Development of Electronic Teaching Materials Using Flip PDF Professional in Class V Elementary School

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Abstract: Flip PDF Professional is software that has the ability to convert PDF documents into digital rotating pages, which enables the creation of interactive learning content with a variety of supporting features. This research includes a type of research and development that develops, produces, validates and tests whether the product is effective or not and can be accounted for. This research uses the ADDIE model where the stages are A (Analysis), D (Design), D (Development), I (Implementation) and E (Evaluation). Based on the results of the validity test of electronic teaching materials using Flip PDF Professional in class V elementary school, the material expert assessment results were 96% in the very valid category, media/design experts were 88% in the very valid category and language experts were 95% in the very valid category. very valid. Meanwhile, the practicality results show very practical criteria after assessing practicality by students with an average score of 92.77% in the very practical category and practicality assessment by teachers with an average score of 86.67% in the very practical category. This shows that electronic teaching materials using Flip PDF Professional in class V elementary schools meet the criteria of being very practical and valid for application in elementary schools.

Keywords: Canva; Electronic Teaching Materials; Flip PDF Professional

Introduction

Education is the main foundation for someone to understand and manage life in this world. In education, there is interaction between teachers and students who are reciprocal to study a field of science (Wilujeng et al., 2021). The knowledge gained through education is able to guide individuals in taking steps that support personal progress and preparation for the future. One of the right ways to improve the quality of human resources is through education. Good education reflects a good country because education affects the quality of human resources in that country (Hasbie et al., 2023). Teaching in education is very important to prepare students who have good character, knowledge, intelligence, and skills/expertise. Education is an action to prepare students to be ready to carry out their roles in the future (Khofifah et al., 2019; Yandri et al., 2013).

Education units have an important role in determining the quality of education. The quality of education can certainly be improved through an effective learning process (Nursaptini et al., 2022). Teachers have an important role in determining educational success and the quality of the learning process. As educators at the elementary level, teachers are expected to be able to create interesting, effective and enjoyable learning experiences for students (Devirita et al., 2021).

The learning process carried out cannot be separated from the teaching materials used in each learning process. Teachers rely heavily on teaching materials, but they do not develop teaching materials

that suit students' learning needs and situations (Ridhoni et al., 2023). Teaching materials are very important so that the learning process can be understood well by students (Indrawini et al., 2019). Teachers play a full role in the learning process, but can now be replaced by using technological devices (Devirita et al., 2021). The type of learning in question is the provision of learning programs with the aim that students can learn and experience an experience (Syadida, 2022). Therefore, to realize the goals of learning, they must be realized in learning within the school environment. With learning, children will be given knowledge to become individuals who think critically (Andayani, 2020). What things are given to students are listed in a curriculum.

The current curriculum is the Merdeka curriculum. Independent Curriculum is a term related to an educational approach that gives students more freedom to explore, choose and direct their own learning. Independent Curriculum is a curriculum idea that requires independence from teachers and students (Maulita et al., 2021). This curriculum aims to help students develop critical thinking skills, creativity, initiative and independence.

One of the distinctive characteristics of the Merdeka Curriculum is the combination of Natural Sciences (IPA) and Social Sciences (IPS) subjects into Natural and Social Sciences (IPAS) at the elementary school level (Anisah et al., 2023). The reason behind this combination is because at elementary school age, students tend to see the world as a whole and integrated. They are still in the simple. holistic and comprehensive thinking stage, but not yet in too much detail (Purnawanto, 2022). Therefore, by combining science and social studies subjects, it is hoped that students can learn to manage the natural and social environment in one unit (Sari et al., 2023).

In accordance with curriculum requirements, learning objectives are achieved, then teaching is considered successful. Learning objectives must be focused on more comprehensive goals, in particular: Understanding concepts related to community life and the environment. To achieve optimal competence, a person needs to have the basic ability to think logistically and critically, high curiosity, the ability to solve problems, and good social skills. Apart from that, it is also important to show commitment and awareness of social and human values. The ability to communicate, collaborate and compete in a diverse society, both at the local, national and global levels, is also an important aspect that must be possessed. (Kusmiati et al., 2021; Rama Sanjaya et al., 2019).

It is clear that all students must receive complete teaching to achieve the desired learning goals considering the urgency and purpose of learning. Learning can certainly improve students' abilities,

learning experiences, and students' skills in the classroom because students must learn independently and discover concepts in their own way, but still under the guidance and supervision of the teacher.

One of the causes of low student learning outcomes is an inefficient learning process. Learning outcomes can be interpreted as the maximum results achieved by a student after experiencing the teaching and learning process in studying certain subject matter (Amalya et al., 2021). Lack of interaction between teachers and students during learning often occurs because most of the teacher's time is spent providing explanations of material that has been prepared, while students focus on being recipients of information. As a result, they never try anything new and just copy what the teacher does. Because students believe that doing as the teacher shows is enough to solve the problem, students do not have the ability to find alternative solutions. During initial observations carried out in three schools, the value of the Learning Goal Achievement Criteria (KKTP) for the science and science lessons used was 80. The students' summative assessment of science and science was still relatively low.

In an era that continues to change rapidly, technology integration has become very important in the learning process (Sa'adah et al., 2020). The development of science and technology continues to develop rapidly so that it demands the availability of quality human resources. Various tasks and jobs in the globalization era require adequate knowledge and skills (Doyan et al., 2020). As the first foundation for acquiring knowledge, elementary schools act as the main center for acquiring basic knowledge. Currently, every teacher is expected to have expertise in utilizing digital media to create teaching materials. Technological advances in the field of education have resulted in teacher and student competence to carry out relevant teaching and learning processes (Syukri et al., 2021)

The teaching materials in question can be written or unwritten materials. Nowadays, teaching materials can be designed non-printed (using technological applications) which are known as electronic teaching materials. Electronic teaching materials are a new form used by teachers in delivering teaching materials (Sriwahyuni et al., 2019; Tagazi et al., 2023). Materials related to application-based teaching materials are materials that are able to combine two materials, namely material related to the visual aspect and material related to the audio aspect. Visual materials are intended to stimulate students' sense of sight, while audio materials are intended to stimulate students' sense of hearing in the learning process. With these two types of material, a teacher can create a high-quality learning process because communication during the process becomes

more effective and efficient (Mahendra, 2019; Muthaharoh et al., 2019).

Teaching materials use electronic format so they can be used via various devices such as computers, laptops or smartphones (Wardani et al., 2021). This is of course very important because it will make it easier for teachers to distribute teaching materials that students can learn, especially during distance learning. Apart from that, the use of electronic teaching materials is also useful for limiting the use of paper (Rahman et al., 2023; Tagazi et al., 2023). The application of application-based teaching materials as a means of support in the learning process basically aims to convey and communicate about the knowledge presented by the teacher. The use of learning media in the teaching and learning process can create new desires and interests (Firdawati et al., 2021).

Based on preliminary studies on the learning process and interviews conducted in elementary schools, several problems were found both in terms of students and teachers. Problems faced by students include Students are less interested in studying social studies is a because the learning material is not presented in an interesting way and is not related to their real experiences. They prefer to play rather than being asked to sit down to read, and tend to prefer or view learning pictures and videos that have lots of interesting colors. This can be seen from the results of filling out the student interest questionnaire in electronic teaching materials. Apart from that, students are less able to work together in solving problems and developing social attitudes with other friends. This can be seen in group discussions, where only a few students are willing to work together with their group friends, while many work individually. They also lack confidence in facing tasks related to IPS.

Apart from the problems above, researchers also found problems that occurred with teachers in using teaching materials both during the learning process and during interviews, including Teacher and student books provided by the Ministry of Education and Culture are still the only teaching materials used by teachers in teaching. This is caused by the transition from the 2013 curriculum to the independent curriculum, so that other learning media are not yet available for teachers to use, causing the learning process to not reach the optimal level. Teachers have not provided problems that are close to students in learning, so they feel unfamiliar with the examples of problems given. Apart from that, there is no learning available that utilizes electronic teaching materials to support learning, apart from children's and teacher handbooks.

Through the interview process with teachers, it was revealed that each school had received technological assistance from the government in the form of laptops and Chromebooks, which should support the effectiveness of the learning process. Unfortunately, these tools have not been utilized optimally in learning activities and are only stored in the teacher's room. Apart from that, other technological facilities, such as school WiFi networks, projection equipment (infocus), and learning applications, have also not been utilized optimally by teachers, even though they have the potential to facilitate the implementation of learning.

However, the reality on the ground is that the use of technology in learning is not yet optimal. This is supported by data, including data obtained through observations in schools, filling out questionnaires, and from accredited journals, even though the benefits of this technology are very good for learning. This is caused by teachers who do not yet have the skills to utilize technology in learning activities. Therefore, electronic teaching materials have not been widely applied by teachers in learning.

In this research, researchers chose to use the professional Canva and Flip PDF applications in developing electronic teaching materials. This application is a software or application software that is used to process or transform material from conventional books into reading material that can be opened via electronic devices such as smartphones and computers. This application allows teachers to create teaching materials or reading materials that are presented to students with attractive displays which include not only writing but also videos so that the process of delivering the material to students can be fun and interactive.

Canva is an application website that covers the fields of graphic design and brand building which is one of the most popular websites and applications today, with the help of Canva it can make it easier for everyone to create their own designs (Alfian et al., 2022; Putri et al., 2023). Flip pdf Professional is software that has the ability to convert PDF documents into digital rotating pages, which enables the creation of interactive learning content with a variety of supporting features (Febrianti, 2021; Ummi et al., 2021). Flip PDF Professional is an application that is rich in interesting features so that it makes it easier to create electronic teaching materials for the learning process in elementary schools.

The teaching materials developed in this research are the latest form of teaching materials that have been developed by previous researchers, because the teaching materials developed use the Canva and Flip PDF Professional applications. The originality found in the teaching materials developed is that when creating instructions for the teaching materials, they did not take them from the internet but used voice recordings from the researchers themselves. Apart from that, the

originality of this teaching material lies in the design which is designed in such a way that it is different from teaching materials that have been developed by other researchers.

Method

This type of research is research and development. This research is a type of research and development which develops, produces, validates and tests whether the product is effective or not and can be accounted for (Sugiyono, 2017). Research and Development (R&D) is a series of processes or steps. steps in developing new products or improving existing products so that they can be accounted for (Aisy et al., 2023). The aim of this development research is to create a product accompanied by testing the effectiveness of the product that has been created.

Development research also consists of several models, including the Dick & Carey development model, Kaufman, Plomp, Thiagarajan (4D), Borg & Gall, Kemp, ADDIE, and many other models. However, in this research, researchers used the ADDIE model in product development. ADDIE is an abbreviation of A (Analysis), D (Design), D (Development), I (Implementation), and E (Evaluation) (Yandri et al., 2013). Researchers chose to use the ADDIE model because the ADDIE model is a complete model, where the ADDIE model does not just implement the product in the field, but, the ADDIE model is equipped with product evaluation at each development stage.
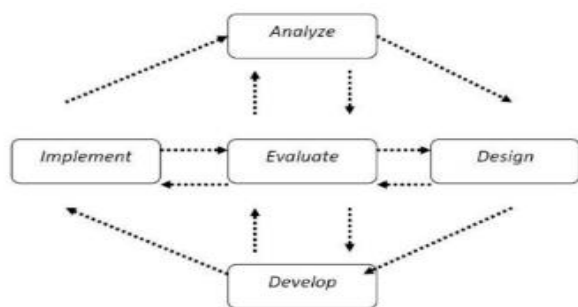

Figure 1. Stages of the ADDIE Development Model (Safitri et al., 2022).

The development of the ADDIE model consists of 5 stages (Analysis, Design, Develop, Implement, and Evaluate). First stage, Analysis namely needs analysis, which is an in-depth process for identifying and understanding needs, problems and challenges in science and science learning in elementary schools.(Maulita et al., 2021) This analysis was carried out by observing and interviewing educators and several students to express and determine the basic problems experienced when learning. Needs analysis is

also carried out by distributing questionnaires to students and educators to see the need for teaching materials in the school.

The development research procedure using the ADDIE model is presented in the following chart:
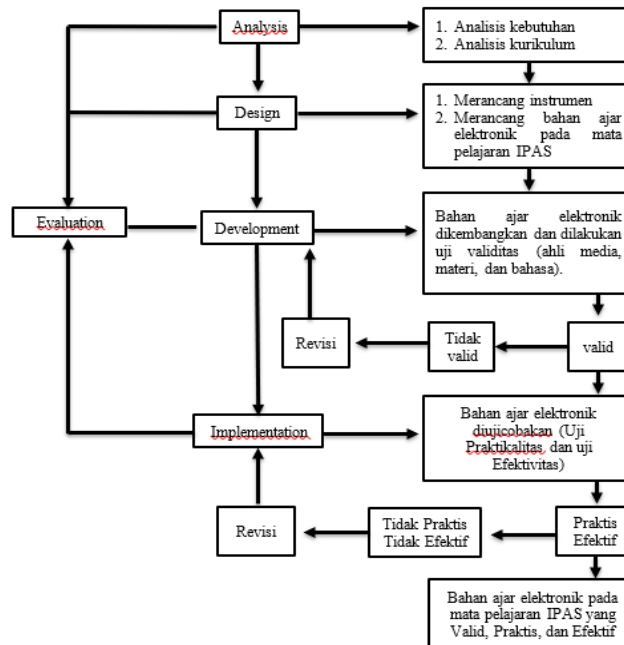
Figure 2. ADDIE Development Research Procedure (Rusdi, 2018)

Second stage, Design. At this design stage, the activities carried out by researchers are designing the instruments needed to develop electronic teaching materials for science subjects. Researchers designed the instruments needed to develop electronic teaching materials for science subjects. They created a validity sheet to measure the suitability of electronic teaching materials in the learning process. Questionnaires for students and teachers were also prepared to find out how practically these electronic teaching materials are used during the learning process. In addition, tests are designed to measure the effectiveness of electronic teaching materials in improving the activities and learning outcomes of fifth grade elementary school students. Designing electronic teaching materials using Canva and Flip PDF Professional for fifth grade elementary school students involves several stages. First, review the material on learning outcomes, then design the cover and background using the Canva application. Next, teaching materials are created and the Scratch application is used to make the module electronic or put the e-module online. The use of language that is appropriate, clear and easy to understand by students is also paid attention to. The appearance of the teaching materials is designed to be

attractive and innovative, and the teaching materials that have been designed are converted into electronic teaching materials.

Third stage, Development. At this stage, the development of all materials that have been submitted at the design stage will be developed into electronic teaching materials. The aim of this development stage is to produce the final form of electronic teaching materials that are developed after going through revisions based on expert input. The validation results from several experts in the form of comments and suggestions will indicate whether the product being developed is valid or not. Electronic teaching material products for science subjects were then revised according to the validators' suggestions. Next, it was tested on several students to determine the validity and reliability of the product.

Next, the Implementation stage. This stage is the stage where the validated product is implemented in learning. This stage begins with preparing the tools and learning environment. If everything has been conditioned, then the product developed can be implemented in learning. This field trial was carried out to determine the level of practicality and effectiveness of electronic teaching materials using Flip PDF Professional in class V of elementary schools.

The final stage is Evaluation. Where after carrying out the implementation stage, the researcher carried out an evaluation. This evaluation can be seen from the assessment of the four previous ADDIE processes, namely Analysis, Design, Development and Implementation. Evaluation is also seen from the teacher's obstacles after using the product in the field and the results of evaluations carried out by students at the implementation stage of electronic teaching materials. Learning outcomes assessment is also used to measure the level of effectiveness of teaching materials on learning outcomes.

Results and Discussion

This research was conducted based on the stages of development of the ADDIE model which include stages analysis, design, development, implementation, and evaluation. This ADDIE model considers it important that each stage be evaluated and systematically, making this ADDIE model unique, complex and practical in designing electronic teaching materials using Flip PDF Professional in class V elementary schools. After these stages were carried out, the results of validity, practicality and electronic teaching materials using Flip PDF Professional were obtained in science and technology subjects in elementary schools. The results of the research carried out are described as follows.

The analysis stage is a basic step in conducting development research to determine the needs that will be used in developing electronic teaching materials using Flip PDF Professional in class V elementary schools. The analyzes carried out were: The needs analysis was carried out by researchers using observations and interviews with class V teachers as well as filling out questionnaires by students. The interview focused on the use of learning media in science subjects and the difficulties faced in the learning process, especially in science subjects. In addition, curriculum analysis is carried out by analyzing Learning Outcomes to determine material and formulate learning objectives. The learning outcomes used are the achievements in science and science learning class V (phase c) of the independent curriculum.

The next stage is Design. At this design stage, the activities carried out by the researcher were Preparation of the instruments needed to develop electronic teaching materials using Flip PDF Professional in science subjects is carried out first. Next, designing electronic teaching materials using Flip PDF Professional is done by determining the design of the teaching materials in accordance with the specified materials. At this design stage, researchers began to create learning media by designing using Canva. At this design stage, what is done is to determine the design of the teaching materials that will be made according to the material that has been determined. Researchers started creating learning media by designing using Canva.

The Development Stage is the development stage after the design stage. All materials that have been submitted at the design stage will be developed into electronic teaching materials using Flip PDF Professional in class V of elementary schools. The aim of this development stage is to produce the final form of electronic teaching materials that are developed after going through revisions based on expert input. Before conducting field trials, validation of the electronic teaching materials being developed is necessary. Validation is an activity of collecting data or information from experts in the field (validators) to determine whether the media being developed is valid or invalid (Ravista et al., 2021)

Validation of the product being developed was carried out by five expert validators consisting of one language expert validator, two Media expert validators, and two Content expert validators, of which one practitioner validator came from an elementary school teacher. the results of validation by experts in the development of electronic teaching materials using Flip PDF Professional in science and science subjects in elementary schools, can be concluded in the following validity assessment recapitulation table 2.

Referring to the feasibility category, the validity results of developing electronic teaching materials using Flip PDF Professional in science and science subjects in elementary schools are included in the very feasible category in terms of material, media/design and language.

Table 2. Recapitulation of Material, Media and Language Validation Results.

Assessment Aspects	Validity Value	Category
Material	96%	Very Valid
Media/Design	88%	Very Valid
Language	95%	Very Valid

The next stage is implementation. Implementation was carried out after making improvements to the validity test stage. The results of the development are applied in science and science learning to determine the effect of electronic teaching materials using Flip PDF Professional on the quality of learning including aspects of ease of use, usefulness, appearance and time of use of electronic teaching materials using Flip PDF Professional in science as learning. At this stage, the teaching materials were implemented or applied to three schools with the number of students in the three elementary schools being 62 students and 3 teachers. The following is a further explanation regarding the implementation stages that the researchers have carried out: After using teaching materials, the next stage is to carry out a practicality test to evaluate the level of usability and use of electronic teaching materials using Flip PDF Professional by students and teachers. The practicality of the teacher aspect was evaluated through trial data obtained from fifth grade teachers in three schools. This data is primary data obtained directly from teachers to assess the extent to which electronic teaching materials are effective and easy to use in the learning process.

Table 3. Recapitulation of Teacher Aspects of Practicality Results in Three Schools

Which school are you from	Score	Mark	Category
School 1	53	88%	Very Practical
School II	52	86%	Very Practical
School II	51	85%	Very Practical
Amount	156	260	
Average		86.67%	Very Practical

The average practicality score obtained by teachers was 86.67% in the very practical category. The practicality results obtained by teachers regarding the use of electronic teaching materials using Flip Pdf

Professional show very practical criteria. This shows that the research product in the form of electronic teaching materials using Flip Pdf Professional is very practical to use in science and science subjects in elementary schools.

Practicality trial data for electronic teaching materials using Flip Pdf Professional is primary data obtained directly from students using a student practicality questionnaire instrument. The recapitulation of students' practicality test assessment results can be seen in the following table 4.

Table 4. Results of Student Aspect Practicality Test

Which school are you from	Mark	Category
School I	94.29%	Very Practical
School II	91.75%	Very Practical
School III	92.26%	Very Practical
Average	92.77%	Very Practical

Based on table 4, it can be seen that the average practicality score for School I students is 94.29% in the very practical category, School II is 91.75% in the very practical category and School III is 92.26% in the very practical category. The students' average practicality score was 92.77% in the very practical category. The practicality results obtained by students regarding the use of electronic teaching materials using Flip Pdf Professional in class V elementary school show that the criteria are very practical for use as electronic teaching materials.

After carrying out a practicality test, it is continued with an effectiveness test whose data source is obtained from student learning outcomes. Data taken on student learning outcomes were taken before and after following the learning process using electronic teaching materials in class V elementary school: (1) Formative evaluation, which has been carried out step by step in the ADDIE development model, starting with needs analysis, design, development, to implementation with evaluation descriptions; (2) Summative Evaluation. The final stage of the research is a summative evaluation, namely testing student activities and learning outcomes. The learning activity test was carried out using a student observation questionnaire filled in by the teacher, while the effectiveness of learning outcomes was tested using a pretest conducted at the beginning of the research and a posttest at the end of the research.

As for the student activity section, the aspects assessed in this research include 12 assessment aspects which will be assessed by the teacher as an observer in the research process. The following are the results of the student activity observation questionnaire. Based on table 5, it is known that the students' activeness score in the learning process was 81.56% with very effective criteria. This means that the use of electronic teaching

materials using Flip PDF Professional in class V elementary school is very effective in student learning activities.

Table 5. recapitulation of the results of observations of activity in the learning process

Which school are you from	Score	Mark	Category
School I	50	83	Very effective
School II	45	75	Effective enough
School III	50	83	Very effective
Amount	145	242	
Average		81.56%	Very effective

The stage of testing the effectiveness of student learning outcomes is carried out in 3 (three) stages which include the initial stage, namely giving a pre-test, the second stage, namely the learning process using electronic teaching materials using Flip PDF Professional in class V elementary school and the third stage, namely giving a post-test. test. These three stages are carried out offline or face to face in class.

Based on the pretest-posttest results, it was seen that students' learning increased from before using the development of electronic teaching materials using Flip PDF Professional in class V of elementary school to after using the developed teaching materials. For the results obtained before using (Pre-test), the average value was 64.55, while after using (Post-test), the average value was 89.60 in the effective category. Meanwhile, for the N-Gain score, an average value of 0.7373 was obtained with a percentage of 73.73, which means that electronic teaching materials using Flip PDF Professional in class V of elementary schools are effective in improving student learning outcomes.

Conclusion

Research produces electronic teaching materials using Flip PDF Professional in class V elementary schools through a development process using the ADDIE model with stages of analysis, design, development, implementation and evaluation. Testing the validity of electronic teaching materials using Flip PDF Professional in class V of elementary schools, based on the results of the assessment by material experts, they obtained a score of 96% in the very valid category, media/design experts obtained a score of 88% in the very valid category and 95% score from language experts. with a very valid category. This shows that electronic teaching materials using Flip PDF Professional in class V elementary schools can be used and are suitable for use as electronic teaching materials using Flip PDF Professional in class V elementary

schools. The practicality results show the criteria of "very practical" after assessing the practicality by students with an average score of 92.77% in the very practical category and teachers with an average score of 86.67% in the very practical category. This shows that electronic teaching materials using Flip PDF Professional in class V elementary schools meet the criteria of being very practical to be applied in elementary schools. Effectiveness test results on student activity and learning outcomes. In terms of student activity scores, students scored 81.56% in the very effective category. Meanwhile, the results of the effectiveness test on student learning outcomes from pre-test and post-test score data, the pre-test score was 64.55 and the post-test increased to 89.60 after using electronic teaching material products in science learning. With an N-Gain Score of 0.7373 in the medium category and an N-Gain Score% of 73.73 in the quite effective category.

Author Contributions
The authors of this paper consist of four people, namely F.K, D, Z.Z, and Y.E. This article was done collaboratively at each stage.

Conflicts of Interest
The authors declare no conflict of interest.

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