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RESEARCH ARTICLE

EFFECTIVENESS OF ANDROID-BASED SCIENCE LEARNING MEDIA FOR CRITICAL THINKING ABILITY OF JUNIOR HIGH SCHOOL STUDENTS

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Abstract

IPA learning media based on android is a tool to provide learning information about natural phenomena in the form of events and causes of environmental consequences contained in the android operating system. Android-based science learning media designed in the form of an application. This research development research with 4D model with stages of definition, design, development, and dissemination. Covid-19 pandemic period is difficult to do effective learning. This study aims to analyze the effectiveness of android-based and conventional learning media in measuring students' critical thinking ability on environmental pollution materials. This research is a development research conducted in MTs Negeri 8 Banyuwangi. Based on the results of the research that has been implemented, the use of android-based science learning media in experimental classes and decimation classes is quite effective for students' critical thinking skills. Whereas in control classes that use conventional means are not effective for students' critical thinking skills.

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Introduction:-

Based on UNESCO's annual world education monitoring report, out of 120 countries, Indonesia's Education Develop Index (EDI) is ranked 64th. The survey results were also released by the PERC (Political and Economic Risk Consultancy). The PERC states that indonesia's education system ranks worst in the Asian region, compared to Malaysia, China, Taiwan, India. For that we need a new breakthrough in education in Indonesia (Huda, 2020).

Environmental pollution is one of the materials in seventh grade science lessons. Based on the syllabus of science subjects and the results of discussions with the Principal of the MTs Negeri 8 Banyuwangi on October 26, 2020, information was obtained about science learning about environmental pollution material contained in the syllabus. The teacher mentions the syllabus uses a variety of learning methods, that is: lecture, discussion, and presentation methods. The method selection is based on the difficulty level of the material being discussed.

The teacher said that he had difficulty delivering material on environmental pollution because of the limited time available for implementing the learning process, and the country's situation was less conducive because of Covid-19. Teachers must be able to utilize technology to create an effective, fun, and challenging learning environment for students (Lattemann, 2011). Rosengrant, Van and Etika (2009) states that exposing students to real learning in their daily lives, whether in terms of material exposure and problems or questions, will help students to improve their representation skills.

Students during learning find it difficult to wait for directions from the teacher first. In general, learning takes place conventionally with teachers as learning centers (TCL). As for exploring critical thinking ability must go towards student centered learning (SCL). Critical thinking is the ability to evaluate and organize arguments in the form of interpretation, analysis, evaluation, and inference (Aghajani and Gholamrezapour, 2019).

The lack of complete learning tools also causes difficulties for students and teachers in carrying out the teaching and learning process. Based on the analysis of critical thinking needs is very important. Kharbach (2012) the thinking skills most needed in the 21st century are critical thinking. Critical thinking skills are part of high-level thinking skills that reflect 21st century learning skills (Haerazi, 2020). By Facione (2013) critical thinking indicators, namely: a) Interpretation; b) analysis; c) evaluation; d) inference; e) explanation; and f) self-regulation.

The use of android-based learning media needs to be done to overcome the condition of Indonesian Education that has not reached the best conditions from other countries (Mukidin, 2012). According to Hwang, et al., (2013) approaches based on mobile learning have better performance and less cognitive load compared to those who learn to use traditional approaches. Mobile learning is classified as mobile learning. Mobile learning (m-learning) is the learning and practice of using mobile devices, such as smartphones, mobile phones, tablets, PDAs, MP3s and pocket PCs in learning and teaching (Oyelere et al., 2016).

Indonesian students should get used to using android technology properly. Learning facilities through android have many advantages including supporting communication and improving interaction between learning (Brown, 2005). If it is not utilized to develop education, it will have an impact on the level of education in Indonesia. In general, educational media has the use to overcome communication barriers, limited classrooms, passive student attitudes, and so on. Mobile learning systems should include greater access to the content and information needed on time, reduce cognitive load during learning tasks and increased interaction with users and other systems (Lee, 2011).

Android-based learning media is very appropriate to attract students in learning, because nowadays smartphones are widely owned for a communication. In addition, android-based learning media can make it easier for students who no longer read thick books, because the android application can be accessed with just one device that can be carried anywhere and can be viewed at any time. The rapid development of communication and information technology not only changes lifestyle but also the learning process in schools (Abugohar et al., 2019). To know the effectiveness of android-based learning media in exploring students' critical thinking ability, research is needed. The purpose raised by the researchers is to compare the effectiveness of the use of android-based learning media with conventional effectiveness to students' critical thinking abilities.

Research Methods:-

This type of research is research and development. This research is classified as development because it develops android learning media. The media developed is an application that can make grade VII students think critically. Research on the development of android-based learning media using a 4D development model consisting of define, design, develop and disseminate (Thiagarajan and Semmel, 1974). The focus of this research is to compare the effectiveness analysis of the use of android-based learning media with conventional effectiveness to students' critical thinking ability. Effectiveness is indicated by the acquisition of N-Gain percent. This research was conducted using 2 groups of students in MTs Negeri 8 Banyuwangi and 1 group of students in MTs Darul Amien school year 2020/2021. This group is divided into experimental class group, kontrol class and decimation class. The experimental class group consisted of 34 students, the kontrol class group consisted of 34 students and the decimation class consisted of 20 students. Experimental classes and decimation classes are treated using android-based learning media. The kontrol class gets conventional treatment. Effectiveness analysis of two critical thinking ability treatments analyzed using uji N Gain.

Research and Discussion Results:-

This research is a research development that aims to get APK products that can be installed on android phones that are effective against students' critical thinking ability. Critical thinking is interpretation ability, analytical ability, kampuan evaluation, inference ability. The use of this APK is expected to make students think critically, which will have an impact on their results.

Before testing the effectiveness, this learning media had previously gone through a test of validity and practicality. This validation was carried out by 2 validators from lecturers Magister Education Science Universitas Jember. The effectiveness test was conducted to students of grade VII MTs Negeri 8 Banyuwangi Indonesia and MTs Darul Amien academic year 2020/2021. Effectiveness test is done from pre-test and post-test. Pre-test is done before treatment using android-based or conventional learning media. Post-test is done after treatment using android-based or conventional learning media. Problem pre-test and post-test integrated critical thinking indicators.

As for the great effectiveness in the experimental class through the analysis of the N Gain test.

Table 1:- Results of N Gain test analysis of experimental class.

Group	Types of Problems	Average value	N gain Score	N Gain Percent
Experiment Class	Pre-Test	13,79	0,70	69,77
	Post-Test	18,18		

Based on the analysis of Table 1 shows N Gain percent of 69,77 then quite effective.

Table 2:- N Gain test analysis results of control class.

Group	Types of Problems	Average value	N gain Score	N Gain Percent
Control Class	Pre-Test	14,03	0,26	26,06
	Post-Test	15,71		

Based on the analysis of Table 2 shows N Gain percent of 26,06 then ineffective.

Table 3:- Analysis results of N Gain decimation class test.

Group	Types of Problems	Average value	N gain Score	N Gain Percent
Decimation Class	Pre-Test	14,05	0,71	70,79
	Post-Test	18,30		

Based on the analysis of Table 3 shows N Gain percent of 70,79 then quite effective.

Discussion:-

From Table 1 obtained N Gain percent of 69,77, so it can be concluded that the treatment using android-based science learning media in the experimental class is quite effective for students' critical thinking ability. Table 2 obtained N Gain percent by 26,06, so it can be concluded that treatment using conventional means is not effective for critical thinking ability. Table 3 shows N Gain percent at 70,79, so that it can be concluded that the treatment using android-based science learning media in the experimental class is quite effective for students' critical thinking ability.

Conclusion:-

Based on the results of research and discussion, it can be concluded that the use of android-based learning media environmental pollution material is quite effective for the critical thinking skills of junior high school students. Based on the results of the study, researchers suggest researching this development on a wider scale so that android-based learning media is more developed and proven effectiveness.

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