Developing English Learning Multimedia for Junior High School Students Based on Constructivism Theory

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Abstract

In this 21st century age, the advancement of computer technology has shifted conventional teaching and learning into computer based learning. Using computer based learning media is considered to be more effective and it enables teacher to increase the students' enthusiasm in joining the learning process. Along with it, constructivism theory has also influenced the development of interactive multimedia. Therefore, This research is conducted to 1) find out how to develop English learning multimedia based on constructivism theory, and 2) answer whether constructivistic-based English learning multimedia is effective to be used in improving students' English achievement on learning descriptive text. This research is conducted in SMP Muhammadiyah Purworejo in the academic year of 2018 / 2019. The population of this research is 186 students of eight grade students. The sample taken in this research is 30 students. The mean score of the pre-test is 62.93 and the mean of post-test is 77.07. The result shows that the obtained t-value is bigger than t-table (3.705 > 2.000). Finally, it can be concluded that the use of constructivistic-based English learning multimedia to teach reading descriptive text for the eighth grade students of SMP Muhammadiyah Purworejo in the academic year of 2018 / 2019 is effective.

Keywords: Multimedia, *Constructivism* Theory

A. INTRODUCTION

In general, Indonesian children spend more than 2000 hours learning English from elementary school to university. However, they still have difficulty to speak English fluently. Therefore, an approach needs to be designed to build confidence and fluency in speaking English naturally. Besides, the approach to learn English is emphasized in fluency, confidence, ability to socialize, creativity and accuracy to develop the important English-language foundations (reading, writing, listening, speaking, grammar and vocabulary) .

Based on the Human Development Index (HDI), Human Development Index (HDI) is a comparative measurement of life expectancy, literacy, education and living standards for all countries throughout the world. As one of the indicators in HDI, it can be said that if the education quality of a country is good, then the quality of the population of a country also will be good. In 2010, Indonesia's HDI rank was 111. This rank is far below to the ranks of other countries in the Southeast Asia region, including: Singapore (ranked 23), Brunei (30), Malaysia (66) Thailand (87) and the Philippines (105).

Based on data from TIMSS and PISA, the rank of education quality in Indonesia also is not very satisfying. Thus, innovation in learning is needed to increase students' level and understanding in learning English. Hence, it can be said that English learning process in Indonesia has a lot of problems. The main problem is the low achievement in learning English. It must be immediately addressed in various ways.

The challenge faced in education today is the advancement of computer technology. Therefore, there are many developments of computerl-based learning media nowadays. Based on various research results, the use of computer technology will attract students' enthusiasm and make the learning process running more effective. The students' enthusiasm also will make students to be able to focus on learning that ultimately it can improve the ability of students to understand and master the concept of the materials.

Learning process is influenced by many factors, internal factors and external factors. Internal factors are factors that comes from students themselves. One of the internal factor is learning style or learning theory. Constructivist theory states that good learning comes from students' initiative. In learning process, the students must construct their own knowledge through meaningful experiences. Allesi & Trollip (2001: 32) explains, the principles which are suggested to achieve learning objectives based on constructivist theory are: (a) emphasizing in learning than teaching, (b) emphasizing in students to think and act, (c) emphasizing in active learning, (d) using discovery or guidance approaches, (e) encouraging students to develop information and projects, (f) using cooperative activities or collaborative learning, (g) using meaningful learning activities, (h) involving students to choose and associating learning goals, strategies and ways of evaluating, (i) encouraging personal autonomy, (j) supporting students reflection on learning, (k) encouraging students to accept and reflect on real world complexity, and (l) using assessment and personal activities that are relevant to students.

Constructivism has given influences on the development of interactive multimedia. Constructivism believes that traditional learning methods such as training and practice (drill & practice) are less able to develop students throughout life. It means that learning method is difficult to apply in the new situations. In development of learning media, constructivism advocates hypermedia methods, simulations, and others that are more useful for students. By these methods, students are free to find information, apply their own learning styles, and use software as a learning resource other than teacher. According to Jonassen (Allesi & Trollip, 2001: 36), constructivismm supports the use of computer based on tools, where students can design and develop their knowledge. The main constructivismm integration with learning media lies on interactivity. Interactivity is manifested in the form of learner control. Based on the explanation about the use of computers in learning process and constructivismm theory above, then it is important to develop a multimedia product based on constructivism theory.

B. LITERATURE REVIEW
1. Theoretical Framework
a. Multimedia

The development of computer-based learning media is one of the implementation of learning models using computer. By utilizing computer, learning will be interactive because students can learn based on their desires and abilities. This is because the development of computer-assisted learning provides various learning menus and starts with the explanation of the use instructions, competency standards, basic competencies, presentation of material, training and evaluation.

The use of computer-based learning media also encourages students to be active and sustainable in the learning process so that students will be the problem inventor and solver. Thus, students will easily accept learning material and eventually learning goals also will be achieved.

Media is a tool for delivering messages from the sender to the recipient. According to Gerlach and Ely (Azhar, 2009: 3) " Broadly, the media is human, materials or events that develop students capability to obtain knowledge, skills and attitudes". Champagne and Brigs (Karto Soeharto, 1992: 98) implicitly stated "learning media includes tools that are physically used to convey the contents of learning materials including: books, tape recorders, cassettes, video cameras, video recorders, films, slides, photos, pictures, graphics, television and computers". Heinich, et al (1996: 8) gives the following understanding of media:

> *A medium (plural, media) is a channel of communication. Derived from the Latin word meaning "between" the term refers to anything that carries information between source and a receiver. Examples include film , television, diagrams, printed materials, computers and instructors.*

Arief S. Sadiman, et al (2003: 6) states that "media are various types of components in the students' surroundings that can stimulate them to learn". From the above definition, it can be concluded that the media is everything that can be used to assist learning process.

Now, media is developed based on the advancement of computer technology. The advancement of computer technology creates combination of sound, images, videos, moving and still images. This combination is called multimedia.

Recently, multimedia become one of the interesting research materials in education because it is one of the latest technologies that has ability to make learning media more complete. Multimedia embraces various media in one software. It will make teachers easier to convey teaching materials and students will feel be involved in the teaching and learning process.

Multimedia is a combination of various media: text, graphics, images and videos. Multimedia is also defined as the use of computers to create and combine text, graphics, audio, images, moves (video and animation), by combining links and tools that allow users to navigate, interact, create and communicate (M. Suyanto, 2005: 21) . These various media are combined into one unit that will produce an information that has high communication value. Many studies prove that by designing a learning process by adding pictures and sounds in a software, it is able to be accepted well by students as evidenced by the high response of students in the teaching and learning process.
Furthermore Neo & Neo (2001) states that the use of computer-based multimedia is not only for independent learning, but also can solve problems in groups. This was stated that:

> *The multimedia project in this course enabled the students to exercise their creative and critical thinking skills in solving their design and development problems, work collaboratively to gain team-based experience, and to face the real-life situation of problem-solving. This is a student-centered learning approach wnich allows them to construct their own knowledge and understanding, and determine their own learning goals. The role of the teacher, on the other hand, change from the "sage on the stage" to a "guide on the side, " assisting the students in the construction of their knowledge.*

Computer-based learning certainly has benefits for the learning process. Yusuf Hadi (2004: 473-474) states that a media is used based on several basic assumptions:

1) Its use not only adds or enriches the learning experience, but also presents learning materials that are as an integral part of the curriculum.

2) Learning materials have to be design in such a way to enable participants to choose and determine their own learning progress when it is necessary.

3) Learning materials can be presented and accepted in all educational institutions (schools and other learning centers).

Based on those several assumptions above, computer-aided learning is developed because it has benefits for the learning process which is carried out in individual learning as well as guided learning. Ismaniati (2001: 26-28) revealed some of the benefits of computer-aided learning. The benefits include:

1) Computers can increase the motivation of the learner.

2) Computers are able to provide information about errors and the amount of study time as well as time for problems solving in the learning.

3) Computer-based learning can be an alternative to overcome weaknesses in the group learning.

4) Computer -based learning can help learners to be skillful to select the parts of the lesson they want to learn.

5) Computer -based learning is useful for learners who often find difficulties whenever they join traditional learning.

6) By computer-based learning, the learners do not feel embarrassed if they make a mistake because the computer-based learning provides dialog that occurs among its own participants.

7) Computer-based learning strongly supports individual learning in which individual learning is recommended in the modern education.

8) Computer-based learning allows the learners to get to know and get used to computers which are now very well-known and used by many people. Computer is a media for delivering effective learning

b. Theory of Constructivist Learning

Theory of Constructivist suggests that learning is about the initiative of learners. In learning, students have to construct their own knowledge through meaningful experiences. Allesi & Trollip (2001: 32) explains that the principles which are suggested to achieve learning objectives according to constructivist theory are: (a) emphasizing learning rather than teaching, (b) emphasizing students to think and act, (c) emphasizing active learning (d) using discovery or guidance approaches, (e) encouraging students to build information and projects, (f) using cooperative activities or collaborative learning, (g) using meaningful learning activities, (h) involving students to choose and associating learning goals, strategies and ways of evaluation, (i) encouraging personal autonomy, (j) supporting students learning reflection, (k) encouraging students to accept and reflect on real-world complexity, and (l) using assessment and personal activities that are relevant to students.

Constructivist theory have an impact to the development of interactive multimedia. Constructivist theory believes that traditional learning methods such as practice and practice (drill & practice) are less able to develop life-long learners. It means that learning methods are difficult to be applied into new situations. In the development of multimedia learning, constructivist theory suggests hypermedia methods, simulations, and others that are more useful for students. By these methods, students are free to find information and apply their own learning styles and use software as a learning resource other than the teacher. According to Jonassen (Allesi & Trollip, 2001: 36), constructivist theory supports the use of computer-based tools in which students can design and build their own knowledge. The main constructivist integration with multimedia learning lies in interactivity. Interactivity is manifested in the form of learners control. Therefore, the development of multimedia should pay attention to the interactivity from the beginning to the end of development, in the strategy and also design of materials which will be presented.

c. **Thinking** Framework

Learning is a system that consists of many components influencing it. The components can be internal or external factors. The existence of a positive component certainly will be able to encourage the achievement of the learning objectives.

A component that contributes to the learning process is the use of learning media. Along with rapid development of technology, computer-based multimedia learning can be arranged. Mutimedia will be capable of combining various effective learning resources, such as: still images, moving pictures, sounds, animations, texts, films, and so on.

The one of internal factors which play an important role is learning, that is students have to construct their own knowledge through meaningful experience. Constructivist theory believes that traditional learning methods such as practice and practice (drill & practice) are less capable of developing life-long learners. It means that learning methods are difficult to be applied into new situations. By combining the use of computer technology with the constructivist learning theory in learning process, it will give a great impact to students. For example, the natural intelligence of students will appear by looking at pictures of nature. By solving certain problems, students' kinesthetic intelligence will also develop. Thus the development of multimedia learning products that is based on contructivist learning theory will be capable of improving students' ability to understand and master the concepts in the learning materials

d. Hyphothesis

The hypothesis of this study are

a. Multimedia based on constructivist learning theory for English learning can be created.

b. The use of multimedia in English learning process which is based on constructivist learning theory can be effective to improve students' learning achievement.

C. RESEARCH METHOD

1. Type of Research

This research includes development research and quantitative research methods. According to Borg and Gall from Center for Policy Research and Educational Innovation, research and development model is "a process used to develop and validate educational products". Sometimes this research is also called 'development-based research' which appears as a strategy and aims to improve the quality of education. Besides for developing and validating educational outcomes, research and development also aims to find new knowledge through 'basic research' or to answer specific questions about practical problems through 'applied research' which is used to improve educational practices. This development research is used to develop learning multimedia based on Multiple Intelligences, while the quantitative research method is to assess learning implementation, student responses, and the outcomes of students learning comprehension towards multimedia which has been developed. Learning tool that will be developed in this research is learning multimedia.

This research uses quasi-experimental study. This study aims to compare the effectiveness of learning process which use multimedia and learning process without using multimedia

2. Research Design

This study uses two research designs -- the research design for learning multimedia development and the research design for assessing the effectiveness of the use of learning multimedia.

1. The Research Desain of Multimedia Development

The research design of field trial in the develop stage will use *one-shout case study*. Based on this design, research will be conducted by implementing a treatment design on the research subject and followed by measurement of its consequences. This research design can be described as follows:

$$X \rightarrow O$$
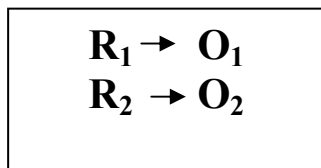
In which:

X   : Treatment

O   : Observation Results

     2.   The Research Design of The Effectiveness of Learning Miltimedia Use

The research design of the effectiveness of learning miltimedia use utilizes *Posttest-Only Control Design* which is described as follows:

$$R_1 \rightarrow O_1$$
$$R_2 \rightarrow O_2$$

In which:

R_1 : Treatment for classes that get multimedia development

O_1 : The result of observation of classes that get multimedia development

R_2 : Treatment for classes that do not get multimedia development

O_2 : The result of observation of the classes that do not get multimedia development

3.5. Technique of Collecting the Data

     To obtain the data, the researcher applied:

   1.   Experts' Validation Data

     The experts' validation data are analyzed descriptively by examining the results of the experts' assessment of learning multimedia. The results of the study are used as an input for revising/refining the learning multimedia that has been developed (instrument 1).

   2.   Test

     Test is conducted to determine the student learning comprehension as well as the effectiveness of multimedia use towards student learning outcomes.

3.6.   Technique of Analyzing the Data

     To analyze the data, the researcher applied *T-Test* formula:

$$t_{obs} = \frac{\left(\overline{X_1} - \overline{X_2}\right)}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}} \sim t(v) \quad ; \; v = \frac{\left(s_1^2/n_1 + s_2^2/n_2\right)^2}{\dfrac{\left(s_1^2/n_1\right)^2}{n_1-1} + \dfrac{\left(s_2^2/n_2\right)^2}{n_2-1}} \quad \text{(Budiyono, 2003: 151)}$$

In which:

$\overline{X_1}$: mean of experimental classes

$\overline{X_2}$: mean of control classes

s_1^2 : variance of experimental classes

s_2^2 : variance of control classes

n_1 : total number of experimental group of students

n_2 : total number of control classes

D. FINDINGS AND DISCUSSION

From the data and computation, the researchers got the finding and it will be discussed below:

Descriptive Analysis	Pre-test		Post-test	
	Experiment	Control	Experiment	Control
High Score (H)	76	76	92	88
Low Score (L)	44	44	60	56
Mean (M)	62.93	61.46	77.07	69.87
Median (Me)	64	62	78	68
Mode (Mo)	60	64	80	68
Range (R)	32	32	32	32
Standard Deviation (SD)	7.272	6.765	8.064	6.946
Variance (SD^2)	52.892	45.775	65.030	48.257

Table 1. The Descriptive Analysis of the Result of Pre-test and Post-test

Based from the data, the students' achievement in pre-test of experimental group of the eighth grade students of SMP Muhammadiyah Purworejo are sufficient result on their reading mastery on descriptive text. From 30 samples, there are 20 students (67%) who are in sufficient category, 7 students (23%) who are good, and there is no studentwho is categorized excellent, and the students' achievement in post-testis good result. From 30 samples, there are 2 students (7%) who are sufficient, 13 students (43%) are good, and 15 students (50%) are categorized excellent.

One-Sample Kolmogorov-Smirnov Test

		Post Experiment	PostControl
N		30	30
Normal Parameters[a]	Mean	77.0667	69.8667
	Std. Deviation	8.06411	6.94676
Most Extreme Differences	Absolute	.158	.173
	Positive	.158	.173
	Negative	-.142	-.145
Kolmogorov-Smirnov Z		.866	.945
Asymp. Sig. (2-tailed)		.442	.333

a. Test distribution is Normal.

Table 2. Normality Test using SPSS Computation

The data can above can be interpreted that if the value of Asymp. Sig. (2-tailed) higher than 0.05 (p> 0.05), the data is normal. Based on the data above,

the result of experiment group is 0.442. Because the value of Asymp.Sig. (2-tailed) (0.442) is higher than 0.05 the data distribution of experimental group is categorized normal. In addition, the result of control group is 0.333. Because the value of Asymp.Sig. (2-tailed) (0.333) is higher than 0.05the data distribution of control group is also norma l categorized.

E. CONCLUSIONS

Based on the research finding and discussion, the rsearcher comes to these following conclusions:

1. The result shows that the post-test mean of the experimental group is 77.07which belongs to good category and the post-test mean of control group is 69.87which also belongs to good category.

2. It shows that using interactive multimedia in teaching reading descriptive text at the eighth grade students of SMP Muhammadiyah Purworejo in the academic year of 2018/2019 is effective. It is proven that the result of the obtained*t-value* is bigger than *t table* (3.705>2.000).

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