THE DEVELOPMENT OF CONTEXTUAL-BASED INTERACTIVE MULTIMEDIA LEARNING MATERIALS IN GEOMETRY FOR ELEMENTARY SCHOOL CLASSES V

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Abstract

Learning to material of geometry ideally supported by models of a plane or two and three dimensional geometry objects, so that the concept can be developed well in students.However, along with the development of computer technology, geometry models can be created in three-dimensional form as a learning medium.The purpose of this study is to develop the contextual-based interactive learning materials in the media plane and two and three dimensional geometry objects for students of class V that are valid, practical and effective.The study was carried out from June 2013 to February 2014. The experiment was conducted following the 4D models comprising the steps of define, design, develop and disseminate.Interactive media learning created using macromedia flash 8 program.The results showed that the interactive medium is valid for construct and content.In these constructs, the interactive media has fulfilled interactive elements, and contextual.In content, it is in conformity with the basic competencies.The media also has a good level of practicality.This is evidenced by its function that is equivalent to teaching materials commonly used, easy to use, according to the time available and can replace the role of the teacher as the main source of information.Learning media has a good level of effectiveness.This is evidenced by the learning activities of students and classical learning achievement of students who have reached 85% above the minimum criteria.This study suggeststhattheinteractivelearning mediaisvalid, practicalandeffective.

INTRODUCTION

This study is about the development of interactive learning media in geometry materials for Elementary School Classes V. This study was conducted because there are still many difficulties faced by teachers and students in learning geometry in the fifth grade of primary school. Ideally, learning geometry should be supported by models of plane and two and three dimensional geometry objects, so the concept can be built quickly on students. However, there are still many handicaps to make, to storage and to bring these models by the teacher. When the model is not available in the learning process, many students are not understand with the concepts, so that the activity and student learning outcomes do not pass the minimum criteria of mastery learning. When students of elementary school do not understand on geometry material, it can have an enormous impact in learning geometry at the next levels, because the geometry materialsl in class V is the first one introduced to students. Based on this problem, it is important to find an alternative media in learning geometry for the fifth grade. The alternative media developed in this study is a contextual-based interactive learning media. The development of this media have a good prospect because ICT has developed rapidly and

most of elementary school students are also already familiar with computer namely for online or offline games. Each developed product should be considered it validity, practicalities and effectiveness first, before it is used in learning process. Therefore, the research question of this study is: how is the validity, practicalities and effectiveness of contextual-based interactive multimedia that is produced?

THEORETICAL FRAMEWORK
Interactive Multimedia
Multimedia is the combination of various media such as text, images, graphics, sound, animation, video, interaction, and others that had been packed into digital files (computerized), is used to convey or deliver a message to the public (Rosch in Munir, 2013 ; Warsita, 2008). There are several advantages of computer-based learning: a) provide opportunities for learners to solve problems individually, b) provide an interesting presentation with animation, c) providing learning content choices are many and varied, d) capable of motivating students to learn, e) capable of activating and stimulating teaching methods well, f) enhance the development of student understanding of the material presented, g) stimulate students to learn with passion, so that the material presented easily understood by learners, h) learners gain experience is concrete and increase learner retention, i) giving direct feedback, j) learners can determine their own pace of learning, k) learners can specify the evaluation (Wena, 2009; Sigit*et al.*, 2008).

There are several aspects of visual communication that must be owned by an interactive learning multimedia are: communicative, creative, simple, using the visual language of a harmonious, intact and matching that user perceptions of being whole, the depiction of objects in the form of a representative image, the selection of appropriate color, the fit between typeface with information that would be submitted, either harsu layout, navigation should be familiar and consistent (Lestari, 2007). Interactive learning multimedia can be used at various levels of education and various fields of study that can make learners study independently, should not be subject to the educator. Learners can start learning at any time and may terminate his satisfaction and repeat function which are useful for material that is not yet understood learners (Sanjaya, 2010).

CONTEXTUAL APPROACH
Suparno in Sulistiyono (2010) and Riyanto (2010) defines learning as a contextual approach which has references concept of teaching and learning that helps teachers in linking subjects (content) with the real situation and motivate the students to connect knowledge and apply that knowledge in everyday life -day. Dewey in Ningrum (2009), said that students will learn best when what is learned related to what is already known and with activities or events that will take place around it.

To be able to implement contextual learning, the teacher in their learning should be linked between the material to be taught to the students real world and encourage students to make connections between the knowledge possessed by its application in their daily lives, involving seven major components CTL. The main components are as follows CTL.

a. Developing the idea that students will learn to be more meaningful if he were given a chance to work, discover, and construct their own knowledge and skills *(constructivism).*
b. Forming a study group that is mutually dependent *(interdependent learning groups)* so that the learning results obtained from a sam work with others.
c. Facilitating the discovery *(inquiry),* namely that students gain knowledge and skills through his own discovery (not the result given the number of facts).
d. Developing properties curious students through questioning *(questioning).*
e. Modeling *(modeling),* meaning there is always a learning model that can be replicated.
f. Reflection *(reflection),* is a way of thinking about what the new learned or backward thinking about anything we've done in previous days.
g. Actual assessment *(authentic assessment),* is the process of collecting a variety of data that can provide a snapshot of student learning progress. (Directorate of Junior high school in Supinah, 2008).

METHOD
This is a development research on learning media using 4D models that consist of define, design, develop and disseminate steps. This study is conducted at State Elementary School 26 Padang using students class V class V as tryout subjects.

Collecting Data
Completion of questionnaire validity by experts and the practicalities of filling questionnaires by teachers and students. Tests to determine student learning outcomes and student learning activity observation.

DATA ANALYSIS
Analysis for Validity
Analysis of validity for each aspect performed using a Likert scale with criteria 4 = very good, 3 = good, 2 = less, 1 = very poor. To determine the average of validators assessment, use the formula:

$$R = \frac{\sum_{i=1}^{i=n} V_i}{n}$$ .... (Muliyardi, 2006)

Average obtained, adjusted for the category adopted fromMuliyardi (2006:82) as follows.

Table 1. Validity categories of Multimedia Learning

Mean	Categories
Mean >3,2	Very valid
3,2 > mean ≥ 2,4	Valid
2,4 > mean ≥ 1,6	Enough
1,6 > mean ≥ 0,8	Less valid
0,8 ≥ mean	Not valid

Analysis for the practicalities
Analysis of the responses of teachers and students
Data on teacher and student responses to learning activities is tabulated.

And then find the percentage using formula:

$$P = \frac{\sum skor\,per\,item}{Skor\,mak} \, x100\%$$

Table 2. Prakticality category of Interactive Multimedia (Riduwan, 2007)

(%)	Category
0 – 20	Not good
21 – 40	Less good
41 – 60	Enough
61 – 80	Good
81 – 100	Very good

The formula for analysis kognitive learning achievement:

$$KB = \frac{T}{Tt} \times 100$$

Student is passed when learning achievement ≥ 75

RESULT AND DISCUSSION

Interactive multimedia that has been designed, validated by experts (expert validators) and teachers (practitioner validator). There are four aspects that is validated by experts, i.e. didactic, content, layout and language aspects; and three aspects are assessed by practitioners validator, i.e. content, layout and language aspects. In addition to providing assessment, the validator also provide suggestions for further product development. The suggestions given by the validator are summarized in Table 4.

Table 4. Validator Recommendations and Follow-Up

No.	Valida-tors	Validator Suggestions	Follow-up
(1)	(2)	(3)	(4)
1.	JS	Didactic aspects with respect to CTL (7 elements) is based on real conditions that contain elements of the whole of the seven elements.	Six of the seven elements of CTL contained in interactive media.Element that is not loaded is authentic assessment.
2.	IR	Under the forward and backward arrows should be completed with the words forward and backward so that students do not doubt which was clicked	Words is written under arrow, such as: start, up and back.
	DR	1. The unsupport animation should reduced.	The line has been adjusted to text.
		2. Adjust the length of the underline to text. .	Voice is more hardened.
		3. Navigation system needs to be enhanced, so thateasy to use	
		4. Audio quality can still be enhanced	
	EPI	enhanced byusing the equalizer	
		.Forward and backward buttons should	

	be completed with words so that students are not confused

After revision, then performed the validation. Validation of multimedia learning is done by four people validator. Average validation results are shown in Table 5.

Table 5. Multimedia Interactive Learning Validation Value

No.	Aspects Rated	Average	Category
1.	Didactic	3.50	Very valid
2.	Material	3.60	Very valid
3.	Language	3.40	Very valid
4.	Layout	3.40	Very valid
	Average	**3.47**	**Very valid**

Based on the results of the validation of interactive multimedia in Table 5, it can be seen that the developed learning media is very valid. This means that multimedia learning has been developed can be used in learning.
Product Trial
1. Practicality of Interactive Learning Multimedia
   The practicality data of interactive multimedia is obtained from teachers and students.

Table 6. Teacher's response to interactive learning Multimedia

No.	Aspects Rated	Average	Category
1.	Ease of use	100%	Very practical
2.	The time required	100%	Very practical
3.	Appeal	66.7%	Practical
4.	Easily interpreted	100%	Very Practical
5.	Have the same equivalence	66.7%	Practical
	The total level of Practicality	**86.68%**	**Very Practical**

Based on Table 6 it can be seen that generally the teacher gives point a very practical to developed interactive learning multimedia.

Table 7. Students' response toInteractive Learning Multimedia

No.	Aspects Rated	Average	Category
1.	Ease of use of instructional media	97.4%	Very practical
2.	The time required in the implementation of	98.1%	Very practical
3.	Fascination Media	97.4%	Very practical
3.	Easily interpreted	74.4%	Practical
4.	Have the equivalence	78.6%	Practical
	The total level of Practicality	**89.18%**	**Very Practical**

Effectiveness of Multimedia Learning
a. Student learning activities

There are five activities was observed during the learning process, they are discuss in groups, ask the teacher, presenting the results of the discussion, doing exercises, actively moving the mouse and keypad on a laptop, and learning seriously and happily.

Table 8. Observations of students Activities

No	Activities	Number of meeting			Mean	Kriteria
		I	II	III		
1.	Discuss in groups				79,3%	Very efective
2.	Ask the teacher				50,3%	Enough
3.	presenting the results of the discussion				51%	Efective
4.	Doing exercises				84,7%	Very efective
5.	Actively moving the mouse and keypad on a laptop				85,3%	Very efective
6.	learning seriously and happily.				88%	Very efective

b. Student learning outcomes

Analysis of the results of the cognitive aspects of learning is done by comparing the values obtained by students with a minimum completeness criteria (KKM) is determined by the school that is ≥ 75% and ≥ classical completeness percentage of 75%.

Table 9. Learning Achievement of Students of SDN 26 TelukBayur

No.	Material	Number of students	Classical completeness (%)
1.	Plane	39	82
2.	Two and three dimensional	39	77
3.	Nets	39	79
	Average	**39**	**79.3**

DISCUSSION

Multimedia is the integration between the various media texts, images, video and animation in a digital medium that has the ability for interactive feedback and information obtained by non-linear (Munir and Zaman, 1999). Multimedia in the

computer context by Hofstetter (2001) is the use of a computer to present and combine text, sound, images, animation and video with tools and connections so that the user can navigate, interact, and work and communicate. Interactive multimedia is multimedia that is equipped with a control device which can be operated by the user, so the user can choose what is desired for the next process (Munir, 2013). In this study has produced a multimedia interactive learning for elementary school fifth grade students on the material geometry. In accordance with the definition of an interactive multimedia, the multimedia interactive learning generated already meet these criteria where multimedia learning made already contains text, images, animation in the digital media (computers). In addition it has also created multimedia interactive capabilities where users can control the speed of the media in accordance with their respective capabilities and the user can also select the menu you want to be seen or studied according to user interests. Interactive forms of multimedia learning made also demonstrated the ability of the media to respond to the answers given by the user who made *the game* or practice.

Interactive Multimedia developed is intended to facilitate students in learning the material geometry class V 6 is the standard of competence to understand the properties and relationships between wake wake. Based on these objectives, then the material is delivered based on the contextual approach. Contextual approach to the geometry of the material have been loaded with the shapes are often found in students' daily lives. Contextual approach is a concept of learning where teachers bring real-world situations into the classroom and encourage students to make connections between the knowledge possessed by its application in their lives as members of families and communities (Nurhadi 2007).

Multimedia interactive learning has been made through the validation, test the practicalities and effectiveness trials. Here are discussed one by one the value obtained at each of these stages.
1. Validity of multimedia interactive learning
Validation of interactive learning multimedia aims to produce valid in terms of construction *(construct validity)* and *content* (content *validity).* Multimedia interactive learning in the didactic aspect of an otherwise very valid by the validator because the products have been developed to accommodate the CTL component. Six of the seven components of CTL is constructivism, inquiry, community learning, questioning, modeling, and reflection has the underlying form of interactive multimedia delivery is made. Validator considered that the six components of the CTL already tereksplisit made in interactive multimedia. Problems with the interactive multimedia *game* delivered in the form of raised student motivation and critical thinking helps them to relate knowledge to real life students. It can be seen from the scores obtained by an average of 3.5 with experts and practitioners very valid category. Validity of the didactic aspect is also achieved due to the translation of the material starting from the easy to the difficult material.

Interactive learning multimedia on the content aspect is also expressed very valid by the validator. It can be seen from the average score obtained 3.6 with very valid category. Validity in the aspect of the content provided by the validator caused competency achievement indicators SK and KD prepared based on SBC curriculum, multimedia materials made in accordance with the indicators of achievement of competence, the material includes facts, concepts, principles and procedures and drawings created to

help memfisualisasikan concept abstract. Bandono (2009) stated that in preparing teaching materials must be adapted to the existing curriculum.

Judging from the language aspect, multimedia interactive learning is also stated very valid by the validator. Average ratings for aspects of language validator is 3.4. Very valid value given by the validator caused multimedia types and sizes have been using the correct letter, the language used is communicative, the language used to motivate students to interactive multimedia for ferreting out, and the information presented is easy to understand as well as the terms used are not ambiguous . Munir (2013) states that in a multimedia text structure is one thing to note that the message be communicative.

Interactive learning multimedia is expressed very valid on layout aspects by validator with an average was 3.4. This is due to the image being used is clear and attractive, and the color and size of the image can be seen clearly. The use of images in the learning process will facilitate the students to understand the subject matter. Image serves as an aid in learning activities in the form of a tool that can provide a visual experience to the students to clarify and simplify the complex and abstract concepts become more simple, concrete and easy to understand. Studying the images mengiring allow students to learn the material becomes meaningful and easy to understand and help your memory to the subject of our study. This is in line with the opinion of Sanjaya (2010: 168) that the use of images in learning it can provide a broader knowledge to students. The images on the interactive multimedia animation is packaged in the form appropriate to the material presented. Munir (2013) states that one aspect of concern in interactive multimedia is animated.

2. Practicality of multimedia interactive learning
The results of the analysis of questionnaire of teachers to the practicality of the developed learning multimedia suggests that interactive learning multimedia is very practical. Category obtained from five aspects of assessment items which consists of 1) ease of use, 2) the time required, 3) attractiveness, 4) easy to interpret, and 5) have the same equivalence. The assessment of the five points, three of which are rated by the teacher points to a category that is very practical aspect of ease of use, time required and easy to interpret, while the two other categories considered practical. Sukardi (2011) states that a product is said to be practical can be seen from the ease of use, the time required in the implementation, product appeal to the interests of students and easily interpreted by the teacher.

a. Students' response to the practicality of multimedia interactive learning
Students' responses to the interactive learning multimedia is very practical. Of the written comments given students most of them expressed enjoy to learn math using interactive multimedia learning. This caused quite easy for them to follow the commands written or delivered orally by the addition of multimedia attractiveness and colorful media presence that makes their *games* are not bored to learn and be challenged to complete a given game. Joseph (2005) suggests one practical terms is easily administered. This means that students can understand and use appropriate interactive learning multimedia instructions.

Of the implementation of learning is clear that the teacher is no longer dominated learning to explain the material in front of the class and the students sat quietly taking notes. Of the implementation of learning, it is clear that the use of multimedia interactive learning, students are very active in learning, show enthusiasm and share with a group of friends in the control of multimedia interactive learning. Students without prompting by the teacher, spontaneously discuss each answer will be given in the game provided or answering an existing practice in any material. More teacher acts as a facilitator, each group came to ask if anyone in trouble, and keep motivating students to focus on the study material. Using a highly interactive multimedia learning support teachers to allocate time. Of learning carried out three times, all went according to the time available. Preliminary activities, core activities and events covering can be done well.

Multimedia interactive learning effectiveness

The effectiveness of multimedia interactive learning with CTL approach in this study viewed from the multimedia capabilities of this learning to enable students to learn and facilitate students' understanding of the subject matter.

a. Student Activities

    The observation of student activity in the SDN 26 TelukBayur during learning using interactive multimedia is very well known in which there are three prominent activities, i.e. actively moving the mouse and keypad on a laptop, working on exercises and learn seriously and happily. Two other activities are also done by students is discussing in groups and a presentation to the class. Prominence of activity moving the mouse and keypad on a laptop, answering practice questions and study seriously and happy due to several things. First learning using interactive multimedia introduced to students so arouse students' interest in learning because students are learning in a relaxed and happy. Students feel have nothing to lose and learn in a relaxed and happy atmosphere so that almost all students would be actively involved in learning. Second, multimedia interactive learning students are learning very interesting because the students how to operate relatively easy. Students are guided by the instructions displayed by voice and navigation buttons are clearly visible, giving rise to the desire of students to try to control it. Serving material displayed in the form of *games* coupled with the appearance of each page is filled with bright colors is also one of the attractions that make students want to learn. Learning to use interactive multimedia has been able to realize the concept of active learning, innovative, creative and fun (PAIKEM). PAIKEM learning is learning that is mandated by the government through the Indonesian government regulation No. 19 of 2005 on national education standards set forth in section IV of the standard process of paragraph 1 of article 19 which states that the process of learning to implement an interactive, inspiring, fun, challenging , motivating the students to actively participate and provide enough space for innovation, creativity, and independence according to their talents, interests, and physical and psychological development of students.

    Activities are categorized fairly during the learning process using interactive multimedia is to ask the teacher. From the observations it appears that the student is not too much to ask the teacher because they already understand and learn how to run a given interactive multimedia. In each group there are students who have been accustomed to using a laptop and they are much give instructions to a friend who is not accustomed to using a laptop or who do not understand how to operate

the multimedia learning studied. Of learning done seen that the discussions in the group work effectively without the need for instruction from the teacher. Students who understands spontaneously teach her who do not understand even motivate a group of friends in fear or shame to move the mouse and keypad. Activities are centered on student makes the teacher has enough time to observe and assess the activities of all students in the classroom and is always ready to assist students who are experiencing difficulties.

Ali and Sukisno in Wati (2011) said that the media in learning to: 1) generate motivation to learn, 2) stimulate learners to learn energetically, 3) enable the learner response, 4) provide fast information to teachers about student activity . Based on the results of Thomas (2005) note that the use of media in the learning process according to the needs, circumstances, conditions and characteristics students can improve students' learning activities. So in the learning process needs to be a medium of learning that the students are motivated to learn.

b.   Student Results

Achievement test is used to determine the effectiveness of the learning process. Based on the learning outcomes data, the percentage of students having studied classical completeness by using interactive multimedia is 79.3%. Percentage of completeness obtained was on the classical completeness set is 75%. This means that multimedia interactive learning made has been able to bring students to an understanding that is desired by the standards of competence and basic competences. Sudjana (2009) stated that the study results show how adaptable learners after receiving their learning experience.

CONCLUSION

Based on the results of research and discussion can be formulated conclusion that interactive learning multimedia developed is very valid, very practical and very effective.

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