The Effect of Acid Bases Learning Media Using Android-Based Chemical Triangle Applications on Learning Outcomes of Class XI High School Students 3 in Padang City

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Abstract - This study aims to determine the effect of acid base learning media using an Android application based on Chemistry Triangle towards learning outcomes. This research was conducted in January at High School 3 in Padang. The type of research used is a quasi-experimental with research design Non-equivalent Pretest-Posttest Controls Design. The population of this study was all students of class XI of the Public High School of Padang in academic year 2018/2019. The sampling technique in this study was a cluster sampling technique. The research sample was 71 students. The analysis technique used is the t-test . The results hypothesis testing using the t-test is obtained at 0.01 the research obtained shows the learning outcomes of students in the experimental class higher after the conducted study using learning media Android. Thus it can be concluded that there is effect Acid base learning media using an Android application based on Chemistry Triangle towards student learning outcomes.

Keywords – Android Learning Media, Chemistry Triangle, Learning Outcomes, Acid Base.

I. INTRODUCTION

Chemistry is the study of the properties of matter and the accompanying changes (Chang, 2011). Chemistry is the science of knowledge covering facts, concepts, and principles (Zainul, R & Sepriadi, P, 2012). The chemistry basically covers three types of chemical representation is: macro, micro and symbolic sub (Sunyono, et al., 2015). Chemistry learning most of the topics of the discussion are abstract, so it needs to be understood at the submicroscopic level (Sunyono, 2012). In Chemistry Triangle there are three levels of representation, namely level macroscopic, submicroscopic and symbolic (Chittleborough, 2014).

Chemistry is a subject that is considered abstract and difficult for most students , one of the chemical learning subjects that is considered abstract and difficult for students to understand is acid base (Fitriyah, & Sukarmin, 2013).

This is in accordance with the results of the initial analysis of researchers through interviews with several chemistry subject teachers and students found several problems experienced by students in learning. First, most students consider acid-base material difficult. Second, the use of instructional materials that have not presented three chemical phenomena in a comprehensive way so that chemical teaching especially in acid-base material is only taught at the macroscopic and symbolic level. Third, students have difficulty in solving calculation questions on acid-base material.

In learning to improve students' understanding of acid-base material is to use Chemistry Triangle, which can help students better understand abstract material. One way to help students understand abstract chemical concepts is to use learning media, one of which is learning media that

utilizes the Android application system contained in Smartphone (Sudjana & Rivai, 2011).

Learning media can clarify presentation and information so that it can facilitate and improve learning processes and outcomes (Arsyad, 2011). Therefore, the use of learning media can create a pleasant learning atmosphere, trigger students' creativity and activity and will have a positive impact on learning outcomes. Besides this Android -based smartphone learning media can make students learn independently, so students can learn anywhere (Zainul, R & Jannah, AR, 2017). In addition, the presence of teaching materials in the form of learning media can also help students improve their creativity and learning outcomes (Zainul, R & Lusi, F, D, 2018).

II. LITERATURE REVIEW

Media is derived from the Latin medium. The medium is defined as an intermediary or introduction to communication from the sender to the recipient (Daryanto, 2010). Learning media are all tools and materials that can be used for educational purposes, such as radio, television, books, magazines and so on. Definition of media specifically can be interpreted as a means or means of communication that is used as an intermediary or an introduction to messages that contain information from the source to the recipient of the message (Sanjaya, 2010).

One learning that utilizes technology is learning media using an Android application. Android is a software used on mobile devices including operating systems, middleware and core applications (Sugeng, 2013).

In studying chemistry modeling is used in several levels of representation, namely; macroscopic, submicroscopic, and symbolic (Jansoon, 2009). Chemistry Triangle is a learning orientation used in the world of chemical education. Chemistry Triangle is an essential character of chemistry that includes three levels of representation, namely macroscopic, submicroscopic and symbolic levels .

III. METHODOLOGY

This research is a quantitative research carried out in January 2019 at Padang State High School 3. Implementation is carried out 4 *meetings.* Sample research is a class XI student of MIPA 5 which amounted to 35 people and students of class XI MIPA 6, amounting to 36 people in acid-base material. The instrument in this study is interview guidelines and learning outcomes test questions .

IV. RESULTS AND DISCUSSION

a. Results

The initial test data of the experimental class students and the control class of SMA 3 obtained were described according to the average, standard deviation, variance, maximum value and minimum value. The description of the data from the initial test (pre test) can be seen in Table 1 below.

Based on Table 1, it can be seen that the scores of students in the experimental class tend to be lower than the scores of the control class students, as well as the average of the two classes. The standard deviation in the experimental class is lower than in the control class, this shows that the understanding of the control class students about the Acid Base material is more diverse than the experimental class. Data on the final test results of students in the experimental class and control class obtained is described according to the average, standard deviation, variance, maximum value and minimum value.

Table 1. Description Data of *Pre Test* Student Learning Outcomes Experiment Class and Control Class

No	Statistics	Experiment Class	Control Class
		Pre Test	*Pre Test*
1	Average	41,01	41,26
2	SD	7,30	7,39
3	Variance	50,08	55,30
4	Minimum	23,31	26,64
5	Maximum	53,28	53,28

Description of the end of test data (*post-test*) can be seen in Table 2. Based on Table 2 shows that the scores of students in the experimental class tends to be higher than the value of control class, as well as the average of these two classes. Standard deviation in the experimental class is higher than in the control class, this shows that students' understanding of the experimental class about Acid-Base material is more diverse than the control class. The

maximum value of the experimental class and control class is the same but different in frequency, while the minimum value in the experimental class is higher than the control class.

Prerequisite test analysis conducted ji u normality is obtained that the grade sample normal distribution, where significant value > 0.05. Then the homogeneity test was obtained that the sample class was homogeneous distribution,

where the significant value > 0.05. Furthermore, the t-test was carried out to see the effect of using acid base learning media using the Chemistry Triangle based Android application on learning outcomes. The following hypothesis test result data for student learning outcomes can be seen in Table 3.

Tabel 2. Description Data of *Post Test* Student Learning Outcomes Experiments and Classes Control

No	Statistik	Experiment Class	Control Class
		Post Test	*Post Test*
1	Average	90,39	85,38
2	SD	8,82	8,65
3	Variance	77,72	74,87
4	Minimum	66,60	59,94
5	Maximum	96,57	96,57

Tabel 3. Hypothesis Test Results for Sample Classes

	Test Value =71					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Learning Outcomes	2.534	69	.014	5.271	1.121	9.421

If the significance value > 0.05 then H_0 is accepted and if the significant value <0.05 then H_0 is rejected. Decision reject H_0 means no effect of acid base learning media using the Chemistry Triangle based Android application on learning outcomes. The decision accepted H_0 means acid base learning media using the Chemistry Triangle based Android application on learning outcomes. Obtained in the hypothesis that the significance < 0.05, which means that H_0 rejected, thus it can be concluded that there is the effect of acid base learning media using the Chemistry Triangle based Android application on learning outcomes.

b. Diskusi

The results of hypothesis testing indicate that student learning outcomes at high-level schools in the experimental class that study Chemistry Triangle oriented Acid Base learning media are higher than the learning outcomes of students in the control class who study without Chemistry Triangle oriented Basa Acid learning media . Based on the hypothesis testing it can be concluded that the acid base

learning media using the Chemistry Triangle based Android application at high level schools can provide a better effect than learning without basic Acid-based learning media oriented Chemistry Triangle .

If a student has a level of academic ability different then given the same teaching, then the results obtained also differ according to the level of academic ability it has (Nasution, 2008). Students at high level schools usually tend to have high academic abilities, so they are easier to understand and accept lessons. With the help of learning such as Chemistry Triangle based Acid Basa learning media can help and facilitate students in understanding learning material.

In addition, students with high academic abilities can have a positive influence on other students in understanding the material. Where by dividing students into small groups helps students understand the role of individuals so students can understand the material (Zainul, R & Cheva, VK, 2019). This can be seen when students ber discussion. Students who have high academic abilities can help other friends in solving

the problems found in the media in each group. Group discussions conducted by students to answer the questions in the media increase the activity of students in the learning process. Students who do not or do not know can ask students who know better so the existence of a discussion process can help improve students' understanding of solving the problems contained in the media. This theory is in line with Asma (2012) which states that the tutorial process between students in groups can improve their academic abilities because they provide tutor services to other friends so that it requires more in-depth thinking about the relationship of ideas contained in the material. In addition, these students can also receive lessons better like remembering and understanding.

In learning media there are also images that can add to the attractiveness of the media so that it can reduce students' boredom in the learning process (Zainul, R & Setiadi, T, 2019). As well as in the media there is also a video that uses reciprocal relationships between three levels of chemical representation that show understanding of chemical concepts as a whole, so that it can help students learn chemistry more meaningfully (Zainul, R & Guci, SR F, 2012) . With this learning media can increase student enthusiasm in learning and make students more focused in the learning process (Zainul, R & Rahman, E. F , 2018). In addition, with the presence of teaching materials in the form of learning media Android.

V. CONCLUSION

Based on the results dipero leh, it is known that the use of instructional media oriented Bases Acids *Chemistry Triangle* in SMAN 3 in ng effect in improving student learning outcomes. Therefore, *Chemistry Triangle* -oriented Acid Base learning media can be used as an alternative learning media that is appropriate for Acid-based material.

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