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Independent Curriculum Management Through Developing Teaching Modules on Style Materials

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ABSTRACT

Educational achievement in Education for Sustainable Development (hereafter, EfSD) demands fair and equitable education. This condition gives rise to various preparations that must be taken into account by teaching staff through program plans and strategies designed to achieve the quality of education as regulated in the curriculum. The aim of the research is to examine the conditions for implementing EfSD in elementary schools through the management of learning modules. The research uses the Research and Development or R&D method with the ADDIE model. The research begins with an analysis stage consisting of an analysis of problems, needs and curriculum, teachers, and students. The design stage takes the form of resource management and management of material aspects through the development of independent curriculum teaching modules. At this stage, a validation test was carried out by material experts and practitioners which resulted in an average of 94.48%. Then the implementation or trial phase was limited to 10 students, the test was extensive on 22 grade 4 students. The evaluation stage aims to determine the suitability of the independent curriculum teaching module product for use in schools. The test results showed that student responses were limited to 87.87% and broadly 93.24%. It can be concluded that the development of teaching modules attracts students to learn according to their characteristics, skills and interests.

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1. INTRODUCTION

Education can be said to be one of the important elements in advancing a nation. The young generation as part of a nation can be formed to make the right decisions on every problem. This means that the formation of the attitude or character of the younger generation in solving a problem can be done through education as a foundation (Ruhaliah et al., 2020), (Susanti et al., 2023). Likewise, education is included in international ideals throughout the world which are organized into aspects of Education for Sustainable Development (EfSD) (UNESCO, 2017).

Sustainable Development Goals (SDGs) is a global action plan agreed by world leaders, including Indonesia, to end poverty, reduce inequality and protect the environment. Achieving education in the SDGs requires fair and equitable education. This means that the education of all individuals at various levels of society must be achieved as an indicator of the creation of fair education as an effort to educate society. Therefore, education plays an important role in the nation's progress and global competition (Merma-molina, et al., 2023). This condition then gives rise to various preparations that must be considered by the government and teaching staff through program plans and strategies designed to achieve maximum educational quality as regulated in the curriculum (Amin et al., 2023). The curriculum is defined as a planning instrument and as a guide for teaching staff in carrying out teaching and learning activities that are used to achieve predetermined educational goals (Fakhrunnisa, et.al., 2023) and (Dewi, et.al., 2023).

The school is currently implementing an independent curriculum. Where the independent curriculum is a curriculum that optimizes learning with various content intended to help students to strengthen competition and deepen learning concepts. Teachers have the opportunity to provide lessons through various strategies that are tailored to students' interests and learning needs [4]. Students are also expected to have a Pancasila Student Profile (Novita & Muharawati, 2022). Therefore, the implementation of the independent learning curriculum can be an effort to realize fair and equitable education in ESD (Leal et al., 2024).

EfSD in Indonesia was carried out by the Ministry of National Education in the United Indonesia Cabinet (2008-2009), but its implementation was not comprehensive. The results of a study in 2008 found that the implementation of EfSD had problems with regulations, human resources and the EfSD material itself (Aprima & Sari, 2022). Apart from that, teachers do not understand how to integrate EfSD theory and practice in schools, and there is a lack of learning materials related to EfSD (Nousheen et al., 2020), (UNESCO, 2017), and (Fekih et al., 2021). This problem is a challenge in achieving EfSD that will become more difficult. Achieving EfSD is not only the responsibility of the government and formal educational institutions. However, it also requires the involvement of elements of society such as figures, institutions and the family environment, for its success. Therefore, it is necessary to manage resources related to people, money, materials, methods, machines, and markets. The aim of this research is to examine the conditions of ESD implementation in Bogor City cluster 1 elementary schools through the development of teaching modules in the independent curriculum.

This research is based on several previous researchers, including (Primasti, 2021) who analyzed the EfSD program with the finding that EfSD has been integrated into all learning activities, but the problem is that the teaching materials are less comprehensive in terms of depth and breadth. material. In line with this research, Nurdiansyah's research (Susilawati et al., 2023) found that the implementation of an EfSD-based curriculum can be realized in learning, but there needs to be a role from school administrators to make it happen. Furthermore, research findings (Nurwatin, 2022), (Dewi et al., 2023) emphasize more on the impact of independent curriculum on learning, while (Cipnal Muchlip, 2022) analyzes human resource management in relation to curriculum implementation with the finding that several schools do not yet have special unit in human resource management. EfSD studies in previous research emphasized the implementation of the curriculum and learning tools more, not yet on teaching modules as part of the learning plan to be implemented. Therefore, further research needs to be carried out regarding the development of teaching modules that adopt EfSD aspects. This research tries to develop a teaching module with EfSD aspects and then a trial is carried out on students to see the effectiveness of the teaching module with EfSD aspects. Thus, the novelty of this research is that the teaching module uses aspects of EfSD**.**

2. METHODS

This research was conducted at the Panaragan 2 State Elementary School, Bogor City, which was chosen to measure student perceptions of aspects of EfSD or Education for Sustainable Development

(PPB). This research is categorized as development research aimed at improving the management of management resources through an independent curriculum at Panaragan 2 State Elementary School, Bogor City. This ADDIE model R and D research consists of the following stages:

a. Needs analysis, which is a stage consisting of literature studies related to curriculum analysis, teaching materials or teaching tools used, and articles related to the issues to be researched. At this stage a preliminary study is also carried out by conducting interviews with teachers, students, school principals and parents about the needs of students and the school. The aspect that were focused on in the interview can be seen in the following table.

Tabel 1. Interview Aspects/Indicators

No	Aspect/Indicators	Subject
1	Curriculum and syllabus	Teacher
	Depth and breadth of material	
	Learning models and methods	
	Learning media, LKPD, evaluation tools	
2	Learning activity	Student
	Interest in learning	
	Motivation to learn	
3	Learning facilities	School principals/Headmasters
	Class supervision	
4	Attention to studying at home	Parents
	Support in learning at home	

b. Design, is a stage that begins with reviewing theory as a basis for designing teaching modules, designing teaching modules according to independent needs and curriculum, designing learning models in accordance with independent curriculum-based management resources, designing instruments to measure the success of management products resource management for material aspects of the independent curriculum, and compiling instruments for expert validation. The design of the teaching module refers to the current curriculum, namely the independent curriculum, where the independent curriculum applies the principle of students' freedom of thought in finding learning styles. Therefore, the teaching module developed is designed to include the TPACK principle (Technological, pedagogical, and Content Knowledge), the principle of 21st Century skills, namely 4C (Critical Thinking and Problem solving, Creativity and innovation, collaboration, and communication), as well as the HOTS principle (Higher Order Thinking Skills). These three principles are found in the learning objectives, learning activity steps, and learning evaluation.
c. Development, is the stage of developing management resource management after there is a prototype design. Development was carried out by creating a resource management model for material aspects related to the implementation of the independent curriculum. After this stage is completed, a validation test is carried out by language and material experts and a limited trial is carried out on 10 students with the aim of finding out how the students respond. After that, revisions are carried out and the teaching module product is ready to be implemented. Resource management models for material aspects include, among other things, content or content of learning materials that match the theme, depth, and breadth of the material to be taught, as well as sources that support the learning material. The criteria used for the validation test can be seen in the following table.

Table 2. Validation Criteria/Indicators

No	Criteria/Indicators	Validator
1.	Sentences according to student characteristics The writing is clear and easy to read. Sentences are easy to understand Simple and unambiguous sentences Write sentences according to EYD.	Language expert
2.	Depth and breadth of material Suitability to student characteristics The content is in accordance with the learning objectives. Suitable for student learning styles Systematic writing in accordance with the applicable curriculum	Material expert

d. Implementation, is the stage after product revision by conducting extensive trials on grade 4 students. Trials are carried out to measure the extent to which students understand the material taught according to the teaching module that has been developed. The quasi-experimental method is used to see students' understanding of the learning material by conducting an initial test or pretest before being given the teaching module and a post-test carried out after learning with the teaching module. The results of this treatment showed an increase in learning scores after and after the use of the teaching module.
e. Evaluation is the final stage after extensive testing to determine the advantages and disadvantages of the teaching module product. After that, product effectiveness and refinement tests are carried out, and it is disseminated in proceedings, journals, or product outreach to users. The stages of development research using the ADDIE model can be seen in Figure 1 below.

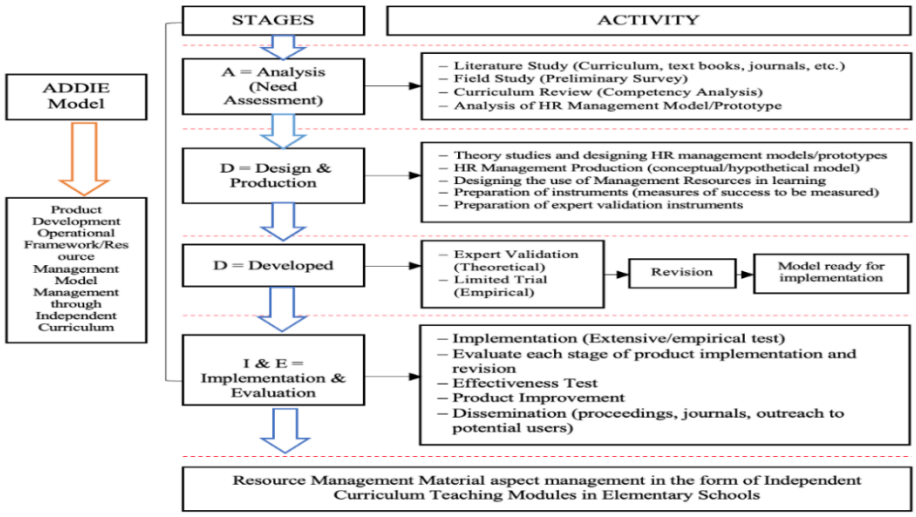


Figure 1. Stages of the ADDIE Model Adapted to Research Needs.

The image above shows the stages or steps of development research activities using the ADDIE model. The initial stage is a needs analysis. After knowing the needs of teachers and students, the next stage is carried out, namely designing or designing products that suit the needs of teachers and students, namely teaching module products, then development is carried out according to the design, then validation tests are carried out by language and material experts, after that revisions are made according to the validator's suggestions and input, then a limited and extensive testing phase on class IV students, and finally evaluating the results of the teaching module product trials, after revisions are made based on the evaluation results, the teaching module can be used in schools that need it.

3. FINDINGS AND DISCUSSION

This research produces learning tools in the form of Teaching Modules in the independent curriculum as one of the Educational for Sustainable Development (ESD) components for class IV students at SD Negeri Panaragan 2, Bogor City. This teaching module contains learning plans, student worksheets, and assessments in them. This teaching module contains science material (science and social studies). Researchers created this teaching module by referring to the ADDIE development model, according to Robert Marible Branch. The ADDIE development model includes five development procedures: analysis, design, development, implementation, and evaluation.

3.1 Analysis

Problem analysis was carried out by gathering information from 22 students and class teachers through interviews and distributing problem questionnaires. This interview activity aims to identify the natural and social science learning process at SD Negeri Panaragan 2 in general. The results of the interviews showed that students had difficulty understanding the material. This was due to the material being too broad and the use of learning media not being optimal. Another cause is the lack of teacher innovation in implementing learning models and methods that are not yet varied. On the other hand, the media and learning resources used are very limited to textbooks. This package book can only be held by students if the students borrow books from the school library. Usually students borrow books when learning the Science Project, after learning is finished, students return the school textbook. In this case, students do not have control over the ownership of the textbook. This makes learning less independent because student handbooks are only available in schools. Apart from interview activities, problem analysis was also carried out by distributing problem questionnaires to 22 students. This aims to find out the problems of learning sciences in terms of difficulties in learning the sciences project, implementing the independent curriculum, and understanding the sciences project material and its relation to the local wisdom of making batik according to the major. The problem analysis stage is carried out by distributing a problem questionnaire containing 12 questions. The percentage obtained from the problem analysis questionnaire results is presented in table below.

Table 3. Data from Analysis Questionnaire Results

No.	Question	Number of Answers		Percentage (%)	
		Yes	No	Yes	No
1.	Students have difficulty learning the Science Project	20	2	90.90	9.10
2.	Students have difficulty learning aspects of style	19	3	86.36	13.63
3.	Students are confused about the Implementation of the Independent Curriculum for Science and Technology Subjects in style material	17	5	77.27	22.73
4.	Students can channel their talents and interests in science lessons	15	7	68.18	31.82

The table above shows the results that 90.90% of students think that learning science and science is difficult and 86.36% of students think that learning style is difficult. One of the TPs that students consider difficult is "Students can determine style. in everyday life". Apart from that, 77.27% of students felt confused about the implementation of the Independent Curriculum in Science Subjects. The thing that confused students was that there was no provision for achieving the material at each meeting. Teachers may combine different aspects of the material in one meeting. So that the teacher can change the material at each meeting. This seems to free up the teacher to convey the lesson material. Then as many as 68.18% of students felt they had not received their rights to channel their talents and interests in science lessons. Developing talents and interests in science and science subjects is a characteristic of the Merdeka curriculum. This is the difference between science and applied science subjects in the previous curriculum.

3.2 *Design*

The next stage in this research is to design management resources through aspects of the teaching module. The general design is described as follows:

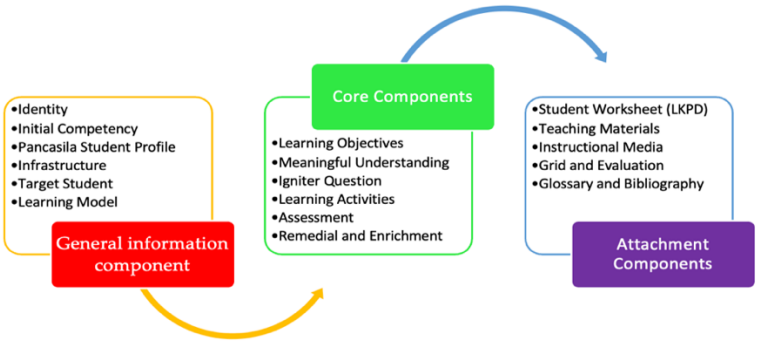
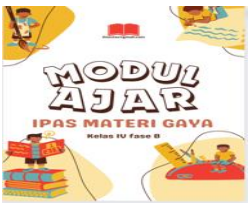
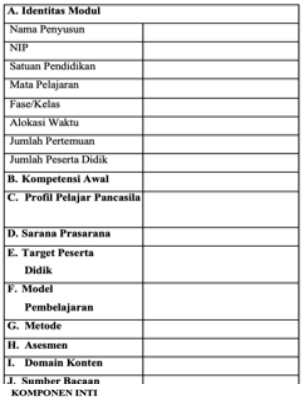
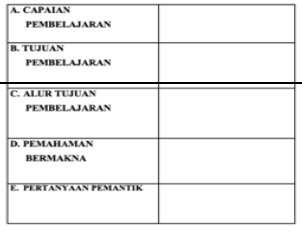


Figure 2. Teaching Module Design with Three Components

The design stage focuses on the material aspects, specifically the teaching modules within the independent curriculum. This stage encompasses various plans for developing these modules, including the design of module components, preparation of module materials, and creation of assessment instruments. Initially, the cover of the teaching module is determined. Following the cover, the foreword page is developed. The general information section is then created, containing the module's identity, the Pancasila Student Profile, and other necessary classroom preparations. The core components of the module include learning objectives, learning scenarios with their respective syntax, and trigger questions. The final section of the teaching module is the attachment component, which comprises student worksheets, reading materials, and a bibliography.

So that the prototype results at this design stage produce an initial design of the independent curriculum-based teaching module components on substance material and its changes, namely: (1) Cover, (2) Foreword, (3) general information, (4) core components, (5) Attachment Components. The results of the independent curriculum teaching module design are contained in table 2 below.

Table 4. Teaching Module Design or Story Board

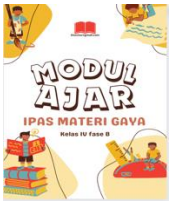
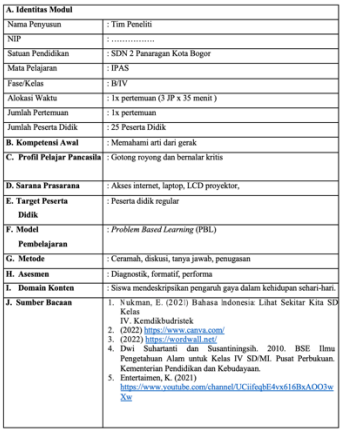
Part	Information	Picture
Cover	Front view of the teaching module	
General information	Contains: 1) Module Identity; 2) Initial Competency; 3) Pancasila Student Profile; 4) Infrastructure; 5) Target Students; 6) Learning Model	 A. Identitas Modul Nama Penyusun NIP Satuan Pendidikan Mata Pelajaran Fase/Kelas Alokasi Waktu Jumlah Pertemuan Jumlah Peserta Didik B. Kompetensi Awal C. Profil Pelajar Pancasila D. Sarana Prasarana E. Target Peserta Didik F. Model Pembelajaran G. Metode H. Asesmen I. Domain Konten J. Sumber Bacaan
Core Components	Contains: 1) Learning Objectives; 2) Meaningful Understanding; 3) Igniter	 KOMPONEN INTI A. CAPAIAN PEMBELAJARAN B. TUJUAN PEMBELAJARAN C. ALUR TUJUAN PEMBELAJARAN D. PEMAHAMAN BERMAKNA E. PERTANYAAN PEMANTIK

Part	Information	Picture
	Questions; 4) Learning Activities; 5) Assessment	
Attachment Components	Contains: 1) Student Worksheet (LKPD); 2) Reading Material; 3) Learning Media; 4) Glossary, 5) Bibliography	

3.3 Development

The development stage will focus on material aspect management resources, in this case the teaching modules in the independent curriculum. The teaching modules created are based on the Learning Objectives Flow, the flow is based on Learning Achievements. The essence of this stage is developing material, the same as developing material in the learning implementation plan (RPP). Development is based on three components, namely information components, core components, and attachment components. The development results list the parts that will be filled in from the three components shown in the following table.

Table 5. Teaching Module Design or Story Board

Part	Information	Picture
Cover	Front view of the teaching module	
General information	Contains: 1) Module Identity; 2) Initial Competency; 3) Pancasila Student Profile; 4) Infrastructure; 5) Target Students; 6) Learning Model	
Core Components	Contains: 1) Learning Objectives; 2) Meaningful Understanding; 3) Igniter Questions; 4) Learning Activities; 5) Assessment	

A. Identitas Modul	
Nama Penyusun	: Tim Peneliti
NIP	: .....
Satuan Pendidikan	: SDN 2 Panaragan Kota Bogor
Mata Pelajaran	: IPAS
Fase/Kelas	: B/IV
Alokasi Waktu	: 1x pertemuan (3 JP x 35 menit)
Jumlah Pertemuan	: 1x pertemuan
Jumlah Peserta Didik	: 25 Peserta Didik
B. Kompetensi Awal	: Memahami arti dari gerak
C. Profil Pelajar Pancasila	: Gotong royong dan bernalar kritis
D. Sarana Prasarana	: Akses internet, laptop, LCD proyektor,
E. Target Peserta Didik	: Peserta didik regular
F. Model Pembelajaran	: *Problem Based Learning* (PBL)
G. Metode	: Ceramah, diskusi, tanya jawab, penugasan
H. Asesmen	: Diagnostik, formatif, performa
I. Domain Konten	: Siswa mendeskripsikan pengaruh gaya dalam kehidupan sehari-hari.
J. Sumber Bacaan	1. Nukman, E. (2021) Bahasa Indonesia: Lihat Sekitar Kita SD Kelas IV. Kemdikbudristek 2. (2022) https://www.canva.com/ 3. (2022) https://wordwall.net/ 4. Dwi Suhartanti dan Susantiningsih. 2010. BSE Ilmu Pengetahuan Alam untuk Kelas IV SD/MI. Pusat Perbukuan. Kementerian Pendidikan dan Kebudayaan. 5. Entertaimen, K. (2021) https://www.youtube.com/channel/UCiifeqhE4vx616RxAOO3wXw

Part	Information	Picture
		KOMPONEN INTI A. CAPAIAN PEMBELAJARAN: Peserta didik memanfaatkan gejala kemagnetan dalam kehidupan sehari-hari, mendemonstrasikan berbagai jenis gaya dan pengaruhnya terhadap arah, gerak dan bentuk benda. B. TUJUAN PEMBELAJARAN: Peserta didik dapat mendemonstrasikan berbagai jenis gaya dan pengaruhnya terhadap arah, gerak, dan bentuk benda. C. ALUR TUJUAN PEMBELAJARAN: 1. Peserta didik dapat mengidentifikasi gaya melalui percobaan dengan tepat. 2. Peserta didik dapat menguraikan sifat-sifat gaya untuk dimanfaatkan dalam kehidupan sehari-hari dengan tepat. D. PEMAHAMAN BERMAKNA: Peserta didik dapat mengidentifikasi dan mengetahui sifat-sifat gaya serta pemanfaatannya dalam kehidupan sehari-hari. E. PERTANYAAN PEMANTIK: 1. Siapa di antara kalian yang memiliki kegemaran bersepeda atau bermain sepakbola? 2. Mengapa sepeda itu dapat bergerak? 3. Mengapa bola itu dapat bergerak? 4. Bagaimana sepeda kalian bisa berhenti ? 5. Mengapa saat bermain trampolin kalian bisa lompat ke atas ?
Attachment Components	Contains: 1) Student Worksheet (LKPD); 2) Reading Material; 3) Learning Media; 4) Glossary, 5) Bibliography	

The development stage consists of the process of printing teaching modules that have been designed and are ready to be tested in the classroom. This stage begins with arranging the appearance of the teaching module's front page, cover image, name of the teaching module compiler. At this stage, the research conducted a product assessment with expert validators to determine the level of validity of the teaching module. Expert validation tests were carried out to determine the validity of the teaching module before testing student responses. This validation was carried out on 2 expert validators consisting of 1 material expert validator and 1 teacher as a practitioner. The determination of validators is based on the competence of each validator. The material expert validator is a Pakuan University Science Learning Lecturer with Basic Education Competencies and the practitioner expert is a class IV teacher at Panaragan 2 Public Elementary School.

The calculation results showed that material expert validation was 96.3% with a very valid category, namely the material was relevant to the competencies that students had to master, the description of the material was sufficient to meet the demands of the curriculum, the material was presented coherently and was easy for students to understand and the language used in the teaching module was easy understood by students. Meanwhile, the percentage of teacher validation results is 92.66% with a very valid category, namely the material is relevant to the competencies that students must master, the material description is sufficient to meet learning outcomes, the language used in the teaching module is easy for students to understand, it presents learning objectives that must be mastered. students, suitability of the teaching module cover design with the material. The average percentage of validation results from 2 validators is 94.48%. These results indicate that this teaching module is very valid without revision. The product validation graph from experts is presented in Figure 5 below.

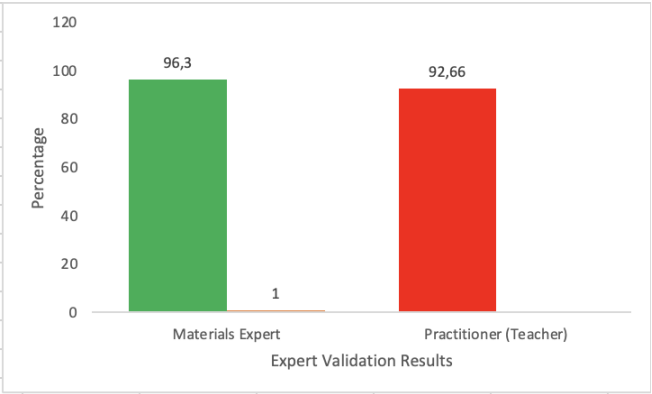


Figure 3. Validation Results by Experts

3.4 Implementation

The implementation phase began with a small-scale student response test carried out on 10 fourth grade students at SD Negeri Panaragan 2, Bogor City. This stage is carried out by giving questionnaires to students to be given an assessment of the teaching module. Aspects that need to be seen from student responses are the appearance of the cover, the appearance of the contents and ease of learning. Apart from filling out questionnaires, students can also provide suggestions and comments on the teaching module. The percentage of small-scale student response test results carried out on 10 students was 87.87%, namely the cover on the teaching module made students interested in learning, the pictures were clearly visible, the pictures on the teaching module could explain the material being presented, the teaching module being delivered was visible. clear, the illustrations displayed on the LKPD help understand the material, the teaching module can help understand the concept of the material well, the writing and font size in the teaching module can be read clearly, the sentences in the teaching module are easy to understand, the teaching module makes learning fun, the module teaching is easy to operate, more interested in science and science learning, especially the style material in the form of teaching modules, teaching modules make students enthusiastic about learning, learning activities using teaching modules are not boring. These results show that this teaching module is very interesting and can be continued at the large-scale response test stage. Apart from that, students also commented that this teaching module was very good and very helpful in understanding the material well. The results of the small-scale response are presented in Table 5.

Table 6. Results of Small Scale Response Questionnaire

No	Assessment Aspects	Amount	Total Percentage (%)	Criteria
1.	Cover View	82	91.11	Very interesting
2.	Module Contents Display	182	86.77	Very interesting
3.	Ease of Learning	103	85.83	Very interesting
	Total	**367**	**87.87**	Very interesting

A large-scale student response test was carried out on 22 class IV students at SD Negeri Panaragan 2, Bogor City. A large-scale student response test was carried out to see the response of final stage students to the use of teaching modules in class. The results of this large-scale response test become the final assessment of the teaching module developed. As with small-scale student response tests, data collection at this stage is by providing response questionnaires for students to fill out. The aspects seen from student responses are the appearance of the cover, the appearance of the contents, and ease of learning. Apart from filling out questionnaires, students can also provide suggestions and comments on teaching modules. The results of the large-scale student response test were 93.24%. These results show that this teaching module is very interesting. Comments and suggestions from students say that the teaching module is 1) interesting and easy to understand 2) the writing and image size in the

teaching module can be read clearly 3) they are more interested in learning. The results of the large-scale response are presented in table 6.

Table 7. Large Scale Response Questionnaire Results

No	Assessment Aspects	Amount	Total Percentage (%)	Criteria
1.	Cover View	470	94.95	Very interesting
2.	Module Contents Display	1070	92.66	Very interesting
3.	Ease of Learning	608	92.12	Very interesting
	Total	**2148**	**93.24**	Very interesting

3.5 Evaluation

The final stage of the ADDIE development model is the evaluation stage. The results of this stage will be an analysis of research data obtained from an analysis of the validity of the science and science teaching modules in the independent curriculum in class IV elementary schools, from validators (experts/experts) by lecturers and teachers/practitioners. Then, the practical analysis is seen from the questionnaire responses from class IV students at SD Negeri Panaragan 2, Bogor City. Teaching modules are teaching materials that have been developed by researchers using the independent curriculum. This research and development model for teaching materials refers to Robert Marible Branch's ADDIE model. The ADDIE model has five stages, but researchers limit it to four stages, namely Analysis, Design, Development, and Implementation. Meanwhile, the final stage, namely evaluation, was not used due to financial, energy, and time limitations. Researchers chose to use the ADDIE model, because the ADDIE model presents systematic steps from analyzing student needs to applying the product to students, making it possible to produce science and technology learning modules that are in accordance with the Merdeka Curriculum. An independent curriculum is one of the components of the Educational for Sustainable Development (EfSD).

Discussion

Based on the results of the needs and problem analysis, information was obtained that the problem with science and technology learning was that students were less interested in learning. Apart from that, in studying force material, students also experience difficulties when studying force material, the properties of force, and the influence of force on objects. The teaching materials used at this school are textbooks which students do not fully own, because they have to borrow them from the library. So far there are no supporting teaching materials or teaching modules that help students to better understand the science material and can support students' competencies, especially in improving 21st-century skills or known as 4C. The problems experienced by these students became the basis for developing the teaching module for science and technology subject matter. The selection of class IV science subjects is in accordance with the syllabus in the independent curriculum. This is in line with Indriaturrahmi and Sudiyatno's research. The use of STEM-based science and science teaching modules for class STEM. The validation results from material experts show that the feasibility aspect of the content gets a very good score because the Learning Objectives (TP) in the module have been developed to the point that the ATP is in line with the Learning Outcomes (CP), the material included in the teaching module is accurate, and the learning material supports it. The product being developed can make the material more interesting, so it can motivate students to discover further knowledge. This is in accordance with Kinanti and Sudirman's research which states that the teaching materials used by students should include material that is in line with the learning concept and can develop students' abilities, so that students are able to understand the material and competencies more easily and can support learning activities.

The percentage of validation results from material experts regarding aspects of the appropriateness of the content and components of the teaching module was 96.3%. This aspect contains

an assessment regarding the suitability of the TP with the material in the teaching module. With these results the product developed is included in the "Very Valid" category.

Material experts also provide assessments regarding the advantages and disadvantages of the IPAS teaching module. The advantage of this teaching module is that "the learning module is applicable and in accordance with the needs of students in the class. Apart from that, as the material expert said regarding the shortcomings of this teaching module, "The material about the influence of forces in everyday life needs to be improved." Suggestions for improving the teaching module include adding material on the influence of style related to the culture of students in their daily lives. This statement is in line with research conducted by (Nasrul, 2018), (Vedianty & Samsul Arif, 2023)that the teaching materials used in learning greatly influence students' interest and motivation to learn. So the teaching materials used should contain the integrity of the material content as well as supporting features that can foster students' understanding of the material. This finding is also in line with Kusuma's research which states that good teaching materials will have a high level of clarity and be easy for students to understand.

The results of the response test showed that the cover design in the module was attractive, the color display of the teaching module was attractive and clear and the selection of images was in accordance with the content of the material, and the delivery of the material in the teaching module encouraged active students. The large-scale response test obtained a percentage of 93.24%, this result meets the very interesting category. The data from the first response test showed a result of 87.87%, while the second response test showed a result of 93.24%. There was a relative increase in percentage and did not cause many significant changes. These two percentages can be said to mean that the product developed meets the Very Attractive category with the product development criteria set by (Akbar & Ayun, 2019). The Science and Technology teaching module in style material is very valid and can be used as supporting teaching material for students as a learning process. Apart from that, the results of previous research by (Maghfiroh et al., 2023), who has developed interactive learning content in science and science subjects, material on energy sources based on Problem Based Learning, regarding the creation of teaching modules for fourth grade elementary school students. Apart from that, the results of previous research by (Munawaroh et al., 2017), who developed the science module, showed that the use of the science module received an appropriate score to meet the requirements for the Very Valid category and the module can also be used as teaching material that can support learning and is practically used to improve learning outcomes.

The development of this teaching module has also attracted the attention of other researchers such as (Merma-molina et al., 2023), (Komalasari et al., 2018), (Abdullah et al., 2013), (Rondeau & Rondeau, 2017), (Watkins et al., 2021), (Maghfiroh et al., 2023) with the finding that the teaching module developed has had an impact on improving student learning outcomes. Apart from that, aspects of students' skills and attitudes in learning increase their activity, cooperation and tolerance. However, what is different from the research findings is the subjects studied by students and the teaching modules developed. However, it can be concluded that the teaching module developed has a positive influence on students in classroom learning. Meanwhile the journal article (Bahtiar et al., 2023) and (Novita et al., 2020) examines digital capabilities that have an impact on learning outcomes. The results of previous research provide an illustration that development can be carried out not only on open modules or learning tools, but there are also other tools and teachers need to have skills in using digital technology.

4. CONCLUSION

Development of an Independent Curriculum Teaching Module as part of Education for Sustainable Development (EfSD) class IV phase B SDN 2 Panaragan, Bogor City. This design uses the ADDIE development model developed by Robert Smaldino. Validators are needed to validate the Teaching Module in the independent curriculum towards Education for Sustainable Development

(EfSD) that has been developed. The research results stated that the science and natural science learning modules in the independent curriculum were included in the Very Valid and Very Interesting category in learning science on Gaya material. Material expert validation obtained a score of 96.3% and practitioner validation results (class IV teachers) were 92.66%, so the average validator result was 94.48%. This figure shows that it is in the Very Valid category and is feasible to implement. Student responses to the development of independent curriculum teaching modules towards Education for Sustainable Development (EfSD) aspects of style material in class IV of SD Negeri Panaragan 2 Bogor City are included in the Very Interesting category because they obtained results of 87.87% for small-scale trials and 93.246% for large scale trials. Based on the description above, it is stated that the development of the Science and Technology Teaching Module in the independent curriculum is towards Education for Sustainable Development (EfSD) with a material style that is very interesting and suitable for reuse as teaching material in the classroom. However, this research needs to be developed into other tools such as teaching materials in the form of teaching materials, learning media, Student Worksheets (LKPD), and evaluation tools. Therefore, it is hoped that further research can research and develop other learning tools besides teaching modules by implementing a new curriculum.

As is known, the aim of sustainable education is to empower and equip present and future generations to meet their needs using a balanced and integrated approach to the economic, social and environmental dimensions of sustainable development. The research findings are in accordance with the aims of sustainable education. It is said that because the teaching module development product has implemented the TPACK principle (Technological, Pedagogical, and Content Knowledge), the principle of 21st Century skills, namely 4C (Critical thinking, Creativity, Collaboration, and Communication). Through these principles, students, as the future generation, can acquire the skills needed in society.

This research has limitations, for example, it has not developed other aspects such as teaching materials, learning media, LKPD, and evaluation tools. Therefore, future researchers can examine aspects that have not been researched and developed in this research. Suggestions and implications are also given to policyholders to be able to analyze learning needs according to the characteristics of students, the school environment and society.

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Conflicts of Interest: This research is truly the result of research for scientific purposes, especially on classroom management in elementary schools. Where this research is important to carry out to find the right way or strategy in managing management resources in material aspects such as teaching modules.

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