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Development of Project-Based Learning E-Modules with Local Wisdom Content in Grade IV Science Lessons (IPAS)

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Abstract

This research is based on developing a learning media product. E-modules developed to meet the needs of learning resources. The objectives and significance of this research to understand the entire procedure of developing project-based E-modules with local wisdom content for Grade IV Natural and Social Sciences in MI/SD. The process of creating the e-modules should be explained in detail based on the type intended for use in the research. This will allow us to determine the suitability of the e-module product, making it useful for teachers and students who utilize the product. Secondly, the responses provided by both teachers and students when using the project-based E-module product with local wisdom content should be ascertained. These responses will be valuable in assessing students' interest in self-directed learning using the product. Additionally, understanding teachers' responses when using the product can facilitate the teaching process and address any challenges that arise. Therefore, this research aims to uncover the responses generated. This e-module is expected to attract attention and be independent in learning to add to the learning experience and have knowledge about local wisdom in the area. This study uses a development research design, which uses the ADDIE model consisting of 5 stages: analysis, design, development, implementation, and evaluation. The results of the study show that the results of the validation trials of media experts and material experts mean that the average percentage score is 77% with valid criteria used but needs revision. The results of user trials get a percentage score of 82.4% with valid criteria used but need revision.

Keyword: *ADDIE, E-Modules, IPAS, Project Based Learning*

Introduction

The educational focus that is a priority for improvement is related to the quality of education, especially the quality of learning. Among the many existing conditions, numerous efforts have been made to enhance this quality, including developing learner-oriented instruction (Munir 2017). The maximum learning objectives will be achieved by creating learning resources that utilize information technology, computers, or instructional media. Therefore, using instructional media that includes visualizations and animations can capture learners' attention, encouraging them to study. This is in line with the use of information technology and computers, which serve as tools for teachers and students in the learning process (Mulyati, n.d.).

The Merdeka Curriculum, initiated by the Minister of Education and Culture of the Republic of Indonesia, responds to several complaints and issues educators face in the learning process. With the implementation of the Merdeka Curriculum, the burden and responsibilities of teachers are reduced, starting from administration to freedom from intimidation pressures. The Merdeka Curriculum is a diverse curriculum with a variety of learning approaches. This curriculum focuses on essential content to allow students enough time to grasp concepts and strengthen competencies. The Merdeka Curriculum is applied to cultivate independence in thinking. The most important aspect of this thinking independence is directed towards teachers (Khoirurrijal 2022). "The Merdeka Curriculum serves as a

response to education in the era of the Fourth Industrial Revolution and also the era of Society 5.0.

In the modern age, education is not merely about transferring knowledge from teachers to students; it has evolved to meet the changing educational needs. Students require learning experiences that align with the advancements of the times. In this era of digital transformation, often referred to as the Fourth Industrial Revolution, there's a shift towards virtualization of all human activities. This includes learning models as well. The facilities provided by educators will facilitate easier interactions. As a result, learning will proceed smoothly and yield positive outcomes as intended (Dasopang and Pane 2017). Effective learning necessitates the use of teaching materials in the form of media that are relevant to the times. One of the teaching materials capable of facilitating student learning today is electronic modules (e-modules).

An e-module is a form of self-directed learning material systematically organized into specific learning units. It is presented in electronic format, where each learning activity is linked with navigation links that enhance interactivity for learners. These e-modules are equipped with video tutorials, animations, and audio presentations to enrich the learning experience, making students more interactive (Najuah 2020). One of the alternative solutions that can help improve the quality of learning is by developing digital teaching materials or electronic modules. Generally, in the implementation of the learning process in schools, digital teaching modules are not yet widely available. The instructional materials used are usually limited to textbooks. This leads to monotonous learning for students, creating a boring learning environment. To address this, E-modules were developed.

E-modules are expected to be beneficial for teachers in meeting the need for learning resources, which were previously limited in availability. They also bring new experiences to the learning process, motivating students to engage. The curriculum of the Merdeka Curriculum teaching module is a learning tool that includes learning objectives, instructional steps, teaching media, and assessments designed based on the flow of learning objectives (Rahmadayanti and Hartoyo 2022). Because in the Merdeka Curriculum, teachers have the freedom to develop teaching materials, e-modules can be one of the solutions.

The implementation of the Merdeka Curriculum is closely related to project-based learning. Project-Based Learning (PBL) can be understood as an approach that provides students with the opportunity to deepen their knowledge and develop their abilities based on their individual characteristics through problem-solving and investigative activities. In its implementation, the project-based approach holds higher potential. This is because teachers can guide and facilitate students in finding answers and solutions to the learning challenges they face. Moreover, it provides them with the opportunity to foster innovation, creativity, understanding, and the enhancement of skills (Fikriyah and Gani 2015). This project-based learning model can assist learners in studying the following aspects (Kristanti and Subiki 2017); First, strong and meaningful knowledge and skills are built through authentic project tasks and tasks. Second, it expands knowledge through the authenticity of curricular activities by engaging in open-ended planning or investigations, resulting in outcomes or answers not predetermined by specific perspectives. Third, it constructs knowledge through real-world experiences and interpersonally negotiated cognitive processes occurring within a collaborative work environment.

The Merdeka Curriculum is also closely related to local wisdom. Local wisdom in its broader sense encompasses not only cultural norms and values but also opinions or ideas, including influences on technological development, healthcare provision, and aesthetic values. It can be said that local wisdom is spread across the entire cultural heritage, whether factual or fictional, or even in the realm of thought. This means that local wisdom continues to persist to this day, or becomes the treasury of stories from a particular region (Sedyawati 2000). Local wisdom can also be interpreted as the set of values governing societal life, which exists in the form of religion, customs, and the cultural heritage of our ancestors. Another

definition of local wisdom is that it continually evolves to adapt to the environment, thereby generating knowledge with regional characteristics. The outcome of this amalgamation with traditions and customs can be valuable for the life of a community (Suhartini, n.d.). Due to disruptions in the current era, students are experiencing a crisis of pride in their own culture, especially regarding local wisdom. Therefore, proactive measures are necessary to ensure that Indonesia's local wisdom, which serves as a national identity, continues to thrive and evolve. This aligns with the Merdeka Curriculum, which also emphasizes local wisdom as a content that needs to be developed within the Pancasila student profile program.

Natural and Social Sciences, often abbreviated as IPAS, are fields of knowledge that encompass the study of living and non-living entities within the universe, along with their interactions. It also examines human life both as individuals and as social beings who interact with their environment. IPAS education plays a role in realizing the Pancasila Student Profile, which represents the ideal image of Indonesian learners. The IPAS subject serves to help students nurture their curiosity about the phenomena occurring around them. Their curiosity drives them to understand how the universe works and interacts with human life on Earth. This understanding is harnessed to identify various challenges and find solutions to achieve sustainable development goals (Putra and Rahmi, n.d.).

In both madrasas and schools, it's a factual observation that many teachers have yet to fully harness technology-based instructional media in their classroom teaching. For instance, many teachers still rely on traditional textbooks. However, teaching materials and electronic media need to be developed for the context of curriculum-based self-directed learning. The lack of variation in teaching methods is inhibiting effective learning. It's fair to say that using only textbooks is less engaging for students.

The solution to addressing these issues related to teaching materials lies in the development of digital or electronic instructional materials. As of now, madrasas and schools lack digital teaching modules. Thus, the need arises to create a new and enjoyable learning environment, leading to the development of e-modules. These e-modules would be beneficial for both teachers and students, meeting the need for learning resources. Given that teachers have the freedom to design their own teaching modules and modify them as needed, the anticipated e-modules are expected to capture attention and promote self-directed learning. This approach would enhance the learning experience and foster an understanding of local wisdom in their respective regions.

Therefore, this research aims to develop project-based e-modules enriched with local wisdom content for Grade IV Natural and Social Sciences. The study is a case analysis conducted in SD N Ngunut located in the Gunungkidul region of Yogyakarta.

Methods

This article uses the ADDIE model development research method. The development of the IPAS E-Module is based on a project base learning approach with local wisdom. One of the development models is the ADDIE Model which stands for Analyze, Design, Develop, Implement, and Evaluate. ADDIE belongs to the concept of systematic product development. ADDIE as a fundamental process for creating effective learning resources. The ADDIE model has five stages (Sugiyono 2017). The five stages are arranged in a systematic, integrated, and have general procedures. Following are the general concepts and procedures contained in the ADDIE model that will be developed;

Pic. 1 Stages of the ADDIE Model

Explanation of each stage namely; 1) Analyze, namely the initial stage so that it requires a needs analysis in making E-modules so that you can understand the products to be developed, such as student needs, learning systems and media used in learning. 2) Design is the stage for determining the subject of the user, and analysis related to the material for which the lesson plan will be developed. 3) Development is the stage for translating design specifications into real products, resulting in a prototype E-Module. 4) Implementation at this stage, the results of the prototype begin to be tested in learning. 5) Evaluation is the last stage carried out to find out the deficiencies contained in the E-Module. There are two evaluations, namely formative evaluation, which already exists at each ADDIE stage, and summative evaluation, which is a test designed for certain criteria.

The design of the E-Module trial was carried out with the stages of material expert validation and media expert validation. After conducting trials, researchers revised the product developed until it was suitable for testing. Next, the product trial continued with trials in class IV at SDN Ngunut with a total of 15 students. The instrument used in this research is a questionnaire in the form of numbers and criteria such as

Table 1. Likert Scale Assessment Score

Question	Score
Very Good	5
OK	4
Enough	3
Minus	2
Very Less	1

The instruments prepared have a list of questions and a column to include expert comments. The scale used is the Likert scale. Based on expert assessment data using expert and user validation instruments, expert validation values can be obtained using the formula;

$$P = \frac{n}{N} \times 100\ \%$$

With:
P = Percentage
N= Number of empirical scores
N= Maximum number of scores

Qualitative descriptive is data that presents the expert team's assessment regarding the validity of the E-Module. The percentage of validation results is adjusted to the following categories

Table. 2 Expert Validation Criteria

Validity Criteria	Information Level of Validity
85,01% – 100 %	Very valid, or can be used without revision

70,01 % – 85,00 %	Valid, or usable but needs minor revision
50,01 % – 70,00 %	Not valid, it is recommended not to use it because it requires a lot of revision
25 % – 50,00 %	Invalid or unusable

The data analysis method is triangulation. Sugiyono stated that triangulation is a data collection technique that combines various existing data collection techniques and data sources. The main research data is questionnaire data in the form of numbers, so it is calculated by adding up the appropriate scores and then analyzing according to the criteria for each answer. Then to strengthen and check the validity of the questionnaire data, matching was carried out with the documentation data obtained from observations.

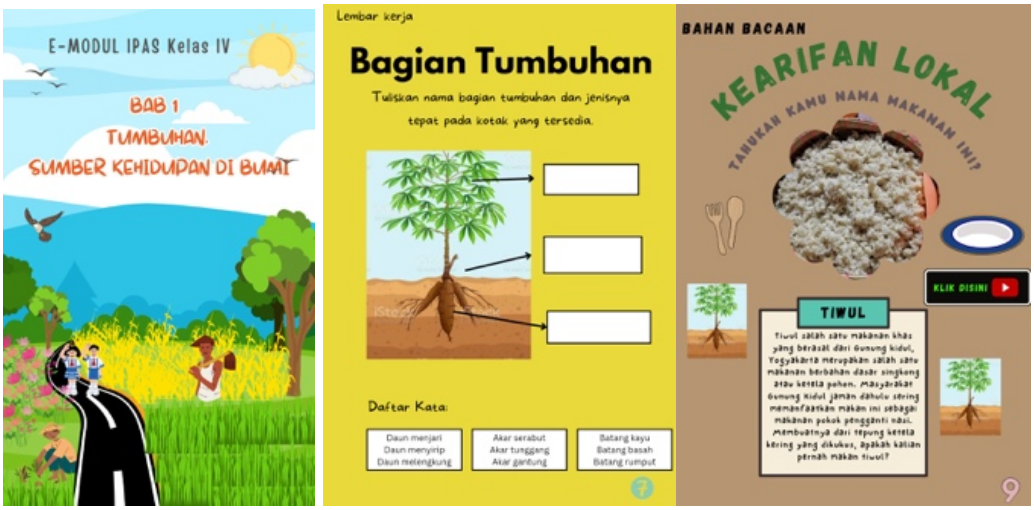
Result

The first stage in the development of this E-Module is the Analyze stage. Namely, researchers carry out an initial needs analysis through several methods such as observation and interviews. The aim is to obtain information related to the learning media needed by students. Based on the results of observations and interviews, it is known that the media used is still a textbook, not yet using various media, especially those based on electronics. Apart from that, it can also be seen that the teaching materials used by students to study independently at home are still limited. Elementary school age children are of concrete operational age, meaning that the learning resources provided must be concrete or real, not abstract. So that students need to learn to use the latest learning media with real pictures, photos or video links that add to their knowledge regarding the material to be delivered.

The second stage of research is the Design stage. Researchers then designed a Science E-Module based on Project Base Learning with the theme of local wisdom. Next, by creating a module framework, compiling learning outcomes and learning objectives. The module outline contains module parts, namely the title, general instructions, module instructions, module material, exercises, worksheets, and evaluation. At this design stage, the researcher also designed the validation instruments needed to assess the quality of the developed learning module products.

The third stage of this research is the Development stage. Researchers began developing E-module products by making the module design into a product. Researchers collected material from various references and then developed it into complete learning module content.

Picture 2. E-Module Product Results



Then at this stage the researchers validated the E-Module product. Two people validated the E-Module product, namely 1 media expert, 1 material expert, and then 15 students as users. The following is data from the validation results of the E-Modul product.

Table 3. Media Expert Validation Results

Aspect	Indicator	Result Value
Text	Font size	4
	Type Font	4
	Neatness	3
Images and Video	Images Selection	4
	Videos Selection	5
Color	Color Selection	4
	Color composition	4
	Suistability of writing and background	3
Interesting	Attention	4
	Ease of understanding the material	5
Total		40
Percentage= $\frac{40}{50}$ ×100 %		80 %

Based on data analysis from validation results from E-Modul product media experts, the product quality is 80% and is in the valid category, and can be used even though it needs slight revision.

Table. 4 Material Expert Results

Aspects	Indicators	Value Result
Material	Easy to understand	4
	Conformity between CP and goal	4
	Cobtains local wisdom	3
	In accordance with curriculum	4
	Suitability of material with media	4
Evaluation	Kesuaian materi dengan evaluasi	4
	Difficulty of level question	3
	Conformity of evaluation to object	3
Language	Correct use of language	4
	Ease of understanding of material	4
Total		37
Persentage= $\frac{37}{50}$ ×100 %		74 %

Based on data analysis from validation results from E-Modul product material experts, the product quality is 74% and is in the valid category, and can be used even though it needs slight revision. Then the average for the two experts is 77%, which means it is valid and suitable for use and needs a little revision.

The fourth stage of research is the Implementation stage. Implementation was carried out by trialling the use of the E-Modul product on users who were 15 grade IV students at SD Ngunut.

Table 5. Assessment results of class IV students

Aspect	Indicator	Average

Material	Ease of understanding material	4,2
	Provide motivation	4
	Easy to understand instructions	4,2
Images and Video	Images selection	4
	Video clarity	4
Text and Color	Color selection	4,3
	Color and image suitability	4,6
	Text easy to read	4,3
Evaluation	Difficulty of question	4
	Easy of understanding questions	3,9
Total		41, 2
Persentage= $\frac{41,2}{50}$ ×100 %		82, 4 %

Based on data analysis of validation results from users of the E-Modul product, the product quality is 82.4% and is in the valid category, and can be used even though it needs slight revision.

The fifth stage, researchers carried out product evaluations in the form of expert questionnaire results regarding the E-Module. Based on the validation results, in general the E-module is suitable for use but needs revision. Revisions from media experts explained that revisions were needed regarding the neatness and composition of the writing and e-module background. Then material experts must make better evaluations and adapt them to existing local wisdom. Apart from that, researchers also conducted an evaluation by asking for responses from users of the E-module product. Based on the response results, the E-Module is also in a suitable condition for use. Other responses, users are happy and increase their interest in learning. Because this is a new medium for them.

Discussion

The objectives and significance of this research are as follows: Firstly, to understand the entire procedure of developing project-based E-modules with local wisdom content for Grade IV Natural and Social Sciences in MI/SD. The process of creating the e-modules should be explained in detail, based on the type intended for use in the research. Based on the data above, it is known that the result is 77% and is in the proper category and needs a little revision. This will allow us to determine the suitability of the e-module product, making it useful for teachers and students who utilize the product.

Secondly, the research conducted by Jefri Putra and Ulfia Rahmi who also developed e-modules for Grade IV Natural and Social Sciences in elementary school, focusing on fostering independent character. Unlike what the researcher will do, which is project-based with a local wisdom content focus. Moreover, the research subjects will be more numerous and come from both elementary and primary schools in Gunungkidul. In the research conducted by Ni Komang Ayu Miana and Ni Wayan Suniasih. They also developed Natural and Social Sciences e-modules with local wisdom, but it differs from what the researcher will do, which is project-based and focused on local wisdom from a different region. Additionally, the content of the module and the research methodology used are of a different nature, leading to distinct innovations.

Conclusion

Based on the results of project-based development of the IPAS Class IV MI/SD E-Module product using local wisdom, it can be concluded that this research uses the ADDIE model development design which consists of 5 stages, namely analysis, design, development, implementation and evaluation. The validation results from 2 experts and 15 product users mean that the E-Module is suitable for use, but revisions are needed so that the product developed is better.

Declarations

This research is a single researcher independently funded by the author. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. However, this research would not have run smoothly without the help of Ngunut Elementary School, Playen as the location, and fourth-grade students as research subjects. If readers need data, we, as researchers, are ready to provide the data and can contact you via the email listed. In this research there are also purely no financial interests or competing personal relationships that could influence the work in this research. Specifically for testing products developed by researchers.

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