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# E-Module Based on Flip PDF Corporate of Integer Materials to Improve Mathematics Learning Outcomes Elementary School

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Abstract

The aims of this study were (1) to find out the feasibility of the module with *Flip PDF Corporate* on integers for class VI SD students in class VI SD, (2) to find out the practicality of modules with *Flip PDF Corporate* on integers for class VI SD students in class VI SD and (3) find out the effectiveness of the module with *Flip PDF Corporate* on integer grade VI SD students in grade VI SD. This type of research uses a development research model known as R&D (*Research and Development*) using Sugiyono's development model with the following steps: (1) potential and problems; (2) data collection; (3) product design; (4) design validation; (5) design revisions; (6) product trials; (7) product revisions; (8) trial use. The subjects in this study were students of class VI at SDN Tlogorejo 2 and students of class VI at SDN Sidomulyo 2, Wonosalam District, Demak Regency. We collected data using observation, interviews, questionnaires, and tests. The data analysis technique in this study was to find the average rating of all validators, find the average student response to the module and test the *independent sample t test*. The results showed that 1) the e-module using *flip PDF corporate in mathematics learning* integer material is feasible to use, (2) the response of teachers and students gives a positive response to the use of the e-module flip PDF *corporate* based and (3) the application of *flip PDF corporate* based on the experimental class gave better learning outcomes than the control class.

## INTRODUCTION

Education is a means to pass down life skills so that skills that have existed in one generation can be preserved and developed by the next generation with the dynamics of life challenges faced by children [1]. Education is expected to be able to produce an individual who is innovative and creative, the quality of education can be improved by improving the quality of learning which is a combination of learning activities carried out by students and teaching activities carried out by teachers. Mathematics is one of the subjects that can foster innovative and creative students.

Mathematics is a complex subject [2], [3], [4], [5], [6] [7]; [8], [9], [10]. Mathematics is a complex science that underlies the development of modern technology. Mathematics has a vital role in various disciplines and advances the power of human thought. Rapid information and communication technology developments should be based on mathematical developments in number theory, algebra, analysis, probability theory, and discrete mathematics. Mastering and


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creating technology in the future requires a vital mastery of Mathematics as early as possible. Advances in science and technology have changed the outlook and lifestyle of the Indonesian people in carrying out their activities and activities [11]. According to Rakhmawati and Atmaji (2018), mathematics is one of the basic sciences from its applied and reasoning aspects, which has an essential role in mastering science and technology [12].

Based on the results of a preliminary study of mathematics learning outcomes in grade VI students at SDN Tlogorejo 2 Wonosalam Demak. In this subject, many grade VI students experience incomplete learning outcomes. The formative test results adjusted to the minimum completeness criteria (KKM) for Mathematics subjects, namely 70, showed that 45.4% or 15 of the 33 students of class VI SDN Tlogorejo 2 had not completed and had grades below the class average. The problem is suspected because the teaching materials applied by the teacher have not been able to accommodate the needs of students in learning, coupled with the current situation that there is no direct face-to-face. Most students do not try to work on the questions given by the teacher. They lack completeness in their notes, and the atmosphere of learning activities has not been comfortable and pleasant. As a solution to solving these problems, this research intends to develop e-modules in learning.

The learning process cannot be separated from the role of ICT (Information and Communication Technology). The use of technology used in educational activities can support the quality of education [13]. Students do not widely use technology development at SD Negeri Tlogorejo 2 for learning. For example, with Android ownership, most of it is only used for social media and games. Researchers try to change the direction of students' activities using social media and games towards valuable and fun learning without reducing the time they spend using Android.

E-module is a form of teaching material packaged entirely and systematically, containing a set of learning experiences planned and designed to help students master specific learning objectives ([14]. Learn are teaching materials systematically designed based on a particular curriculum and packaged in specific learning units displayed using electronic devices such as computers or androids. Every learning activity is connected by a link as a navigation that makes students more comfortable. Interactive programs with animated videos and audio enrich the learning experience. This study develops an E-module using *Flip PDF Corporate*. *Flip PDF Corporate* is a *software* that has a function to open every page like a book. *Flip PDF Corporate software* can create and convert pdf files, images/photos into a book or physical album when we open it per page.

## METHOD

### 1. Product Design Development Results Module

### Planning Media

a. Election letter

The selected font in Module It consists of several exciting fonts, for example, *Arial, Time News Roman,* and others. Font size is also adjusted to the need for writing titles with large font sizes so they can be read and seen clearly. For information on the module instructions and the writing of the letters on the page, *buttons* are adjusted to make it look attractive for those who play the E-module.


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b. Use Picture

The images used in this module are adapted to the theme of the existing material. The background and material images are arranged according to needs to attract children's attention. The background of the home page is different from the background of the main page, with the aim that children do not get bored.

c. Election Color

Color selection is very influential on the attractiveness of the Module. *Background* color on the module *is* made differently, and the color selection also varies. This module combines colors with attractive colors for elementary school children, especially Grade VI.

d. *Software* selection application

The application selection is very influential in the creation and development of this *Module.* Making is done using the *Flip PDF Corporate application.* This application was chosen because it is one of the applications that can be used to create modules. This application can package modules excitingly and interactively for students to learn. Images in the module are also not broken and can be seen clearly because they come from a PDF file. It is also easy to operate with the *Flip PDF Corporate* application. This application is only used to create e-modules, while to become a link, files in pdf format are published using a *netlify account.* After becoming a link, this link can be shared through the WA group or SD's blog, so it is easy to access.

## 2. Module Design

a. *Flip PDF Corporate* Cover Module

The module **c**over contains the title **and** the name of the creator. The cover is made to find the initial picture of the material to be studied.


Figure 1. Module Cover


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*b.* Contents of Flip *PDF Corporate* Module

The table of contents in this module makes it easy for students to find the page to read. The table of contents for the *Flip PDF Corporate* module can be seen in the following figure 2.


Figure 2. Table of Contents View

*c. Flip PDF Corporate* Module Introduction

The introduction is the opening for the module, which contains Instructions for Using the Module, Basic Competencies (KD), and a concept map, the main menu, which is a window for connecting to the desired sub-material. The introduction to the module can be seen in Figure 3 below.


Figure 3. Emodule Introduction Screen


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*d.* *Flip PDF Corporate* Material

There are two learning activities are studied, namely, the addition of integers. Second, subtraction of integers. The module material can be seen in table figure 4 below


Figure 4. E-Module Material Display

*e.* *Flip PDF Corporate* Latihan Module Training and Evaluation

In evaluation activities, students are presented with practice questions in the form of quizzes that can be done, and the results can be seen immediately. If the results are unsatisfactory, they can be repeated according to student needs.

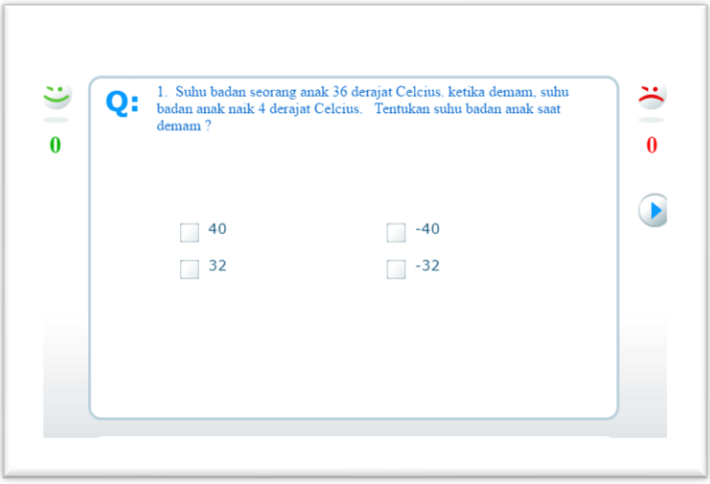


Figure 5. Display of Practice Questions

Evaluation in this module, using google Forms, measures students' ability to understand the material learned in the module. Students can answer according to their understanding of previously studied material, but they can only work on evaluation questions once. More in the following figure 6.


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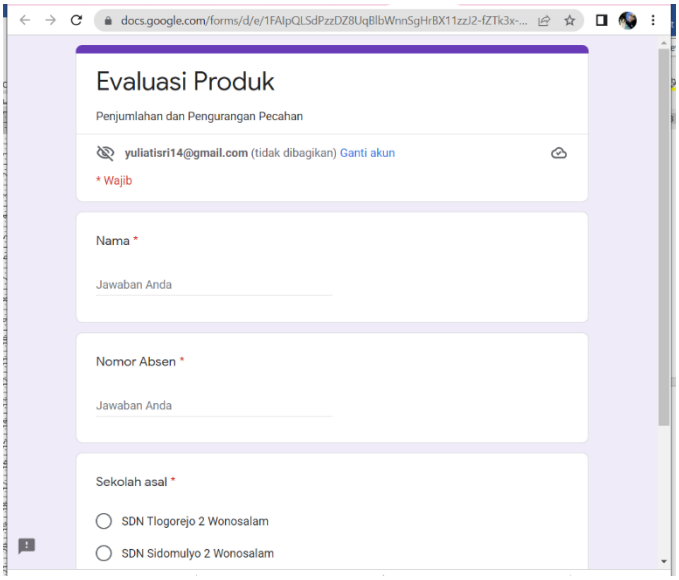


Figure 6. Display of Practice Questions

E-module development can be seen in the outline from the beginning to the end of the module through a chart described as follows.

Based on the development of the E-module using *Flip PDF Corporate,* a set of exciting and interactive learning media is obtained. This learning media set contains links containing material, videos, quizzes, practice questions, and evaluation questions that can immediately tell how far the material is absorbed [15].

E-modules can be opened with Android just by opening the shared link. opened via the *Flip PDF Corporate application* with a computer/laptop.

After the module has been created, the next step is to test the feasibility by validating it with media and material expert lecturers. The validation can be described as follows:

## 2. Media Eligibility of E-module Products

a. Expert Validation Theory

Validation on material experts was carried out to assess the material aspect, namely one lecturer who became a material expert, the lecturer of the Master of Basic Education at Muria Kudus University. Validation results from material experts on the module using *flip PDF corporate* feasible with a percentage of 80% of mathematicians. These data align with research conducted by [16]. That is, obtaining a very high validation value criterion indicated by an average percentage of 94.8%. With the validation level, it is stated that the learning media created by the researcher is very valid and feasible to be used for testing on users.

b. Expert Validation Media

One lecturer validates media experts by providing an assessment of the media used. The lecturer who became a media expert as a lecturer in the Master of Basic Education at Muria Kudus University. Results evaluation expert media show a score of 99 with a percentage of 79%, which is in the proper criteria. Based on the validation criteria obtained, it can be concluded that the interactive mathematics e-module on the addition and


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subtraction of integers is valid and can be used in field trials. [17]. The research obtained the average result of the media expert's assessment of 2.83 with the "quite valid" criteria, and in the second stage of validation, an average of 3.70 was obtained with the "valid" criteria. Thus the product has also been said to be valid in the media aspect.

### 3. E-module Practicality Using *flip PDF Corporate*

*a. Limited Scale Test*

which has been revised according to suggestions from material and media experts, then a small-scale trial is carried out. This trial was conducted to determine student responses regarding using the module. This small-scale trial involved six respondents consisting of 6th-grade students at SDN Tlogorejo 2. The use of the e-module using *flip PDF corporate* was carried out after the students did the pre-test. After the learning activities using the e-module using flip PDF corporate were completed, the students worked on the post-test questions. The results of the pre-test and post-test of students in small-group trials are shown in the following table. Furthermore, the student and teacher response questionnaires were given by the researcher. The results of student and teacher responses are used to improve the learning modules developed. Each student's response results consist of 5 criteria, i.e., criteria very 81% - 100% eligible, 61% -80% eligible criteria, 41% -60% decent criteria, 21% -40% less eligible criteria, and 0% -20% unfeasible criteria. The student response questionnaire analysis showed that the responses were in a small-scale trial in class VI SDN Tlogorejo 2. As many as six students showed an average percentage of 95% with a very decent category. The questionnaire is also a reference for the absence of technical revisions to the learning media. A small-scale trial questionnaire was also given to teacher class VI SDN Tlogorejo 2. The teacher allowed evaluation by advising that the module uses *flip PDF corporate* to be better.

### Module Effectiveness

1) Normality test

Table 1. Results of the Normality Test

**Tests of Normality**

| | Class | Kolmogorov-Smirnov [a] | | | Shapiro-Wilk [a] | | |
|---|---|---|---|---|---|---|---|
| | | Statistics | f | sig. | Statistics | f | sig. |
| Student learning outcomes | Experiment Pre-test | 173 | 0 | 117 | 872 | 0 | 13 |
| | Post Test Experiment | 183 | 0 | 077 | 915 | 0 | 080 |
| | Pre-Test Control | 156 | 7 | 091 | 921 | 7 | 042 |
| | Post-Test Control | 163 | 7 | 064 | 921 | 7 | 042 |

The results of calculating the normality test through SPSS Statistics version 23 using the Kolmogorov-Smirnov (KS) statistical parametric, it was found that the significance value of the student's pre-test obtained the sig value as follows, namely Pre Test class on the experiment was 0.117, the class obtained a value of $> \alpha = 0.05$, so it can be concluded that the group population is normally distributed. Meanwhile, for the significance value of the Post Test results, the experimental class is 0.077. The class obtained a value of $> \alpha = 0.05$.


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So it can be concluded that the group's population is normally distributed. Thus it can be concluded that the sample data is normally distributed. [18] In his research in testing the effectiveness of textbook development, data were obtained with a significance value of for the experimental group 0.035 and a significance value of for the control group 0.091. Because the significance value for the two groups is > 0.05, as a basis for decision-making in the Shapiro-Wilk normality test, it can be concluded that the data on students' critical thinking values for the experimental group and the control group are normally distributed.

2) Homogeneity Test

Table 2. Homogeneity Test Results

| | | Levene Statistics | f1 | f2 | Sig. |
|---|---|---|---|---|---|
| Student learning outcomes | Based on Mean | 202 | | 5 | 655 |
| | Based on Median | 113 | | 5 | 738 |
| | Based on the Median and with adjusted df | 113 | | 4,485 | 738 |
| | Based on trimmed mean | 286 | | 5 | 596 |

The results of the homogeneity test with SPSS Statistics version 23 using *the test of Homogeneity of Variances* can be concluded that the significance value is 0.655 > (0.05), then the data is homogeneous. This significance value indicates that $H_0$ is accepted so that the pre-test and post-test data are homogeneous (same).

Final Data Analysis

3) t-test

Table 3. T-Test Results

| | | F | Sig. | T | F | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
|---|---|---|---|---|---|---|---|---|
| Mathematics Learning Outcomes | Equal variances assumed | .202 | .655 | 2,191 | 45 | .034 | 764.815 | 349.140 |
| | Equal variances not assumed | | | 2,187 | 40,84 | .035 | 764.815 | 349.726 |

Researchers use the formula *Independent sample t-test* with SPSS 23 is used for the t-test. The results of the t-test before and after using the e-module using.

From the independent sample test data, the 2-tailed significance value on the independent sample t-test is 0.0 34, where the value is smaller than 0.05. Thus, H0 is rejected, and H1 is accepted. The calculated t value is 2.19100, greater than 2.08596 (table t value). Based on this explanation, it can be concluded that there are significant differences in student learning outcomes before and after using the e-module. In line with the research of [19], which shows that seen from a row of equal variance assumed in Table 4.21, the output of the Independent Samples Test. Sig = 0.00 <0.05 means that Ho is rejected or there is a difference between the experimental and control classes [20]


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## CONCLUSIONS

Based on the results and discussion, it can be concluded that (1 ) the e-module using *flip PDF corporate* in mathematics learning on integer material is feasible to use based on the results of material experts and media experts. The feasibility of material experts scored 80% with appropriate criteria. Media experts scored 79% with appropriate criteria, (2) the response given in a small-scale trial in class VI SDN Tlogorejo 2, as many as six students showed an average percentage of 95% with a very feasible category, and (3) from the independent sample test data the 2-tailed significance value in the independent sample t-test was 0.034, where the value is smaller than 0.05 so that the experimental class is better than the control class.

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