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The Effect of Media-Assisted Discovery Learning Model on Student Learning Outcomes at SMA Negeri 13 Medan on Buffer Solution Material.

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Abstract: The Effect of Media-Assisted Discovery Learning Model on Student Learning Outcomes at SMA Negeri 13 Medan on Buffer Solution Material. This study aims to determine the effect of media-assisted Discovery Learning learning model on students' chemistry learning outcomes and to determine the chemistry learning outcomes of students taught using learning video media higher than the chemistry learning outcomes of students taught using powerpoint media. This study used two experimental classes in experimental class I was given treatment using the Discovery Learning learning model based on learning video media, and for experimental class II using the same learning model but using powerpoint media. From the results of the study, the average value obtained after being given a pretest in experimental class I was 44.94, and the average value of experimental class II was 45.36. After being given treatment then given a posttest, the average value of student learning outcomes in experimental class I was 88.1 and the average value of experimental class II was 84.5. Both experimental classes experienced a high increase in learning outcomes after being given treatment, and obtained data on the increase in learning outcomes in experimental class I was higher than experimental class II. It can be concluded that the media-assisted Discovery Learning learning model can improve student chemistry learning outcomes, especially on buffer solution material, and the effect of the Discovery Learning learning model using learning video media is higher than using powertpoint media.

Keywords: Discovery Learning, Video and Powerpoint media, Learning Outcomes, Buffer Solutions.

Abstrak: Pengaruh Model Pembelajaran Discovery Learning Berbantuan Media Terhadap Hasil Belajar Siswa Di SMA Negeri 13 Medan Pada Materi Larutan Penyangga. *Penelitian ini bertujuan untuk mengetahui pengaruh model pembelajaran Discovery Learning berbantuan media terhadap hasil belajar kimia siswa dan untuk mengetahui hasil belajar kimia siswa yang dibelajarkan dengan menggunakan media video pembelajaran lebih tinggi dibandingkan hasil belajar kimia siswa yang dibelajarkan dengan menggunakan media powerpoint. Penelitian ini menggunakan dua kelas eksperimen pada kelas eksperimen I diberikan perlakuan menggunakan model pembelajaran Discovery Learning berbasis media video pembelajaran, dan untuk kelas eksperimen II menggunakan model pembelajaran yang sama tetapi menggunakan media powerpoint. Dari hasil penelitian diperoleh nilai rata-rata setelah diberikan pretest pada kelas eksperimen I sebesar 44,94, dan nilai rata-rata kelas eksperimen II sebesar 45,36. Setelah diberikan perlakuan kemudian di berikan posttest, diperoleh nilai rata-rata hasil belajar siswa pada kelas eksperimen I sebesar 88,1 dan nilai rata-rata kelas eksperimen II sebesar 84,5. Kedua kelas eksperimen mengalami peningkatan hasil belajar yang tinggi setelah diberikan perlakuan, dan diperoleh data peningkatan hasil belajar pada kelas eksperimen I lebih tinggi dibandingkan*

kelas eksperimen II. Dapat disimpulkan model pembelajaran Discovery Learning berbantuan media dapat meningkatkan hasil belajar kimia siswa khususnya pada materi larutan penyangga, dan pengaruh model pembelajaran Discovery Learning menggunakan media video pembelajaran lebih tinggi dibandingkan menggunakan media powertpoint.

Kata kunci: *Discovery Learning, Video and Powerpoint media, Learning Outcomes, Buffer Solutions*

▪ INTRODUCTION

One of the main problems of forml education is the low ability of students to understand lessons. This is because learning conditons are still conventionl or the teacher still dominates and does not provide access for student to develop indepndently through their thinking process. Education empasizes unproductive thinking, memorizaton, and finding only one correct answer, and as a result student creativity can be hampered. High thinking processes including creative thinking are rarely trained, so learning like this can lead to rigidity in the student's thinking process and less broad in reviewing a problem so that learning outcomes become low. Teachers are an important factor in improving student creativity and learning outcomes. Many things can be done by teachers to stimulate and improve students' thinking, attitudes and creative behavior, namely by carrying out activities inside or outside the classroom. (Purnamawati, 2010).

The achievement of learning outcomes by students is supported by several factors, namely internal factors which include students and external factors which include family aspects, learning methods, facilities, and learning tools that are being used in the learning process, besides that what supports the improvement of learnin outcoms is the learnin model used (Yakina et al., 2017).

Learning models and learning media must be utilized by a teacher properly in order to create a pleasant learnin atmospher for students, fun learnin is learning that has interactin betwen teacher and student without pressure, because learnin model and learning media are tools that can be used by an educator in the learning process to eliminate student boredom while following the learning process (Balim, 2009).

One of the learning model that can be used to improve students' learning outcomes is the discovery learning model. The discovery learning model teaches students with the idea of finding, critical thinking, questioning, and problem-solving skills, so that student will also be active in building their own knowledge and increasing student learnin success (Balim, 2009). The discovery learning model is a series of learnin activities that maximaLl involve all student' abilities to search and investigate systematical, criticaly, logicaly, analyticaly so that they can formulat their own discoveries (Nugrahaeni, 2017).

According to Diantini (2015), the discory learning model can improve students' learning abilities effectively and can improve students' attitudes compared to using conventional and psychomotor learning. Similarly, according to Nurjanah (2020) learning by using discovery learning-based LKPD can improve students' collaboration skills and can also improve students' mastery of concepts in the material of the reaction rate equation.

The use of media in learning has a good impact on student abilities. Where learning media can help students more easily understand learning material, and increase student interest in learning. Some media that can be used by teachers to improve student learning outcomes are powerpoint media and learning video media. Powerpoin media is a software application used to convey material in the form of writing, drawing shapes,

photos, various colors and types of writing. Power point is an application commonly used by teachers and students to present information in front of the class which is able to create various types of presentations such as slides, handouts, or even screen computer projections that are easy to use and provide advanced features for making presentations (Lestari, R., 2021).

Video medic is a very effectiv media to help the learnin proces. Video medic is easy to understan the content, because it has guidelines and explanations that are delivered directly with visuals and sound. Student interest is the motivations of student to know the description of the practice that will be carried out, so that students' understanding of the material presented becomes faster and maximized (Bhaskara, et al., 2014). Video media also allow student to learn on their own, by watching learning videos repeatedly outside of school hour. Learning method and media have a big role in the learning process (Nurhayati, et al., 2018).

Based on observatins made at SMA Negeri 13 Medan, the teaching and learning process, especially in chemistry subjects, is still teacher-centered or the teacher is more active than all students. This happens because teachers until now still use the lecture method and rarely use learning media during the teaching and learnig proces in class. Learning with this lecture method often causes boredom for all students, because they are not required to be active in solving the problems being discussed. this greatly impacts the learning outcomes of the students themselves. Evidenced by the results of preliminary observations that have been made with one of the chemistry teacher at SMA Negeri 13 Medan, based on the results of the students' midterm test scores, the average score of students in chemistry subjects, especially on buffer solution material is still low, not meeting the Minimum Completenes Criteria (KKM) value of 75. This is what often causes student learning outcomes to be low.

In this study, researchers will use two different media, in different classes, and researchers will see a comparison where the learning outcomes are higher. Based on the above backgrond, researches are intersted in conductig a study entitled The Effec of Media-Assisted Discovery Learning Model on Student Learning Outcomes at SMA Negeri 13 Medan on Buffer Solution Material.

▪ METHOD

Population and Sample

The populatin in this study were all studens of class XI majoring in science, at SMA Negeri 13 Medan T.A 2023/2024 consisting of 8 classes where each class consisted of approximately 36 students. In sampling in this study was carrid out using Purposive Sampling technique on studens of clas XI MIA 3 and clas XI MIA 4 who had the same initial ability on buffer solution material. Where clas XI MIA 3 as an experiment clas I, which will be given learning using the Discovery Learnig learning model assisted by learning video media, and class XI MIA 4 as an experimental class II, which will be give learning using the Discovery Learning learning model assisted by powerpoint media.

Research Design

The reserch design on this study is a study that uses Two Group Pretest - Posttest. Where each experimental class will be given different treatments. To determine the success rate of the treatment that has been carried out, this study uses a test on students, which consists of two stages, namely an initial test in the form of a pretest before giving

material and a final test in the form of a posttest after giving material. Thus the reserch designe carried out is as on the table below.

Table 1. Research Design

Class	Pretest	Treatment	Posttest
Experiment I	T_1	X	T_2
Experiment II	T_1	Y	T_2

With provisions:

X : By using the discovery learning model assisted by video media
Y: By using the discovery learning model assisted by powerpoint
T_1 : Pretest
T_2 : Posttest

Data Analysis and Hypothesis Testing

Normality Test

The normalcy test is employed to test whether the statistics is commonly allotted to be used in in parametric information. Chi squared price (X^2) obtained is compared with the table chi squared price at $\alpha = 0,05$ with db = 5 If the calculated chi aquared (X^2) < the table chi squared price, then the data are called normall dispersed.

Homogeneity Test

Homogeneit goal is to confirm that the data in the analysis set come from populatins that do not differ much in diversity. The homogeneity formula is as follows.

$$F_{count} = \frac{S_1^2}{S_2^2} = \frac{\text{Largest Variance}}{\text{Smallest Variance}}$$

Hypothesis Test

The hipothesis is testid with the righ side t test if the alternative (Ha) is greater or above (>). The hyphotesis used is a significant level t test with $\alpha = 0,05$ and db = $(n_1 + n_2)-2$ and probability $(1-{}^1/_2\alpha)$ with the criteria if $t_{count} > t_{table}$ then Ha gets approved while Ho is refused, the formula used to calculating the hyphotesis is as follows.

$$t = \frac{(\bar{x}1-\bar{x}2)}{\sqrt{\frac{S_1^2}{n1}+\frac{S_2^2}{n2}}}$$

▪ RESULT AND DISCUSSION

Normality Test

Education Outcomes

The information normality check was accomplished by way of the chi square tes at a significan level $\alpha = 0,05$ with the standards if $X^2_{count} < X^2_{table}$ then the data is said to be normal distribution, the records obtained may be visible on Table 2.

Table 2. Normality of Education Outcomes

Class	Data	X^2_{count}	X^2_{table}	A	Description
Experiment I	Pretest	4,85	11,0705	0,05	Normal
	Posttest	6,31	11,0705	0,05	Normal
Experiment II	Pretest	3,61	11,0705	0,05	Normal
	Posttest	4,32	11,0705	0,05	Normal

From the data on Table 2 above, it could be conclud that the X^2_{count} inside the pretes and posttes facts for the examination class and the standard class is smaller than X^2_{table} so the data is refered to as typically normally distributed.

Homogeneity Test

Homogeneity analysis was carried out with criterion that if $F_{count} < F_{table}$ with a significant level of $\alpha = 0,05$, then the data is called homogeneus. Data on the homogeneity of student's education outcomes and interests are presented on Tables 3.

Table 3. Homogeneity Test of Learning Outcomes

Class	Data	F_{count}	F_{table}	Description
Examination	Pretest	1,06	1,75	Homogeneous
Standard				
Examination	Posttest	1.65		Homogeneous
Standard				

From the data in Table 4 above, homogeneity test of student education outcomes obtained $F_{count} < F_{table}$ then Ho is accepted or the data is normally because there is no difference within the variance of the data in the examination and standard class.

Hypothesis Test

Hypothesis Test I

The data analysis concluded that the posttest data gathering from the two classes are normaly alloted and homogeneous. The hypothesis will be tested using the righ handed t statistical test with the criteria $t_{count} > t_{table}$ so that Ho is rejected but Ha is accepted. Table 4 presented the finding of the first hipothesis tes.

Table 4. Hypothesis Test Results I

Data	T_{hitung}	T_{tabel}	Description
Pretest-Posttest	33,51	2,03	Ha is accepted, H0 rejected

From the data in table above, it can be conclude that t_{count} for learning outcomes is 33,51 > t_{table} (2,03) so that Ha is acepted and H0 rejectid.

Hypothesis Test II

The student's interest data was tested the righ handed t statistical test with the criteria $t_{count} > t_{table}$ for Ha is accepted and Ho is rejected. Table 5 convey the findings of the second hypothesis test.

Table 5. Hypothesis Test Results II

Data	T_{hitung}	T_{tabel}	Description
Pretest-Posttest	21,63	2,03	Ha is accepted, H0 rejected

From the information above, it can be conclud that t_{count} for interest in learnig is 21,63 > t_{table} (1,697) so that Ha is acepted and Ho is rejected.

Hypothesis Test III

For the third hipothesis test, it was testid using an independen sample t-tes. To determine whether the chemistry learning outcomes of students taught using learning video media are higher than the chemistry learning outcomes of students taught using powerpoint media. Table 6 Shows the result of hypothesis III test.

Table 6. Hypothesis Test Result III

Data	T_{hitung}	T_{tabel}	Description
Posttest Class Experiment I and II	2,78	1,99	Ha is accepted, H0 rejected

Based on the results of the data above, where the $t_{count} > t_{table}$ value, then for testing the third hypothesis is accepted, or Ha is accepted and H0 is rejected. It can be seen that the t_{count} value is greater than the ttable value. Where the tcount value is 2.78 while the t_{table} value is 1.99. If the value of $t_{count} \leq t_{table}$ then Ha is rejected or H0 is accepted. So it can be conclud that the chemistry learning outcomes of studens taught using learning video media in experimental class I are higher than the chemistry learning outcomes of students in experimental class II taught using powerpoint media.

Discussion

Based on the data obtained and data analysis that has been carred out, it is found that the average value of the pretest for experimental class I is 44.94 and the average pretest for experiment class II is 45.36. Then after being given a posttest with the same question as the pretest, the average posttest value for experiment class I was 88.1 and for the average posttest value for experimental class II was 84.5. With the acquisition of the above data, it can be interpreted that the experiment class I and experiment clas II experienced an increase in value from before treatment to after treatment. So from these results it shows that there is an influenc from the application of the Discovery Learning learning model with the help of learning video media and powerpoint.

Then the data from the pretest and posttest results were tested for normality as a prerequisite for conducting hipothesis testing. For the normality test, the Chi-Quadrat value for the experimental class I pretest was 4.85, for the experimental class I posttest Chi-Quadrat value of 6.31, for the experimental class II pretest Chi-Quadrat value of 3.61, for the experimental class II posttest Chi-Quadrat value of 4.32, and for the Chi-Quadrat Table value with a significant level of 0.05 which is 11.07, with this pretest and posttest data said to be normally distributed.

Furthermore, the data was tested for homogeneity with the aim of knowing that the pretes and posttes data were homogeneous or not. After the homogenety tes was carrid out, the Fcount value for the pretest was obtained at 1.06, for the Fcount value for the

posttest was obtained at 1.65, and for the Ftable value of 1.75. With this for pretest and posttest data for both sample groups is homogeneous.

The test results on the third hypothesis after testing the independen sample t tes, obtained a tcount value of 2.78, and for the price of the ttable value with a significant level of 0.05, db = 70, a value of 1.99 was obtained. From these results it can be interpreted that the tcount is greater than the ttable value (2.78> 1.99), with this Ha accepted or H0 rejected, it can be concluded that the learnig outcoms of students taught with the Discovery learnig model assisted by learning video media are higher than the learnig outcomes of student taught with the Discovery Learning learning model assisted by powerpoint media.

This is in line with reserch conducted by Mubarok (2014), that the learning outcomes of student who use the Discovery Learning learning model are higher than the learning outcomes of students who use the direct learning model, with an average value of 80.176 in the Discovery Learning learning model and 76.083 in the direct learning model. In addition to the use of learning models, based on reserch conductid by Hadiyanti & Widya (2018), the existence of powerpoint media can improve student learning outcomes and facilitate the learnig proces. Helping students learn by organizing lessons, emphasizing key points, keeping attention, including bullet points and illustrations helps students acquire and understand lessons.

Overall, the two media used when conducting research can have a positive effect on student learnig outcomes, where there is a significant increase in learning outcomes. Based on the research results and data that have been obtained and explained above, it can be concludid that the Discovery Learning learning model with the hep of learning video media and powerpoint can be an alternative learning that can be use in the learnig process at school, in order to obtain better student learning outcomes and create an effective and enjoyable learning atmosphere.

▪ CONCLUSION

Based on the result of reserch and data acquisition that has ben done, it can be concludid that: (1) There is an increse in student learnig outcomes after being given treatment using the Discovery Learning learning model assisted by learning video media in experimental class I. (2) There is an increase in student learnig outcoms after being given treatment using the Discovery Learning learning model assisted by powerpoint media in experimental class II. (3) The learning outcomes of students who were given treatment using the Discovery Learning learning model with learning video media were higher than the learnig outcoms of students who were taught using the Discovery Learning learning model with powerpoint media.

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