modules with appropriate content	3
Content	Conformity of the material to the linked content for each chapter	6
	e-module according to the scientific approach method	8
	Conceptual truth	3
	The presentation of the material requires students to learn actively	5
	Accuracy of facts	3
	The presentation of the material creates a pleasant atmosphere	4
Language	Proper and clear use of language	5
	Proper and clear use of sentences	4
	Readability	4
	Use of the term	6
	Integrating learning resources from youtube content, phet, padlet and articles	3
	The role of e-modules in learning	4

Table 2. Student Response Questionnaire Grid

Assessment Aspect	Indicator	Number of Items
Student response to the content of the e-module	Compatibility of e-module explanations	2
	New knowledge provided	2
	Ways of delivering the material	1
Student response to the e-module display	Integrating e-modules with internet platforms	2
	E-module page appearance	2
Students' response to ease of learning	Providing material understanding	2
	Ease of operation of the e-module	2
	Stimulating interest in learning	1

Table 3. Interview Guidelines for Students

No	Questions
1.	What do you guys think about the electronic book we have made?
2.	From this electronic book, you can learn anything?
3.	What new knowledge do you guys get from this electronic book?
4.	Do you think this electronic book already covers all the material in the vibration, wave and sound chapter?
5.	Did the teacher also give you an electronic book?
6.	Do you like the appearance of the electronic book?
7.	Does the animation in the e-module interfere with students learning?
8.	Can students more easily remember with the addition of animations?
9.	What is the shortage of this electronic book?
10.	Do students open this book even though they are not doing learning as they are today?
11.	Is the text difficult to understand?
12.	Can the video be played clearly?
13.	Is the explanation video understandable?
14.	What are the difficulties of students when using this electronic book?

After obtaining validation data from material and media experts, a quantitative descriptive analysis was carried out (Mardapi, 2012). Meanwhile, the data on student responses results were analyzed using descriptive techniques using a percentage of the average overall results of student responses. The quality of the e-module, the result of the development of expert assessment, was known by converting the score into qualitative data (interval data) on a scale of four. The reference for changing the score to a scale of four is presented in the Table 4.

Table 4. Score Change Reference

No	Score Range	Value	Category
1.	$X \geq \bar{X} + 1.sbx$	A	Excellent
2.	$\bar{X} + 1.sbx > X \geq \bar{X}$	B	Good
3.	$X > X \geq \bar{X} - 1.sbx$	C	Good Enough
4.	$X < \bar{X} - 1.sbx$	D	Less Good

(Mardapi, 2012)

3. RESULT AND DISCUSSION

Result

The product design began with identifying problems through a literature study with the theme of learning during the pandemic and conducting interviews with class VIII teachers on how the methods and teaching materials were used to teach the vibration, wave, and sound chapters. Based on interviews with some public and private junior high school teachers, they still have not provided learning media that can integrate video, images, and online practicum. One of the strategies that can be done in learning during a pandemic is the use of e-modules. In this case, e-modules can allow learning to occur both in and outside the classroom. The e-module is expected to be a medium capable of displaying various features such as videos, images, articles, games, quizzes, and practicum.

After identifying the problem, the next goal formulation was carried out. The purpose of this study is to develop an e-module, find out the feasibility of this e-module and find out the student's response to the e-module in learning during a pandemic by using the Canva application. Based on this goal, a scientific approach-based e-module was developed using the Canva application. Before compiling the design of the e-module, the researcher formulates the material to be included in the learning content. The formulation of the material item begins with the study of KI and KD 3.8 on vibrations, waves, and sounds in class VIII. Basic Competency Indicators are presented in Table 5.

Table 5. Basic Competency Indicators

Kompetensi Dasar (KD)	Indikator
3.11 Analyze the concepts of vibration, waves, and sounds in everyday life, including animals' human auditory and sonar systems.	1. Analyzing the concept of deep vibration and vocal cords of the eardrum. 2. Analyzing factors affecting vibrations in the pendulum. 3. The characteristics of waves on a string are slinky, light, and sound waves. 4. Analyzing factors affecting the reflection of waves in a string, slinky, waves, light, and sound waves. 5. Analyzing the concept of sound in human hearing and sonar in animals. 6. Analyzing changes in the sound reflection in human hearing loss.
4.11 Presenting the results of experiments on vibrations, waves, and sounds	**1.** Shows a concept map of the relation of the principle of pendulum work in the vocal cords and eardrum. **2.** Presents a concept map of the rope/slinky wave principle equation on transverse and longitudinal waves. **3.** Presents a concept map of the linkage of the whisper test and the auditory process

The next step is the script writing of the e-module. In writing the e-module script, researchers select content according to the learning objectives to be achieved and write in an easy-to-understand language. The writing and design of this e-module is done using the canvas application. The Canva application itself is a tool for a graphic designer to make it easier to compile or create various modern and innovative designs online. The app can be used to create innovative and integrated e-modules with multiple features. Once the e-module is in production, this medium is ready to be validated by validators. The validation results from the material experts in Table 6 are obtained below.

Table 6. Material Expert Validation Results

Aspect	Result	Maximum Score	Category
Serving	10	10	Excellent
Content	29	29	Excellent
Language	18	19	Excellent
Characteristic	7	7	Excellent
Rata-rata		**16**	**Excellent**

The validation results from material experts in the presentation aspect show a scale of 10 while the largest scale is 10, so it can be concluded that the presentation of the e-module is very good. Product validation is also carried out with media expert validation presented in Table 7.

Table 7. Media Expert Validation Results

Aspect	Result	Maximum Score	Category
Graphics	23	23	Excellent
Characteristi	6	6	Excellent
Average		**14.5**	**Excellent**

The next step was to test the product on 10 students who use the E-module that has been developed. Students are asked to respond to the product used. Student responses contain aspects regarding the content of the module, the appearance, and ease of learning presented in Table 8.

Table 8. Students' Responses To E-Modules

No	Questions	SS	S	TS	STS
E-Module Content					
1.	This module describes vibrational matter, waves, and sounds in everyday life	90%	10%	0%	0%
2.	The content of the material following the learning objectives	60%	40%	0%	0%

No	Questions	SS	S	TS	STS
3.	E-modules provide new knowledge about vibration, wave, and sound materials	60%	40%	0%	0%
4.	Sentences in the e-module are easy to understand	50%	50%	0%	0%
E-Module Display					
1.	Design display of e-modules according to the subject	90%	10%	0%	0%
2.	The use of animation in it is not superfluous	50%	50%	0%	0%
3.	Text Size is appropriate	20%	70%	10%	0%
4.	The existence of videos and quizzes in the e-module	60%	40%	0%	0%
Ease of Learning					
1.	I felt the ease of operation of the e-module	60%	40%	0%	0%
2.	There are sentences that motivate the spirit of learning	40%	60%	0%	0%
3.	E-modules provide clarity on vibrational, wave, and sound materials in everyday life	60%	40%	0%	0%
4.	The material becomes more interesting when packaged with e-modules	60%	40%	0%	0%
5.	More engaging learning using e-modules	80%	20%	0%	0%

Discussion

Product development in the form of E-modules on vibration and wave materials based on the results of literature studies that learning during a pandemic is a serious challenge that needs more attention (Kartimi et al., 2021a; Pressley, 2021; Sadikin & Hamidah, 2020). Guru no longer acts as a provider of learning facilities in the classroom but also a mobilizer so that students are more aware of the importance of learning (Arman et al., 2020; Chinedu & Kamin, 2015; Khuluqo et al., 2021). The observations show that teachers have not become mobilizers and have not provided learning media that can arouse student learning motivation The presentation of e-modules must at least present material following KI and KD in the curriculum (Darmayasa et al., 2018; Pratiwi et al., 2021). Adding the material explanations with animations, videos and images will make the presentation of the e-module easier to understand (Linda et al., 2021; Oktaviara & Pahlevi, 2019). The correctness of the delivery of concepts needs to be observed. The use of proper grammar can influence students in conducting learning with effective time. Based on Table 6, excellent results were obtained on the categories of presentation, content, linguistics, and characteristics. This e-module contains concepts and presents facts and phenomena of life's vibrations, waves and sounds. There are instruction sentences so that students can understand a concept from the point of view of scientific thinking. The language used is a language that is easy for students to understand. The material, which is packaged in a simpler form and contains its application in all fields, aims to make it easier for students to relate concepts. So it can be concluded that based on the material experts, this module is worth applying to students.

Material experts and media experts carry out validation. Validation results from media experts show this e-module is also excellent in graphics and characteristics. The graphic aspect of the score obtained is 23, which is at the same time the maximum score. The determination of media validation was seen in the characteristics of the e-module, obtaining a maximum score of 6 points. Students can investigate with an online practicum and get concepts obtained from their investigations according to the steps that have been in the e-module. Before conducting experiments, there was also a way to use the application to make it easier to operate. The e-module design was equipped with animations that increase students' interest in learning with e-modules in addition to adding attractive appearances, animation also serves to provide signs to students for instructions and things to remember when studying vibration, waves, and sound materials. Based on Table 6 and Table 7, E-this module was feasible and can be tested on students.

The trial was conducted on 10 class VIII students who carried out learning activities in three chapters in the e-module. Based on filling out the questionnaire on the google form and the results of the interview through google meet, it was obtained that SIswa responded quite well to the design of a scientific approach-based e-module with this application, especially in the content of the module. This can be proven by the results of the questionnaire recapitulation and interview description in Table 8**,** which showed that the approval tendency is at a high percentage. This result was good. Based on the interview results; students stated that they had learned vibration, waves, and sound material in daily life in school learning. The teaching that is done is only getting assignments and doing questions from the teacher. When students were questioned regarding the concept of vibration and waves, they also did not answer, and some answered that they still did not understand the concept of this material.

This e-module not only makes it easier for students but also makes it easier for teachers to teach (Darmayasa et al., 2018; Pratiwi et al., 2021). Teachers only need to follow the flow and steps of learning in the e-module without the need to create or provide additional media. Students can easily understand the language used in this e-module. The material about vibrations, waves and sounds included in this medium is a concept

accompanied by applications and facts closely related to daily life. In line with previous research, the preparation of e-modules using easy-to-understand instruction sentences will make it easier for students to understand the concept of the lesson (Sidiq & Najuah, 2020; Sofyan et al., 2019). Based on the media validation results, this e-module has excellent grammar. Based on the description above, the E-module can be used to learn vibrations, waves, and sounds.

This learning media applies a scientific approach; students seem to follow and are interested in learning steps that have been integrated with the teaching material. Based on researchers' observations, students are more enthusiastic about learning new facts about their hearing by carrying out reading activities and viewing videos related to the material in various sources. The scientific approach method can help teachers deliver material (Hamzah & Mentari, 2017; Novili et al., 2016). First, students were invited to observe phenomena in the material taught, namely vibrations, waves and sounds. The questioning activity is the second stage after the problem or phenomenon is observed by students (Astatin & Nurcahyo, 2016; Sabirin et al., 2016; Yastiari, 2020). Information gathering activities can also train to identify problems through predetermined variables at the questioning stage. At the stage of associating or reasoning, students are given space to analyze problems, and the last was to communicate here; students succeed in obtaining a product or problem solving from the activities that have been carried out.

The yang method combined in this media was useful as a liaison in the achievement of learning objectives where the e-module also provides a forum to communicate between students and teachers and improve learning by creating this e-module (Asrial et al., 2020; Rahmatsyah & Dwiningsih, 2021). The e-module is developed following the material that learns about vibration, waves, and sounds with communicative language to make it easy for students to understand. The e-module in the vibration, wave, and sound chapter was a medium that can be accessed via pc or smartphone. Whenever and wherever, students can use or open this module. Students can also connect directly with various links the teacher has selected as a learning resource. In the e-module display, links have been provided to several other platforms such as YouTube, website, and Google forms to do quizzes. In this module, each Chapter was given animation to give students clues and make the appearance more attractive so that it is more motivating to learn.

The questionnaire results showed that the percentage of the questionnaire student response to the e-module display was quite positive. But it was worth paying attention again to the size of the letters that must be enlarged. Meanwhile, based on the interviews conducted, students' opinions were obtained that they liked the appearance of the e-module, from the explanation to the features displayed. Students think that media like this can help them from the saturation of online learning, assisted by videos, animations, online practicums and simulations that were easy to understand. The usefulness of electronic media in learning, e-modules have different characters according to the specified design (Nisa et al., 2020; Winatha & Abubakar, 2018). This media can function as a companion for students in doing independent learning. Creating interactive and fun learning so as to add to the meaningfulness of learning.

The background design and writing in the e-module already have the right contrast, making it easier for students to read letters. Some animations and images help students understand the learning system in the display. The display of images and animations in this e-module will help visualize the teaching material delivered so that module readers are helped to understand the content of the module easily in understanding difficult concepts (Puspita et al., 2021; Winatha et al., 2018). Tampilan in the e-module also has an important role in the success of learning objectives, a display that follows the characteristics of students and following the material will make students understand (Hamzah & Mentari, 2017; Syahrial et al., 2019). Using e-modules equipped with interactive images and animations can improve student learning outcomes. Students who use this interactive e-module become interested in learning science, especially the vibration, wave, and sound chapters.

Learning will be easier if a suitable shutter and infrastructure support it. Learning should be done with enthusiasm and can add new ideas to students (Afriyanti et al., 2021; Fonda & Sumargiyani, 2018). In this case, the e-module configured using the Canva application was very accessible. Students can access it anywhere, providing a wider range of the material and learning experience sections (Istuningsih et al., 2018; Ummah et al., 2020). Teachers need a breakthrough to create a learning atmosphere that is not boring during the current pandemic. This e-module has several advantages, namely key use branches in learning and designing. Based on the questionnaire, the results of the e-module student response have met the aspects of student learning ease. The scale obtained showed students answering the choice strongly agree and agree. Meanwhile, the results of student interviews stated that this e-module could provide a new atmosphere and make learning activities more varied. Students can use this teaching material independently, and it was designed systematically according to learning steps using a scientific approach. Students can practice scientific thinking from the learning steps and understand the concept from several learning video links and simulation videos linked in the e-module. This was following the statement in the research that has been carried out that book presented in electronic format, every learning process is connected to a link that can make learning more interactive by equipped with audio, video, and animation to enrich the student's learning experience (Mumpuni et al., 2021; Novili et al., 2016; Usmeldi, 2016).

E-modules can assist teachers in delivering learning materials and facilitating murid in learning independently (Asrizal et al., 2018).

The preparation of the e-module using the Canva application. This application is a platform that can facilitate book design, power points, Instagram fit, and much more. The tools in Canva also provide many designs and animations that can be easily edited without needing to design them from scratch. Canva is perfect for novice designers because its drag-and-drop feature can quickly develop anything (Christiana, 2021; Puspita et al., 2021). Canva can be accessed via laptop, pc, or smartphone. The first step to creating a design is creating an account. first, here is the initial display when opening the Canva application.

In designing tools as teaching assistants, it was necessary to carry out several stages as follows; a) identification of KD into GPA, b) determining learning objectives, c) determining discussions and events related to the material, d) compiling learning activities following the scientific approach method, e) determining the design of e-modules on the canvas application. The framework of the guide that has been compiled is then included in the canvas design to be given animations, videos, and inserted other learning links. Based on the results of research and discussions that have been carried out, it can be obtained that this scientific approach-based e-module can help in learning, making it easier for teachers to design learning. Still, several things need to be considered when designing e-modules for students, namely the font size or writing size so that students can easily read the e-module. This e-module also provided an alternative to teachers during the COVID-19 pandemic to provide learning with a new atmosphere and strategies using canvas design.

4. CONCLUSION

Based on the study results, it was obtained that learning media in the form of E-modules based on a scientific approach are suitable for use during a pandemic. E-modules declared feasible and valid can help the learning process by providing elements that interest students in learning. Positive student responses show that learning during the pandemic can still run well.

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