DEVELOPMENT OF *FLIPBOOK-BASED* E-MODULE ON ANIMALIA MATERIAL AS TEACHING MATERIAL TO TRAIN DIGITAL LITERACY OF CLASS X HIGH SCHOOL STUDENTS

Pengembangan E-Modul Berbasis Flipbook Materi Animalia Sebagai Bahan Ajar Untuk Melatihkan Literasi Digital Siswa Kelas X SMA

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Abstract
Digital literacy is a necessary skill for students to enter the 21st century education era. The research aimed to provide an electronic module of Animalia material to train digital literacy for class X high school students which is valid and practical. This research refers to the 4-D development model (*Define, Design, Development, and Disseminate*) without disseminate. The validity of the e-module was measured based on the feasibility of contents, the feasibility of presentation and the suitability of the E-Module with the characteristics of the module and digital literacy indicators by education experts and material experts. The practicality of the E-Module was measured based on a readability test utilizing the *fry graph*, implementation at the limited trial, as well as the response of Biology teachers and class X High School students to E-Modul Animalia. Descriptive-quantitative analysis was applied to the data. The results showed that the Animalia E-Module was very valid, with an overall score of 100%. E-Modules can be deemed practical with the results of the readability test according to the student's grade level, namely level 10, the findings of the observation of learning implementation yielded a score of 100 %, signifying that the Animalia E-Module is being utilized very effectively in addition to the acquisition of results from teachers' and students' responses comprising 96% and 95%, respectively. Therefore, it can be concluded that the Animalia E-Module is very valid, practical and feasible for use in learning.
Keyword: Online learning, evaluation content, Animalia

Abstrak
Literasi digital merupakan keterampilan yang harus dikuasai oleh peserta didik untuk menghadapi era pendidikan abad ke-21. Tujuan penelitian ini yaitu menghasilkan modul elektronik materi Animalia untuk melatihkan literasi digital siswa kelas X SMA yang valid dan praktis. Penelitian ini mengacu pada model pengembangan 4-D (Define, Design, Development, dan Disseminate) tanpa disseminate. Validitas E-Modul diukur berdasarkan kelayakan isi, kelayakan penyajian dan kesesuaian E-Modul dengan karakteristik modul dan indikator literasi digital oleh ahli pendidikan dan ahli materi. Kepraktisan diukur dengan uji keterbacaan yang mengacu pada grafik fry, keterlaksanaan pada saat uji coba terbatas, serta respons guru Biologi dan siswa kelas X SMA terhadap E-Modul Animalia. Data dianalisis secara deskriptif-kuantitatif. Hasil penelitian menunjukkan bahwa E-Modul Animalia sangat valid yakni dengan perolehan persentase skor keseluruhan sebesar 100%. E-Modul dapat dikatakan praktis dengan hasil tes keterbacaan sesuai dengan tingkatan kelas peserta didik yakni level 10, dan hasil observasi keterlaksanaan pembelajaran diperoleh skor 100% yang menunjukkan penggunaan E-Modul Animalia terlaksana dengan sangat baik, serta perolehan hasil respons guru dan peserta didik sebesar 96% dan 95%, sehingga dapat disimpulkan bahwa E-Modul Animalia sangat valid dan praktis serta layak digunakan dalam pembelajaran.
Kata kunci: pembelajaran online, konten evaluasi, Animalia

INTRODUCTION

Students require skills in preparation for a prosperous society in the 21st century. Students are supposed to be able to apply the knowledge they have acquired (Soh et al., 2010). The capabilities of the 21st century comprise skills in learning and innovation, technology, media, and information skills, alongside career and life skills (Greenhill, 2010). Government-mandated changes to the curriculum led in a transitions in the orientation regarding learning, which was initially teacher-centered to student-centered, this is the solution for establishing 21st century competencies for students (Redhana, 2019).

Digital literacy should be cultivated throughout the educational process in order to strengthen the nation's character and better prepare it for the educational landscape of the 21st century (Khasanah & Herina, 2019). Digital literacy is the ability to comprehend and utilise information supplied through a computer in a variety of formats and sources (Gilster, 1997). Furthermore, Hague and Payton (2010) describe digital literacy as the set of abilities, information, and comprehension that enable a person to use digital technology in all of life securely, creatively, and intelligently. In order to reduce the dissemination of misleading information, it is crucial that students are equipped with the skills to differentiate between informational and fake news (*hoaxes*). The news portal feature on learning media, according to Pratiwi & Indana (2022) can encouraging students to prioritize reading before conclude on a given material concept.

Animalia materials with a Basic Competency 3.9 is one of the high school Biology learning materials set by the Permendikbud 2018. The Kingdom of Animalia material comprises a vast amount of information and requires students to classify creatures into phylum based on body layers, body cavities, body symmetry, and reproduction. According to the results of Nur'aini et al. (2015), the teacher has difficulty in teaching Animalia material because it contains quite a lot of subchapters, but the time allotted for teaching is limited, and the learning media used is ineffective and inadequate. Students also have difficulties describing the characteristics of each phylum, classifying and offering illustrations, and identifying the role of members of the invertebrate phylum in only 6 hours, making it difficult for them to comprehend the material (Alawiyah et al., 2016). In accordance with the results of Nurbaiti (2017) students have difficulties learning in Kingdom Animalia material due to a variety of issues, one of which is the tools and materials utilized in the learning process, with

an average percentage of 80.15 %, which is in the high category.

The difficulty in grasping concepts as a whole by students might lead to misconceptions (Shalihah et al., 2016). According to the findings of Ahmad and Indana (2018) stated that one of the factors of misconceptions was caused by learning resources used by students, namely books and the internet (22.20% ; 11.76%). This is confirmed by Qodriyani et al. (2017) indicating that there is still a dearth of innovative, high-quality teaching materials capable of attracting students' learning interest.

The use of modules in learning can help students understand the material independently, achieve learning goals, and overcome learning difficulties. Because the purpose of module preparation is to clarify and facilitate the presentation of the material so that it is not too verbose, overcome time and space limitations, increase learning motivation, and permit students to measure their own learning outcomes (Direktorat Tenaga Kependidikan, 2008). Moreover, modules are specifically packed materials that make it easier for students to master the material as a whole (Daryanto, 2013). Based on the findings of Chasanah et al. (2019), the use of learning modules has a stronger impact on the learning outcomes of students, with an average score of 83.3 compared to 76.7 for package books.

The development of technology has had a significant impact on the field of education, specifically as a medium to improve the search for information, hence enhancing the effectiveness of learning (Suryadi, 2015). However, several high schools continue to rely on textbooks as their primary instructional resource, and the features of digital literacy skills are also still relatively low (Putri & Ambarwarti, 2019). In addition, according to research by Misbah (2018), the high use of *smartphone* among students is not directly proportional to their digital literacy skills, so digital literacy skills among students are categorized as very low, with a score of 32.81, and the majority of students receive learning outcomes below the minimum completion criteria (KKM). This pertains to the information sources utilized by students, as determined by the findings of the response questionnaire, 45% of students are uninterested in the command to surf the web's features, and they prefer to use brainly websites and blogspots while receiving assignments. According to Muhammad and Ambarwati (2021), the effort to improve students' digital literacy can be made by providing instruction on how to utilize websites correctly, analyzing, digesting, and integrating information.

Today's rapidly advancing information and communication technologies can facilitate the

transformation of print modules into digital or electronic modules that are assembled interactively (Yulando et al., 2019). The E-Module can be designed in the form of a flipbook, namely a digital book in which it can contain text, images, audio, video, and animation that can visualize learning materials and is interactive (Miyosa, 2021). The usage of interactive E-Modules can increase student learning outcomes, as demonstrated by Wulandari et al. (2020), that post-test scores for students in classes utilizing interactive E-Modules are higher (62.55) than those of students in classes using conventional E-Modules (43.6). In accordance with the findings of Pratiwi & Indana's research from 2022, student learning outcomes improve with the use of learning media in the form of QR-code-based E-Modules, and students can also practice digital literacy skills during the learning process. According to Rachim and Ambarwati (2021) students' digital literacy skills can also be improved by the use of flipbooks in the learning process, this can be proven by the results of research that the E-flipbook developed was declared effective by obtaining an average score of increasing student digital literacy of 0.7 with a high category.

Background of this research, the goal of this project is to provide valid and practical teaching materials in the form of a Flip Book-based E-Module on Animalia material to train digital literacy in class X of Senior High School students. Setiyadi et al. (2017) have previously explained that the production of teaching materials is necessary so that the learning process is more effective, efficient, and does not divert from the skills to be acquired; this is an effort to enhance the quality of learning. The findings of this study will assist students in optimizing their learning capability in accordance with technology advancements especially in animal kingdom.

METHOD

This research was a development research that intends to provide valid and practical teaching materials in the form of electronic modules for Animalia material to train digital literacy. Animalia E-Module was created using a 4D development model, consisting of the *Define, Design, Develop,* and *Disseminate* stages. However, this research was conducted in a limited trial, therefore the *dissemination* step was not conducted. The development and validation of the Animalia E-Module was carried out at the Biology Department, FMIPA UNESA, while the limited trial was carried out at High School of Muhammadiyah 3 Sidoarjo by involving of 15 students in class X-3.

The validity of the E-Module is determined based on the feasibility of the content, the feasibility of the

presentation, the compatibility of the E-Module with the characteristics of the module, and the compatibility of the E-Module with digital literacy indicators. These evaluations are performed by two validator lecturers, namely educational expert lecturers and material experts. The validation method uses the criteria of the Likert scale (1-4), and the percentage of validity is computed using the following formula:

$$\text{Validation score (\%)} = \frac{\Sigma \text{ score obtained}}{\Sigma \text{ max score}} \times 100\%$$

Validation results are interpreted using the validity category. The E-Module is considered valid if it receives a percentage result between 61% and 80% and is very valid between 81% and 100%.

The practicability of the Animalia E-Module is evaluated based on the readability test, the implementation at the time of the limited trial, and the responses from Biology teachers and students. The readability of the E-Module was tested using the *Fry* formula. By using the *Fry* formula can be known the difficulty level of a reading. The readability score is derived from the 100 words contained in the E-Module; the number of sentences and syllables (multiplied by 0.6) in those 100 words are used to compute the readability score. Both results are transformed into a Fry Graph. The vertical line represents the number of sentences per one hundred words, whereas the horizontal line represents the number of syllables per one hundred words multiplied by 0.60. The intersection of points between a vertical and horizontal line reflects the readability or difficulty level of a text (Harjasujana & Yeti, 1997). Three reading samples were used in the readability test.

The implementation data is obtained from the results of observations of student activities while using the Animalia E-Module, which is collected using the activity implementation instrument. Scoring refers to the answer criteria "Yes" (Score 1) and "No" (Score 0) on the Guttman scale. This measurement's resulting results are calculated using the following formula:

$$\text{Percentage of implementation} = \frac{\Sigma \text{ } Activities \text{ } carried \text{ } out}{\Sigma \text{ } Activities} \times 100\%$$

The E-Module is practical if it scores between 71% and 85%, and it is very practical if it scores between 86% and 100%.

The Guttman scale was used to evaluate the practicability of teachers' and students' responses. The following formula is utilized to determine the positive respons to the Animalia E-Module:

$$\text{Positive response (\%)} = \frac{\Sigma \text{ Yes score}}{\Sigma \text{ Responsdents}} \times 100\%$$

The findings are then evaluated based on a number of categories, including the following: a percentage of 0% to 21% is deemed impractical, 26% to 50% is less practical, 51% to 70% is pretty practical, 71% to 85% is practical, and 86% to 100% is very practical.

RESULT AND DISCUSSION

This study succeed produced teaching tools in the form of Animalia E-Modules to train digital literacy, which are accessible in exe *(offline)* and HTML *(online)* formats. The E-Module in exe format can only be viewed on a laptop, however, the HTML format is offered as a link URL and is accessible on laptops, tablets, PCs, and smartphones with a strong internet connection. Electronic modules in the form of softcopy or URL can facilitate the independent study of course material by students at anytime and in anywhere. It is a form of technology integration into the learning process in the digital era with space and time efficiency (Susantini, 2021).

The E-Module was designed using *Corel Draw* and *Microsoft Word*, then transformed in flip PDF Professional software so that it can be utilized interactively and folded (back and forth). According to Seruni et al. (2019), Flip PDF Professional software is deemed superior to other software because it has more features that make the learning process more interactive, so that the E-Module developed contains text, images, videos, hyperlinks, and quizzes that make it easier for students to comprehend the material.

The E-Module was composed of an introduction, contents and closing. The introductory section includes standard competencies, descriptions of E-Modules, time allotment, prerequisites, ultimate objectives, and instructions for using E-Modules. The content section contains 13 learning activities that thoroughly explain the Invertebrate and Vertebrate groups. Each subchapter explains the learning objectives, indicators of success, organism's definition, body structure, classification, reproduction, and role in life. The material presented in the E-Module is compiled based on several book reference sources, one of which is Zoology. In addition, in each chapter there is also a summary of the material, a quiz containing 10 multiple-choice questions, and a grid of questions. The final part has a biology glossary, a bibliography, and information about the author.

The developed interactive E-Module was designed to instruct students in digital literacy. Additionally, this E-Module These skills are packed into four features, namely, *Mari Kita Pahami*, *Info⁺*, *Fakta Animalia* and *Quiz* (**Table 1**). These features are presented in each chapter, so that students continue to practice their digital literacy skills while using this Animalia E-Module.

Table 1. Features on the Animalia E-Module

No	Feature	Description	Digital Literacy Indicators
1.	Mari kita pahami	This feature showcases Animalia-related videos that are available *offline* and *online*. The online view will make it easier for users to translate the language.	- Hypertextual Navigation - Knowledge Assembly
2.	Info⁺	This tool provides students with access to articles and websites with more Animalia-related content in order to broaden their understanding	- Hypertextual Navigation - Internet searching - Knowledge Assembly
3.	Fakta Animalia	This feature provides information regarding the role of Animalia in daily life.	- Hypertextual Navigation - Content Evaluation
4.	Quiz	This feature contains multiple-choice questions to find out the level of understanding of students after studying Animalia material in this electronic module.	- Hypertextual Navigation - Knowledge Assembly

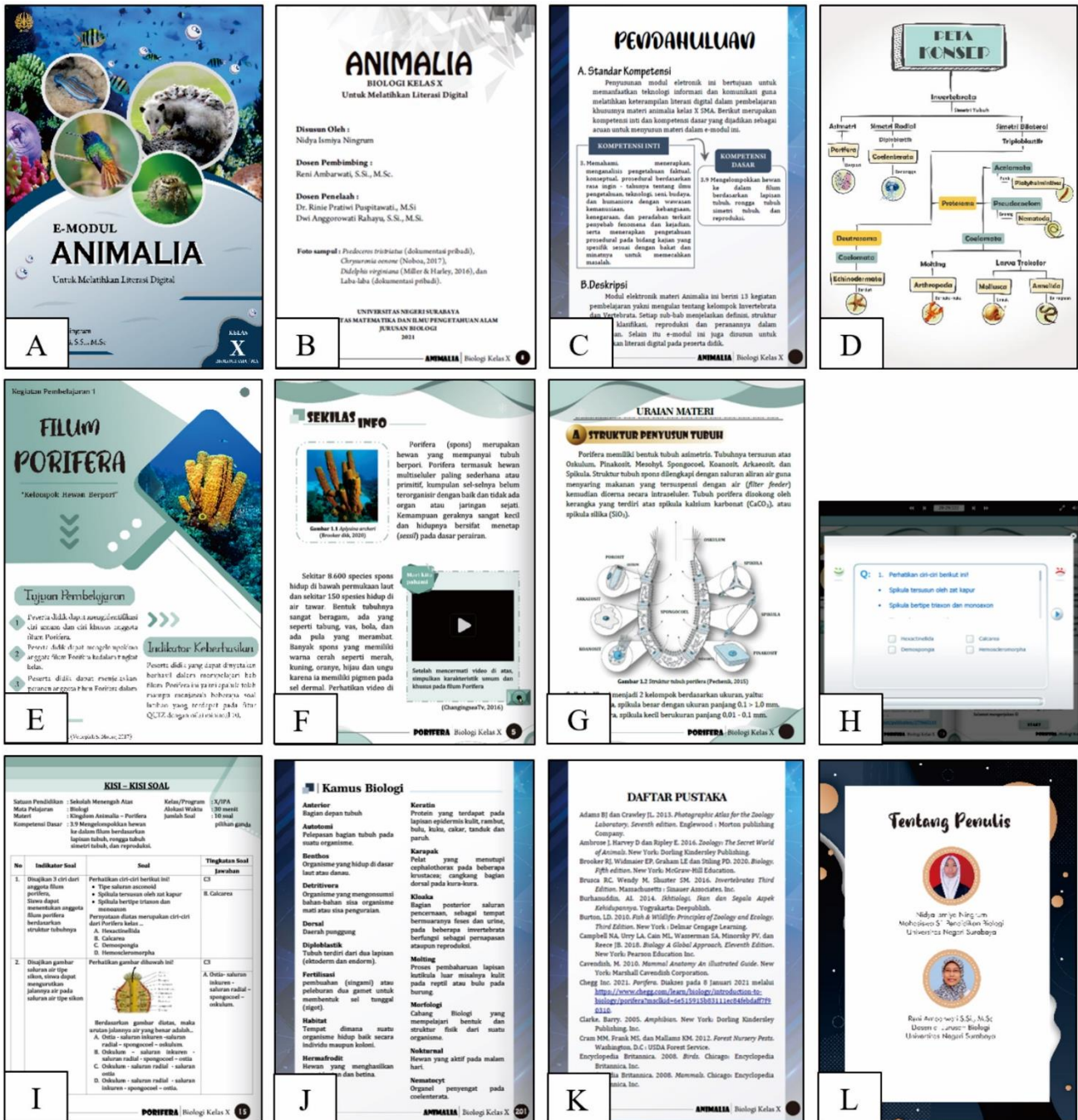Here is a display of the Animalia E-Module that has been created.

Figure 1. Animalia E-Module display to (A) Front Page; (B) The Inner Page; (C) Introduction; (D) Concept Map (E) Cover on each phylum or class; (F) At a Glance at the Info; (G) Material Descriptions; (H) Quizzes (I) Grid of Questions; (J) Dictionary of Biology; (K) Bibliography; and (L) About the author.

The validity of the Animalia E-Module to train digital literacy students' is examined from four aspects: the feasibility of the content, the feasibility of the presentation, the compatibility of the E-Module with the characteristics of the module, and digital literacy indicators. The E-Module was validated by two expert namely, education experts and material experts. The findings of the validation of the E-Module were summarized in **Table 2**.

Table 2. Animalia E-Module validation results

No	Assessment Aspects	Score		Percen-tage	Cate-gory
		V1	V2		
Feasibility of Contents					
1.	The suitability of the content or material with basic competencies	4	4	100%	Very valid

No.	Aspect	V1	V2	%	Category
2.	Completeness of Animalia material	4	4	100%	Very valid
3.	Systematics of module components	4	4	100%	Very valid
4.	Scope and accuracy of the material	4	4	100%	Very valid
	Average	**4**		**100%**	**Very valid**
Feasibility of Presentation					
5.	Serving technique	4	4	100%	Very valid
6.	E-Module Design	4	4	100%	Very valid
7.	Use of E-Modules	4	4	100%	Very valid
8.	Supporting presentation of material	4	4	100%	Very valid
	Average	**4**		**100%**	**Very valid**
Compatibility of E-Modules With Module Characteristics					
9.	Self instruction	4	4	100%	Very valid
10.	Self Contained	4	4	100%	Very valid
11.	Stand Alone	4	4	100%	Very valid
12.	Adaptive	4	4	100%	Very valid
13.	User Friendly	4	4	100%	Very valid
	Average	**4**		**100%**	**Very valid**
Compatibility of the E-Module with the Digital Literacy indicator					
14.	Internet searching	4	4	100%	Very valid
15.	Hypertextual Navigation	4	4	100%	Very valid
16.	Content Evaluation	4	4	100%	Very valid
17.	Knowledge Assembly	4	4	100%	Very valid
	Average	**4**		**100%**	**Very valid**
	Overall average	**4**		**100%**	**Very valid**

Note:
V1: Lecturer of education expert ; V2: Material expert lecturer

The practicality of the Animalia E-Module is determined by readability test, implementation, and teacher and student responses. The purpose of the readability test is to determine the level of difficulty or ease of a reading text so that it may be comprehended and understood by the reader. The following are the results of the readability level of the E-Module (**Table 3**).

Table 3. Results of readability tests on the Animalia E-Module utilizing *fry graph*

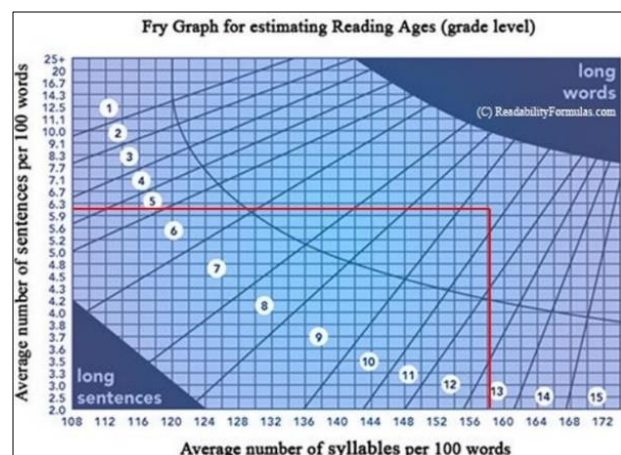| Sample	Pages on the E-Module	∑ Sentences per 100 Words	∑ Syllable per 100 Words multiplied by 0.6	Level
1.	XI	5	261 x 0.6 = 156.5	11
2.	9	7	272 x 0.6 = 163.2	10
3.	165	6,5	258 x 0.6 = 154.8	10
Average		**6,1**	**158.2**	**10**

Figure 2. Average results of readability tests on the Animalia E-Module

Based on the practicability of the Animalia E-Module from an implementation standpoint during a limited trial by two observers, students were actively utilizing the Animalia E-Module with a 100% practicality result and every student is cognizant of all observed facets, as indicated in **Table 4**.

Table 4. Implementation of limited trials using Animalia E-Module

No.	Observed aspects	Implementation	
		P1	**P2**
1.	Students study the Animalia E-Module usage instructions.	√	√
2.	Students adhere to the instructions for using the Animalia E-Module.	√	√
3.	Students read content regarding the objectives and success indicators of Animalia material.	√	√
4.	Students read the	√	√

No.	Observed aspects	Implementation	
		P1	**P2**
	introduction to the Animalia material.		
5.	Students read the Invertebrates and Vertebrates concept map.	√	√
6.	Students read the material presented on the Animalia E-Module.	√	√
7.	Students observe photos and videos featured within the Animalia E-Module.	√	√
8.	Students follow hypertext and hyperlink navigation.	√	√
9.	Students explore a web page offered on the Animalia E-Module.	√	√
10.	Students read a summary of the material.	√	√
11.	Students read and answer questions contained in the Animalia E-Module.	√	√
12.	Students read the Biology dictionary.	√	√
	Percentage	**100%**	**100%**
	Overall Percentage Average	**100%**	
	Category	**Very practical**	

Note :

P1: Observer 1 ; P2: Observer 2

The high school Biology teacher's overall yielded a good response of 96% with very practical criteria. Module's Four aspects make up the practicality: the aspects of content, the aspects of presentation, the aspects of E-Modules, and the aspects of digital literacy (**Table 5**).

Table 5. Results of the teacher's response to the Animalia E-Module (n=5)

No.	Component	Percen-tage	Cate-gory
Content Aspects			
1.	The suitability of the material or features with basic competencies.	100%	Very practical
2.	Presentation of material in E-Module Animalia accordance with the truth of the concept.	100%	Very practical
3.	Easy-to-understand material.	100%	Very practical
4.	The material was presented in a complete and consistent manner in each chapter.	80%	Practical
5.	Features might stimulate students' curiosity and desire to study.	100%	Very practical
6.	Features can help learners in understanding Animalia material.	100%	Very practical
7.	E-Modules can help teachers in teaching Animalia material	100%	Very practical
8.	Teachers are interested in implementing the Animalia E-Module in the classroom.	60%	Quite practical
9.	Word selection based on the level of comprehension of the student.	100%	Very practical
10.	The language used is clear and easy to understand.	100%	Very practical
11.	Sentences are clear and not double-meaning.	100%	Very practical
	Average	**95%**	**Very practical**
Presentation Aspects			
11.	Attractive E-Module display.	100%	Very practical
12.	This E-Module has a systematic arrangement of text, graphics, and videos.	100%	Very practical
13.	The text's size and color are appropriate for the learning medium so that it may be read easily.	100%	Very practical
14.	Images and videos are readily available and visible	80%	Practical
15.	The quiz feature is well accessible.	100%	Very practical
16.	Features are given precisely in accordance with the supporting data.	100%	Very practical
	Average	**97%**	**Very practical**
Aspects of the E-Module			
17.	Self instruction	100%	Very practical
18.	Self Contained	100%	Very practical
19.	Stand Alone	100%	Very practical
20.	Adaptive	100%	Very practical
21.	User Friendly	80%	Practical
	Average	**96%**	**Very practical**

No.	Component	Percentage	Category
Aspects of Digital Literacy			
22.	Internet searching	100%	Very practical
23.	Hypertextual Navigation	100%	Very practical
24.	Content Evaluation	80%	Practical
25.	Knowledge Assembly	100%	Very practical
Average		**95%**	**Very practical**
Average positive responses		**96%**	**Very practical**

With 15 students in the 10th grade of high school, the Animalia E-Module was piloted on a small scale. A total of 25 questions covering four different aspects—content, presentation, E-Modul, and digital literacy-were given to students as part of the trial. Based on these findings, the Animalia E-Module received a 95% percentage score, indicating that it is very practical (**Table 6**).

Table 6. Results of students' responses to the Animalia E-Module (n=15)

No.	Component	Percentage	Category
Content Aspects			
1.	Easy-to-understand material.	100%	Very practical
2.	The material was presented in a complete and consistent manner in each chapter.	100%	Very practical
3.	Features might stimulate students' curiosity and desire to study.	93.3%	Very practical
4.	Features can help learners in understanding Animalia material.	93.3%	Very practical
5.	Students are eager to include the Animalia E-Module into their educational experience.	100%	Very practical
6.	Word selection based on the level of comprehension of the student	93.3%	Very practical
7.	The language used is clear and easy to understand.	100%	Very practical
8.	Sentences are clear and not double-meaning.	93.3%	Very practical
Average		**97%**	**Very practical**
Presentation Aspects			
9.	Attractive E-Module display.	100%	Very practical

No.	Component	Percentage	Category
10.	This E-Module has a logical arrangement of text, graphics, and videos.	100%	Very practical
11.	Images displayed according to the topic.	100%	
12.	Images and videos are well accessible and clearly visible.	86.7%	Very practical
13.	The text's size and color are appropriate for the learning medium so that it may be read easily.	93.3%	Very practical
14.	The quiz feature is well accessible.	86.7%	Very practical
15.	Features are given precisely in accordance with the supporting data.	100%	Very practical
16.	The E-Module display has an excellent resolution.	86.7%	Very practical
Average		**94%**	**Very practical**
Aspects of the E-Module			
17.	Self instruction	100%	Very practical
18.	Self Contained	100%	Very practical
19.	Stand Alone	80%	Practical
20.	Adaptive	100%	Very practical
21.	User Friendly	93,3%	Very practical
Average		**95%**	**Very practical**
Aspects of Digital Literacy			
22.	Internet searching	93,3%	Very practical
23.	Hypertextual Navigation	93,3%	Very practical
24.	Content Evaluation	93,3%	Very practical
25.	Knowledge Assembly	100%	Very practical
Average		**94,98%**	**Very practical**
Average positive responses		**95%**	**Very practical**

Based on the validation results (**Table 4**), the Animalia E-Module received an overall average score of 4, with percentage 100%. As a result, it can be seen that the developed Animalia E-Module has a very valid category. The aspect of content feasibility received an average score of 4 with a percentage of 100%, which was a very valid category. Every aspect of the content's

feasibility is rated as highly practicable because the learning objectives pertain to the 2013 curriculum and the material offered in the E-Module is in compliance with the core skills outlined in Permendikbud No. 37 of 2018. This is accordance with Daryanto's (2013) assertion that the construction of teaching materials in the form of modules must adhere to specified standards competencies and basic competencies. In addition, the E-Module content has been presented in accordance with the concept's accuracy. The validator lecturer has presented this in the following manner:

"*The module is very good, interesting and the concept is correct.*"

The accuracy of the concept is a crucial factor in the creation of teaching materials. The significance of the veracity of the information provided in teaching materials so as not to supply students with erroneous ideas or confusion when receiving content throughout the learning process (Susiani et al., 2017).

A presentation feasibility component with an average score of 4 and a percentage of 100% is considered to be very valid. Every aspect of the presentation's viability is high because the material is presented in a consistent manner, the design is appealing, the features are presented precisely in accordance with the supporting material, and the E-Module is presented with a high enough resolution so that it is feasible for use in learning. According to Wulandari et al. (2018), learning media with an engaging presentation might boost students' interest in learning due to their appealing appearance and facilitate their comprehension of the concepts they have acquired.

A good module should focus on a number of qualities, according to the Direktorat Tenaga Kependidikan in 2008, including *self instruction, self contained, stand alone, adaptive,* and *user-friendly.* This is in line with the findings of the validation process, which showed that every component in the compatibility of the E-Module with the characteristics of the module got a percentage of 100% with a very valid category. Therefore, the preparation of the Animalia E-Module is in accordance with the characteristics of the module. In addition, the E-Modul conformity aspect with digital literacy indicators also gets a validation result of 100%. Because the development of the Animalia E-Module has been based on the digital literacy indicators developed by Giltser (1997), which include internet searching skills, hypertextual navigation, content evaluation, and knowledge assembly.

The overall results from the validators indicate that the produced E-Module is appropriate for use in the learning process, particularly in the Material Animalia class X Senior High School. In accordance with the findings of Puspitasari and Risdianto (2020), the E-Module that has been deemed to be highly valid is appropriate for usage in the learning process.

The results of the obtained validation value are deemed to be very valid, but they must be enhanced in accordance with the validator's suggestions, specifically to the content and presentation aspect. The following are comments made by validator lecturers on content feasibility.

"*It is essential to highlight the Phylum or Class's general and unique characteristics.*"

"*The explanation about the role within each Phylum or Class is not only a negative one, but also a beneficial one, particularly for Nematodes.*"

"*Questions can be emphasized more on morphological characteristics, classifications and benefits.*"

In the presenting aspect, validators also provide suggestions, particularly:

"*Make sure the media can be opened, because I found it difficult to open the media at first.*"

"*Each and every video display must include citations.*"

"*After seeing the video, there is no further instruction. for example the students are asked to infer or uncover information from the video.*"

"*Make sure that every species name is italicized.* "

The Animalia E-Module was piloted with 15 students from class X-3 at Senior High School of Muhammadiyah 3 Sidoarjo after modifications were made based on the feedback of the above-mentioned validators. According to Zakiyah and Dwiningsih (2021), the purpose of the validation performed by experts is to determine the quality of the E-Module with valid or invalid categories in every aspect. In addition, comments and suggestions might serve as instructions for enhancing the E-Module prior to its publishing.

Most of the teacher's response results are directly proportional to the validation results, so the E-Module can be said to be practical. The average percentage score for the content aspect was 95%, for the presentation aspect it was 97%, for the module aspect it was 96%, and for the digital literacy aspect it was 95%. The teacher's suggestion based on the content aspects, particularly:

"*For the creation of questions and grids on the module at the high school education unit level, the response choice is enhanced to be up to choice E, since it is only up to choice D for questions and*

grids at the junior high school education unit level."

"For the evaluation question model, it is better to aim at the AKM (literacy and numeracy) question model."

The number of alternative answers on multiple-choice tests varies according to the level of education. For Elementary Schools and Junior High Schools there are four answer options, and for Senior High Schools there are five answer options. The function of this alternative answer as a deceptor or distractor (Pusat Penilaian Pendidikan, 2007). While the AKM (Minimum Competency Assessment) question is used to assess students' reading literacy and numerical literacy. Without making a distinction between specializations in science, social studies, language, or religion, both reading and numeracy are fundamental skills that students must possess. So that the learning system in the classroom is more focused on strengthening reading skills and logical-systematic reasoning (Pusat Asesmen dan Pembelajaran, 2021).

Based on the aspects of presentation, the teacher gave positive comments on the E-Module, namely as follows:

"Very good, this E-Module is designed in such a way"

"The development of the Animalia E-Module has been good. Contains capable material invite students to learn independently, critically, and creatively."

In addition, students also responded similarly, namely:

"The features presented on the e-module piqued my interest and motivation for learning."

"The appearance of the E-module is interesting and easy to learn."

Based on the above statement, it can be concluded that the E-Module that has been developed has an attractive appearance and features and is easy to understand, hence increasing student motivation to learn Animalia material. This concurring with Eliyasni (2020) the E-Module flipbook model is designed to make learning more interactive, so as to increase the interest in learning students.

The ease of students in understanding Animalia material can be supported by the results of the readability test. If the E-Module material corresponds to the grade level of the student, the readability of the E-Module can be easily comprehended. Based on **Table 3**, the E-Module has distinct readability levels in each sample, notably levels 11, 10, and 10, with an average level of 10. The readability level of level 10 is a difficult level. This level is appropriate for High School students. This is in accordance with the level of education utilized as a reference when developing this Animalia E-Module.

This statement relates to the findings of Muwaffaqoh's et al research (2021): if the readability level of a discourse corresponds to the grade level, students can readily comprehend the content. So that the Animalia E-Module that has been developed is classified as a practical criterion.

Students also suggest that audio explanations can be added to the Animalia E-Module to make it easier for students to comprehend the information at any time and place.

"Even better would be if the appearance was accompanied with an audio explanation, so that we could learn at home as if we were in school."

This can be supported by the explanation of Putri et al. (2018) that modules are teaching materials that are arranged systematically with the aim that students can learn independently or with teacher direction. Additionally, identical statements were made by other students.

"E-Modul is easy to carry around because it can be accessed anywhere by simply clicking on a pre-existing website link."

This statement is in accordance with Febrianti, et al., (2017) electronic modules are presented in the form of softcopy so as to make it easier for students to learn the material independently on their own whenever and wherever they choose. According to Handayani et al. (2021), the usage of E-Modules can make the learning process more interactive, exciting, and accessible at any time and place, as well as enhance the quality of learning.

E-Modules can instruct students in digital literacy and boost their independently learning (Sanova et al., 2021). This is consistent with the results of expert validation, teachers' and students' responses, which indicate that the *self-instruction* part achieves a perfect score (100%). E-Module is also called teaching material for self-study because it includes equipped with instructions for using the module. Thus, when students are comfortable with the use of the E-Module, they are able to engage in learning activities even if the teacher is not present throughout the learning process.

Digital literacy skills can be trained by the existence of interactive teaching materials in the form of E-Modules, where students can receive and provide information properly and correctly through the digital media used (Pratiwi & Indana, 2022). Based on the validation results, the responses of teachers and students to indicators of digital literacy receive an average score of 100%, 95%, and 94.98%, respectively. These indicators include internet searching skills, hypertextual navigation, content evaluation, and knowledge assembly. Teachers

also argue that the E-Module can train students' digital literacy skills.

> *"Modules have been good enough to help students' digital literacy."*

Digital literacy indicators are packaged into several characteristics that refer to the indicators developed by Giltser (1997). This is consistent with Ambarwati et al. (2019). The assertion that digital literacy can be improved and trained by internet search competencies, hypertextual navigation, content evaluation, and knowledge assembly.

The features presented in the Animalia E-Module aim to train students' digital literacy. These skills are organized into four features, namely *Mari Kita pahami, Info⁺, Fakta Animalia,* and *Quiz*. Each chapter's content is supported with videos in the *Mari Kita pahami* feature. The presented video is an audio-visual medium to facilitate comprehension in studying Animalia material. This is confirmed by Mulyadi's et al. (2018) assertion that the usage of video in the E-Module is extremely helpful for students to comprehend the content of the E-Module. According to Foutsitzi (2018), the use of audio-visual media can provide experience and change in the learning process because the images in audio-visual media are not static images but animated images, which gives audio-visual media more graphic advantages and the perception of being an attractive medium.

The E-Module also presents the *Info⁺* feature that provides hypertext or hyperlinks to Animalia-related materials and websites. On the basis of the findings of the learner's response, supporting information that complements the subject can assist the learner in expanding his understanding.

> *"By observing and reading the e-module, can add insight and natural science that I don't know yet, and the feature is very interesting."*

This is consistent with the findings of Muis and Pitra's research from 2021, which indicates that the usage of the internet in the learning process can improve and raise students' knowledge of learning materials, as well as motivate and increase their enthusiasm in learning. Moreover, there *Hyperlink* on teaching materials can train students' digital literacy (Wijaya et al., 2016).

The *Fakta Animalia* feature on the E-Module includes information regarding the role of Animalia in daily life. With this feature, students are able to evaluate the validity of an information content. The last feature in the E-Module is the Quiz which contains multiple-choice questions to find out the level of understanding of students after studying animalia material. The questions presented refer to the learning objectives contained in the E-Module. This is consistent with the findings of Ulva et

al. (2016) that multiple-choice questions can be used to determine the level of students' mastery of the material.

Teachers and students also give "no" answers in some components so that the percentage results obtained are lower than other components. One of these factors is teachers' desire for using the Animalia E-Module in the learning process, which has a 60% percentage result. Every teacher has different teaching experiences and principles, there are teachers that place a greater emphasis on learning that does not constantly require technology. One of the teacher's responses down below serves as evidence for this.

> *"However, I am not currently interested in using. This is because students with post-pandemic symptoms utilize electronic devices and laptops excessively. So that learning is suboptimal and inadequate teachers oversight. So maybe this E-Module can be utilized at the appropriate moment in the future."*

In terms of the ease of accessing images and videos, the response of teachers was 80% and students 86.67% were obtained. *Online* use of the Animalia E-Module requires a robust internet connection. If the internet connection is insufficient, the E-Module will continue to *reload* and cannot be utilized to its fullest potential. This was further reinforced by a remark made by one of the observers who observed the implementation in a limited trial.

> *"Some students have trouble accessing the E-Module, particularly when opening images and videos. As the internet signal is insufficient, they must connect to the internet through other students."*

In the realm of education, the utilization of E-Modules also has a positive aspect. This can be seen in the responses of the students:

> *"This E-Module can help the younger generation, so that the younger generation does not just play games."*

In accordance with the research of Susilo and Prasetyo (2020), the development of digital-based teaching materials packed for mobile learning seeks to reduce students' propensity for playing online games and using social media, as well as the use of smartphones is more directed into the realm of learning.

Animalia material has a very broad scope, with 13 chapters covering Porifera, Coelenterata, Plathyhelminthes, Nematodes, Annelids, Mollusca, Arthropods, Echinoderms, Pisces, Amphibians, Reptiles, Birds, and Mammals, so that a lot of information must be understood and mastered by students. With the availability of an interactive E-Module with digital literacy training features, it is anticipated that students

will be able to learn the subject. Because the E-Module is a teaching material that is compiled as a whole and systematically and is practical to use anytime and anywhere.

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CONCLUSION

The developed electronic module of Animalia material is very feasible for use in learning. The eligibility is in terms of the feasibility of the content, presentation, suitability of the E-Module with the characteristics of the module and digital literacy which as a whole obtains a 100% percentage of eligibility with a very valid category. Additionally, the Animalia E-Module is also categorized as very practical, this is in terms of readability tests which get the result that the readability level in the E-Module is in accordance with the level of education, namely level 10; All parts of implementation seen during the restricted experiment yielded 100% results, and 96% and 95% of teacher and student responses were obtained.

SUGGESTION

Further research is necessary to conduct additional study on the interactive E-Module to train students' digital literacy of Animalia material that can be accessible offline via smartphones, so that students can more easily access the material anytime and anywhere without the need for an internet connection.

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