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Development of Static Fluid E-Module Contained with Local Wisdom of South Kalimantan

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Abstract

This research aimed to develop an electronic module on static fluid material that contained the local wisdom of South Kalimantan. This study used the ADDIE research and development design. The sample for this research was 62 students in class XI in one of the public schools in Banjarbaru, South Kalimantan. Data was collected with validation sheets and response questionnaires with a survey technique. The data was then analyzed using the Aiken formula and descriptive statistics. The results showed that the validity in terms of media was 0.92-1.00 and the validity in terms of material was 0.92-1.00. The average student response to the e-module is 4.40 in the very good category. Based on these results, it can be concluded that the developed e-module was valid and obtains a very good response, so it is suitable for use as a teaching material on static fluid material.

Keywords: Development; Electronic Modul; Local Wisdom; Static Fluid

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INTRODUCTION

Education cannot evade the responsibility of introducing Indonesian culture to students. Culture is introduced to students, so they know, love, and preserve it (Jufrida et al., 2021). Pingkan et al. (2021) and Lesmana & Nurussaniah (2022) stated that regional culture which is part of the national culture needs to be preserved because of the ancestral heritage which contains local wisdom.

Local wisdom is the noble identity of the Indonesian nation. Physics should participate in introducing and teaching local wisdom to students. Wati et al. (2021), Herwandi et al. (2021), Misbah et al. (2020) and Jufrida et al., (2021) stated that should be presented as attractively as possible, incorporating local wisdom, so that students not only learn physics but also become acquainted with the local wisdom of their region.

Based on an interview with a physics teacher at a public school in Banjarbaru, it is known that so far teachers have not taught physics by integrating it with the local wisdom of South Kalimantan. As a result, students only receive physics material without knowing its relevance to the surrounding environment. Even though Fauzi et al. (2022) and Elisa et al. (2022) proved that learning physics by associating it with local wisdom has been improved learning outcomes. Then, Elisa et al. (2022) proved that this integration strengthens the profile of Pancasila students. Syahmani et al. (2022) also proved that it

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helped students understand the material and improves problem solving abilities. Besides that Agustina et al. (2023) stated that integrating physics with the local wisdom instills an attitude of caring for the environment. Even Setianingrum et al. (2023) stated that it developes a sense of love for local culture.

In addition, so far students have never studied using flipbook-based electronic modules. Even though flipbook media has various advantages, namely the appearance is attractive so that it is popular with students; can be equipped with pictures, moving animations, audio, video, colorful backgrounds, navigation buttons; portable; can be accessed anywhere as long as there is an internet network; and can be accessed without installing the application first (Yuniarrahmana et al., 2021). Yuyun et al. (2022) stated that flipbooks were interactive and attractive to students because of these various features and the animation on flipbooks when opening each page like a printed book made an impression on students. The use of flipbooks has also been shown to improve learning outcomes (Diana et al., 2022; Muhammad et al., 2021; Mutmainna et al., 2022; Nasution et al., 2022), making students independent in learning (Arnila et al., 2021; Misbah et al., 2021), and improve student learning mastery (Berasa & Desnita, 2023).

Building on this, a flipbook-based electronic module was developed containing local wisdom. This e-module is made for static fluid material because South Kalimantan has quite a lot of local wisdom related to this material, for example the Floating Market and the jukung (a means of transportation for the Banjar people). The development of flipbook-based e-modules containing local wisdom is strengthened by previous research which states that flipbook-based e-modules filled with local wisdom make students enjoy learning, increase learning motivation, instill an attitude of caring for local culture, and foster curiosity (Andriani et al., 2023). In addition, flipbook media containing local wisdom attracts students' learning interest (Kusumaningrum & Masruro, 2022; Andriani et al., 2023). Local wisdom content in the learning process including in e-modules can also improve learning outcomes, problem solving skills, scientific literacy, creative thinking skills, and critical thinking skills (Sari et al., 2023). Therefore, the development of this e-module is expected to provide great benefits for students.

This research adds to the treasury of research and development of flipbook-based electronic modules filled with local wisdom. However, the e-module in this study focuses on the local wisdom of South Kalimantan. Therefore, this e-module will add to the richness of various previous e-modules in terms of local wisdom associated with physics material.

The purpose of this research is to develop a flipbook-based electronic module containing South Kalimantan local wisdom on static fluid material for high school students/equivalent. This article focuses on e-module validity. In addition, this article also discusses student responses to the e-modules that were developed.

METHOD

The researchers used the ADDIE design in conducting this study. Therefore, this research is a type of Research and Development which aims to produce a product. The stages of this research are analysis, design, development, implementation, and evaluation (Dick, Carey, & Carey, 2001; Welty, 2007). The product being developed was tried out on 62 students at one of the SMAN in Banjarbaru in the 2022/2023 academic year in the even semester. This sample was selected using purposive sampling because these students were selected for the reason that they were studying static fluid material.

This study used instruments in the form of module validity sheets and student response questionnaires to the developed modules. Module validity sheets consisted of validity in terms of media and materials. Overall there were 43 indicators that are validated. The

student response questionnaires consisted of 10 statements that need to be filled in by students. The data collection technique in this study is a survey. The data was then analyzed using the Aiken formula (Aiken, 1985) and the mean (Widoyoko, 2019). The response results were also categorized into certain criteria (Widoyoko, 2019).

RESULT AND DISCUSSION

E-Module Validity

The developed e-module is an e-module on static fluid material. The e-module is used online. Figure 1 shows some parts of the e-module.

Figure 1 Part of Static Fluid E-Module Contained with Local Wisdom of South Kalimantan

The validity of the e-module is known from the validation results carried out by three validators who are experts in the field of physics education. The e-module developed can be seen in the three of them filling out the e- module validation sheet which contains questions regarding the validity of the media and the validity of the material adapted from Nisrina et al. (2022). Table 1 shows the validity of the e-module in terms of media.

Table 1 E-Module Validity in Terms of Media

No.	Indicators	V_{count}	V_{table}	Categories
1.	Interface (Display)			
	a. The cover illustration can describe the contents of the e-module	1.00	0.92	Valid
	b. The color combination in the cover of the e-module is harmonious	1.00	0.92	Valid
	c. The shape and size of the letters on the cover of the e-module are proportional	0.92	0.92	Valid
	d. The typeface used is easy to read	0.92	0.92	Valid
	e. The placement of elements (learning objectives, materials, summaries, practice questions, self-assessment) is consistent based on the pattern of writing	0.92	0.92	Valid
	f. Consistent placement of chapter titles or equivalent	1.00	0.92	Valid
	g. Illustrations (images/videos) are able to clearly reveal the meaning/meaning of objects	0.92	0.92	Valid
	h. Spacing between text and illustrations is appropriate	1.00	0.92	Valid
	i. The choice of type and size of letters is clear and	0.92	0.92	Valid

No.	Indicators	V_{count}	V_{table}	Categories
	legible			
	j. The sound in video and audio is clear	0.92	0.92	Valid
	k. Spacing between text and illustrations is appropriate	1.00	0.92	Valid
	l. The color combination in the contents of the e-module is harmonious	1.00	0.92	Valid
	m. Consistency in the use of symbols/symbols	0.92	0.92	Valid
2.	Navigation (How to use moving pages in the e-module)			
	a. The link on the e-module can be accessed	1.00	0.92	Valid
	b. Page numbering according to table of contents	0.92	0.92	Valid
	c. The instructions for using the e-module are easy to understand	1.00	0.92	Valid
	d. Instructions for working on questions are easy to understand	1.00	0.92	Valid
	e. The self-assessment guide is easy to understand	0.92	0.92	Valid
3.	Robustness (e-module resilience that minimizes errors)			
	a. The e-module is easy to access	1.00	0.92	Valid
	b. The e-module link works fine	0.92	0.92	Valid
	c. Video links work fine	0.92	0.92	Valid
	d. The evaluation link works fine	1.00	0.92	Valid
	e. The practice questions link works fine	1.00	0.92	Valid
	f. Practice questions on Google form work well	1.00	0.92	Valid

Based on Table 1 it can be seen that the developed e-module is valid from a media standpoint. Table 2 presents the validity of the e-module in terms of material. The data in Table 2 shows that the developed e-module is valid from a material standpoint.

Table 2 The Validity of The E-Module in Terms of Material

No.	Indicators	V_{count}	V_{table}	Categories
1.	Subject Matter (Related to content or subject matter)			
	a. The material presented is in accordance with scientific concepts and does not cause misconceptions	0.92	0.92	Valid
	b. The material is discussed in depth according to the expected competencies	1.00	0.92	Valid
	c. The order of presentation of the material is correct	1.00	0.92	Valid
	d. The material is presented systematically	1.00	0.92	Valid
	e. The suitability of the material with the learning objectives	1.00	0.92	Valid
	f. Appropriateness of material containing local wisdom	1.00	0.92	Valid
	g. The use of language is easy to understand and does not cause multiple interpretations	1.00	0.92	Valid
	h. The use of language is in accordance with the development of students' thinking	0.92	0.92	Valid
	i. The spelling used refers to the Enhanced Spelling guidelines	1.00	0.92	Valid
	j. Consistency in use of terms	0.92	0.92	Valid
	k. Accurate use of symbols	0.92	0.92	Valid
	l. Delivery of messages between chapters/sub-chapters between systematic lines with content and interrelatedness	1.00	0.92	Valid
2.	Auxiliary Information			
	a. Concept maps make it easier for the reader to know the topics to be studied	0.92	0.92	Valid
	b. The introduction (identity of the e-module, learning objectives, and a brief description of the e-module) is	1.00	0.92	Valid

No.	Indicators	V_{count}	V_{table}	Categories
	appropriate			
	c. Instructions for using e-modules are easy to understand and appropriate for achieving learning objectives	1.00	0.92	Valid
	d. The content of local wisdom related to the material adds to students' knowledge	1.00	0.92	Valid
	e. Example questions at the end of each material discussion help students strengthen their understanding of the material	0.92	0.92	Valid
	f. The summary at the end of each lesson covers the core material and is easy to understand	1.00	0.92	Valid
	g. Self-assessment helps students to introspect on their understanding of the material	1.00	0.92	Valid
3.	Affective Considerations (regarding how the e-module motivates student learning)			
	a. Knowledge at the beginning of the material in the form of illustrations motivates students	0.92	0.92	Valid
	b. The language used is dialogic which allows students to communicate as if they were using the e-module	1.00	0.92	Valid
	c. Presentation of material that contains local wisdom keeps students motivated in learning	1.00	0.92	Valid
4.	Pedagogy (related to learning strategies, interactivity, evaluation, and feedback quality)			
	a. Features in teaching materials facilitate active student interaction	1.00	0.92	Valid
	b. The suitability of the practice questions to achieve the expected competence	1.00	0.92	Valid
	c. Accuracy of feedback and answer keys	1.00	0.92	Valid
	d. Ease of access to answer keys to measure student abilities	1.00	0.92	Valid

The validators also provided suggestions for the developed e-module. These suggestions included adding explanations related to local specialties in each subchapter, the concept map page should be titled and given a page number, enlarging the space for videos so that they are easy to see, writing image captions again, choosing large image resolutions so that they are clearly visible, and writing page numbers correctly because between the right and left page numbers are less proportional. Researchers then revised the e-module according to the suggestions of these validators.

The results of this study are in line with the results of other studies. E-modules in the form of flipbook was as valid as flipbook-based e-modules that have previously been developed (Asrizal et al., 2022; Febrian et al., 2023; Romadona et al., 2021; Sumarsono & Anggaryani, 2022). This validity indicates that the e-module is theoretically feasible to use in class, the same as the e-module developed by Arnila et al. (2021), Diana et al. (2022), Sumarsono & Anggaryani (2022), Febrian et al. (2023), and Berasa & Desnita (2023) were valid so that they could be applied in learning. In addition, this result indicates that the e-modules meets the minimum eligibility criteria (Berasa & Desnita, 2023).

In addition, the validity of this e-module was the same as the research of Febrian et al. (2023) which meant that e-modul had meaningful validity are guaranteed quality, could stimulate interest and interest in learning, was appropriate and easily accepted by students, had positive effect on students, and could be a connecting bridge to connect students to understanding the material. Romadona et al. (2021) and Nasution et al. (2022) also developed e-modules with a valid flipbook so that they were in accordance with the learning process and the material being taught. In addition, these results showed that the e-

module developed has scientific truth (Nasution et al., 2022) and could be a source of learning (Erniwati et al., 2022).

Student Response to E-Module

Student responses to e-modules are known fom questionnaires filled out by students. The questionnaire contains various questions adapted from (Sa'diyah, 2021). Students were asked to fill out a questionnaire after students studied static fluids using the developed e-module. Figure 2 shows the students' responses to the e-module.

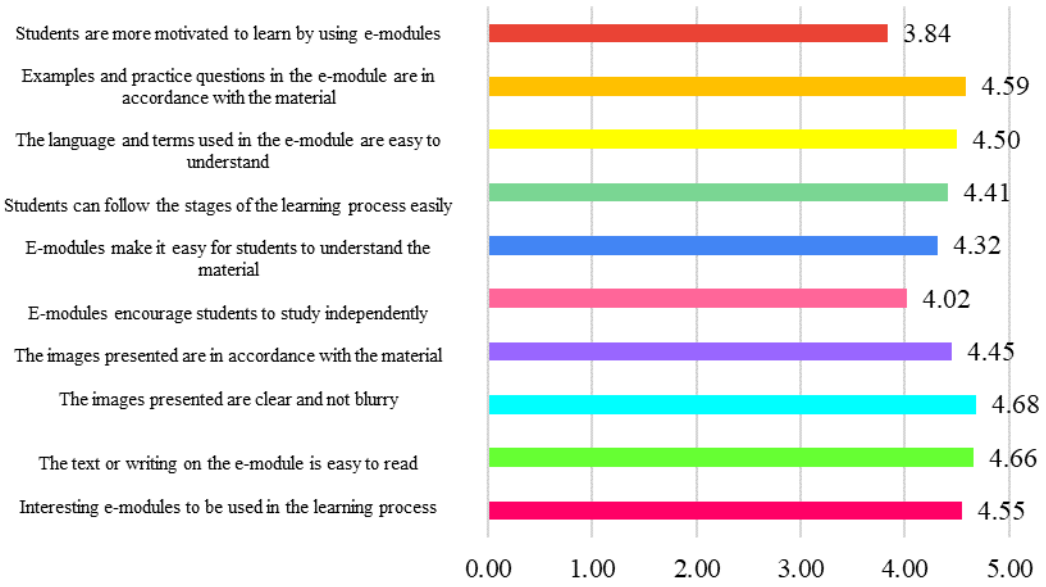

Figure 2 Student response to the e-module

Based on Figure 2 it can be seen that students gave very good responses. The overall self-response average is 4.40. These results indicate that e-modules are feasible and practical to use from a student's point of view (Berasa & Desnita, 2023; Sa'diyah, 2021). These results also indicate that the e-module attracts interest, increases learning motivation, and helps them learn (Lesmana & Nurussaniah, 2022). Asrizal et al., (2022) also stated that this very good response indicated that the developed e-module helped students understand the material and encouraged students to obtain better learning achievements.

This very good response is due to the e-module being developed in the form of a flipbook. Flipbooks can generate motivation and help students learn effectively (Yuyun et al., 2022). This is reinforced by the research of Sumarsono & Anggaryani (2022) which shows that the static fluid e-module using flipbooks obtains a positive response from students. In addition, this very good response is due to the e-module containing the relevance of local wisdom to static fluid material. The local wisdom content contained in the e-module makes the e-module attractive to use and fosters learning motivation (Pingkan et al., 2021). In addition, the integration of local wisdom with physics is needed by students to help them understand material from everyday life so that it is normal for students' responses to be good (Nugraha & Prabowo, 2022). This is reinforced by the research by Fitriah (2020) and Lesmana & Nurussaniah (2022) which shows that students respond very well to teaching materials containing local wisdom because learning becomes meaningful, contextual, and beneficial to students' lives.

CONCLUSION

The flipbook-based electronic module on static fluid material is valid with a validity coefficient of 0.92-1.00 both in terms of media and in terms of material. In addition, the e-module also received a response with an average of 4.40 in the very good category. Thus, the developed e-module is suitable for use as teaching material on static fluid material at the SMA/equivalent level. The next research can develop similar e-modules for other physics materials.

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