

THE DEVELOPMENT OF LEARNING MEDIA BASED INTERACTIVE MATH COMIC FOR STUDENTS OF VIII GRADE JUNIOR HIGH SCHOOL

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Abstract

The ability of teachers to take advantage of technological developments in learning is highly expected so that students' attention increases in following the Learning process, one obstacle faced by students is the difficulty of understanding the material of cubes and blocks and their formulas. The purpose of this study is to develop interactive comic learning media that is expected to solve problems faced by students and teachers in learning. This Learning Media will be packaged in the form of an interactive Learning CD. This type of research is development research or *Development Research*. The development research model that the author uses is a computer-aided learning product development model (PBK). Validation is carried out by experts consisting of two lecturers and one teacher to see if this learning media is valid. From the results of the validity test questionnaire analysis conducted by the validator, it can be concluded that the overall validation results for interactive mathematics comic learning media obtained were 87.50 with valid criteria. While the practicality test was carried out by 26 students to see whether this learning media was practical to use or not. From the results of the analysis of student practicality questionnaire sheets, it was obtained that overall student assessment of the learning media used was 89.29% with practical criteria.

Keywords: interactive Learning Media, Comics, cube and cuboid

Abstrak

Kemampuan guru dalam memanfaatkan perkembangan teknologi dalam Pembelajaran sangat diharapkan agar meningkatnya perhatian siswa dalam mengikuti proses Pembelajaran, satu kendala yang dihadapi oleh siswa adalah kesulitan memahami materi kubus dan balok serta rumusnya. Tujuan dari penelitian ini adalah untuk mengembangkan media Pembelajaran komik interaktif yang diharapkan dapat menyelesaikan permasalahan yang dihadapi oleh siswa dan guru dalam Pembelajaran. Media Pembelajaran ini akan dikemas dalam bentuk CD Pembelajaran interaktif. Jenis penelitian ini adalah penelitian pengembangan atau *Development Research*. Model penelitian pengembangan yang penulis pakai yaitu model pengembangan produk pembelajaran berbantuan komputer (PBK). Validasi dilakukan oleh para ahli yang terdiri dari dua orang dosen dan satu orang guru untuk melihat apakah media pembelajaran ini sudah valid. Dari hasil analisis angket uji validitas yang dilakukan oleh validator, maka didapat kesimpulan bahwa secara keseluruhan hasil validasi terhadap media pembelajaran komik matematika interaktif yang didapatkan adalah sebesar 87,50 dengan kriteria valid. Sedangkan uji praktikalitas dilakukan oleh 26 orang siswa untuk melihat apakah media pembelajaran ini praktis digunakan atau tidak. Dari hasil analisis lembar angket praktikalitas siswa, diperoleh bahwa secara keseluruhan penilaian siswa terhadap media pembelajaran yang digunakan adalah sebesar 89,29% dengan kriteria praktis.

Kata kunci: Media Pembelajaran interaktif, comic, kubus dan balok

INTRODUCTION

The development of science and technology increased the rate of improvement in the field of education. and has been used in the learning process. The learning process will certainly not be separated from the role of a guru. Oleh should therefore teachers must develop their potential in order to improve the quality of learning. So many ways that can be teachers to improve the quality of learning, one of them by using advances in science and technology.

In general, teachers in the learning process experienced many constraints that need solutions and reforms in accordance with the teaching provided by the teacher. Based on observations and interviews conducted by the author on 25 February 2015 by Mrs. Sri Utami, S.Pd., as a mathematics teacher in class VIII, and some of the students in junior Adabiah Padang, it is known that in the learning of mathematics is still a lot of attention to the explanation given by the teacher, so the teacher is not optimal in implementing the learning. Moreover, I also see the lack of attention of students in participating mathematics learning, most students are busy chatting with friends, playing smartphone placed on the table, doing things like drawing that has nothing to do with the material, and also bullying other students are common. This is presumably because the learning atmosphere that is still less fun for students. From interviews with several people and students, students are generally more interested in entertainments such as television, internet, playstation, online gaming. Results of an interview with the author of a mathematics teacher, said most students feel bored because many mathematical materials and concepts that are abstract, the formulas are complicated and difficult to understand, so math seems so dull and less attractive for students. One hard lesson delivered by simply explain and difficult to understand some students are in the material cubes and cuboid, sub materials, a) cube and its elements, b) beam and its elements, the problem is that students do not really understand each of the fields and which are the parts of this building.

One of the factors that cause less interesting mathematics learning among students is due to the lack of use of appropriate learning media and learning media varies by teacher. The use of learning media will greatly help the effectiveness of the learning process in schools. In addition to the motivation to learn, learning media can also help students to improve their understanding of the material being taught.

To overcome these problems, the authors plan to design and develop an interactive comic media in mathematics, which is packaged in a CD learning and describing the types of comics, so that by the time the students learn not only to understand the material but also get entertainment from a comic story. Reading comics is one that is designed with images, colors, characters, interesting stories so as to give the feel of entertainment to the reader, especially for students, comics can also be used as a learning medium for the story of the comic can be adapted to the material to be taught.

In the development of instructional media interactive math comic's comic media creation based on the material and teaching materials in class VIII SMP. Make use of the collaboration of several software are Macromedia comics and Manga Maker Comipo flash and flash lainnya. Macromedia supporting software is software that can create animations from the simple to the complex. While Maker Comipomerupakan software pembuat Manga Comics, ranging from the design of a cast of characters, storylines and background.

Miarso in Rusman (2011) states that "media learning is something that is used to distribute messages and can stimulate the mind, feelings, concerns, and willingness sibelajar so as to encourage terjasinya deliberate learning process, aiming and control" (p.170). Gagne and Briggs in Arsyad (2013), "implicitly states that learning media includes tools that are physically used to convey the contents of teaching materials, consisting of books, tape recorders, cassettes, video camera, graphics, movies, photos, TV, and computer "(p. 4).

The research problems are interactive math How does the development of comics as a medium of learning the material cubes and blocks valid for junior high school students? How practicalities of media and comics mathematics interaktif pada material cubes and blocks for class VIII SMP? The research objective is to produce a valid medium of learning and practical for junior high school students of class VIII, namely CD media interactive learning math comic on the material cubes and blocks. It is expected to use interactive math comics, able to increase awareness and understanding of mathematics students in the learning process and also students can learn independently in rumah. Guru also will be greatly assisted in the delivery of the subject matter.

Interactive Learning Media

According Seels and Glasgow in Arsyad (2013), "Media interactive learning is a delivery system of teaching which presents video footage with computer control to the audience (students) who not only hear and see the video and sound, but also provide a response that is active, and the response was that determine the speed and sequencing of the presentation "(p.36).

Interactive learning media is a vehicle that can stimulate students to active learning activities is lacking, because of the opportunity to explore and discover mathematical concepts. However, with the development of science and technology today is increasingly

encourage increased and the utilization of technology in the learning process is interactive teaching materials. One of the teaching materials were very helpful teachers in interactive learning process that is interactive learning media, examples of interactive media ie CD learning interactive learning interaktif. CD own one of the products of multimedia. According Hofsteter in Rusman (2011) "Multimedia is the use of computers to create and combine text, graphics, audio, moving images (video and animation) by combining links and tools that allow users to navigate, interact, create, and communicate" (p . 296-297).

Mathematics Interactive Comics

Sudjana and Rival (2011) argues that "can be defined as a form of comic cartoon that reveals the character and act out a story in sequence tightly and linked to the image and is designed to provide entertainment to the reader" (p. 64). Usually comics printed on sheets of paper and come with dialogue balloons and text conversations between characters, and can be published in various forms, ranging from caricatures, strip to book form .While comic books mathematics is a reading that will tell about the material, concepts and theory in math, and in the story played by each of the characters forming the story, from characters to the background. This interactive math comic elements such as math comic actor in creating interactive educational situation when learning to read and understand. In this study the authors create interactive mathematics learning media comic that will load the comic element is formed by media mathematics computer using Macromedia Flash and Manga Maker Comipo and packed into an interactive learning CD comic mathematics. Accordingly concluded with interactive math comic is a media-created story in cartoon form and tells the mathematical material packaged in a CD interactive learning, so in reading and understanding the comic create interactive educational situation between readers (students) with the comic itself.

Macro Media Flash Maker And Manga Comipo

According to Sutopo (2003) Macromedia Flash is "application software for animation that is used for the Internet, is equipped with some kind of animation, audio, interactive animation, and more" (p.60). According to Ananda (2008) flash has advantages including the following:

- 1) An animation technology most popular websites.
- 2) The small file size with good quality.

- 3) to create a website.
- 4) Can create CD-interactive.
- 5) Can make animated websites and animated cartoons.
- 6) Can make the game (game). (p. 1).

With software macromedia flash, the author made a moving animation design and design background of the comic as well as a packaging form of interactive math comic that will be made in CD interactive learning math comics. Manga Maker Comipo is a program created to make comics that companies use to create a whole wide range of comics for comics work purposes (comipo.com/en/index.html. 2012. chap.1)

Software Maker Comipo Manga created by a company called Comipo LLP, this application was created to make a variety of comics from perusahaan itself. Manga Maker application Comipomerupakan revolusioneryang new piece of software that allows anyone to create high-quality comics and users can easily create their own unique story, and the situation simply by selecting and pose a 3D character.

METHODS

According Soenarto (2006) research for development (development research) is: research to develop and produce educational products in the form of materials, media, tools and / or learning strategies, evaluation tools, and as it is used to overcome the problem of education, increase the effectiveness of PBM in class or laboratory and not to test the theory. "(p. 1). This research resulted in the form of instructional media educational products in the form of CD interactive learning math comics. The products developed are comic interactive math on grade material cubes and blocks SMP. The research model development that researchers use the model of product development of computer assisted learning (PBK), developed by Sutopo (2003). This development model consists of six stages: 1) concept, 2) design, 3) collecting materials, 4) assembly, 5) testing, 6) Distribution.

But in this study, the authors only reached the stage of testing is limited to small-scale trial, because the trial only done in school by taking some students of class VIII SMP. Meanwhile, phase distributions are not made because research and development is only until the stage of product revisions and limited testing to students.

Implementation research uses five stages of the development model, namely: 1) concept, 2) design, 3) collecting materials, 4) assembly, 5) testing.

Implementation steps of research are:

a) Phase Concept

At this stage there are five things to do that

1) Identify the problem

There are a few things to do on the identification of the problem, namely: (a) the unavailability of media that can increase retention of material students but nuanced entertainment and there are interactive elements in it that comic math interactive, (b) the difficulty of students to understand the material cube and cuboid sub material, the cube and the elements -unsurnya, beam and its elements, formulas cubes and blocks, (c) the independence and activeness of student learning is still lacking. therefore the researchers want to develop interactive learning media comics mathematics.

2) Formulate goal

Researchers develop media that can make users learn while to get entertainment, easy to understand and does not make students bored ie interactive math comic, and the destination media users are teachers, students and the public who wish to provide teaching or learning about the material cubes and cuboid.

3) Analysis of learning needs to learn that researchers saw during the observation, that students need tools/media that can make students happy, entertained and there are materials related in it, especially on the material cube and cuboid.

4) Analysis of the characteristics of learners

Researchers looked and found that, if the student is faced with modern things such as the use of computers, LCD, Laptops, smartphones, etc., students are more interested and entertained, so that researchers interpret create media learning using modern tools can be entertaining and at the same time make the students learn the material cubes and cuboid.

5) Plan and prepare learning materials software

Research materials used are; a) determine the material, namely cubes and blocks, sub-topic, the cube and its elements, beam and its elements, the formula cubes and blocks, b) development model, that model development research that the researchers use,

product development model assisted learning computer (PBB), developed by Sutopo (2003). 3) core software, namely: Macromedia Flash and Manga Maker comipo, and some supporting software ie, Adobe Photoshop CS5, etc.

b) Design

1) Design software (Media)

Software media to be created is shaped type Application (.exe) can be used on any computer. Form of the general structure shown in instructional media is such a scheme below.

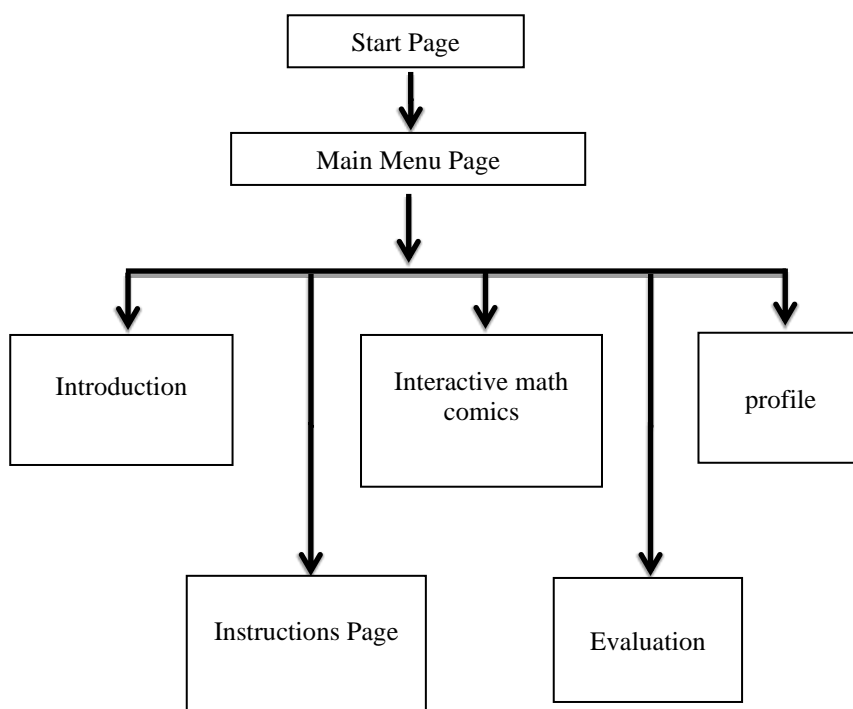


Figure 1. General Structure comic interactive math

2) Develop a storyboard

c) Collecting Material

At this stage of gathering materials and materials to make products such as: Material principal (lesson plans and teaching materials used in junior high school, math books concerning material cubes and blocks), collect, pictures (button image), additional animation, button sound ,

d) Assembly (packaging into learning media)

Step along the way is to use a software core that has been set is macromedia flash and manga maker comipo, the early stages of designing comics, (specify background,

character, background design comics), using an application manga maker comipo and Adobe Photoshop CS5

e) Testing

Experiments conducted to look at the percentage level of validation and practicality of the product created can mecapai goals and objectives. Test trials conducted expertly done by using a questionnaire validity as a validation on media created. Each validator assessing media interactive math comic based questionnaire validation that researchers provide. Once completed with the expert testing meets predetermined criteria, carried out limited testing small scale.

In observation of the researchers, it appears that students are so enthusiastic in participating in the learning process that uses mathematical comic interactive media. During the performance of small-scale field trials, there are several obstacles that writers face among the speakers found on the computer is not alive, so that students can listen to the sounds contained in this interactive math comic. On starting to use interactive math and reading comics there are some students who asked about how to continue reading the media because they still do not understand how to use the interactive comic, is due to the media that they use a new thing for them.

Each student has a different speed in completing interactive learning in mathematics comic and almost no student is simultaneously studying the materials on interactive math comics, this is because every student has different abilities in understanding the material. In working with the answer sheet evaluation also looks there are students who finish work faster. At the end of learning by using these interactive math comics media, students were given a questionnaire to determine the practicalities of the practicality of these media are used by students in learning, particularly in the material cubes and blocks

RESULTS AND DISCUSSION

Based on the validation sheet given to three people validator, the implementation of the validation is performed three times, and it can be concluded that the media interactive learning math comic on the material cubes and beams are generated by third validity value is valid, it is used as a medium of learning in mathematics. In summary the results of the first validation can be shown in Table 1 below.

Table 1. Results of the First Validation Comics Math Interactive Media In Material and Beam Cube For Class VIII students of SMP.

Number	Evaluation Component	Validator			Sum of Score	Validity index	Criteria
		1	2	3			
1	Material						
	Substance	7	7	6	20	41,67	Valid/not valid
2	Comics Lay out						
		8	8	16	32	44,44	Valid/not valid
3	Instructional						
	Design	12	16	21	49	52,04	Valid/not valid
Total Score					101	46,76	Valid/not valid

From the first validation results show that the value of 46.76 by the criterion of validation is lacking / not valid, it can be concluded that the media is not feasible to use, and returned to the researcher for the revised and diperbaiki. Pada second validation, briefly validation results can be displayed in table 2 following.

Table 2. Results of Validation Both Comics Math Interactive Media In Cube Material and Beam For Class VIII students of SMP.

Number	Evaluation Component	Validator			Sum of Score	Validity index	Criteria
		1	2	3			
1	Material	9	9	11	29		
	Substance					60,42	Moderate/ valid enough
2	Comics Lay out	12	12	17	41	56,10	Moderate/ valid enough
3	Instructional	20	17	24	61	63,54	Moderate/ valid enough
	Design						
Total Score					131	60,65	Moderate/ valid enough

From the first validation results showed that the criteria for the validation value is 60,65 dengan enough / pretty valid, it can be concluded that the media is still not fit for use, and returned to the researcher to be revised and improved. In the second validation, briefly validation results can be displayed in Table 3 below.

Table 3. Validation Results Third Media Interactive Math Comics Cube In the Matter and Beams For Class VIII students of SMP.

Number	Evaluation Component	Validator			Sum of Score	Validity index	Criteria
		1	2	3			
1	Material Substance	14	13	13	40	88,90	Valid
2	Comics Lay out	19	21	22	62	86,11	Valid
3	Instructional Design	26	30	31	87	90,63	Very valid
Total Score					189	87,50	Valid

From Table 3 obtained is final validation results obtained validator, validation results in the table above shows the validity of the overall value amounted to 87.50 with a valid criteria. This indicates that the learning media comic interactive math on material cubes and blocks for class VIII SMP, which had developed a valid either of the component substance of the material, display visual communication, and instructional design. In its development, media interactive learning math comics have been revised based on suggestions from the validator.

Analysis Practicalities

Data from the test product by the practicalities of students obtained through a questionnaire and a list of names of students who test the practicalities. Complete data analysis of test results by the practicalities of students briefly shown in Table 4 below.

Table 4. Results of the practicalities Media CD interactive learning Math Comics on material cubes and blocks for Class VIII students of SMP

Number	Aspect	Scores on students' responses	Practicality index	Criteria
1	Ease of use	567	90,86%	Very practical
2	Effectiveness of learning time	170	81,73%	Practical
3	Usefulness and attractiveness.	563	90,23%	Very practical
Total Score		1300	89,29%	Practical

The results of the analysis of the practicalities of student test data in the above table shows the value of the practicalities of Media comic material interaktif pada math cubes and blocks for class VIII SMP as a whole amounted to 89.29% with practical criteria. This shows that media interactive learning math comic that has developed both in terms of the practical aspects of ease of use, the effectiveness of the learning time and the beneficial aspects and appeal.

CONCLUSION

Based on the research results obtained it can be concluded that the result of the development of mathematics berbasis komik interactive learning media on the material cubes and blocks for class VIII SMP, already fit for use as a medium of learning mathematics with a score of 87.50 validation on valid criteria. And comics produced matematika yang also have the ease of use with the value of the practicalities of 89.29% with a practical criterion.

In connection with the development of research by the author, the authors put forward the following suggestions:

1. For math teacher and junior high school students to use interactive math instructional media comic that has dikembangkan sebagai one of learning media, and can also be used as a medium for remedial in cubes and blocks of matter.
2. Media interactive learning math comics are produced require material development as a whole, because the material cube and beam on a new comic is limited to a sub subject of the cube and its elements, beam and its elements, the formula cubes and blocks.
3. It is necessary to do further research to test the effectiveness of interactive media for learning mathematics comics in this study only to the limited testing small scale.

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