

Development of Powerpoint Interactive Teaching Materials in Mathematics Learning

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Abstract

This study aims to develop a teaching material in the form of PowerPoints in mathematics learning, namely quadrilateral material for class VII Junior High School/Islamic Junior High School. This is motivated by the lack of interactive teaching materials that make students quickly feel bored when learning mathematics. This research is a development research adapted from the Borg and Gall model which consists of seven stages including needs analysis, developer capabilities, products to be developed, product concepts, product development, expert testing and trials. The feasibility of the product reaches the very feasible category in terms of the validation questionnaire of three experts and the results of the trial to the mathematics teacher get a percentage of 85%. So it can be concluded that the interactive PowerPoint teaching materials are very suitable to be used for learning mathematics.

Keywords: development, teaching materials, mathematics learning, mathematics learning materials, interactive teaching materials

INTRODUCTION

Changes that are felt in humans based on the experience gained and can affect human behavior can be said by learning. This is in line with what was expressed by Hintzman (2002: 90): Learning is a change in organism due to experience which can affect the organism's behavior. By learning someone will get new experiences from previous experiences, because the purpose of learning is to help students get the opportunity to practice something new (Dewey, 1963).

In learning it will not be separated from a learning and other supporting components in a learning. One of them is the use of technology. Technology is something that is important in education today, its role in the world of education is to make teaching materials that are very varied, interactive and liked by today's students. So with the help of technology, interactive teaching materials can be applied to mathematics learning to facilitate student understanding. One of the media is based on Microsoft PowerPoint.

Studying mathematics is the same as studying all fields of science, because mathematics is the queen of science. Besides being important to learn at school, mathematics also has an important role in everyday life (Gazali R.Y, 2016). However, in reality students still find it difficult when studying mathematics, this can be seen from the results of the PISA study that Indonesian students are still ranked below the international average.

There are several factors that cause low student mathematics learning outcomes, including the lack of use of interactive teaching materials, students do not prepare themselves to learn, do not have a high sense of problem solving so they easily give up, there is no high sense of enthusiasm to keep trying and feel not confident on their mathematical skills (Cowan, 2006). Based on this, the teacher's role is needed to change the mindset of students, both from the learning process and from the existence of interactive teaching materials to produce maximum results.

The ability of teachers to make teaching materials is an action to determine successful mathematics education (Lestari, 2013). Therefore, the teacher who acts as a presenter must prepare a teaching material to support learning in the classroom and choose the right method or approach according to the condition of the students. According to (Ngozi, B.O. Samuel, A.O. and Isaac, O.A., 2012) that the right support tool is an audio-visual one, because students will gain more understanding recorded through the eyes, ears, touch and others. This means that audio-visual teaching materials will have a good balance pattern. According to Eggen & Kauchak (Jacobsen, et al, 2009) the following things need to be done by teachers related to teaching materials, 1) foster high communication skills in the learning process, 2) material is contextual, 3) create various forms of examples and representations subject matter to students.

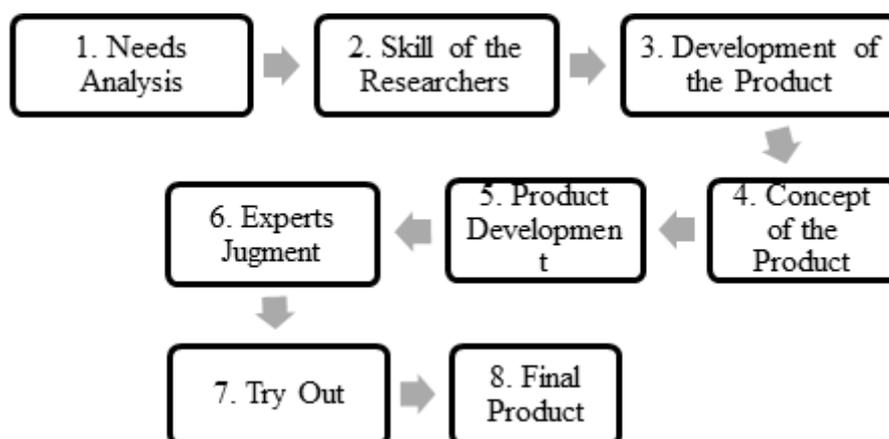
It is stated in the 2013 Curriculum document (Minister of Education and Culture, 2012) that in the current situation learning in schools is still using textbooks, whereas learning should be contextual. In the textbook there is only discussion material, while there should be a material and the learning process, how to assess it, and the achievement of competence. Therefore, teaching materials are needed as a companion media for textbooks so that they can be optimized in teaching and learning activities.

Based on the demands of the curriculum, alternative teaching materials are needed that can be used by teachers and students in their learning activities, one of the alternative forms of teaching materials is the use of interactive teaching materials in the form of PowerPoints. Because PowerPoint is often used to present something, and one of them is subject matter. By using PowerPoint, teaching materials will become more interesting and interactive because in PowerPoint you can insert slides, images, audio, video, other media and even add other applications such as iSpring Suite so that it looks attractive and interactive.

Based on this description, the purpose of this research is to produce an interactive teaching material in the form of a PowerPoint display in learning mathematics and to determine the feasibility of teaching materials for learning mathematics.

METHOD

This type of research is Research and Development and the development model is the Borg and Gall (2003) model which has 10 stages, but according to the needs of the researcher, this research only reaches the seventh stage. The following are the steps of the Borg and Gall development model:



Picture 1. Media Development Procedures

The development procedure is divided into three main stages, namely 1) the needs analysis stage 2) the design stage 3) the development stage and product results. In the needs analysis stage, a survey of mathematics teachers was conducted, determining an appropriate product and planning. The design stage is making initial planning and determining the product concept. The third stage is carrying out product development and conducting expert tests and trials to determine the feasibility of the final product.

The instrument used is in the form of a questionnaire, consisting of an expert questionnaire and a product trial questionnaire. The expert questionnaire (media, material and language) and the test questionnaire, namely the mathematics teacher questionnaire. The questionnaire is then used to collect data and to determine the feasibility of the responses from these experts.

Qualitative data in the form of filling out questionnaire sheets were then clarified into 4 categories of choice with a rating scale of 4, namely score 1, score 2, score 3 and score 4. Then to determine the feasibility of teaching materials, the average score obtained was interpreted into a table according to Sugiyono 2010, which are as follows:

Table 1. Score Interpretation for the Feasibility of the Media

| Percentage | Interpretation |
|------------|--------------------|
| 0- 25 % | Very Inappropriate |
| 26 – 50 % | Inappropriate |
| 51 – 75 % | Appropriate |
| 76– 100 % | Very Inappropriate |

According to the Puslitjaknov team, a good minimum criterion is teaching materials that reach a percentage of 70% (Puslitjaknov, 2008).

FINDINGS AND DISCUSSION

The results of the feasibility of interactive PowerPoint teaching materials in mathematics learning were obtained from the results of the three experts' tests, namely (media, material and language). Media experts assess the quality of media from the aspect of visual appearance and programming aspects. The material expert is correcting the wrong and inaccurate material, the aspects assessed are the content feasibility aspect and the presentation feasibility aspect. And linguists are assessing the language according to the EYD. And each aspect gets a percentage above 70% and belongs to the very feasible category. After being declared feasible, this teaching material was tested on mathematics teachers, the aspects assessed were aspects of learning design and aspects of technical quality of use. The feasibility of interactive teaching materials according to experts can be seen in the following table:

Table 2. The Feasibility of the Learning Module

| No. | Assessment for Media Feasibility | Percentage | Categories |
|---------------------------------|----------------------------------|------------|-------------------------|
| 1. | Media Expert | 87,5% | Very Appropriate |
| 2. | Material Expert | 80,62% | Very Appropriate |
| 3. | Language Expert | 82,69% | Very Appropriate |
| 4. | Mathematics Teacher | 85% | Very Appropriate |
| Percentage Score Average | | 84% | Very Appropriate |

The process of developing these teaching materials follows the steps of Borg and Gall up to the seventh stage which is divided into three main stages. First, the needs analysis stage. At this stage the researcher conducted a limited survey of mathematics teachers and the results showed that teachers still lacked a teaching material when they wanted to teach mathematics. So that teachers still need an interactive teaching material to assist in the learning process. After knowing that teachers still need teaching materials, the researchers determine an appropriate product to be developed, teaching materials are developed independently by researchers, namely teaching materials in the form of interactive PowerPoints to optimize teachers in their learning.

Second, the design stage. At this stage, the researcher made an initial plan by determining the teaching materials, namely the Quadrilateral Build, determining the KI, KD and Quadrilateral Indicators. Next, develop the concept of interactive teaching materials. The concept of interactive PowerPoint teaching materials is as follows: the device needed is a laptop or computer, designed using the PowerPoint application and the iSpring Suite add-ins, consisting of 10 main slides, there is a digital book and Quismaker, music is inserted on each slide and the final result is a presentation which is converted into web form (html).

Third, the development stage and the final product. Product development made in the form of PowerPoint which has been converted into web form (html) which consists of 10 main menus, namely 1) Opening Menu, 2) Main Menu, 3) Instructions Menu, 4) Competence Menu, 5) Material Menu, 6) Quiz Menu, 7) Glossary Menu, 8) Bibliography Menu, 9) Profile Menu and 10) Closing Menu.

In the opening menu, it is designed with an attractive appearance and leads the user to open the teaching materials by clicking the START button. Next will be delivered to the main menu, on the main menu there are 7 other menus and here the user is free to choose the menu to be addressed.



Picture 2. The Main Menu Display

Furthermore, the instructions menu, in the instructions menu contains information on the use of the navigation buttons contained in this teaching material. The competency menu is a competency that must be possessed by students when studying Quadrilateral Shapes. Furthermore, the material menu, this menu displays digital books in which there are cover books, book guides, concept maps, materials, sample questions and summaries.

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Cover of the Book, the Mapping Concept



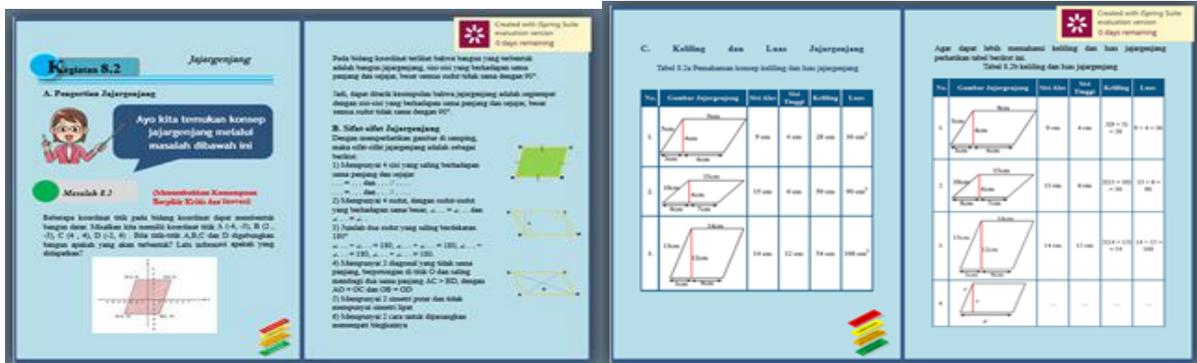
(a)

(b)

Pictures 3 (a) Quadrilateral Chapter Display, 3(b) Mapping for Rectangular Chapter

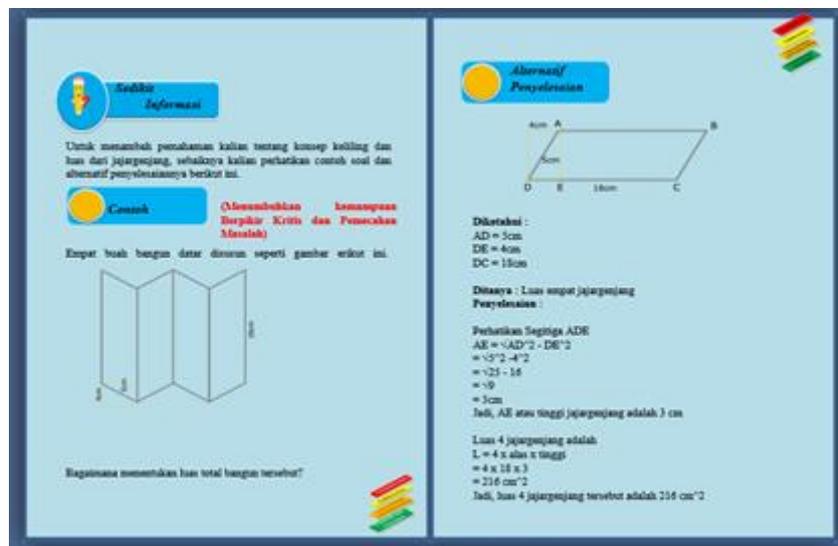
Learning Materials, Exercises, Lets Practice and Summary

The material of rectangular flat shapes includes squares, rectangles, trapezoids, parallelograms, rhombuses and kites. Each chapter displays the definition, properties, circumference and area of a flat shape.

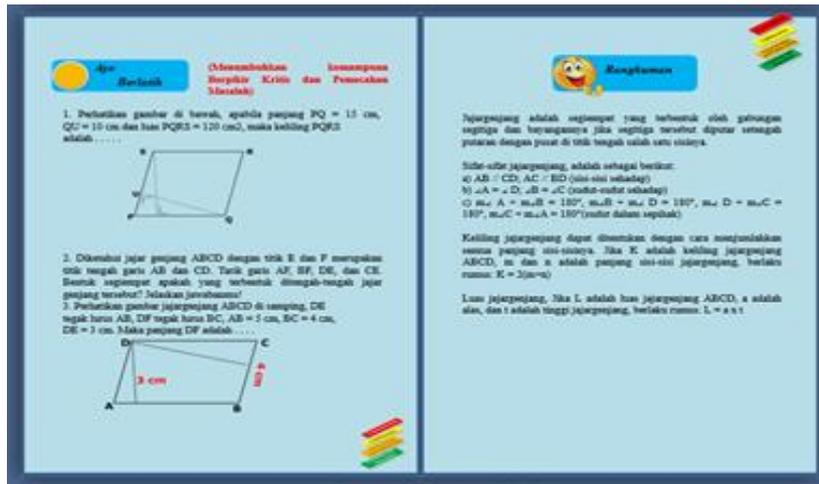


Picture 4. Quadrilateral Building Material

The following are examples of questions that are found at the end of each material and the questions are equipped with solutions. After the sample questions, to conduct an evaluation, the Let's Practice icon is given which contains questions to determine the final ability after studying the material. At the very end, a summary is provided to summarize all the material that has been studied.



Picture 5. Exercises and Answer Keys



Picture 6. Let's Practice and Summary

Next is the quiz menu, this menu is an interactive menu because the user will get feedback when running this menu in the form of appreciation for answering questions and final scoring, equipped with time to answer them.



Picture 7. Quiz Menu

CONCLUSION

The final result of this research and development produces a product in the form of interactive PowerPoint teaching materials which are published in the form of web files (html). The development process goes through seven stages, namely: 1) Needs Analysis, 2)

Researcher Ability, 3) Developed Product, 4) Product Concept, 5) Product Development, 6) Expert Test, and 7) Trial. The feasibility and quality of interactive teaching materials in mathematics learning was obtained from the test of three experts, namely media experts 87.5%, material experts 80.62%, and linguists 82.69%. The assessment of the mathematics teacher as a trial of this teaching material is 85%. Based on the results of the assessment, it is included in the very feasible category. And these teaching materials are expected to be used for mathematics learning activities at school, and it is recommended to make interactive teaching materials on other materials.

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