

Development of Student Mathematics Teaching Based on Contextual Education to Improve Mathematical Literacy Ability

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ABSTRACT

This research aims to develop contextual-based teaching materials based on Bakmi's E-Book (Learning Algebra by Al-Khawarizmi) by going through 5 stages of ADDIE. The results showed that Bakmi's E-Book met the validity index of 81%. The percentage of material validation results is 88.1% in the Very Eligible category and media validation is 89.6% in the Very Eligible category. The test results of Bakmi's E-Book products have met the practicality index of teaching materials to be used of 96.7% in the Very Interesting category to use. In addition, Bakmi's E-Book teaching materials can also improve student learning outcomes on Algebra material. It is shown from the results of the effectiveness test through the pretest and posttest that there is an increase of 0.8% in the category of High improvement. Taking into account the results of existing research, the development of teaching materials should be carried out in a sustainable manner by holding the principle, in order to achieve the learning objectives to the maximum.

Keywords: *Contextual Mathematics Learning; Literacy Ability.*

INTRODUCTION

Many branches of science, mathematics is a very important scientific field. Mathematics as a discipline that clearly relies on thinking processes is considered very good to be taught to students. It contains various aspects that substantially lead students to think logically according to patterns and rules that have been arranged standardly. So often the main goal of teaching mathematics is nothing but to familiarize students with being able to think logically, critically and systematically. In mathematics, which has an abstract nature, a good understanding is required. This is important because to understand a new concept, it is necessary to have a proper understanding of the previous concept. So that the knowledge gained by students is constructed according to their respective learning experiences according to the stage of development and the surrounding environment. Mathematics lessons are very important and very influential lessons in everyday life, both in the development of science and technology, as well as in the context of forming students' positive characters (Nasrulloh & Nisa', 2021).

The teaching and learning system will not be separated from other components that interact with each other in it. One of the components in the process is learning resources. Learning resources are resources that teachers can use for the benefit of the learning process, either directly or indirectly, in part or in whole (Sudjana & Rivai, 2010). Learning is also a process of communication between teachers and students. To support teacher-student communication, in general, all schools must have a handbook or can be termed a module. However, not all modules have stimulation regarding the application of the knowledge that has been learned. So that many students find it difficult to apply learning outcomes and feel less motivated in participating in learning activities. That understanding of concepts and materials Math doesn't only support success a student in the academic field, but it is also important to develop critical mathematical thinking required in daily life. Based on description above it can be concluded that the ability of mathematics is needed in dealing with today's daily life (Satiti et al, 2021)

Many dimensions of our daily life are related to mathematics. Therefore, learning mathematics will be more meaningful if students are given the widest opportunity to do mathematical activities. Many students are able to present a good level of mathematical memorization of the material they receive, but

this is not proportional to the understanding and process of getting it. Most students are not able to relate what they learn to how that knowledge will be used or utilized. Students have difficulty understanding in depth about facts or other parts of mathematics because the material that has been taught so far is something abstract. Media learning is a means or a tool education that can be used as intermediary in the learning process for enhance the effectiveness and efficiency in achieve teaching goals (Aprilla & Nasrulloh, 2019).

One approach that is considered good to be applied in learning mathematics is learning with a contextual approach. The contextual approach or Contextual Teaching and Learning (CTL) is a learning approach that links the material being studied with the context of students' daily lives. Of the seven main components of contextual learning, it is very synchronous with efforts to raise students' critical thinking skills, especially in the components of asking, discovering, and reflecting. According to Johnson, critical thinking is one of the characteristics of the CTL approach. With contextual-based mathematics learning, it is hoped that students will get meaningful learning, students are more active in learning activities and are able to apply them in everyday life. The development of teaching materials needs to be packaged in such a way that students can study the material independently and improve their problem-solving abilities. Based on the explanation, the researcher designed a teaching material to overcome the problems that occur in the field by conducting a study with the title Development of Student Mathematics Teaching Materials Based on Contextual Education to Improve Mathematical Literacy Ability

METHOD

Media learning is a means or a tool education that can be used as intermediary in the learning process for enhance the effectiveness and efficiency in achieve teaching goals. This research was carried out with a research and development approach. This type of research is a research method used to produce certain products, and test the effectiveness of these products (Sugiyono, 2010). The development model used in this study follows the stages of the ADDIE development model. The ADDIE model is an approach that emphasizes an analysis of how each component that is owned interacts with each other by coordinating according to the existing phases. The following is the theory of applying ADDIE in learning activities. The ADDIE development model is divided into five stages, namely: (1) analysis, (2) design, (3) development, (4) implementation, (5) evaluation or feedback.

The type of data from this research is quantitative and qualitative because this research was conducted with research and development (R&D). Qualitative data obtained from observations sourced from observing learning activities, questioning and answering with students, teachers of mathematics subjects, school staff and strengthened by documentation during the learning process that researchers observed. While quantitative data obtained from the results of questionnaires and tests. The results of the analysis obtained from quantitative and qualitative data are used as a reference in determining the feasibility of the product developed. The questionnaire used in this quantitative data analysis uses a Likert scale.

RESULT AND DISCUSSION

Result

This research uses research and development (R&D) methods. The development model used is ADDIE. The description is as follows:

- **Analyze**

This analysis aims to determine the basic needs by conducting observations of the learning activities carried out. In addition, this analysis aims to find out what is needed to support the implementation of this development research. This analysis stage is the initial stage before research and development is carried out. This analysis phase is carried out by analyzing student needs or identifying problems (needs) determining learning competencies, identifying required resources and determining products developed as a result of analysis and solutions to problems that occur by adjusting the characteristics of students and the environment.

- **Design**

The second stage is to design the results of the analysis carried out from the analyze stage. Based on the data obtained from the analyze stage (analysis) to obtain data that the right media and in accordance with the times and technological advances are contextual-based e-books. Therefore, at this stage it is necessary to prepare teaching materials, determine basic competencies, describe materials, evaluate, determine images, videos and musical instruments that are in accordance with the material. The concept of

this e-book is BAKMI (Learning Algebra by Al-Khawarizmi) which presents various table of contents (menus) with unique names as well. The following is the material coverage of the Bakmi e-book.

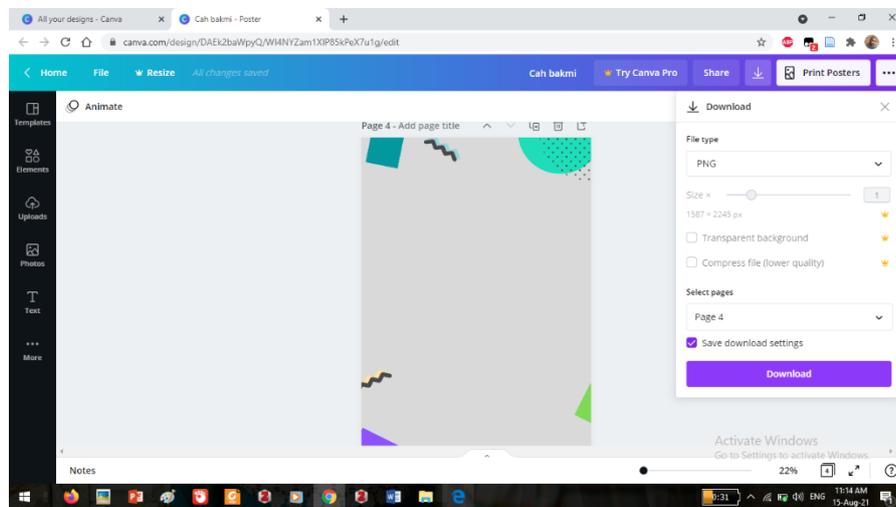


Figure 1. Designing Product in Canva

- **Development**

After doing the bakmi e-book design stage, then the stage of developing the design or design that has been made using the Microsoft Word application is transformed using the Flipbook application to become an e-book that can be used on gadgets. There is a basic but important thing to note that the initial appearance of the e-book must be made as attractive as possible so that students are interested in learning. In the flipbook application, researchers can add video or music link pages as well as design the appearance of the e-book as attractive as possible.

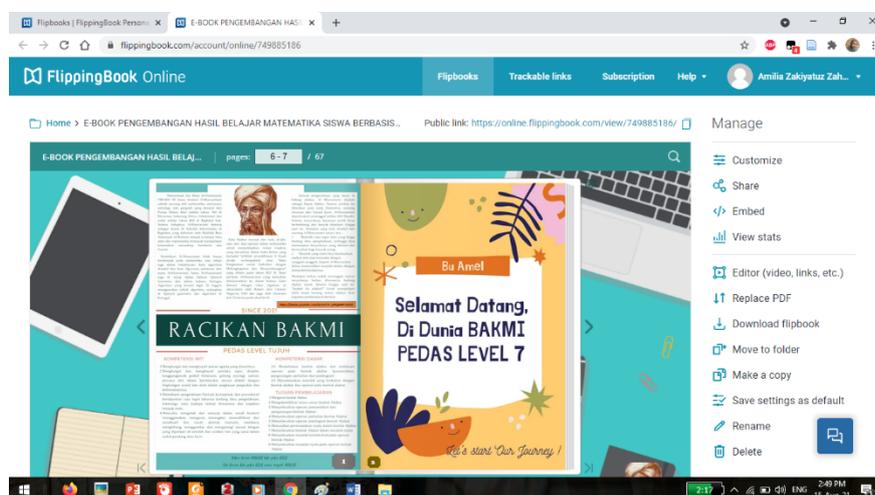


Figure 2. Developing Product in Canva

- **Implementation**

At this stage a trial is conducted to see the feasibility of the teaching materials that have been developed. The implementation process is used to collect data on student responses to contextual-based e-books using flipbook applications or websites so as to achieve effective basic competency standards. In addition, students can also download e-books and print if students want to have a form of teaching material. The teacher applies what has been planned in advance into the actual learning process in the classroom. This e-book was tested on 29 8th grade students who live in PP dormitories. An-Najah Denanyar Jombang. This trial was carried out for 5 days from 24 – 29 July 2021.



Figure 3. Implementation the Product in An-Najah Denanyar

- Evaluation

In every meeting of learning activities, students are given a pre-test to determine the initial ability of students regarding the material to be delivered and a post-test as the final evaluation of learning activities and measuring student learning success. The pre-test questions refer to the learning objectives to be achieved and measure students' readiness to receive the material to be given. This pre-test consists of 5 questions covering the basic material and the material to be studied. The post-test questions were taken from the questions in the Bakmi e-book competency test. The results of the pre-test and post-test are presented in the table below, where the calculation uses the Microsoft Office Excel application using the N-Gain formula.

Table 1. The results of the pre-test and post-test

SUBJECT	$\bar{x}PR$	$\bar{x}PO$	$PO - PR$	$NI - PR$	N-Gain Score
1	60	92	32	40	0,8
2	70	94	24	30	0,8
3	69	90	21	31	0,7
4	71	96	25	29	0,9
5	68	91	23	32	0,7
6	50	99	49	50	1,0
7	64	89	25	36	0,7
8	70	97	27	30	0,9
9	60	92	32	40	0,8
10	71	98	27	29	0,9
11	62	89	27	38	0,7
12	59	95	36	41	0,9
13	53	96	43	47	0,9
14	70	87	17	30	0,6
15	62	97	35	38	0,9
16	68	89	21	32	0,7
17	62	92	30	38	0,8
18	64	97	33	36	0,9
19	55	95	40	45	0,9
20	54	89	35	46	0,8
21	59	100	41	41	1,0
22	62	92	30	38	0,8
23	70	85	15	30	0,5

24	73	93	20	27	0,7
25	54	89	35	46	0,8
26	79	89	10	21	0,5
27	67	97	30	33	0,9
27	74	92	18	26	0,7
27	59	91	32	41	0,8
Σ	1859	2692	833	1041	22,8
\bar{x}	64,1	92,8	28,7	35,9	0,8

Discussion

The data obtained from the validation of media experts, namely Mr. Farid Nasrulloh, M. Pd and Mrs. Wiwik Ekawati, S. Pd are data taken by filling out a questionnaire for media experts. The media validation questionnaire contains presentation components which include aspects and indicators. The assessment of the media feasibility component is assessed from 3 aspects, namely the coverage of the material which contains 4 questions, the design which contains 2 questions and contextual which contains 4 questions. Where the percentage of material coverage reaches 95.1% (with the "Very Interesting" criteria), the design aspect reaches 97.4% (with the "Very Interesting" criteria) and the contextual aspect reaches 97.5% (with the "Very Interesting" criteria). Meanwhile, the average total percentage of the three aspects is 96.7% (with the "Very Interesting" category). So that the development of Bakmi's e-book teaching materials according to student assessments is included in the "Very Interesting" category.

CONCLUSION

Developing teaching materials that are valid, relevant, efficient and effective by considering the current condition of students are by holding the principle of relevance (according to competency standards and basic competencies), the principle of consistency (teaching materials taught must be in accordance with basic competencies), the principle of adequacy (material what is conveyed can help students achieve learning objectives, namely mastering competency standards and basic competencies) and the selection of teaching materials. The criteria for selecting teaching materials include determining the behavioral aspects contained in the competency standards and basic competencies as well as determining or selecting the types of teaching materials in accordance with the behavioral aspects contained in the basic competency and competency standards. Learning materials themselves will be divided into several types, namely learning materials of facts, concepts, principles, procedures, motoric, and affective.

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