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E-Modules with A Contextual Approach to Natural Science Content Improve Student Learning Outcomes

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ABSTRAK

Proses pembelajaran pada muatan IPA masih berpusat pada guru yaitu siswa cenderung menerima apa yang dijelaskan oleh guru, namun belum memberikan kesempatan bagi siswa untuk berkembang secara mandiri. Sehingga, jika pembelajaran dibiarkan seperti itu maka hasil belajar dari siswa tidak akan mengalami peningkatan. Penelitian ini bertujuan untuk mengembangkan media e-modul berpendekatan kontekstual pada muatan IPA kelas V SD. Penelitian ini adalah penelitian pengembangan dengan menggunakan model ADDIE. Subjek penelitian ini terdiri dari ahli isi pembelajaran, ahli desain pembelajaran, ahli media pembelajaran, 3 orang siswa uji coba perorangan, 6 orang siswa uji coba kelompok kecil dan 37 orang siswa uji coba lapangan. Metode pengumpulan data yang digunakan yaitu metode kuesioner, pre-test dan post-test. Teknik analis data menggunakan analisis kualitatif, kuantitatif dan statistik inferensial. Hasil penelitian menunjukkan bahwa e-modul yang dikembangkan valid berdasarkan ahli isi pembelajaran, ahli desain pembelajaran, ahli media pembelajaran hasil yang diperoleh berada pada kategori sangat baik, uji coba perorangan dan uji kelompok kecil termasuk kategori sangat baik. Uji efektivitas e-modul berpendekatan kontekstual terdapat perbedaan yang signifikan hasil belajar muatan IPA sebelum dan sesudah menggunakan media pembelajaran e-modul berpendekatan kontekstual. Simpulan penelitian yaitu e-modul layak dan valid digunakan.

ABSTRACT

The learning process for science content is still teacher-centred; students tend to accept what the teacher explains, but it needs to provide opportunities for students to develop independently. So, if learning is left like that, student learning outcomes will stay the same. This research aims to develop e-module media with a contextual approach to class V elementary school science content. This research is development research using the ADDIE model. The subjects of this research consisted of learning content experts, learning design experts, learning media experts, 3 individual trial students, 6 small group trial students and 37 field trial students. The data collection methods used were questionnaire, pre-test and post-test methods. Data analysis techniques use qualitative, quantitative analysis and inferential statistics. The research results show that the e-module developed is valid based on learning content experts, learning design experts, and learning media experts; the results obtained are in the very good category, and individual trials and small group tests are in the very good category. Testing the effectiveness of e-modules using a contextual approach, there was a significant difference in learning outcomes for science content before and after using e-module learning media with a contextual approach. The research conclusion is that the e-module is feasible and valid to use.

1. INTRODUCTION

The development of science and technology continues to develop in this modern era. The development of science and technology also urges the development of education. Education is basically an effort to provide certain knowledge, insight, skills and expertise to individuals in order to develop human talents and personalities (Redjeki & Novi, 2022; Wiyono & Budhi, 2018). With education, humans try to develop themselves so that they are able to face every change that occurs due to advances in science and

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technology. Therefore, education issues need to receive serious attention and treatment involving various issues related to quantity, quality and relevance. Education is an effort used to develop a person's knowledge and skills to become a better individual (Mardhiyah et al., 2021). In essence, education is a conscious effort that humans carry out continuously (throughout their lives) in order to be able to maintain their identity, existence and survival (Rahmadani & Anugraheni, 2017). Education needs to be directed in accordance with the goals contained in the nature of education so that learning is needed that is able to support the process of directing the goals of implementing education itself (Mubarok, 2019).

Learning is a process of cooperation and communication between students and teachers or their environment to achieve a certain goal (Annisa & Marlina, 2019; Hastuti, 2019). The learning carried out receives less attention from students, especially in learning where the material is dense with words and often makes students feel bored when reading it (Subroto et al., 2020). Apart from that, the lack of teacher explanations to link the concepts studied with real life means that students are unable to connect the material they have learned at school and the process of applying that material in everyday life. Learning media is one component that has an important role in learning activities. Learning media can be used as a tool or intermediary that can facilitate the learning process and increase students' interest and attraction in learning (Darojat et al., 2022; Rahmawati & Atmojo, 2021). But in reality, the use of learning media in schools is still not optimal. Based on observations and interviews conducted at SD Negeri 1 Panji, it was found that the methods used by teachers in the learning process still tend to use lecture and question and answer methods. The learning process is generally still teacher-centered, that is, students tend to accept what the teacher explains, but this does not provide opportunities for students to develop independently (Jainuddin, 2019; Permatasari, 2021). So, if learning is left like that, student learning outcomes will not improve. Apart from that, in the learning process teachers only use media such as textbooks to support the learning process and teachers also rarely use innovative learning media because most teachers still have difficulty creating interesting learning media (Rahim et al., 2019; Sukmanasa et al., 2020).This results in student boredom in learning and a decline in student learning outcomes.

The solution to overcome this condition requires teaching materials that can help students to learn independently, such as E-modules to improve student learning outcomes. E-modules are digital teaching materials that are arranged systematically and can present the material in a coherent manner and are equipped with materials, videos and practice questions that can make it easier for students to learn learning material and E-modules are also able to help make it easier for teachers to explain subject matter (Hartika et al., 2022; Raqiztya & Agung, 2022). E-modules are also practical and easy to access using smartphones so this can attract students' interest in learning because they can study anywhere and at any time (Faridah & Afridiani, 2021; Sutama et al., 2021). One learning approach that supports the use of E-modules in the learning process is the contextual approach. Contextual learning is a learning concept where the teacher brings the real world into the classroom and encourages students to make connections between the knowledge they have and its application in their daily lives, while students gain knowledge and skills from a limited context, little by little, and from the process of constructing self, as preparation for solving problems in life as a member of society (Chityadewi, 2019). A contextual approach can enable students to connect the content of academic subjects with the context of daily life to find meaning (Burengge, 2020; Ginting et al., 2021). The aim is to encourage students to be able to apply it in their lives. Thus, the essence of the contextual approach is the connection of each learning material with students' real lives. Contextual learning is a learning approach that emphasizes the process of full student involvement to discover the material being studied and relate it to real life situations so as to encourage students to be able to apply it to their lives.

The results of previous research revealed that E-modules can make it easier for students to learn and can improve student learning outcomes (Kristalia & Yerimadesi, 2021; Wulandari et al., 2020). E-modules can make it easier for students to study independently anywhere and anytime so that they can improve student learning outcomes (Andermi & Eliza, 2021; Saprudin et al., 2021). The aim of research on the development of E-modules with a contextual approach is that it is hoped that student learning outcomes can increase, especially because science content is one of the subjects that studies knowledge and the natural environment.

2. METHOD

This type of research is development research (Research and Development). The development model used in this development research is the ADDIE model. The ADDIE development model has five stages, namely Analysis, Design, Development, Implementation, and Evaluation (Tegeh, 2014). The procedure of this research, namely analysis (Analysiss), at the analysis stage the things that need to be done are determining subjects, analysis of Core Competence, Basic Competence, Indicators, analysis of E-module

needs and analysis of conditions. Design: At the design stage, what needs to be done is to develop a flowchart and storyboard related to the E-module that will be developed. Development: At the development stage, what must be done is to develop the product according to the storyboard that was created at the design stage. Implementation: At the implementation stage, the thing that must be done is to carry out product validation tests, namely 1 person testing the learning content expert, 1 person testing the learning design expert, 1 person testing the learning media expert, 3 individual testing people and 6 group testing people small. Then proceed with testing the effectiveness of the product on all class V students of SD Negeri 1 Panji, and evaluation. The evaluation stage is the final stage in the ADDIE model. At this stage, an evaluation of the E-module is carried out. The evaluation used at this stage is a formative evaluation, where this evaluation is used to determine the feasibility of the product that has been developed. The data collection method used in this research is the questionnaire method and test method. The questionnaire or questionnaire method is used to collect review results from learning content experts, learning design experts, learning media experts, individual trials and small group trials. Then the test method is used for field trials. The test questions are in the form of multiple choices which are used to collect data on student learning outcomes before and after using the E-module. The questionnaire instrument grid for learning content experts, learning design experts, learning media experts, individual trials and small group tests can be seen in Table 1, Table 2, Table 3, and Table 4.

Table 1. Learning Content Expert Instrument Grid

No	Aspect	Component	Number of Items	Item No
1	Curriculum	Identity Learning indicators Learning objectives	5	1,2,3,4,5
2	Material	Suitability of material content Material systematics The level of ease and depth of the material	7	6,7,8,9,10,11,12
3	Language	Clarity of information Language use Legibility	2	13,14
4	Evaluation	Difficulty level of questions Clarity of question formulation	3	15,16,17

Table 2. Learning Design Expert Instrument Grid

No	Aspect	Component	Number of Items	Item No
1	Curriculum	Identity Competencies to be achieved Clarity of learning objectives Clarity of information	4	1,2,3,4
2	Method	Media equipment Clarity of learning design Clarity of study instructions	7	5,6,7,8,9,10,11
3	Evaluation	Availability of learning evaluation Suitability of questions to the material Clarity of learning evaluation instructions	3	12,13,14

Table 3. Learning Media Expert Instrument Grid

No	Aspect	Component	Number of Items	Item No
1	Text Message Design	Determination of the type or size of letters and punctuation Text readability Accuracy of word choice	6	1,2,3,4,5,6

No	Aspect	Component	Number of Items	Item No
		The colour of the text matches the background		
2	Method	Suitability of image to material Availability of image captions Images are easy to understand Accuracy of image layout	4	7,8,9,10
3	Evaluation	Suitability of video to material Videos are easy to understand Clarity of information	3	11,12,13
4	Organizing E-module	E-module is easy to use Clarity of instructions for use Navigation consistency	3	14,15,16

Table 4. Individual and Small Group Trial Instrument Grid

No	Aspect	Component	Number of Items	Item No
1	Media Learning	Ease of use Attractiveness Instructional media provisions	3	1,2,3
2	Material	Determination of material content Language Evaluation	10	4,5,6,7,8,9,10,11,12,13
3	Benefit	Interest Motivation to learn	2	14,15

The data analysis technique used in this research is quantitative descriptive analysis. Quantitative descriptive analysis is used to process data that can be measured or calculated directly in the form of numbers or numbers based on the validity results of experts, individual and small group trials. Next, it is analyzed using a conversion level of achievement on a scale of five to determine the percentage of product feasibility. Then the percentage results are converted into categories in Table 5.

Table 5. Achievement Level Conversion with Scale 5

Achievement Rate (%)	Qualification	Information
90-100	Very good	No need to revise
75-89	Good	Slightly revised
65-79	Enough	Revised sufficiently
55-64	Not enough	Many things have been revised
1-54	Very less	Repeatedly make the product

3. RESULT AND DISCUSSION

Result

This development research resulted in a product in the form of E-module teaching materials for class V science content at SD Negeri 1 Panji. The development of this E-module was carried out using the ADDIE development model, including the analysis stage, design stage, development stage, implementation stage and evaluation stage. The first stage is the analysis stage, at the analysis stage the activities carried out are analyzing learning activities, analyzing student characteristics, analyzing supporting facilities. Analysis of learning activities, based on observations and interviews conducted with the class V homeroom teacher at SD Negeri 1 Panji, shows that in the learning process students are not yet able to learn independently and teachers still rarely use interactive media in the learning process. Teachers more often use books or worksheets in the learning process, which causes students to feel bored and fed up with learning. Then, the analysis of basic competencies and indicators shows that the instructional analysis carried out is related to the competencies required to be achieved by students and the material used in the E-module is adjusted to the existing basic competencies and indicators. The basic competencies, indicators and material are presented in Table 6, Table 7, Table 8, Table 9, and Table 10.

Table 6. Basic Competence, Indicators and Theme Material 1

Basic competencies	Indicator	Material
3.1 Explain the locomotor organs and their functions in animals and humans as well as how to maintain the health of human locomotor organs 4.1 Make simple models of human or animal locomotion	3.1.1 Memorize locomotion and their functions in animals and humans. 3.1.2 Explain how to maintain the health of human movement organs 3.1.3 Name animals that are vertebrates and animals that are arvebrates. 4.1.1 Creating models of locomotion from wire	The skeleton of animal locomotion organs Movement organs of vertebrate and invertebrate animals Human movement organs: 1. Human Wireframe 2. Bone Types 3. Functions of the Human Skeleton Human muscles: 1. The shape and location of human muscles 2. Various types of muscle movements

Table 7. Basic Competence, Indicators and Theme 2 Material

Basic competencies	Indicator	Material
3.2 Explain the respiratory organs and their functions in animals and humans, as well as how to maintain the health of human respiratory organs 4.2 Create a simple model of human respiratory organs	3.2.1 Identify the function of the respiratory organs in humans. 4.2.1 Make a chart of the function of the respiratory system in humans	1. Chart of how the human respiratory organs work. 2. respiratory system readings in humans. 3. Reading about animal respiratory organs. 4. Functions of respiratory organs in humans.

Table 8. Basic Competence, Indicators and Theme Material 3

Basic competencies	Indicator	Material
3.3 Explain the digestive organs and their functions in animals and humans as well as how to maintain the health of human digestive organs 4.3 Present work (for example posters, models, or role playing) about the concept of digestive organs and functions in animals or humans	3.3.1 Compare the digestive organs of animals and humans. 4.3.1 Create a digestive chart of human organs and their functions.	Digestive Organs in humans and animals 1. Digestive organs in humans 2. Digestive organs in animals 3. How to maintain healthy digestive organs

Table 9. Basic Competence, Indicators and Theme Material 4

Basic competencies	Indicator	Material
3.4 Explain the digestive organs and their functions in animals and humans as well as how to maintain the health of human digestive organs 4.4 Present work (for example posters, models, or role playing) about the concept of digestive organs and functions in animals or humans	3.4.1 Compare the digestive organs of animals and humans. 4.4.1 Create a digestive chart of human organs and their functions.	Digestive Organs in humans and animals 1. Digestive organs in humans 2. Digestive organs in animals 3. How to maintain healthy digestive organs

Table 10. Basic Competence, Indicators and Theme Material 5

Basic competencies	Indicator	Material
3.5 Analyze the relationship between ecosystem components and food webs in the surrounding environment 4.5. Create work on the concept of food webs in an ecosystem	3.5.1 Complete the chart with the classification of animals based on the type of food they eat. 3.5.2 Name herbivorous, carnivorous and omnivorous animals. 4.5.1 Present a nonfiction text about one of the selected animals.	1. Type of pet food 2. Classification of animals into cornivores, herbivores and omnivores

Analysis of student characteristics was carried out to determine the characteristics of class V students at SD Negeri 1 Panji. Based on interviews with class V homeroom teachers, learning is still conventional and tends to still use the lecture method in the learning process. So that students are not motivated, less interested and less interested in learning, this causes student learning outcomes to be less than optimal. Based on analysis through giving questionnaires to students, it was found that the characteristics of students are easier to understand a lesson if they use audio-visual learning media. Analysis of supporting facilities. Based on the results of observations made at SD Negeri 1 Panji, e-module media is suitable for development in schools. This can be seen from the supporting facilities that support the school's learning process, such as LCD, Wifi, computers and projectors.

The second stage is the design stage, what is done at this stage is determining the software that will be used in developing E-module media, creating flowcharts and storyboards. Flowcharts and storyboards were created with the aim of providing an overview of the E-module work flow being developed, preparing assessment instruments. The assessment instrument was created to determine the validity of the product to be developed, Preparing a RPP (Learning Implementation Plan). This RPP aims to direct learning activities so that they can run optimally by using E-modules with a contextual approach, so that with the RPP learning can be structured systematically. The third stage is the development stage, this stage is the production stage in developing the product. This stage is a continuation of the previous stage, where at this stage the E-module media is developed into a product that is ready to be used by students. The product development stage is collecting teaching materials, these materials are obtained from class V thematic books and other sources that are relevant to the material raised. All learning resources used to develop E-modules such as text, images, videos and quizzes will be combined through the main application, namely flip PDF corporate, so that it becomes complete teaching material. After the teaching materials are combined and become complete teaching materials, the next step is to create e-modules which can be accessed via electronics such as laptops, computers or smartphones. The results of e-module development can be seen at Figure 1.

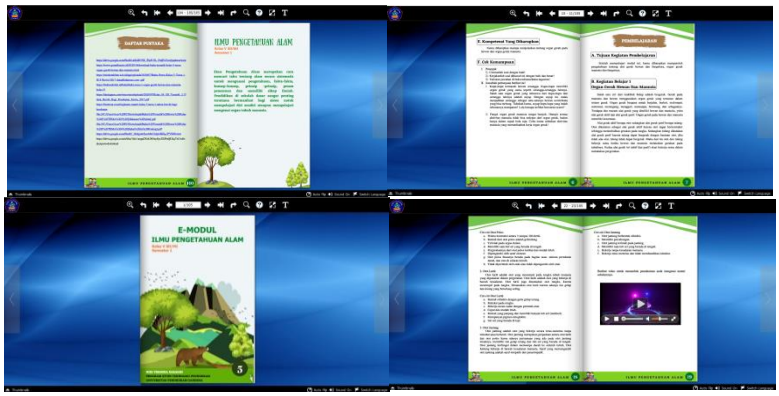

Figure 1. E-module Display with a Contextual Approach

The fourth stage is the implementation stage, after the development stage it is continued with the implementation stage, where in this implementation stage what is carried out is a product validation test to determine student responses regarding the attractiveness of the product being developed. The product validation test stages include product validation tests by experts, namely class V science material content experts, learning design experts and learning media experts. Product trial, namely individual trial with 3

students. Of the 3 students, including 1 student with high learning outcomes, 1 student with medium learning outcomes and 1 student with low learning outcomes. The small group test involved 6 students, including 2 students with high learning outcomes, 2 students with medium learning outcomes and 2 students with low learning outcomes. This product trial aims to determine the validity of the e-module that has been developed. The results of the validity of the contextual approach e-module developed are presented in Table 11.

Table 11. Percentage of E-module Development Validity Results

No	Test Subjects	Validity Results	Qualification
1	Test Learning Content Experts	96.6%	Very good
2	Test Learning Design experts	92.8%	Very good
3	Learning Media Expert Test	96.8%	Very good
4	Individual Trial	96%	Very good
5	Small Group Trials	94.7%	Very good

Based on Table 11, it shows that the results of the percentage of validity of e-module development according to learning content experts are 96.6% with very good qualifications, learning design experts with 92.8% with very good qualifications, learning media experts with 96.8%, individual trials 96% were in very good qualifications, and 94.7% in small group trials were in very good qualifications. The effectiveness of this contextual approach E-module was measured using the pretest and post-test stages on 37 class V students of SD Negeri 1 Panji. The results of the analysis that have been calculated manually are > , this shows that the E-module has a significant influence on student learning outcomes. The fifth stage is the evaluation stage, this stage is the final stage of the ADDIE model. Where at this stage it is used to test the feasibility level of the product that has been developed. The evaluation applied at this stage is formative evaluation. Formative evaluation is used to assess whether or not a product has been developed as a learning medium. Based on the percentage of validity of e-modules from learning content experts, learning design experts, learning media experts, individual trials, small group trials and e-module effectiveness tests, e-modules with a contextual approach are suitable and effective for use as learning media.

Discussion

E-module development research was developed using the ADDIE model, namely analysis, design, development, implementation and evaluation. The ADDIE model is a learning system design model that is simple and easy to learn. Based on the results of the research and analysis that have been found, e-modules with a contextual approach to science content have qualities that are very suitable for use as teaching materials in the learning process in class V of SD Negeri 1 Panji. This is proven through the results of the validity of science E-module development research based on 5 tests including, namely learning content experts, learning design experts, learning media experts, individual trials and small group tests. The results of the validity of the E-module product were carried out using a questionnaire.

Judging from the results of the validity of the learning content experts, the qualifications are very good, so the product is suitable for use as learning media. Some of the feasibility of the resulting product can be achieved, namely, because of the clarity of basic competencies, indicators and learning objectives with the presentation of material that can make it easier for students to learn so that learning objectives are achieved as expected (Agustini & Rofiqoh, 2020; Lilis et al., 2019; Putri, 2018). Furthermore, the systematic content of the material presented in the E-module is in accordance with the learning objectives which can make it easier for students to understand the material and also remember the material studied (Darmaji et al., 2020; Fahmi et al., 2021; Sutama et al., 2021). Then the suitability of language use in the E-module is easy so that students can understand the material (Widiastuti, 2021). Judging from the results of the validity of the learning design experts, the qualifications were very good. Some of the feasibility of the resulting product can be achieved, namely, due to clarity of identity, suitability of indicators, and suitability of the material with the learning objectives that have been set (Herowati & Azizah, 2022; Zahara Konita, 2021). Clarity of learning design, learning instructions are used to guide users in using learning media (Pratiwi & Wiarta, 2021; Yasa et al., 2021). Apart from that, clarity of learning strategies is used to support the creation of effective learning so that students are interested in learning and the accuracy of examples in clarifying material (Gustinasari, M., Lufri, 2017; Meliyani et al., 2022). Then the availability of assessments is used to measure the extent of students' understanding of the material in the media (Hidayati, 2019). Judging from the results, the validity of learning media experts was found to be 96.8% with very good qualifications. Some of the feasibility of the resulting product can be achieved, namely, because of the accuracy and readability

of the text which can make it easier for students to learn how to determine the colour of the text with the background colour so that students are more interested in learning (Adianto, 2019; Nonthamand, 2020).

The results of the review of individual and small group trials obtained very good qualifications, so that the E-module is suitable for use in learning. This is proven by the ease of using E-modules, E-modules are media that can be used to help students learn independently and the attractive appearance of E-modules so that students are interested and motivated in learning (Komikesari et al., 2020; Nurrita, 2018; Pramana et al., 2020). Interesting learning media will be able to increase students' enthusiasm for learning because interesting learning media can help students' psychology, namely by making abstract learning become real (Nurrita, 2018; Supriyono, 2018). The results of this research are strengthened by previous research which states that E-modules can make it easier for students to learn independently (Ismi, 2019; Puspitasari, 2019). E-modules can increase students' interest in learning (Dewi & Lestari, 2020; Zahara Konita, 2021).The advantage of this media is that there are practice questions that are used to measure students' learning abilities and are also equipped with pictures or videos that are used to clarify the material in the E-module. This research is different from other research, namely that the E-module has a contextual approach which is designed to be as attractive as possible to help students learn. This research has a contribution, namely that it is hoped that it can improve student learning outcomes and the implication of this research is that it facilitates students in the learning process independently and can be used anytime and anywhere. Research limitations This contextual approach E-module was developed based on the characteristics of class V students at SD Negeri 1 Panji, so this product is only intended for class V students at SD Negeri 1 Panji. It is recommended for teachers to apply E-modules as teaching materials to support the learning process independently and for other researchers it is hoped that this research will be used as a reference in conducting similar research, so that other researchers can maximize research results.

4. CONCLUSION

The development of e-modules using a contextual approach was developed using the ADDIE development model. Based on the results of expert test reviews and student trials, students are included in very good qualifications, so it can be concluded that e-module The contextual approach is effective and suitable to be applied as a learning medium in class V of SD Negeri 1 Panji.

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