

Development of Multimedia Interactive Learning of Hydrosphere Material for High School

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Abstract

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The purpose of this research is the development of learning interactive multimedia at hydrosphere subject matter class X of high School. The development research which aims to produce learning interactive multimedia on subjects geography which is valid, practical and effective against the learning outcomes of students. Research development was using the Alessi and Trollip models. The steps of its developers, namely, planning, design, and development. On the stage of the alpha test do the validation on the validator I, validator II, and validator III. Test phase implemented in the class X IPS B SMA Muhammadiyah 6 Palembang. Data collection techniques using interviews, questionnaires, and tests. This research is valid and deserves to be tested after going through the process of validation of the validator I, validator II, and validator III. Through the beta test results the practicality shows the average value of 92,3 to the category of "very practical". At the stage of field test learning outcomes of students showed an increase which amounted to 56,6 with the average results of the pretest of 24.6, while the posttest results amounted to 81,2 with N-gain of 0.75 then it belongs to the category of high, this shows that the learning interactive multimedia that is developed has a value of valid, practical, effectiveness and worth to use.

Keywords:

Research development, learning interactive multimedia, Hydrosphere, geography.

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INTRODUCTION

Life in this modern Era, demand preparation, today all individual in this country should be able to know about technology, technology is take import part for daily activity, especially millennial generation, technology improvement and communication get special part in order to make easy implemented to design education system. Used technology for education environment, make sure for tentative changing from netizen, an education may not oriented for pass or today only, but must be able to get good prepare for future too for anticipations strategy.

Uno & Ma'ruf (2016) the advantage for information technology will teach the students for received material easily. Based on Siahaan 2012 in giving an information, the advantage of information technology and communication is one of effective and efficient, especially for learning process, because of technology information and communication has high potentially to improve the quality in learning process.

Improving processed in learning, absolutely are different, followed by the concept of study case, an abstract concept in learning will make difficulties in making conceptual how to teach. For example for geography subject, a lot of material need visually concept in order to make easy for them to understood well.

Using media and multimedia in learning process is take important part, to improve the quality of education. For efficiently learning process, an educator / teacher must be innovative in cultivating the way how to learn effectively. One of stimulus for improve creativity from educator decided to learning tools. Used of multimedia in learning process will make the students critical, innovative in searching study case and motivated them to give good response in learning process.

Geography is one of subject , is part of social science dynamic. The purpose of learn geography, generally in implemented the students for critical thinking. The object of geography study included of 5 point , those are : Hydrosphere, biosphere, hydrosphere, lithosphere, and anthroposphere. Generally geography subject has difficulties level to get comprehension, That's why an innovative educator needed. (Prismanata & Ismiati, 2017)

The purpose of geography education has the scope of study that seeks to integrate and associate elements of the human physical environment in the dimension. To measure these goals, the right source of learning for geography learning is related to practical value is the natural environment and social environment. Therefore, an interesting media used is indispensable. Learning media plays are influenced for the learning results. What is the teacher stimulus will be receiving as good response for learners,, motivation, and interest of learners towards a subject. Furthermore, with an interesting media will make students enthusiastic in taking lessons. In addition, in a study conducted on the use of learning media without using learning media, there is a difference between the learning process that uses media and the learning process without using the media.

For high school school grade (Senior High Schools) in the city, they have enough and supported facilities especially at the level of excellent schools already have adequate facilities, such as computers and LCD (*Liquid Crystal Display*)therefore a teacher is required to be able to master and utilize this form of technology. In general, teachers use computer-based media, which is a *powerpoint application*, but the application has not been able to maximal result. This is evidenced by the results of an interview with one of the high school geography teachers in grade X. Although the results have shown average grades in accordance with the KKM, but there are still students who experience remedial or repeat. This indicates the ability of learners to absorb different learning materials. Some of the students have different brain in capturing the material provided using a variety of media, but there are also some low to moderate average abilities. We can concluded that all student has their own has different competency skills. Students who have low to moderate average ability are those who need to get behavior or assistance in the learning process, so that they can follow study process without left behind from smart learners.

The function of this media in learning process is very important in achieving learning goals. Goal of the media is to produce engagement between teachers and learners are better and efficient. The function of the media here is to clarify, facilitate and make interesting learning messages that will be conveyed from teachers to learners so as to increase the motivation and efficiency of the learning process.

The 2013 curriculum was developed through one of the improvements in mindset, passive learning patterns into active learning, and passive learning patterns into critical learning (Permendikbud No.68 of 2013). In addition, rational curriculum development 2013 for future competencies needed by the next generation of one of the ability to think critically, so that in connect with these expectations critical thinking skills need to be trained and taught to learners. Curriculum 2013 explains that a teacher is only a facilitator, in the learning process the teacher guides the learners to do learning activities so that

learning information can run in two direction. Because of development of technology and information teachers are no longer the only learning *resource*. However, the reality that occurs in the field of teaching and learning process that occurs is still centered on the teacher and the interaction only lasts one way, so the learner becomes less active. Learners listen only to teacher and to be passive and rarely do they take notes, with out give good response.

The *use of Adobe Flash* in learning can help teachers, in explaining learning materials, is expected to make it easier for learners to remember the materials taught, answer practice questions as a strengthening of material understanding and provide new experiences to keep learners motivated, the selection of interesting in the presentation of the material is expected to make learners more to remember the materials tell.

The results from interviews with teachers at high school showed that teachers have known and are familiar with the name of technology, especially in operation of computers, but most teachers there have not been able to manage and utilize the technology to learning process so that the learning process is only done by means of teacher and using textbooks, this is less effective, there are some materials that must be displayed or taught by using an interactive media or multimedia. Therefore, teachers there need interactive learning media in the learning process in order to make learning process effectively and efficiently. Furthermore, based on the results of interviews with teachers of geography subjects in particular showed that geography learning has been done by way of teacher and only shows the images in the textbook as a learning medium. They admitted that they had difficulty obtaining effective learning media for geography lessons in schools so that learning activities were less effective and students found it difficult to understand the materials presented. The results of a study conducted by researchers from a questionnaire circulated to 32 students in class X IPS B showed that 100% of students wanted to learn using a media that could explain how to work in detail that has animated images, and presented using various learning resources so that they can be used as a means of learning individually, especially in geography subjects.

Based on the results of the questionnaire, it can be showed that the average learner states that they need interactive learning media that they can use during learning process, especially geography learning. Therefore, improvements are needed in the learning process, so that learners are more motivated and more active in learning geography subjects, in order to make easily understand them and improve learning measure.. One of the efforts that can be done is by using interactive learning media. With the existence of interactive learning media is expected to help teachers in delivering learning materials so that the learning process can be more interesting and effective learners to be easier in understanding the concepts of geography learning, and is expected to also improve learning activeness so as to have an impact on the increasing learning measurement of learners.

The results of previous research showed that there are improvements to the learning motivation of learners after using multimedia in learning so that the learning measurement of learners can be improved. Interactive Multimedia *Cognitive Mind Mapping Approach in Learning Geography* (2013). This research shows that students who use interactive multimedia mind mapping software will find it easier to learn and visualize the concept of geography It has been shown by the highest percentage of "Satisfaction" which is 43%. that students who use interactive multimedia mind mapping software will be more motivated to learn geography.

The results of the study from (Nihei et al, 2017) "*Effectiveness of Using Teacher-Made Interactive Multimedia Materials in Teaching Geography To Tourism Students*". This research determines the effectiveness of using teachers made interactive multimedia materials (IMM) in teaching Geography. I use experimental methods. Percentages, Averages, and t-tests for dependent and independent groups are used in the analysis of

results. The majority of students in the experimental group felt that the lesson was easier to understand when the teacher used IMM in the classroom because he could facilitate the lesson well. It also giving involved participation in discussions and interactions among learners. They obtained excellent final academic grades (VS) and scored higher in formative assessments compared to those in the controlled group. The performance of the two groups differed significantly as students in the experimental group developed positive attitudes and interests in Geography. Research results from (Rachmadtullah et al, 2018)" Development of *computer-based interactive multimedia: study on learning in elementary education*. The results of this study found that computer-based interactive multimedia applications are valid and suitable for use in teaching and learning activities in elementary schools.

Based on the background explanation above, we concluded that teacher currently known for using media, so that in this thesis determines the title of development multimedia learning interactive matter hydrosphere for high school.

Functionally the learning has been defined as a behavioral change result from an experience. According to (Abante et al, 2014) learning is a process of gaining understanding that leads to the modification of attitudes and behaviors through the acquisition of knowledge, skills through study and experience.

According to (Barron et al, 2015) learning is the process of conveying information to the recipient of information. Furthermore according to (Çelik & Altunaydin, 2018) learning is a process of change so that the occurrence of increased behavior obtained from a new information. In the system approach, learning is a unity of learning components that cannot be separated from each other, because each other supports each other, and those components can support the quality of learning.

Media is a mean of sending messages or information to be conveyed by the source of the message to the target or recipient of the message. Miarso (2015) explained that learning media is something that is used in the learning process that aims to stimulate the thoughts, feelings, attention, and willingness of learners so that the learning process. Learning media is also a tool used by teachers to deliver lesson materials to students. Learning media can be graphic media, audio media, silent projection media, and game media (Nugroho et al, 2013).

Vaugan (2011) explained that: "*Multimedia is any combination of text, art, sound, animation, and video delivered to you by computer or other electronic or digitally manipulated means*". Multimedia is a merger in which there are, text, art, sound, animation and video managed and transferred to the computer or manipulated by digital means. While menurut Yaumi (2013) multimedia is a gathering of text, photos, animations, sounds, and graphics combined into one unity and presented in conveying information.

METHODS

This research was included in the *procedure development* research because the results of the study were product-oriented learning. The development model used by researcher is a multimedia development and design model developed by Allesi and Trollip (2001). The use of this development model because the model is devoted to developing multimedia in learning.

The purpose of this research is to create multimedia learning interactive hydrosphere material validated in geography subject, efficiently, interactive in improving the way how to learn during learning process. Improving model Alensi and Thollip related to : Planning, design, development.

Submitted data by using some method, example observation, documentation,

interview which already done during introducing, validated and cited from expert. Questionnaire, including of post test during learning and in the end of research. The instrument used to fill measurement aspect of assessment already modified by researcher.

Analysis of interview data is done descriptively aims to obtain a description of the comments of geography subjects teachers conducted in introduced to learners, teachers, and peers as well as the beta test stage, the aim of which is to collect problem data in the learning process,. At this stage the data obtained in the form of comments and suggestions on the practicality of learners in using interactive multimedia and conducted also in the *beta test* to get a direct assessment on the geography learning of hydrosphere material.

RESULTS & DISCUSSIONS

Results

This step is an overview of the results and discussion of research that has been done using interactive multimedia learning of hydrosphere material. This research is expected to produce valid multimedia, practical and have effectiveness to the learning outcomes of learners using adobe flash cs6 program.

The research planning is the initial activity before doing multimedia development of interactive learning. The stages carried out are analysis of the needs of learners, analysis of the characteristics of learners, curriculum analysis, analysis of learning media and analysis of infrastructure.

Next in the design phase, the researcher created the concepts to develop interactive multimedia learning, create GBPM, create flowchart design views, create storyboard display designs, organize and collect media content materials, and determine the software to be used in multimedia development.

Instructions for using interactive multimedia consist of navigation buttons to be used in interactive multimedia operations. prepare supporting material such as making instructions how to use, practice questions, and evaluation questions. Supporting materials in the design of interactive multimedia hydrosphere materials from various sources, such as package books, student worksheets and the internet. The resulting product is the development of interactive multimedia learning of hydrosphere material in geography subjects using adobe flash application, made consisting of 6 those are instruction, KD/indicator, material, exercise, evaluation, profile.

Alpha Test

The alpha test conducted by the researcher it has the purpose to request assessment and recommend from validators called as validator I, validator II, and validator III to validate the product to be developed. This alpha test was conducted with a focus on three aspects, related to media aspects, design aspects and material aspects. Alpha test results in the form of qualitative data from validator assessment results, in addition to suggestions and inputs from validators for prototype improvement so that it can be known the validity of three aspects of learning developed. Based on the validation results of the three validators, it can be concluded that interactive learning multimedia products of hydrosphere materials are declared acceptable and worthy to be tested according to the recommendations of the validators.

Beta Test

The beta test involved 3 grade X students who have different competency skills, namely students who have low, medium, and high competency skills. Then the learners were asked to comment on the products developed, the assessment of student practicality questionnaires was assessed quantitatively. The results of the student practicality questionnaire can be seen in table 4 below.

Table 4. Results of practicality questionnaire on beta test

No	Name	L/P	Presentase	Category
1	MDF	P	92	Very practical
2	SPP	L	96	Very practical
3	RF	L	89	Very practical

Product Trial

The researcher conducted product trials to assess the effectiveness of developed media. The implementation of the research was carried out by assessing aspects of knowledge through pre-test, post-test, as well as making tests and assessment of observation results during learning.

In pre-tests, students are given 10 multiple choice questions. The student pre-test results data can be seen in table 6 below.

Table 6. Pre-Test Results

Score	Participants	Presentase	Category
90-100	-	-	Very high
80-89	-	-	High
70-79	-	-	Medium
60-69	-	-	Low
<59	32	-	Very low
Jumlah	32	100%	
Rata nilai		24,6%	Very Low

The next *post-test* is given after the learner has followed the learning using interactive learning multimedia hydrosphere material, *the implementation of post-test* using the same question as the question at the time of *pre-test*. Results of *pretest* learners can be seen in table 7 below:

Table 7. Recapitulation of post-Test results

Score	participants	Presentase	Category
90– 100	8	25%	Very high
80 – 89	20	62,5%	High
70 – 79	4	11,5%	Medium
60 – 69	-	-	Low
<59	-	-	Very low
Total	32	100 %	
Score		81.2%	High

Based on the table above shows improved learning outcomes after using interactive learning multimedia, post-test results with an average of 81.2 or in high categories.

The effectiveness assessment is measured using N-gain so that the following value is obtained.

$$N_{\text{gain}} = \frac{81,2 - 24,6}{100 - 24,6} = \frac{56,6}{75,4} = 0,75$$

From the calculation above, Ngain obtained 0.75, if the N-gain ≥ 0.7 then it enters a high category. Thus, it is advanced that interactive multimedia learning of hydrosphere material is very effective in improving the learning outcomes of learners.

The increasing score between pre-test and post-test experienced by learners varies according to the interaction of the learner with the multimedia provided. But overall, the influence of multimedia developed can help learners in understanding the concept of materials provided through this multimedia. With the data above shows that this media is considered very effective in improving the competence of learners. A visual comparison between pre-test and post-test results can be seen in figure 5 below.

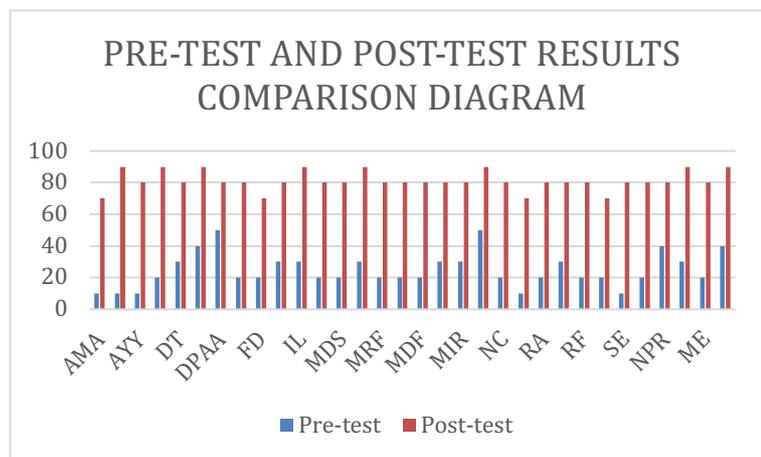


Figure 5. Comparison of pre-test and post-test results of learners in interactive learning multimedia.

Discussion

This research is a development research, that produces interactive multimedia learning of hydrosphere material in geography subjects, with the development of interactive learning multimedia, is expected to support learners in the process of learning activities and be able to provide new atmosphere knowledge for learners, who have has different competency skillsin following the learning process, especially geography learning that must be displayed some materials using video, images, and animation. This research aims to produce learning products that have valid, practical and effective value, so as to improve competence for educators. This development research uses Alessi and Trollip models, with planning, design, and development stages.

Based on alpha test results with validator, this multimedia has been tested validly and worthy of trial, so that this interactive multimedia has qualified in terms of material aspects, media, and design aspects. Multimedia interactive learning is categorized as practical, by seeing the results of multimedia research developed has found what the learners needed, because the material presented is easy to understand by learners.

The effectiveness of this multimedia product was developed and then carried out product trials in the field. Product trials were conducted on 32 learners accompanied by pre-test and post-test materials, during the learning process using multimedia interactive learning of hydrosphere materials of geography subjects, there was an increase in the enthusiasm of learners in following the learning, where students looked more active and focused in geography learning. This is because developed multimedia displays a variety of information, text, videos, and various animations, so learners are motivated to know more about the material studied, especially the hydrosphere material in which animation and images are required in the presentation of the matter.

Based on data from pre-tests and post-tests showed an increase of 57.62 and an N-gain with a score of 0.77. Hanke (1998) explained that includes high criteria if the N-gain ≥ 0.7 . After the researchers conducted pre-tests and post-tests, a score of 0.77 was found in a high category. Thus, interactive multimedia that has been developed by researchers can be concluded that it is effective in improving the learning outcomes of these learners.

Interactive multimedia learning of hydrosphere materials has advantages and disadvantages. The advantages of interactive multimedia learning of this hydrosphere material is, containing materials that have been designed in accordance with the learning steps, materials consisting of text, images, audio, video, and animation, as well as unreliable exercises, the material contained in interactive multimedia is clearer and shorter making it easier for learners to understand the material taught, equipped with various features of systematic navigation system, so that learners can repeat material they do not understand, designed for self-study.

Beside to having strength, interactive learning of multimedia hydrosphere material has shortcomings in terms of content, display, and technical use, some of weaknesses of this interactive learning multimedia is, the inability of supporting devices such as electricity (when the electricity is out) will make this interactive learning multimedia can not be used optimally, this interactive multimedia can not evaluate online and can only be done offline.

The multimedia interactive learning weaknesses can be used as a reference for other researchers to be improved. Further research related to the development of multimedia interactive learning of hydrosphere material should be based online so that learning can take place anytime and anywhere.

CONCLUSION

Based on the results of research validity with data experiment, the development of multimedia interactive learning of hydrosphere material in geography subjects, it can be concluded:

1. Interactive learning multimedia from this hydrosphere material has been tested for validity after being tested by validator I, validator II and validator III, so it is known that this interactive learning multimedia has been feasible for use in geography learning.
2. Multimedia interactive learning of hydrosphere meter has been tested practically. This is based on the results of beta tests conducted on 3 learners through filling out questionnaires obtained very practical assessment on each individual assessor.
3. Interactive learning multimedia of this hydrosphere material has effectiveness towards improving the competence of learners as seen from the learning results between pre-test and post-test scores. In pre-test the value is dominated in a very less category whereas in post-test the value is dominated in a good category, it is

considered to have been very effective which is drawn on ngain values that fall into the high category.

SUGGESTION

Based on the conclusion of research on the development of multimedia interactive learning of hydrosphere material in geography subjects, there are several suggestions given as follows:

1. for learners, it is recommended to use this interactive multimedia learning as a means to support learning activities, especially in geography subjects so as to improve the learning outcomes of learners.
2. for geography educators, so that this learning media is used as an alternative media in the learning process in order to improve the quality of learning.
3. for schools, it is hoped that this interactive multimedia learning can be an inspiration and input in order to improve the quality of learning
4. for other researcher, it is expected that this interactive learning multimedia can be used as a reference in conducting interactive multimedia development research and can be used as a reference in developing interactive multimedia on other basic competencies, better, and perfectly.

CONFLICT OF INTEREST

Based on this i stated that there is no related between the author and the management of The Journal of Educational Technology of Jakarat State University. This this statement was made.

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