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## Development of Interactive E-Module on Learning IPAS

Yunita Susanti<sup>1\*</sup>, Suci Islami<sup>1</sup>, Windy Widya Kusuma Ningrum<sup>1</sup>, Asep Nuryadin<sup>1</sup>,  
Muhammad Aizzuddin bin Ab Alim<sup>2</sup>

<sup>1</sup>Universitas Pendidikan Indonesia, Bandung, Indonesia

<sup>2</sup>Sekolah Kebangsaan Alor Bakat, Kelantan, Malaysia

\*Corresponding Author: [yunita5ts@upi.edu](mailto:yunita5ts@upi.edu)

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**Abstract:** This research aims to develop an interactive e-module as an additional learning media for fourth-grade elementary schools in the Natural and Social Sciences subject (IPAS). The study was conducted utilizing the ADDIE approach of research and development. Fourth-grade students and instructors at SDN Cikadongdong verified the product before it was released. Observation, interviews, and questionnaires were used as the primary methods of data collection. The results of product trials based on the teacher's response showed a score of 95.8%, which was in the very good category. In addition, students' responses based on interview results showed that the students liked the interactive e-module because the appearance of the interactive e-module was attractive, not boring, and easy to use. Thus, it can be concluded that the interactive e-module is considered a very good category and is suitable to use as an additional learning medium in fourth-grade Natural and Social Sciences learning.

**Keywords:** Elementary school, interactive e-module, natural and social sciences learning

## INTRODUCTION

Human existence is influenced by several elements, one of which is education (Fadhilah at al., 2022; Nasrah & Elihami, 2021). Education, as defined by Law No. 20 of 2003, is the process by which individuals acquire the knowledge, skills, and values necessary for contributing members of society, the country, and the state (Lestari at al., 2022; Sukmayadi & Yahya, 2020). With education, humans can develop various aspects of life. Learning occurs when there is interaction between students and their learning environment, such as with teachers, peers, and other learning resources (Siregar, 2018; Gultom & Suhartini, 2021). In addition, learning is successful if it fulfills the components of learning itself, one of which is the use of learning media, which is seen as something that is used as a communication link between class members in the learning process (Miftah, 2013; Ulfa & Purnamaningsih, 2022). In the current era, the very high speed of development of information technology directly demands developments in other fields, one of which is the field of education. To keep up with the times, educators are required to move quickly to adjust to technological developments by using technology in the learning process (Khairrani, 2019; Susanti & Sholihah, 2021). Media is an important focus

in the development of learning technology because learning media in the form of electronic media or other learning machines can help the continuity of learning activities and make it easier and smoother (Miftah, 2013; Puspitarini & Hanif, 2019).

Digital learning media development is needed because of curriculum demands, adjusting learning to student characteristics, and solving problems (Sari et al., 2021; Sukmayadi & Yahya, 2020). Especially in 21st-century learning, the use of technology is commonplace. The results of observations made in the learning process in grade 4 SDN Cikadongdong, which already uses the independent curriculum in learning, teachers only use printed textbooks and some conventional learning media, have yet to be introduced and used digital-based learning media. Based on student learning outcomes in grade 4 SDN Cikadongdong, there are learning outcomes with low student understanding when using only conventional learning media, including IPAS subject matter on “plants as a source of life on earth.” It is necessary to introduce and use digital learning media, one of which is an e-module, which will make it easier for students to understand the material and make it interactive in the learning process. A *Module* is a program that is compiled and designed for student learning continuity and is equipped with various components such as teacher instructions, student activity sheets, and so on (Riyana, 2012; Susanti & Sholihah, 2021). The E-module or electronic module is an innovation in presenting digital or electronic modules that students can use freely (Agustin et al., 2021; Sidiq & Suhendro, 2021).

Based on the discussion, researchers developed an e-module in the IPAS subject matter of “plants as a source of life on earth”. Software applications are needed for the product manufacturing process. One of them is the Flip PDF Corporate application, which is known as software the use to make modules like books (Susanti & Sholihah, 2021; Asrial et al., 2021). Making an E-module using software, namely the Flip PDF Corporate Edition application, has the aim of making the display of teaching materials or textbooks into electronic books in the form of flipbooks. This device can be downloaded for free via the internet to be accessed using any electronic device, including mobile devices. This flipbook is presented not only with text but also with many colorful images, as well as learning videos that can be accessed directly and linked to the YouTube account where the video was taken so that the learning process will be more interesting and not boring (Erlina et al., 2022; Asrial et al., 2021). Through drag, drop or click, it is easy for users to create an e-module assisted by Flip PDF Corporate, which allows adding various animated media such as images, audio, video, animated text, hyperlinks, and so on (Putri & Slamet, 2021; La Aba et al., 2022). This is evidenced by research conducted by Susanti and Sholihah with the conclusion that the Flip PDF Corporate-based e-module on the area and volume of the ball is valid, practical and effective for grade VI students of SDN I Gamping, Talungagung.

## RESEARCH METHODS

This study employs the R&D methodology, which includes five stages (analysis, initial product design, development, implementation, and evaluation) according to the ADDIE development model (Cahyadi, 2019; Hidayat & Nizar, 2021). According to Nuryadin et al. (2021) & Lestari et al. (2023), the ADDIE framework has seen extensive use in digital education, so the ADDIE model is considered suitable for developing an interactive e-module in this study.

Respondents are people involved in development and research to evaluate the products produced. This research involved test respondents and user respondents. Test respondents are experts in their fields to assess the products produced. The interactive

e-module developed will be tested by 1 (one) expert, who is a lecturer in the field of learning media as a media expert. The expert is a lecturer majoring in Elementary School Teacher Education at the University of Education Indonesia. The user respondents were teachers and fourth-grade students of SD Negeri Cikadongdong Tasikmalaya who conducted the trial.

Data collection techniques in developing interactive e-module on the content of IPAS subject matter of plant sources of life on earth in grade IV elementary schools are observation techniques, interviews, and questionnaires. Observation is carried out by directly observing field conditions carried out by identifying places or objects as research sites. While interviews were conducted by asking questions to teachers to collect data as a needs analysis in the preliminary study and conducting questions and answers with students to get student responses after using interactive e-module products. Also, filling out questionnaires by media experts and grade 4 SDN Cikadongdong teachers for the data collection process related to the assessment of the products developed.

## RESULTS AND DISCUSSION

This research produces products in the form of interactive e-modules on the material of plant sources of life on Earth. The description of the development results of each stage carried out as follows:

### **Analysis Stage**

In the analysis stage, researchers conducted a needs analysis by collecting data from interview activities related to the research. In analyzing the problem, researchers conducted a preliminary study at Cikadongdong Elementary School. They found that the teacher only used printed textbooks and some conventional learning media in the learning process. However, there are low student learning outcomes due to students' difficulty in understanding material that only uses conventional learning media. One of the topics that use only conventional learning is the material of plants as a source of life on Earth. After finding the problem, the researcher analyzed the needs of students who should begin to be introduced to digital learning media. The digital learning media is packaged in an attractive, educational and effective manner that can be accessed via mobile phones or laptops in the form of an interactive e-module, which students can use independently and easier to understand the material. This agrees with [Partono \(2019\) & Nazifah & Asrizal \(2022\)](#) that e-modules are seen as needed by 21st-century students with various features that make e-modules more attractive and more interactive so that they can be used independently and multiplatform because they can be accessed through various electronic devices.

### **Design Stage**

The results of the analysis stage become the basis for the design stage. What this stage does is to design an interactive e-module by realizing the flowchart that will be used in the production process. A flowchart is a graphical representation of program steps and sequences ([Budiman et al., 2021](#)). Flowcharts can provide step-by-step solutions to overcome problems that occur in the process that can be seen in Figure 1 ([Sari et al., 2021; Nurhikmah et al., 2021](#)).

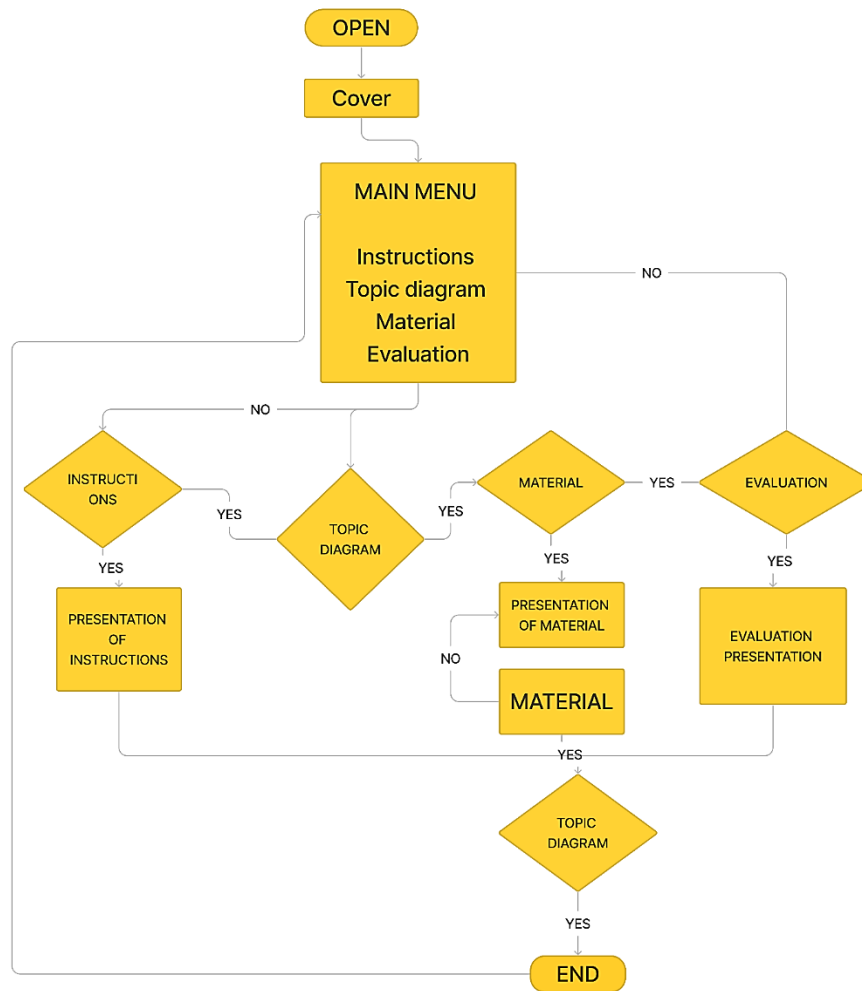


Figure 1. Flowchart of Interactive E-module

## Development Stage

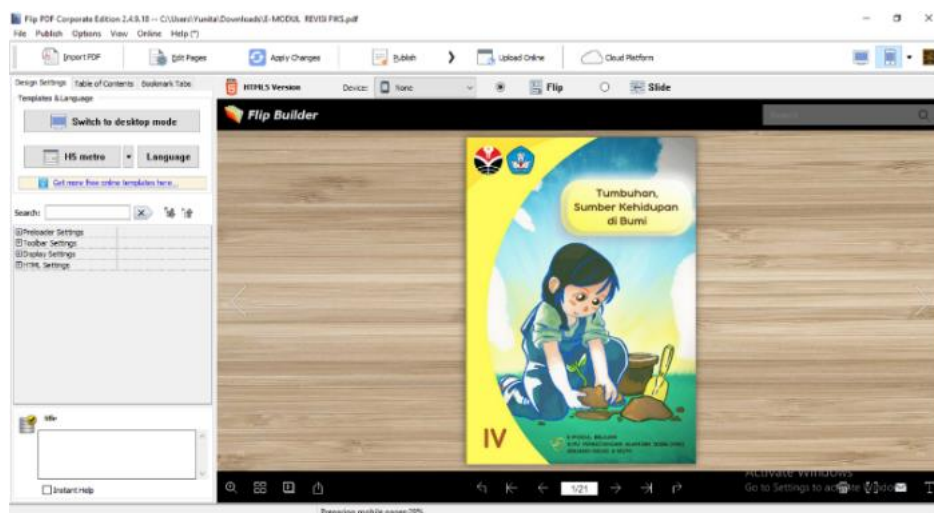







Figure 2. Display of electronic media after importing

The third stage is development. Researchers began to develop electronic-based modules using the Flip PDF Corporate Edition application. First, researchers conducted pre-production by collecting several book sources to be used as a reference for preparing electronic-based modules. Then, at the production stage, researchers carried out several activities, including asking illustrators for help to design the front cover and back cover,

making materials for the contents of electronic-based modules using the Canva application, then compiling and designing each page of the electronic-based module content using Canva. After that, the file is converted into PDF. The next step is to make the material a digital-based module, which is done with the help of Flip PDF Corporate Edition. The first process is to run the flip pdf corporate edition application, click New Project and select version HTML5, browse the electronic-based module PDF file, and click Import Now. After the PDF file is imported, the next module display can be seen in Figure 2.

Table 1. Revision Results Based on Validator Assessment

Assessment Aspect	Before Improvement	After Improvement
Changing the cover		
Add an author or about the author section	None	
Added main menu and video	None	
Add interactive features	None	



After opening the display above, the researcher can choose the background of the electronic-based module display and customize the menu display, flip display, and logo. Then, the researcher adds the Flip PDF Corporate Edition file to the download settings so students can download it and read it offline. The last process is for researchers to upload online then log in and click publish. The process takes time, as it is completed, a link will be published to students and redirected to the application. The matching file, in either \*.fbr or.zip format, is also readily accessible, allowing students to read the book without installing FlashPlayer or any other third-party software. FlipBuilder allows for many output formats, including HTML, ZIP, APP, and FBR, to ensure the module is compatible with as many platforms as possible (Erniwati et al., 2022; Islami et al, 2021).

At this stage, researchers also tested the product before field testing, which was carried out by expert review, namely media experts. Expert review is carried out by a media expert lecturer. The purpose of this validation is to find out related to the development of products that have been developed to have good validity, as well as to get recommendations and suggestions for improving the instruments that have been developed. In terms of expert validation of the test instrument, the percentage score obtained was 75%; based on this percentage, the results of the validation of the test instrument by the expert were included in the sufficient criteria. These results reveal that the product design developed can be used for trials. Based on the results of the validator trial on the validation instrument, the product development of the IPAS electronic-based module needs improvement according to the results of the validity test by the expert. Some aspects along with the revision results can be seen in Table 1.

Based on the Table 1, it displays the revision results from the validation expert regarding the developed electronic-based module. Some improvements after validation are changing the cover of the electronic module display, adding author or about the author, adding videos and interactive menus, and adding menu features.

### Implementation Stage

The fourth stage is the Implementation stage. After the electronic-based IPAS learning module product has been developed, the next step is implementation.



Figure 3. Implementation of the e-module media part of the material in class



Figure 4. Implementation of e-module media part games in class

Products developed into electronic-based IPAS modules in the form of applications are then randomly tested on respondents, grade IV (four) students at SDN Cikadongdong. This research obtained 12 students as respondents in the product development trial and

provided an assessment of the test instruments provided. Based on the data from the trial results, several limitations were found. The constraints were regarding the availability of laptops and internet electronic devices, thereby hindering implementation activities. Furthermore, many respondents are not familiar with the use of electronic devices, so guidance is needed in the implementation process.

### Evaluation Stage

The final stage is evaluation, where there are practical test activities for electronic-based module development products using educator response questionnaires and student response interviews. Large-scale experimental tests were carried out on 12 fourth-grade students at Cikadongdong State Elementary School.

Table 2. Results of Educator Response at Research Schools

No	Aspects	Rated
1.	Observation of the interactive e-module application	4
2.	Observation of IPAS learning tools	3,5
3.	Observation of IPAS learning video for Grade 4 Elementary School	4
<b>Score obtained</b>		11,5
<b>Maximum score</b>		12
<b>Percentage</b>		95,8%
<b>Category</b>		Excellent

According to Table 2, 95.8 percent of educators rated the final electronic module product as "very excellent" after it was put through its paces in a real-world test. Therefore, it can be concluded that the results of the teacher response e-module product test in grade 4 SD Cikadongdong are very good and suitable to use in the learning process. This is in line with the research of [Lestari et al. \(2022\)](#) regarding "Development of Professional Flip Pdf Based E-module on the theme of Global Warming as a Grade VII Independent Learning Resource." It shows that the validity assessment given by the science teacher reached 100% of the developed e-module because of electronic-based media that follows the development of science and technology and is adaptive.

Based on the results of interviews of student responses during the product trial test, it can be said that this electronic module is of interest to grade IV students as this electronic module is easy to use anywhere. Moreover, the flip book display on the electronic module makes students not bored in using the electronic module, and they can understand concepts and gain new experiences in conducting IPAS learning activities on plant body parts material using electronic-based modules. Thus, the IPAS electronic module is an alternative learning and teaching media for students and teachers to achieve learning goals. This is in line with [Umami & Erita \(2021\)](#) research on "Integration of Thematic Instruction Beginning in Fifth Grade Using the Professional Flip Pdf Application." It is said that electronic teaching modules can assist teachers in learning activities. Also, in [Mardhatillah \(2022\)](#) regarding "E-Module Development Using the Flip Pdf Corporate Application on Integrated Thematic Learning in Elementary Schools", it is said that it can be effectively applied to thematic learning with the results of improving student performance which reached 87%.

## CONCLUSION

Several inferences were drawn from the study's findings, including the validity of the generated product—an electronic-based module covering the subject of plant body parts. The expert validation findings reveal a 75% accuracy rate, this data is in the sufficient criteria so that the product can be tested in elementary schools. Students' responses towards the results of electronic-based module products on the topic of plant body parts were declared good. Then, the teacher's response to the results of the electronic-based module product on the topic of plant body parts was declared very good. Based on the teacher response questionnaire results, the results obtained 95.8% with a very good category. Therefore, the products that have been developed can be categorized as feasible as part of learning materials and can be used in IPAS learning in elementary schools. The obstacles in using Flip PDF Corporate Edition as IPAS learning media in elementary schools are that teachers need to be more skillful and have much free time to make it and use it with students. This e-module media is also not suitable for schools that do not have adequate digital facilities.

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