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# The Effect of Instruction Model Using Media and Motivation on Chemical Learning Results (Study of The Effect of Instruction Models Using Media and Motivation in Learning)

Gulmah Sugiharti\*, Wildya Ricky Ananda

Department of Chemistry Education, Faculty of Mathematics and Natural Science,  
Universitas Negeri Medan, Medan, Indonesia

\*sugihartigulmah@gmail.com

**Abstract.** This study aims to determine the effect of instruction models using animation and motivation on student chemical learning results and the interaction between instruction models and motivation. The study was conducted on all students of class XI IPA SMA Negeri 10 Medan in 3 classes and samples were taken randomly. This research is an experimental research with 2x2 factorial anava design. The factors tested were PBL model factors with Macromedia Flash, PBL models with Power Point media, while motivational factors with high and low criteria. Based on the hypothesis test at a significant level  $\alpha = 0.05$ , it was obtained that  $F_{\text{count}} (A)$  was 5.530,  $F_{\text{count}} (B)$  was 29.584, and  $F_{\text{count}} (AB)$  was 4.556, while the price of  $F_{\text{table}} (0.05) (1.56) = 4.01$  then  $F_{\text{count}} > F_{\text{table}}$  which means there is influence and interaction of learning models using animation media and motivation on student learning results. The results of this study indicate that students who are taught with the PBL model using Macromedia Flash media on highly motivated students show the highest average of 85,667, and the average of low motivated students is 80.000. Furthermore, students who were taught with the PBL model using Power Point media on highly motivated students showed an average of 85.294, and an average of students with low motivation was 72.308. Thus it was concluded that in chemical learning the topic of buffer solutions is better to use PBL models with Macromedia Flash media.

## 1. Introduction

The current main problem in formal education (schools) is the low absorption of students, which can be seen from the average learning outcomes of students who still do not meet the minimum completeness criteria (KKM). This is because the learning conditions are conventional and do not monitor the dimensions of the learners themselves. Trianto<sup>[1]</sup> states that the learning process still provides teacher dominance and does not provide access for students to develop independently through discoveries in their thinking processes.

Furthermore, Milfayetty<sup>[2]</sup> revealed that the variations in teaching models used by teachers in the field of chemistry were still not too many and tended to be informative or only transfer knowledge from teachers to students so that students were not actively involved in the learning process. Meanwhile, Sari<sup>[3]</sup> adds that so far the learning model still dominates the learning process in schools. Students just sit and listen to what the teacher says and student



learning cannot fulfill the learning process. Likewise, the material that occurred in SMA Negeri 10 Medan, there were still some teachers in delivering chemistry subject still using the lecture method, and from the minimum learning completeness (KKM) data for class XI in this SMA it was only 75.

The concept of Buffer solution is one of the essential materials which most of the concepts are abstract. The abstractness of the concepts on this subject has the potential to cause misconceptions Marsita <sup>[4]</sup>. Learning a concept is not enough just by memorizing it, but it is also necessary to understand it, so a learned concept is not easily lost. For this reason, learning media can be used, including animation media in the form of Macromedia flash and power point media. The Microsoft Power Point Presentation (PPT) Teaching Method is a newer one Gadicherla & Ramesh <sup>[5]</sup>.

Not only the use of models and media that affect learning outcomes, another factor that also affects learning outcomes is motivation that comes from within students. Sardiman <sup>[6]</sup> wrote that "a student who has high enough intelligence, may fail due to lack of motivation and learning outcomes will be optimal if there is the right motivation in students". So the goal here is to see the effect of learning models using media and motivation on learning outcomes in the buffer solution material, as well as the interaction between learning models using animation and motivation media.

## 2. Research Methodology

This research is an experimental study involving two parallel classes, at SMA Negeri 10 Medan, in class XI MIA for the 2019/2020 school year.

### 2.1 Data Collection

This study involving 2 classes that has different treatment as showed in Table 1 below

**Table 1.** Factorial Research Design 2 x 2

Motivation ( B )	Learning Model ( A )	
	PBL Media Model <i>Macromedia Flash</i> (A <sub>1</sub> )	PBL Model <i>Power Point</i> <i>Media</i> (A <sub>2</sub> )
High	A <sub>1</sub> B <sub>1</sub>	A <sub>2</sub> B <sub>1</sub>
Low	A <sub>1</sub> B <sub>2</sub>	A <sub>2</sub> B <sub>2</sub>

The research instrument used in this study was a test instrument in the form of pre-test and post-test questions in the form of multiple choices, while the non-test instrument was a motivation questionnaire. The test used is a cognitive test to measure student learning outcomes which is arranged in the form of an objective test on the buffer solution material.

### 2.2 Data Analysis

Data analysis was carried out by calculating the mean on learning outcomes and classifying students' learning motivation scores using the high, medium and low categories Arikunto <sup>[7]</sup>. The data obtained were analyzed for normality, homogeneity and hypothesis then analyzed by

2-way ANOVA test at the significant level  $\alpha = 0.05$ . This test was performed using the SPSS 16 program.

### 3. Result and Discussion

#### 3.1 Result

The data on the results of the learning outcomes and motivation tests showed that students who were taught with the PBL model using Macromedia Flash media for highly motivated students showed the highest average, namely 85.667, and the average for students with low motivation was 80.000. Furthermore, students who were taught with the PBL model using Power Point media in highly motivated students showed an average of 85.294, and the mean of students with low motivation was 72.308. Details of the average value of learning outcomes obtained by students for each treatment are shown in Table 2.

**Table 2.** Average Student Result Outcomes which Combined Treatment Between Media and Motivation

Animation Media	Study Motivation	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Macro	High	85.667	1.707	82.247	89.086
	Low	80.000	1.707	76.580	83.420
Ppt	High	85.294	1.603	82.082	88.506
	Low	72.308	1.834	68.635	75.981

Hypothesis testing in this study uses the Two Way ANAVA test with the testing criteria used is  $F_{count} > F_{table}$  at the significance level  $\alpha = 0.05$ , the proposed hypothesis is accepted. Based on the results of data processing, the results obtained  $F_{cal} (AB) > F (0.05) (1.56)$  where  $(4.556 > 4.01)$  and  $sig < 0.05$ , namely  $0.037 < 0.05$ , then  $H_0$  is rejected, which means there is the interaction between learning models using animation media and motivation on student learning outcomes on the subject of buffer solutions.

#### 3.2 Discussion

**3.2.1 Influence of PBL Model Using Macromedia Flash.** The use of the Problem Based Learning model using Macromedia Flash has an influence on student learning outcomes on the subject of buffer solutions. This is indicated by the value of the media significance, which is 0.022, which means less than 0.05, then  $H_{a1}$  is accepted. This effect shows that the class that is taught using the PBL model using Macromedia Flash media has an average value of learning outcomes higher than the PBL learning model using Power Point media, namely with an average value of  $82.83 > 79.67$ . This is in accordance with research conducted by Abanikannda<sup>[8]</sup> which states that the PBL model uses animation media effectively in terms of achieving Chemistry learning.

**3.2.2 Influence of PBL Model Using Power Point Media.** The use of the Problem Based Learning model with Power Point media also has an influence on learning outcomes with a media significance value that is 0.02 less than 0.05, meaning that the use of Power Point

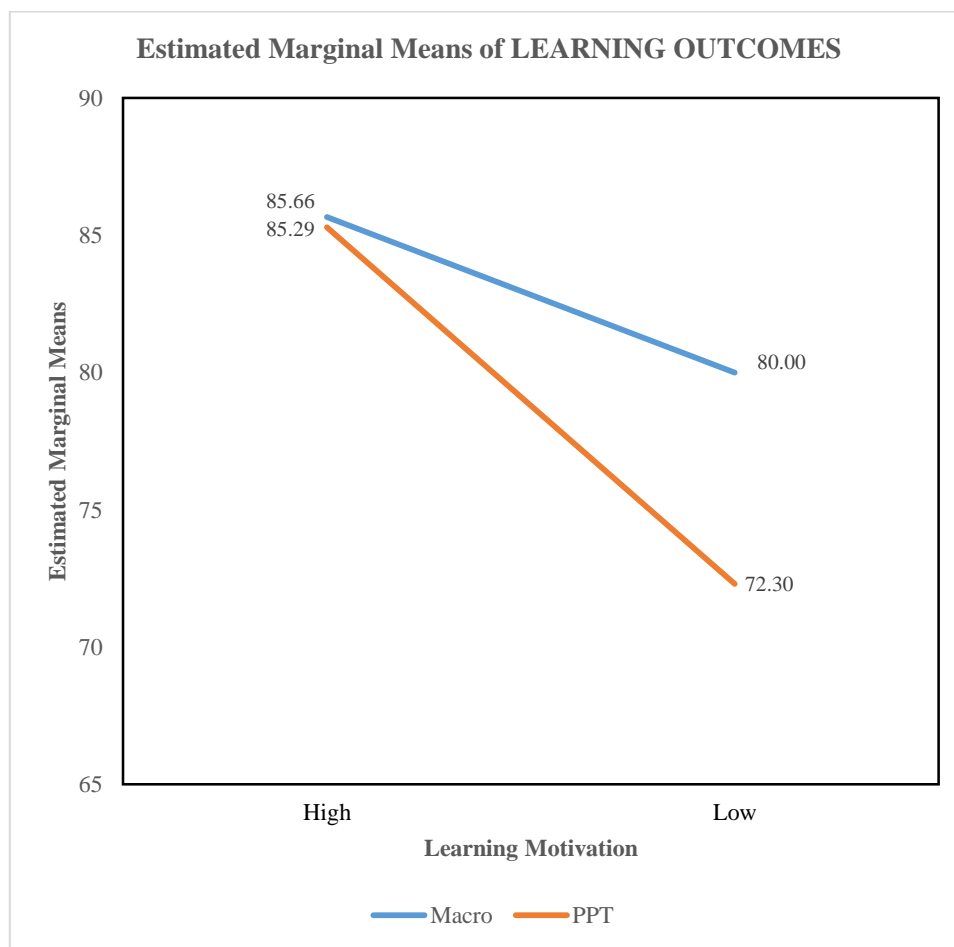
media is not higher than the use of Macromedia Flash media with an average value of 79, 67 > 82.83. Another study conducted by Defiani, et al.<sup>[9]</sup> stated that the average pre-test score of class X IPA 3 students before being treated was 75.19, the average post-test score of class X IPA 3 students after being treated was 78.28 .

*3.2.3 Motivation Influence.* From the motivation questionnaire data obtained, it can be concluded that there is an effect of motivation on student learning outcomes on the subject of buffer solutions. This can be seen from the results of data processing which show the significance value of motivation, namely 0.00, which is smaller than 0.05. This study is in line with Oriahi<sup>[10]</sup> which states that student motivation is very important for better results in academic pursuits. Student motivation has a high positive correlation in their academic performance.

*3.2.4 Interaction of PBL Model Using Media and Motivation.*  $F_{count}(AB) > F(0.05)(1; 56)$  namely  $(4.556 > 4.01)$  and  $sig < 0.05$ , namely  $0.037 < 0.05$ , so  $H_{a4}$  is accepted, it means an interaction between the learning model using animation media with motivation on student learning outcomes on the subject of buffer solutions. Students who have high motivation will give higher chemistry learning outcomes when taught with a learning model using animation media, while students with low motivation will give low chemistry learning outcomes too, this is because there is no encouragement from within themselves to learn and answer questions.

In this study, it is argued that if the learning model factors using media (factor A) and motivation (factor B) are combined, there will be an interaction between the two factors which significantly affects students' chemistry learning outcomes. The form of interaction between the learning model factors using animation media and motivation on student chemistry learning outcomes can be described as presented in the figure 1.

When viewed from the average number of student learning outcomes in each class, it is found that the average number of student learning outcomes is not much different. This means that the learning model and the media used succeeded in improving student learning outcomes, while the students' motivation scores in the experimental class 1 and 2 for high and low motivation were not much different. This research is related to Joni<sup>[11]</sup> who concluded that there is a significant relationship between the use of learning media and learning motivation together on student learning outcomes. Meanwhile, Yanuari and Hanif<sup>[12]</sup> revealed that another alternative to improve students' motivation to learn is to use technology as a medium in the learning process.



**Figure 1.** Interaction between the learning model factors using animation media and motivation on student

#### 4. Conclusion

Based on the results of the research that has been done, it is concluded that there is an effect of the PBL model using Macromedia Flash and Power Point media as well as motivation on student learning outcomes. There is an interaction between the media used and learning motivation. Thus, this study found that in chemistry learning, the topic of buffer solutions is better to use the PBL model with Macromedia Flash media.

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