

Analysis of E-Module Needs with The Flip PDF Professional Application for Integers

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Abstract: The Covid-19 pandemic requires educators to adapt to the online learning system. The unpreparedness of the facilities and infrastructure and the teaching materials used to impact the low learning outcomes of students. This study analyses the need for e-module development with the Flip PDF Professional application on integer material for 6th-grade students in elementary schools. This research is a type of research with a descriptive qualitative approach. Data collection techniques used interviews, document studies, and questionnaires. The study was conducted in three elementary schools in the Sunan Muria Cluster, Demak District, Demak Regency, namely Public Primary School No. 1 Sedo, Public Primary School No. 2 Sedo, and Public Primary School No. 3 Sedo. The research subjects consisted of 3 grade 6 teachers and three grade 6 students. The data analysis technique used the model from Miles-Huberman with three stages, namely data reduction, data presentation, and concluding. The results showed that the teaching materials used were still limited to printed materials, the low creativity of educators in the learning process. The final test score for the first semester of mathematics was the lowest of all subjects. The integer material was the most challenging material for students to master. Requires innovative teaching materials and the ability of students to operate smartphones. The conclusion of this research is the need to develop teaching materials in e-modules with the Flip PDF Professional application on integers material in elementary schools.

Keywords: E-module, integer, flip pdf professional

1. Introduction

Nowadays, human life cannot be separated from technological developments. The presence of technology has a significant influence on human life every day. Technology makes it easier for humans to communicate, move from one place to another easily and quickly, obtain information in an instant, and make it easier to carry out all daily activities; this is in line with the opinion of Damayanti et al. (2018), who said, "The development of information and communication technology has a tremendous impact on human survival and has a significant role in all aspects of life." There have been many technological innovations present in society solely to meet the needs of human life—one of the innovations that are experiencing rapid progress in the field of information and communication technology. Human needs in information and communication technology are no less important than primary needs in clothing and food. Almost all human beings already know and use information and communication technology in their lives (Huda, 2020).

One aspect of life is impacted by the development of information and communication technology in education (Diani et al., 2018). Now the world of education is starting to shift from conventional education to the era of digital education. An era where educators and students must use technology to support the smooth learning process. Therefore, education in today's global generation must always harmonize the development of information and communication technology to improve the quality of education in teaching and learning activities (Aulia et al., 2016), especially now that the world faces the Covid-19 (Corona Virus Disease-2019) outbreak. According to UNESCO, at least 1.5 billion school-age children are affected by Covid-19 from 188 countries, including 60 million in Indonesia (Putria et al., 2020). Since March 2020, teaching and learning activities in Indonesia have been carried out with an online system, meaning that educators and students communicate indirectly through various communication services available in cyberspace. Online learning activities require the readiness of supporting technology and information tools. This learning activity's full use of

technology and information is a new experience for educators and students (Pratama et al., 2020). Various kinds of technology should be applied in classroom teaching (Yustanti & Novita, 2019).

However, learning activities using information technology in this pandemic have brought new problems (Triyanti et al., 2021). These problems include teaching and learning activities that cannot be carried out for long. Educators cannot provide detailed and in-depth explanations due to limited teaching materials, learning methods, and learning media. Students asked to study the material on their own only briefly explained, even those not been taught at all. Students cannot freely ask the teacher for material that has not been understood. Educators cannot fully control teaching and learning activities such as face-to-face classroom learning. This problem lasted for months, resulting in boredom for educators, students, and parents. The real impact of these problems is the decline in student learning outcomes.

Mathematics is a subject that has experienced a decline in learning outcomes due to the Covid-19 pandemic. Mathematics is one of the most challenging subjects and is rarely interested by students (Mahmuda et al., 2021). Even mathematics has an essential role in developing science and technology today. Mathematics provides students with mental training and affects their intellectual development (Wibowo & Pratiwi, 2018). Difficulties in learning mathematics can be caused by several factors such as basic numeracy skills, anxiety, and lack of confidence in the abilities possessed by students. In addition, the use of less supportive learning tools can also make it more difficult for students to learn mathematics. Learning devices are tools used to meet the standards of the learning process to encourage learning (Masitah, 2018). One of the learning tools that can be developed is teaching materials. In its use, the quality of teaching materials needs to be ensured in supporting the effectiveness of learning because the use of teaching materials is linear with the learning process (Cahyadi, 2019). The use of teaching materials needs to be updated according to the readiness of the school and students. One of the teaching materials that can be developed to help the learning process is a module.

Modules are teaching materials designed systematically in the curriculum and packaged in minor learning units. They allow them to be studied independently within a specific time to master the competencies being taught (Sirate & Ramadhana, 2017). Learning modules can be designed according to the learning needs that the teacher wants. In line with this, PP No. 19 of article 20 of 2005 explains that in the learning process, teachers are expected to be able to develop their learning materials or materials as a source of learning for students. The modules that will be used as teaching materials must be relevant to today's curriculum, namely the 2013 curriculum with an integrative scientific and thematic approach. In addition, the module must also adapt to the conditions of the development of technology and information, which is currently overgrowing. However, the use of modules in learning is still very lacking; this is based on the results of the questionnaire distribution based on the needs analysis conducted by (Rahman et al., 2019). It was found that the teaching materials used were 100% textbooks, 66.7% LKS, and 33.3% of learning modules. It can prove that the use of modules in learning is still very lacking.

On the other hand, students born between 2011 and 2025 are the alpha generation who tend to be familiar with technology and are considered a more intelligent generation than the previous generation (Fadlurrohim et al., 2020). It is a challenge for educators to create a more creative and innovative learning process by paying attention to students' cognitive and psychological development. Learning also familiarizes students to acquire 4C skills (Critical Thinking, Communication, Creativity, and Collaboration), which are also related to mathematic (Sugiyarti et al., 2018). Thus, teaching materials that can be developed are electronic-based teaching materials, such as e-modules.

E-modules are books in the form of soft files that students can open and read anywhere and anytime. E-modules are adapted by utilizing technology because modules are usually identical to printed teaching materials (Amin et al., 2021). The difference between modules and e-modules is more striking in the devices used, where e-modules multiply software and other additional media to complete the module. One of the software used is the Flip PDF Professional application. Educators can add videos, images, audio, and hyperlinks with this app. The result of the media is flipbook-shaped teaching materials. Flipbook is a digital book whose use has been packaged like a printed book so that when reading it is like reading a book on a monitor screen or smartphone.

Based on a survey conducted by researchers in three schools, it was found that the math material in grade 6 that was considered difficult was integers. Be aware that many students have difficulty learning material operations numbers around so far (Sidik, 2016). Integer material consists of arithmetic operations (addition, subtraction, multiplication, and division), positive and negative integers, and story problems that must be solved by counting integer operations. So far, students still have many difficulties learning integer operations material (Sidik & Wakih, 2020). According to Mufarizuddin (2018), the factors that cause students to have difficulty in learning integer arithmetic operations are: (a) students do not master the previous concepts used in the material being studied; (b) students still lack mastery of the concepts of subtraction, addition, multiplication, division, of a number when calculating; (c) a monotonous learning method so that students are lazy, bored, which makes students' interest in learning mathematics low; (d) the teacher's lack of attention to students whose level of understanding ability is low.

Several researchers have developed several previous studies related to e-modules. Sriwahyuni et al. (2019) researched to develop electronic teaching materials made using the Flip Pdf Professional application on optical materials, showing that the media had received validation results from experts and practitioners in the excellent category with an average presentation of 79, 45%. Agustin & Pratama (2020) developed an e-module using a scientific approach using Flip PDF Professional on square and rectangular material at SMP Muhammadiyah 3 Malang. The results showed that the module obtained a validation value with a percentage of 86.67%, so it had very valid validity criteria. Based on students'

opinions, the module received an assessment with 87.12%. The module has the criteria of being very effective when used in mathematics learning activities at school. Nisa et al. (2020) researched developing an e-module with the Flip PDF Professional application with a mathematical gamification model for collecting material for junior high school students in two junior high schools in Bandar Lampung. The results show that the module is declared effective and worthy of being used as mathematics teaching materials for seventh-grade junior high school students or equivalent to the 2013 curriculum.

1.1. Conceptual Framework

The conceptual framework can be seen in the Fig. 1 below.

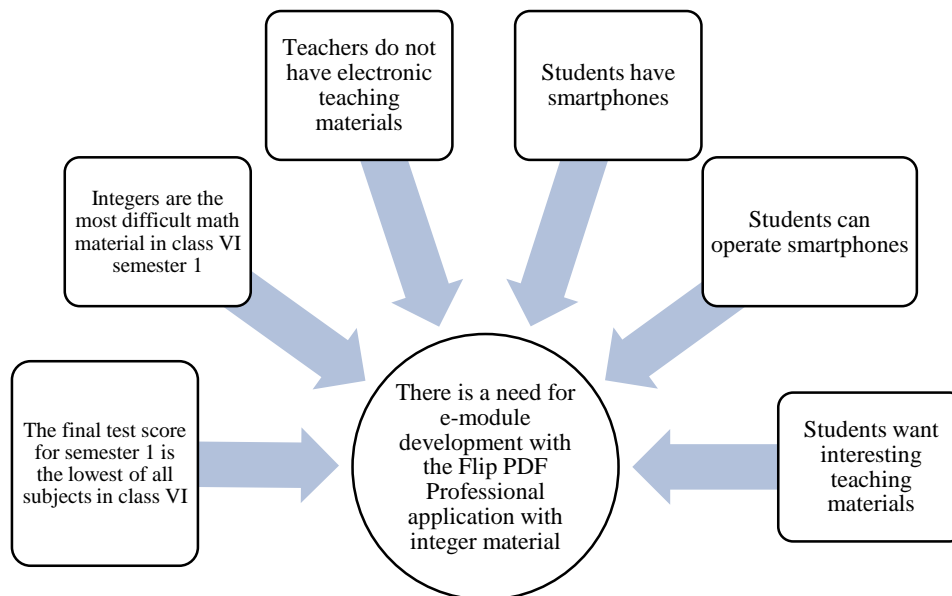


Fig. 1: Conceptual Framework

1.2 Research Objectives

This study aims to determine how they need e-module development with the Flip PDF Professional application on integer material for sixth-grade students in elementary schools. The study results provide initial information regarding the outcome of e-modules with the Flip PDF Professional application that can be used as supporting teaching materials in the learning process.

2. Methodology

2.1 Research Design

This research uses a descriptive qualitative research method. This research was conducted from March 1, 2021, to April 10, 2021. The data sources in this study were obtained from primary and secondary data sources. Primary data sources are obtained from informants who are considered the most knowledgeable in detail and clearly regarding the focus of the research. This primary data source comes from interviews with grade 6 teachers and student questionnaires for grade 6. At the same time, secondary data is obtained from the study results of existing documents as supporting materials to sharpen the existing data in the study. Thus, the data collection techniques in this study used interviews, documentation studies, and questionnaires. Interviews know the resource persons' mindset and the condition of the teaching materials. Document study aims to find information that is not limited to the results of interviews, which is also the supporting data from the interview. And questionnaires are needed to sharpen research analysis related to information related to the condition of students. The data analysis technique used refers to the qualitative analysis stated by Miles and Huberman with the stages including data recovery, data display, and conclusion and verifying. The research procedure is carried out in Fig. 2.

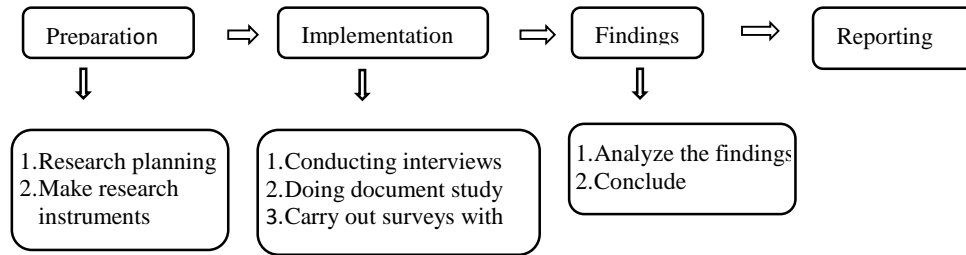


Fig. 2: Research Procedure

2.2 Respondents of The Study

This research was conducted on three teachers and 3 study groups of sixth-grade students in three elementary schools in the Sunan Muria Cluster in Demak District, totaling 62 students. The three schools are Public Primary School No. 1 Sedo, Public Primary School No. 2 Sedo, and Public Primary School No. 3 Sedo. The three schools are located in the same village but with different geographical locations.

3. Findings and Discussion

3.1 Interview Result

Based on the results of interviews, found the fact that in the three elementary schools, (1) organizational learning tools tend to be complete starting from the curriculum, syllabus, learning implementation plans, annual programs, semester programs, teaching materials, learning media, and evaluation tools; (2) the lowest score for the first semester's final test of all subjects is mathematics; (3) the teaching materials that have been used so far are still limited to physical books; (4) teachers have not made many innovations in using learning media in the teaching and learning process of mathematics.

Administratively, the availability of learning tools in the three schools tends to be complete, starting from the curriculum, syllabus, annual program, semester program, learning implementation plans, teaching materials, learning media, and evaluation tools. At the beginning of each school year, the teacher periodically completes the necessary learning tools. The teacher stated that he had no difficulty completing the learning tools because he had been teaching class VI for more than five years. The teacher feels that he has experience in teaching in class VI, so when completing the learning tools, the teacher already knows which part of the content of the learning tools should be changed or not. The school also provides sufficient facilities for teachers to print the required learning device documents. However, the completeness of learning tools is not directly proportional to students' learning outcomes, and this can show from the final exam results for the first semester of class VI.

The three teachers in the three schools stated that the lowest score for the first semester's final test of all subjects in class VI was mathematics. It seems that this is due to learning that must be done online due to the covid-19 pandemic. The teacher stated that it was difficult to teach mathematics material online because online learning was very different from face-to-face learning. Teachers cannot thoroughly guide subject matter due to limited time for online learning. Teachers also cannot use the learning methods used in face-to-face learning, which The low absorption of mathematics teaching materials can be seen in the low score of the first-semester test results in class VI.

The use of mathematics teaching materials in the three schools is still limited to physical printed books. All three schools use the same primary teacher and student handbooks. The texts used were published by the Ministry of Education and Culture of Indonesia in 2018 because three schools buy from the same seller. This book is a book that the Government prepared to implement the 2013 Curriculum. The book was compiled and reviewed by various parties under the Ministry of Education and Culture coordination and use in the early stages of implementing the 2013 Curriculum. In addition to books, teachers also use student worksheets as complementary materials. Many students complete the practice questions in the student worksheet. Teachers do not have printed teaching materials developed by themselves. Teachers also have never used teaching materials in digital or electronic formats. Even so, grade 6 teachers at Public Primary School No. 1 Sedo and 3 sometimes look for teaching materials from the internet to support the material in printed books, but the intensity is sporadic. Teaching materials have a significant role in the learning process. The use of teaching materials appropriately can save time in teaching. The learning process becomes more interactive and practical. Besides that, teaching materials can be used for independent study by students.

Teaching materials that are still in the form of printed books. Teachers in the three schools have not made many innovations in using learning media in mathematics teaching and learning. Teachers mostly use the blackboard as a tool to explain the material being taught. According to the teacher at Public Primary School No. 2 Sedo, the media used so far have been able to teach mathematics well. Because according to him, math material in grade VI does not require sophisticated or complicated media. Actual materials around that exist can already be used as learning media.

Meanwhile, the teacher at Public Primary School No. 3 Sedo said that the media used in learning mathematics so far are media that already exist in schools. The media has existed for a long time, but the condition of the media is not very good, and the number is also limited. However, the three teachers in the three schools shared the same opinion that online learning during the covid-19 pandemic caused the media that had existed and was used by teachers to explain existing mathematical material. The teacher tries to find media from the internet, such as pictures or videos. However, the media has not been fully effective for learning mathematics in the three schools. The limitations of learning media in the research location indicate that it is necessary to learn media by the conditions and needs of schools and students. Using media and visual aids in learning is one option to provide meaningful learning for elementary school students (Zuliana, 2017).

3.2 Document Study Results

Table 1. Document Study Results

Observed aspects	Public Primary School No. 1 Sedo	Public Primary School No.2 Sedo	Public Primary School No. 3 Sedo
Maths syllabus	√	√	√
Annual Program	√	√	√
Semester Program	√	√	√
Lesson plan	√	√	√
Minimum Completeness Criteria	√	√	√
Printed Teaching Materials Document	√	√	√
Non-printed Teaching Material Documents	-	-	-
Document learning outcomes of integer material	√	√	√

The interview results with the researcher confirm the results of the document study. Based on the study of documents in the three schools, the researchers found that the learning tools owned by the three teachers were quite complete. Learning tools have also been filled in well, although not yet perfect. The three teachers have experience teaching in grade VI, so there is no significant difficulty in completing the learning tools. Learning tools are printed and well-covered. A particular place is learning devices, such as a cupboard or a table in the classroom corner. There are quite a lot of printed mathematics teaching materials in the three schools. However, the existing printed teaching materials are books for the education unit level curriculum (KTSP). The three schools used the KTSP curriculum before the current 2013 curriculum. The 2013 curriculum was implemented in the 2013/2014 school year (Setiyadi, 2017). The implementation of the 2013 curriculum requires students to always be active in the learning process, teachers to be creative in developing learning, requires schools to be able to provide facilities and infrastructure (Ratnasari, 2018).

The three teachers in the three schools did not have non-printed teaching materials. In terms of content, the mathematics material in the 2013 curriculum is already in the books in the KTSP curriculum. However, if students have to use more than one book, it will confuse students. One of the teaching materials that can be used is an e-module to learn the material with limited guidance from educators. However, educators do not act actively to be able to provide this. When questions about e-modules were asked to educators, they simultaneously answered with similar statements. They stated that the provision of e-modules was indeed good for students to use. However, educators have never made it so that using the existing printed books is appropriate. However, they added that printed books are more practical in limited learning conditions.

While the media for learning mathematics at Public Primary School No. 3 Sedo already had mathematics learning media. However, the condition is no longer suitable, and the amount is not sufficient to be used. Meanwhile, there is no media for learning mathematics in two classes in other schools. Mathematics learning media exist but for other classes. Learning media is very necessary for learning activities. In online learning, making available media or teaching aids also occurs dysfunction. Educators should try to find media on the internet to get learning resources for students, such as videos from Youtube. Educators need to hold lessons at home with less than five students for some conditions that allow meetings. Learning media is very important in learning activities. Using creative and innovative media is one of the innovations that can attract students' attention in the learning process (Utaminingsih et al., 2019).

The learning outcomes, owned by the teacher, show that the integer material is considered difficult by students; this can show from the results of the test scores at the end of the first semester, where many students have not been able to answer integer questions correctly. Based on the interviews, students have various abilities in the mathematics learning process. Some students are excellent, moderate, and even very weak in mathematics. However, the difficulties mentioned in each research location stated that students often had difficulty understanding the concept of integer arithmetic operations. Concept understanding is an ability related to understanding comprehensive and functional mathematical

ideas, and understanding concepts is more important than memorizing (Fahrudin et al., 2018). Students also have difficulty understanding some of the story questions and problem-solving sentences. In addition, they have not been accustomed to higher-order thinking learning, so students have low-to-middle-level thinking skills.

3.3 Questionnaire Results

Table 2. Questionnaire results

Aspects studied	Public Primary School No. 1 Sedo	Public Primary School No. 2 Sedo	Public Primary School No.3 Sedo
Mathematics is the most difficult subject	82,4%	84%	85%
Integers are the hardest material in the first semester	76,5%	76%	80%
Learning media for integers is less interesting	88,2%	84%	90%
Smartphone ownership	88,2%	84%	85%
Can operate smart phone	100%	100%	100%
Have you ever used a smartphone to search for math material	100%	100%	100%
The mathematics teaching materials used are predominantly printed books	94%	92%	90%
Want exciting and not dull math teaching materials?	88,2%	92%	95%

Based on the results of a survey to 62 grade 6 students at Public Primary School No. 1 Sedo, Public Primary School No. 2 Sedo, and Public Primary School No. 3 Sedo, it was found that students consider mathematics to be the most challenging subject, students state that mathematics learning media is inadequate, students have smartphones at home, students can operate smartphones, students have used smartphones to learn math concepts and material, students agree that there is an interactive media based on android as a medium for learning mathematics. These results, it can be seen that the need for e-modules is very much needed. The provision of this e-module is an option that can be used for the learning process with the characteristics of being able to explain independently, and this helps students to be able to learn independently. Because in the e-module, there are teaching instructions and a complete description of the material aimed at the target. Educators can develop e-modules with limited meetings to facilitate the learning process. Analysis of the needs of this e-module will impact the sustainability of the learning process and students' interest in learning mathematics. Based on this, the assumption of the difficulty of learning mathematics slowly disappears by considering the importance of its presence as a basis for technological development. In addition, the development of e-modules can also project the use of technology in compiling a teaching material as a learning tool. E-modules can also be a medium that can improve students' learning outcomes.

Teachers can use the Flip PDF Professional application. Using Flip PDF Professional software is not only in the form of text. Still, it can be added with images, graphics, links, animations, audio, and video to make the resulting e-module interactive. In addition, this software uses flipbook animations so that students can read e-modules like physically opening a book. E-Modules generated from this software can be used online or offline using electronic devices such as cellphones and computers. The advantage gained when using it online is that students can access the link provided when the material in the flipbook is not available. Students can get detailed information on material not included in the flipbook by visiting the link. Meanwhile, in offline use, students only get information from the maker's flipbooks.

4. Conclusions and Recommendations

Based on the data analysis of research results and discussions that have been carried out, it can be concluded that the obstacles that exist in the learning process are teaching materials that have not been developed innovatively by the teacher. The teaching materials developed can be in the form of e-modules. E-modules can be created using the Flip PDF Professional application so that e-modules are not only in the form of text and images but can be added with videos and animations. It will attract students' interest in learning and increase students' motivation in learning mathematics. However, the researcher only analyzed the need for e-modules for integer material in this study. Further research is needed to analyze other math materials in grade VI.

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