

Pengembangan E-Modul Berbasis Problem Based Learning menggunakan *Kvisoft Flipbook Maker*

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Abstrak

Pada kurikulum merdeka integrasi teknologi dalam pembelajaran harus dioptimalkan, Pemanfaatan teknologi dalam pembelajaran salah satunya adalah penggunaan e-modul. Penggunaan e-modul menuntun siswa untuk belajar mandiri secara lebih efisien dan efektif. Penelitian ini bertujuan menghasilkan e-modul menggunakan aplikasi *kvisoft flipbook maker* berbasis *Problem Based Learning* yang valid dan praktis serta memiliki efek potensial terhadap hasil belajar siswa. Jenis penelitian yang digunakan yaitu *development research* dengan menggunakan alur pengembangan *Analysis, Design, Development, Implementation and Evaluation (ADDIE)*. Subjek penelitian adalah peserta didik kelas VII SMP Negeri 4 Palembang. Teknik pengumpulan data yang digunakan digunakan angket, wawancara, dan tes. Data kevalidan didapat dari validasi 3 (tiga) validator dan data kepraktisan didapatkan dari angket kepraktisan yang diberikan kepada peserta didik. Sedangkan efek potensial dilihat berdasarkan nilai siswa. Hasil penelitian menunjukkan capaian rata-rata kevalidan 3,76 dengan kategori valid, kepraktisan sebesar 3,93 dengan kategori sangat praktis, dan nilai hasil tes siswa yang memiliki efektifitas terhadap hasil belajar yang baik. Maka dapat disimpulkan bahwa e-modul menggunakan aplikasi *kvisoft flipbook maker* berbasis *Problem Based Learning* untuk kelas VII teruji valid, dan praktis serta memiliki efek potensial yang baik terhadap hasil belajar siswa.

Kata Kunci: e-modul, *kvisoft flipbook maker*, *PBL*, pengembangan

Development E-Module with Problem Based Learning Models Using Kvisoft Flipbook Maker

Abstract

In the independent curriculum, the integration of technology into learning should be optimized, the use of technology in learning, one of which is the usage of e-modules. This research aims to produce e-modules using the kvisoft flipbook maker application based on Problem Based Learning that are valid and practical and effective on student learning outcomes. The type of research used is development research using the Analysis, Design, Development, Implementation and Evaluation (ADDIE). The research subjects were class VII students at SMP Negeri 4 Palembang. The data collection techniques used were questionnaires, interviews and tests. Validity data was obtained from validation of numeracy literacy with 3 validators and practicality data was obtained from the practicality questionnaire given to students. Meanwhile, the potential effect is seen based on student grades. The research results show an average validity of 3.76 in the valid category, practicality of 3.93 in the very practical category, and student test results that have a potential effect on good learning outcomes. So it can be concluded that the e-module using the kvisoft flipbook maker application based on Problem Based Learning for class VII has been proven to be valid and practical and effective on student learning outcomes.

Keywords: *development; e-module; kvisoft flipbook maker; PBL*

INTRODUCTION

One of the determinants of the success of the learning process in achieving the goal of learning mathematics is the teaching material (Indriayu, 2019). Teachers still have a very dominant role, teachers have a lot of talk methods and lack an understanding of the learning environment. The impact of students not understanding the material delivered by teachers and the learning atmosphere becomes monotonous. According to the researchers, the teaching material that exists at the moment is generally presented in person so that students are bored and lack understanding of the material. The teaching materials should have an interesting and unique form, content and way of presentation in order to improve students' interest and success in learning. One of the interesting teaching materials developed is the module. As for the form of the module, there is print and visual audio obtained from various sources. The display is also made more interesting in order to facilitate the students in the learning activities in the classroom and aim to motivate the students so that the delivery of material can be accepted well so that learning indicators are achieved (Irwanti & Zetriuslita, 2021). Digital technologies have brought changes to the nature and scope of education and led education systems worldwide to adopt strategies and policies for ICT integration (Timotheou et al., 2023). In the modern era, it seems that a digital-based e-module is considered more practical because it has many other advantages. The advantages of the e-module include: 1) Increasing the rate of learning interaction between students and teachers, 2) Increase the occurrence of interaction learning from anywhere and at any time, 3) Access to students in wide coverage, 4) Facilitate the completion and delivery of learning materials (Ahdhianto et al., 2021; Asmianto et al., 2022; Farahin Rachman Laraphaty et al., 2021).

Based on the results of the interview conducted by the researcher with one of the mathematics teachers the teaching materials used are from the student books, as well as worksheets that match the issues contained in the books. From the observations of the researchers looking at the activities of the teaching learning process, the materials used in general are still printed so less practical. Furthermore, information was obtained that the students of the 7th grade had difficulties in algebra matters in accordance with the teacher's statement that the student's learning outcomes on algebra subjects were very low because the student have difficulties to understand the concept of learning material and the teacher was only attached to a book whose presentation was still abstract, haven't media like video which can access by student. Therefore, electronic teaching materials are needed by combining a Problem Based Learning learning model created with an software.

Nowadays, many available software or applications can be used, one of which is developing e-modules with the help of the kvisoft flipbook maker, allowing teachers to create interesting and interactive e- modules combined with the Problem Based Learning model that is closely related to everyday life as a solution in the problems facing schools. The kvisoft flipbook maker has the advantage of attaching audio and video to users accessing offline and attaching links that can direct users to web pages and load more learning information that can be accessed online (Wibowo & Pratiwi, 2018). With such advantages, the kvisoft flipbook maker application is different from the digital application that can be used to develop e-modules.

Problem Based Learning is a learning approach that begins with introducing students to mathematical problems (Farhan et al., 2021; Padmavathy, 2013; Rézio et al., 2022). With all the knowledge and abilities he has, the student is required to solve problems that are rich in mathematical concepts. The characteristics of Problem Based Learning include positioning students as self-directed problem solve through collaborative activities, encouraging students to be able to find problems and collaborate with them by proposing assumptions and planning solutions, facilitating students to explore various alternative solutions and their implications, as well as collecting and distributing information, training students to skillfully present findings, and getting students to reflect on the effectiveness of their way of thinking in solving problems (O'Brien et al., 2019). The advantage of the Problem Based Learning model is that learning is focused on the chosen problem so that students learn not only concepts related to the problem but also scientific methods in solving the problem (Poerwanti et al., 2022). Participants not only understand concepts relevant to the issue but also gain experience solving problems with scientific method and cultivate critical thinking patterns. Choosing the right learning model becomes crucial in improving student learning outcomes (Lasmini, 2019).

The novelty of this research is integrating the problem based learning model into an e-module designed with Kvisoft Flipbook Maker. Based on the above description, The purpose of this study is to produce e-modules using the kvisoft flipbook maker based on problem-based learning that are valid, practical and effective on student learning outcomes.

METHOD

The type of research method used is research and development (R&D). The development model that the researchers will use is the ADDIE model, the stages are analyze, design, development, implementation and evaluation (Branch, 2010). At the analysis stage, researchers carried out student needs analysis and curriculum analysis. In the design stage, the researcher designs the e-module. Next, at the development stage, validate the e-module, test it on one to one students, small groups and field test to obtain practical data. Validation was carried out on the aspects of construct, content and language, while practicality testing was carried out on the aspects of ease of use and attractive appearance. The subjects in this study are students of the 7th grade in secondary high school at Palembang. The data collection techniques used in this study are leaflets, interviews, and tests. The data raised is analyzed quantitatively, on each detail of the statement the validator and the student will give a score of 1 to 4. From this assessment the score is then sorted and given a category based on the criteria below.

Table 1. Validity and Practical Criteria

score interval	Criteria	
$1 < \bar{x} \leq 1,75$	Not Valid	Not Practical
$1,75 < \bar{x} \leq 2,50$	Quite Valid	Quite Practical
$2,50 < \bar{x} \leq 3,25$	Valid	Practical
$3,25 < \bar{x} \leq 4,00$	Very Valid	Very Practical

The interview data is qualitatively analyzed, the results of interviews with teachers and students are used as a basis in making revisions to the developed modules. The effectiveness of e module analyze at the implementation stage. In that stage e-module using in learning process and in the last session the student take a test and data is analyzed by giving a score to student's answers.

RESULT

Analysis

Analysis of Student Needs

The analysis was conducted to determine the needs of students in mathematics learning at SMPN 4 Palembang. From the results of the interviews that have been conducted, mathematics learning at uses the learning resource of the mathematical book and has already used LCD projector media in the process of finishing the learning material. However, for the use of media e-learning modules has never been applied to mathematical learning. So technology-based learning resources are needed.

Curriculum Analysis

At this step the researchers conducted an interview with one of the mathematics teachers. from the results of the interview, obtained the fact that the school applied the independent curriculum in its learning process. In accordance with curriculum demands, integrating the use of technology in learning must be carried out.

Design

At this stage, the researchers conducted the design process of the algebra e-module through several stages. First, they collected references to algebra materials that were not only contained in printed books, but also used references from some learning websites. Then, they also collected the necessary images from their own photographs or taken from some sources on the Internet. Secondly, the researchers design the material and evaluation issues that are designed with the layout as attractive as possible and using the language that is accurate. In the final stage, researchers do the design of the e-modules that are structured and sorted according to the stage of Problem Based Learning.

Development

Validation

The validation tool used is a validation sheet filled in by the validator and some revision are made in the form of comments and suggestions related to algebra e-modules using a problem-based Problem Based Learning-based kvisoft flipbook maker developed by researchers. As for the list of validators, comments and suggestions can be seen in the table below.

Table 3. Validator comments and suggestions

Validator	comments and suggestions
MSW	In the topic section created a separate page and added some illustrations Fix confusing words on the e-module Cover and color selection is okay because it attracted the attention of students Add video source
FW	The e-module that was made was good It could not be opened through a laptop with the latest version of windows. It is better to add multiplication and division e- module that has been made suitable to the syntax of Problem Based Learning. Add algebra history to the material.
DI	Small media display, add the zoom button to the media

One-to-one

At this stage, the researchers conducted a practicality of the e-module. The practicality consists of the brilliance, clarity and errors seen on the e-module product. The one-to-one test was carried out against three people of seventh grade students with initials MYDP, AA, and AIR. Those three students had high, medium and low mathematical ability.

Small Group

After a limited trial of three students, the researchers proceeded to a small group trial consisting of six randomly selected students in seventh grade students. At this stage, the e-module has been revised at the design stage and one-to-one tested to six students.

Field Trial

The field trial was carried out before the e-module was used in the real classroom. The field test was conducted in twenty peoples of seventh grade student in other class via handphone. This phase is performed to check the validity of e-modules that have been revised in the previous phase to be used in the actual class in the implementation phase.

Implementation

The Implementation phase was conducted on 25 students High School of 25 students in the 7th grade. At this stage, researchers provide e-modules to teachers of mathematics to realize in the learning process. At the end of the e-module, the student will be given questions to evaluate the potential effects on the student's learning outcomes after using the e - module. In addition, students are given a lift to see how practical the e-module.

At the implementation stage, the teacher gives questions that the researcher has done to see the potential effect of e- module on the students' learning outcome. The average result of the student test is 71.6 means entering the range 66-79 stated that the e-module created has a potential effect on the learning outcome with the category Good. In addition to being given questions to see the potential effects, at the implementation stage students are also given a lift to look at the practicality of the e - module that has been tested. The elevation performance of the elevation response of the student is 3.93, which means entering the range of 3.25-4.00 indicates that the product is practical and usable.

Evaluation

The researchers conducted the final evaluation of the activities carried out in the process of producing e-module products by reference to the data obtained in several previous processes. This was done as an evaluation form to perfect the e- module produced. In this study, the product developed as an algebra e-Module based on PBL using the application kvisoft flipbook maker with the material focus aggregation and reduction stated valid by the validator team, practically from the result of the elevator response of the pupils, and has the potential effect of the test results written by the pupil, so this e-

Module can be used with small revisions.

DISCUSSION

E-Module with Problem Based Learning Models Development Procedure Using Kvisoft Problem-Based Flipbook Maker

Based on the problem formula, the researchers will see how validity, level of practicality and also potential effects of the e-module on student learning outcomes. The criteria for a good quality product should meet valid, practical and potential effects criteria (López-Belmonte et al., 2022; Nieveen & Folmer, 2013; Thomas et al., 2019). As for the research procedure used to acquire these three aspects, the ADDIE procedure consists of the analysis, design, development and evaluation.

At the phase of analysis the researchers had conducted an interview with one of the mathematics teachers from the results of the interview, obtained the fact that the school applied the independent curriculum in its learning process. Independent curriculum that requires students to actively learn independently, capable of constructing concepts and solving problems, using a variety of learning resources, as well as conducting technology-integrated learning. Seeing from the student's learning outcomes on mathematical subjects of low value on algebraic material. Once confirmed to the students, they're still confused in operating algebra. Teachers delivery the learning material is still taken from the student book. Based on the above researchers moved to develop e-module with problem based learning models using kvisoft flipbook maker. The use of this digital flipbook is similar to electronic books (e-books) but their advantages This flipbook can be opened sheet by sheet supported by animation, video, writing, etc images that are relevant to the context of the book. the presence of videos, pictures and animations in mathematics learning will make students more interested and flexible (Karmila et al., 2021; Nabayra, 2022)

After conducting the interview, the researchers then performed the design which is by collecting material, creating the layout of e-modules, and organizing e-modules. The material taken is not only adapted from the student books but also some references from the web. The e-modules are organized according to the problem-based learning syntax that begins with the problem (Hendriana et al., 2018; Seibert, 2021). In problem-based learning, learning begins by providing contextual problems. Contextual problems are a useful tool for helping students grasp mathematical concepts, and current curricular trends have produced a wealth of materials that employ contextual problems to introduce and develop new mathematical concepts (Reinke, 2019). Solving mathematics contextual problems is one way that can be used to enable students to have the skills needed to live in the 21st century (Lutfianto et al., 2013). Students need to exercise solving real problems that require reasoning, clarification, argument or other mathematical skills because it associates in the future that they will be able to contribute improvements in society (OECD, 2013). This is in line with the curriculum, for students to learn independently, solve problems and integrate technology.

After designing the e-module, the researchers then proceed to the third phase of development by developing e- modules in accordance with the syntax of problem based learning. At this stage of development researchers develop the design of the subject into a physical or real form which is then tested validity according to the experts. At this stage, it also performed one to one, small group, and field trials to determine the quality of the instrument and to revise the e-module to be tested at the implementation stage.

The fourth stage is the implementation stage, where researchers become observers and teachers who implement the product that has been revised into one class, The students who follow this stage are 25 students with different abilities. At this stage, the value will be obtained from the issue given at the end of the e-module, which will be used as a reference to see the potential effects of the product developed. Besides, at this stage also look at the practicality of the issues that have been revised at the previous stage.

The fourth stage is the implementation, where researchers become observers and teachers who implement the product that has been revised into one class. The students who follow this stage are as many as 25 students with different abilities. At this stage, the value of the issue given at the end of the e-module will be obtained, which will be used as a reference to see the potential effects of the product

developed. Besides, at this stage also look at the practicality of the issues that have been revised at the previous stage.

The final phase is the Evaluation, which is the final evaluation of the activities carried out in the process of producing e-module products by reference to the data obtained in some previous processes. In this study, the product developed as an algebra e-module with problem based learning models using the flipbook maker's kvisoft with the material focus on addition and subtraction stated valid by the validator team, practical from the evaluation result of the student's response, and has effectiveness from test results written by the student.

Validity e-module with problem based learning models using kvisoft flipbook maker

Validation of this e-module was obtained from validation by experts at the development stage. The product is validated with the participation of experts. The experts used the lift and revised by the researchers according to the advice and comments of the experts. There is also an expert assessment of 3.76 where the researchers interpreted the value obtained the value entered the achievement rate of interval $3,25 \leq x < 4,00$ which is very valid with revision (Arigiyati et al., 2019). Based on the validation of the experts it was found that the e-module using the application kvisoft flipbook maker is declared valid with minor revisions in accordance with the comments and recommendations by the experts. The next stage is one-to-one, small-group and field trials.

As for the one-to-one stage to see the student's readability of the e-module that has been created. Students at the one to one stage were 3 peoples from the 7th grade students. During an interview one of the students stated that he was confused the first time in operating the e-module because they were new to using teaching materials in the form of an application.

Small group consists of 6 students of 7th grade, aims to see the productivity of the product seen from the elevator of the pupil. After the e-module is tested, students are given a lift where the average lift at this stage is 3.95, which means the e - module is already in the practical category with revision based on student comments. One of the students with the T initials revealed that he still needed the help of a friend to solve the questions.

The final development phase is a field test. The purpose of the field test is to test the quality of the e-module before it is tested at the implementation stage. Based on interviews obtained students feel helped with the e-module. However, some students still find it difficult to work on the subject given.

After being revised following the comments and advice of the experts and the results of the elevation students then obtained an e-module with problem based learning models using kvisoft flipbook maker is declared valid, valid in content, construction, and language aspects. A valid module is designed to provide clear and in-depth explanations of mathematical concepts. This helps students to understand the concepts better and more thoroughly. Modules include various types of questions and challenging problems, helping students develop problem-solving skills that can stimulate creative and analytical thinking. Problem-based learning modules with multi-representational presentation of material (videos, images) help accommodate different learning styles and make learning more fun and meaningful. With its brief lesson length, tightly focused learning objectives, condensed curriculum materials, excellent instructional activities, refined instructional design, refined content, and strong pertinence, video learning has a positive educational impact (Tan et al., 2021; Wiriyaudomsatean & Thinwiangthong, 2019)

Practicality e-module with problem based learning models using kvisoft flipbook maker

The practicality of this e-module is obtained from the results of the elevation of the students of development and implementation. In the implementation of the practicality test, the learners conduct the learning process using the e-module and are asked to fill in the lift related to the practicability of the e - module. The average student is very fond of learning using an e-module with problem based learning models using kvisoft flipbook maker. They revealed that the e-module used was very interesting, accompanied by a learning video that can be played repeatedly, as well as the presence of illustrations on each example of the topic that made it easier for students to determine variables on this algebra material.

From the result of the lift, the average lift of 3 pupils at the one-to-one is 3.91 with highly practical categories, the mean lift of 12 pupils in the Small Group level is 3.85 with very practical category, and the average elevation of 20 pupils on the field test stage is 3.29. The researchers interpreted entering at an achievement rate of $3.25 \leq x < 4.00$ which means Very Practical (Wati & Ramadhani, Misbah, 2022). From the development stage that has been done it can be concluded that the e-module with problem-based learning models using kvisoft flipbook maker is a practical category. Continued at the implementation stage obtained average elevation of students is 3.93 meaning entering the range of 3.25-4.00 stated the product is very practical and usable. Then from that based on the results that have been carried out from the stage of development to the implementation stage obtained that e-module with problem based learning models using kvisoft flipbook maker has been declared practical.

Interesting and relevant modules can increase student involvement in mathematics learning. An attractive module design can motivate students to study more seriously. Modules can be accessed flexibly, either in class or online. This makes it easier to distribute materials to students and provides flexibility for studying outside of class time. Online based mobile learning provides opportunities for students to study anytime and anywhere, students' responses when using the electronic module were better than using the print module (Syahrial et al., 2021). The use of language in modules that is easy for students to understand is an important aspect in efforts to increase students' understanding of the material and activate student involvement in learning.

Efectiveness of e-module with problem based learning models using *kvisoft flipbook maker*

The efectiveness of e-modules obtained from the written test results of the students of 7th grade on the field test in the implementation stage. The researchers gave five evaluation questions in the form of essays related to algebraic material that had previously been studied using e-modules.

Average student test results of 70.25 shows that e-modules effective to use in learning process.

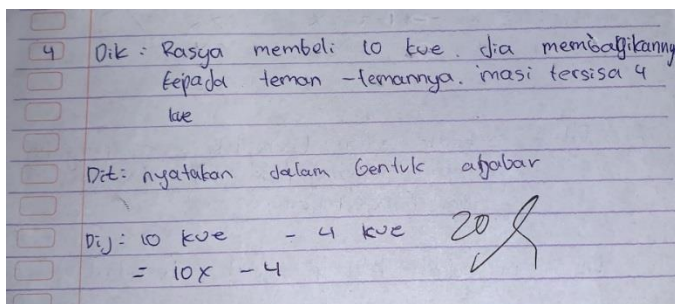


Figure 1. Student's Answer

In the student's answer above, it shows that MFN can understand a problem, MFN is able to understand the condition by writing down the information contained in the question. Then MFN may determine the variable so that the question can be solved well and get a perfect score. With the rapid development of new digital technology, specific characteristics of these developments are continuously changing (Engelbrecht et al., 2020), so the development of effective e-modules must be carried out. Effective e-modules Linking the concepts taught to real-world situations or practical contexts can help readers understand the relevance and application of these concepts in everyday life. Linking learning material to everyday life can increase the sense of relevance and motivation to learn. easy access to modules anytime and anywhere provides flexibility to students. This is especially useful for independent or distance learning. With complete and easy to understand material coverage and the existence of learning videos, it can help students understand mathematical concepts well.

CONCLUSION

Based on research, it can be concluded that, An e-module using *kvisoft flipbook maker* based on *Problem Based Learning* has been produced that is valid, practical and effective for use in mathematics

learning. The valid criteria in this study are obtained from the results of instruments that have been validated by experts at the development stage (development). Whereas the practical criteria, seen from the outcomes of the instruments and interviews given at the one-to-one, small group and field test that requested the e-module developed are very interesting, the language is used, easy to use and understand, and the learning process is more enjoyable. E-modules effective with the category good with the average result of the student test is 70.25, it means that e module can be use in learning process.

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