



## The Effect of Rewards and Punishment on Student Learning Motivation on Stoichiometry Material

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### Abstract

This research is motivated by students' learning motivation which is still in the low category. Giving reward and punishment to students aims to motivate students so that they learn better. This study aims to determine whether there is an effect of reward and punishment on students' learning motivation in stoichiometry material. The subjects of this study were 10<sup>th</sup> grade students at public high school at Pekanbaru City, Indonesia. This study using a purposive sampling technique with consideration of classes having low learning motivation and obtained first class as an experimental class and second class as a control. Data collection techniques used are questionnaires, observation, and documentation. Final data analysis in this study using the t test. From the results obtained, the value of t-count = -3.720 and t-table = 2.04 at a significant level of 5% and Sig. (2-tailed) of 0.001. From this study it was concluded that t-count > t-table and Sig. (2-tailed) < 0.05. So the null hypothesis (H<sub>0</sub>) is rejected and H<sub>a</sub> is accepted. This means that there is a significant effect of reward and punishment on student motivation in stoichiometric material with an effect coefficient of 10.12%.

Keyword:

*Learning and Teaching, Motivation, Reward and Punishment, Stoichiometry*

### 1. Introduction

Learning as a process of effort by students to obtain a new change in behavior as a whole is influenced by many factors (Emda, 2018; Nurdin & Munzir, 2019). The results obtained in

a learning process cannot be separated from the motivation of students in participating in learning. Learning motivation is the initial foundation in doing something, namely as a determining factor for student

learning success. Good motivation will produce better learning outcomes (Emda, 2018; Nurdin & Munzir, 2019). The result obtained in a learning process cannot be separated from the motivation of students in participating in learning. Learning motivation is the initial foundation in doing something, namely as a determining factor for student learning success. Good motivation will produce better learning outcomes (Rahman, 2021; Maryam Muhammad, 2016).

Motivation to learn is the overall driving force both from within and from outside students that ensures continuity and gives direction to learning activities, so that the goals desired by students can be achieved. Each student has a different level of learning motivation. Differences in the level of student learning motivation become a problem for achieving learning goals in schools. Without a high level of learning motivation in students, learning will not run effectively, so that student learning motivation must be considered to achieve learning goals (Arianti, 2019).

One of the public high schools in Pekanbaru City cannot be separated from learning difficulties as an educational entity. This is evidenced by the preliminary study that was conducted at that school, specifically in a class with 31 students, where it was found that there were six

indicators of learning motivation presented in the student learning motivation questionnaire. According to the findings, 52% of students were labeled as having low learning motivation for chemistry classes. Thus, only 48% of the 31 students were categorized as having very high, high, or moderate motivation.

Based on the results of the questionnaire, it appears that most students dislike chemistry lessons because the subject matter requires a lot of memorization, calculations, and abstract concepts that they don't fully comprehend. Students lack the courage to ask questions even when they don't understand, are slow to complete teacher-assigned work, and are easily discouraged when faced with challenges. This is because the students lack the motivation to learn due to a lack of success-driven motivation in them.

One of the factors to increase student motivation is by giving rewards and punishments (Anggraini et al., 2019). Giving rewards will make someone repeat their behavior while giving punishment will make someone stop their behavior (Faidy & Arsana, 2014).

Reward (prize) and punishment (punishment) are two instruments that are considered important in education and development as well as building a good environment and creating

incentives to avoid cheating (Halim Purnomo; Husnul Khitimah Abdi, 2012). Giving rewards is done by praising the results obtained by students, while giving punishment is done by giving reprimands, advice, giving school assignments in the form of questions, and reasonable punishments are given to students who are not violent (Halim Purnomo; Husnul Khitimah Abdi, 2012). So, it is hoped that giving gifts and punishments can have an influence on student motivation.

The degree of difficulty of the material being presented determines the students' motivation. The majority of the material covered in chemistry lessons involves numerous calculations, is highly abstract, and calls for in-depth comprehension. Therefore, it takes a lot of motivation to get students interested in chemistry lessons. Chemistry has many difficult concepts. One of them is stoichiometry. This material uses more calculations and is a chemical concept that is difficult for students to understand because it is a combination of abstract concepts and chemical calculations (Mukhlis, 2017; Polamolo & Lukum, 2022). So, teachers can use several approaches such as scientific and interesting learning methods. The scientific approach focuses the learning process on students so that students can solve

problems and will be more active and looking for something (Indriyanti et al., 2017). One method that can be applied is to use the method of giving gifts and punishments so that children can be motivated to study harder in learning, especially in chemistry lessons.

Based on the previous descriptions, the researcher is interested in conducting research entitled "The Influence of Giving Rewards and Punishment on Student Learning Motivation in Stoichiometric Materials

## 2. Research Method

The quasi-experimental design used in this study is the non-equivalent control group design. The design of the non-equivalent control group design (see Table 1) below:

**Table 1. Nonequivalent Control Group Design.**

Design	Pre- tes	Equivalent	Post- test
<b>Experimental</b>	O <sub>1</sub>	X	O <sub>2</sub>
<b>Control</b>	O <sub>3</sub>		O <sub>4</sub>

Description:

O1 = Pre-test experimental class

O2 = Post-test experimental class

X = Treatment of experimental class

O3 = Pre-test control class

O4 = Post-test control class

The population in the study were students at one of public high school

at Pekanbaru City. The samples of this study were two class 10<sup>th</sup> grade who had low motivation. The two classes are the experimental class which will be given rewards and punishments and the control class which will not be given rewards and punishments. Data collection techniques used are questionnaires, observation and documentation. Data analysis technique is divided into two, namely descriptive analysis using the formula:

$$P = \frac{F}{N} \times 100\%$$

Description :

F : Frequency.

N : The number of individuals.

P : Percentage number.

The second analysis uses inferential analysis, namely normality test using the Kolmogorov-Smirnov test formula, homogeneity test using the F test formula, and hypothesis testing using the t test formula.

### 3. Result and Discussion

This study aims to determine whether there is a significant effect on learning using the reward and

punishment method on students' learning motivation on stoichiometric material at public school at Pekanbaru City. The research was conducted in 3 meetings on stoichiometry in the mole concept sub-material. The data presented in this study consisted of conducting instrument trials and implementing treatments using the reward and punishment method on students' motivation.

An instrument is said to be good if validity has been carried out. In this study, the questionnaire was validated by a chemistry education lecturer at the Education and Teacher Training faculty at one of Islamic State University in Riau. After conducting content validity, 25 valid questionnaire statements were obtained, so the researcher used 25 questionnaire statements.

Data from the validity of the questionnaire instrument trial can be seen in the attachment below (see Table 2):

**Table 2. Summary of Testing the Validity of Questionnaire Statement Items**

No	Criteria	Total	Item Number	Percentage (%)
1	Valid	17	1, 2, ,3, 4, 5, 8, 9,12, 13, 14, 15, 16, 17, 20, 23, 24, 25	68%
2	Invalid	8	6, 7, 10, 11, 18, 19, 21, 22	32%
<b>Total</b>		25		100%

From the results (Table 2) it can be concluded that of the 25 statement items have a correlation coefficient moving between 0.065 to 0.718 and there are 8 statement items that have  $r\text{-count} < r\text{-table}$ . Thus the 8 statement items are not used as statement items in collecting data about student motivation because it is invalid. And there are 17 statement items that are said to be valid because the value of  $r\text{-count} > r\text{-table}$ .

Reliability test to determine the consistency of the instrument measuring instrument to be used. This reliability test uses SPSS 16 with Alpha Cronbach's technique. The data obtained is as follows:

**Table 3. Nilai Questionnaire Reliability Value of Student Learning Motivation Trial**

Variable	Cronbach Alpha	Description
<b>Student Learning Motivation</b>	0,8552	Reliable

The results obtained from the table above are Cronbach's alpha value of 0.8552. This value indicates that the trial data of the student learning motivation questionnaire instrument has a high reliability value.

This homogeneity test data was taken through the teacher's consideration of low student learning

motivation and from the daily test scores of three 10<sup>th</sup> grade chemistry classes. The results obtained are the box's M value of 1.91 with a significant value of  $0.39 > 0.05$ . So the homogeneity test data from three 10<sup>th</sup> grade is declared homogeneous. And the classes taken for research were first class as experimental and second class as a control.

Based on the results of the questionnaire on student learning motivation in class A (experimental class) and class B (control class), the results of student answers were obtained from the questionnaire instrument that had been given.

The total score obtained from the research is 1666. So based on that data, the percentage of research results is:

$$P = F/N \times 100\%$$

$$P = 1666/2108 \times 100\%$$

$$P = 0,7903 \times 100\%$$

$$P = 79,03\%$$

The figures that have been presented are then matched with predetermined categories and it can be concluded that the learning motivation of students in the experimental class with a percentage of 79.03% belongs to the high category. The total score obtained from the control class research is 1529. So based on that data, the percentage of research results is:

$$P = F/N \times 100\%$$

$$P = 1573/2108 \times 100\%$$

$$P = 0,7462 \times 100\%$$

$$P = 74,62\%$$

The percentage that has been presented is then matched with the predetermined categories and it can be concluded that the learning motivation of students in the control class with a percentage of 74.62% belongs to the high category. Thus it can be concluded that in the experimental class the percentage of the motivational questionnaire is greater than the percentage results of the control class.

This normality test aims to determine whether the data is normally distributed or not. results obtained (see Table 4 and Table 5):

**Table 4. Normality Test Results Pre-test and Post-test Experiment Class**

Data	Kolmogrov-smirnov	
	Kolmogrov - smirnov Z	Asymp.sig. (2-tailed)
<b>Pre-test</b>	0,49	0,97
<b>Post-test</b>	0,66	0,77

**Table 5. Normality Test Results of Pre-test and Post-test Control Class**

Data	Kolmogrov-smirnov	
	Kolmogrov - smirnov Z	Asymp.sig. (2-tailed)
<b>Pre-test</b>	0,73	0,65
<b>Post-test</b>	0,69	0,72

Based on the normality test data above, using the Kolmogrov-Smirnov test the pre-test and post-test data for the experimental class were normally distributed.

Both classes are equally normally distributed. Pre-test experimental class Asymp.Sig. (0.97) > 0.05, post-test experimental class Asymp.Sig (0.77) > 0.05, pre-test control class Asymp.sig. (0.65) > 0.05 and post-test control class Asymp.Sig. (0.72) > 0.05. This test was carried out to see the data for the same variant value results are as follows:

**Table 6. Results of Homogeneity Test of Variance of Pre-test and Post-test of Experimental Class**

<b>Homogeneity Test of Variance</b>			
Levene			
Statistic	df1	df2	Sig.
3,189	1	60	0,079

**Table 7. Results of Homogeneity Test of Variance of Pre-test and Post-test of Control Class**

<b>Homogeneity Test of Variance</b>			
Levene			
Statistic	df1	df2	Sig.
2,109	1	60	0,152

From the Table 6 and 7 above it is found that the experimental class has a level statistical value (F) of 3.189 with a significant value of 0.079. And

in the control class it has a level statistical value (F) of 2.109 with a significant value of 0.152. The data is said to be homogeneous if the significance value is  $>0.05$ . From the data above, in the experimental class it can be concluded that the  $H_0$  is accepted so that the experimental class is said to be homogeneous because  $\text{Sig. (0.079)} > 0.05$ . And in the control class it can be concluded that the  $H_0$  is accepted so that the control class is said to be homogeneous because  $\text{Sig. (0.152)} > 0.05$ .

Then a t-test was performed using SPSS 16 with a paired-sample t-test results obtained:

**Table 8. Experiment Class T Test Results**

<i>Paired Samples Test</i>			
<i>Pair 1 pre-test</i>	T	Df	<i>Sig. (2-tailed)</i>
<i>post-test</i>	-3,720	30	0,001

Dari From the table above we can see the value of  $t_0 = -3.720$  with a Sig value  $.(2\text{-tailed})$  of 0.001. when viewed from the value of the  $\text{Sig.}(2\text{-tailed})$  number is 0.001, this means it is smaller than 0.05. So the null hypothesis ( $H_0$ ) is rejected ( $0.001 < 0.05$ ). And it can be concluded that the results of the t-test from the pre-test and post-test of the experimental class there were significant differences

before being given rewards and punishments and after being given rewards and punishments.

**Tabel 9. Control Class T Test Results**

<i>Paired Samples Test</i>			
<i>Pair 1 pre -test</i>	T	Df	<i>Sig.(2-tailed)</i>
<i>post-test</i>	-1,575	30	0,126

From the table above we can see the value of  $t_0 = -1.575$  with a value of  $\text{Sig.}(2\text{-tailed})$  of 0.126. when viewed from the value of the  $\text{Sig.}(2\text{-tailed})$  number it is 0.126, this means it is greater than 0.05. So the null hypothesis ( $H_0$ ) is accepted ( $0.0126 < 0.05$ ). And it can be concluded that the results of the T test from the pre-test and post-test of the control class there is no significant difference before being given reward and punishment with after being given reward and punishment

. From the research results it can be concluded that in this study there was a significant influence giving reward and punishment to students' learning motivation on stoichiometric material with an effect coefficient of 10.126%. Thus, the provision of reward and punishment can be used by teachers in increasing student learning motivation because high learning motivation will result in better learning achievement.

#### 4. Conclusion

Based on the results of the data analysis, it can be concluded that there is an effect of reward and punishment on students' learning motivation in stoichiometry material. This can be proven from the results of the T test using SPSS 16, the value of  $t_0 (-3.720) > t_t (2.04)$  with a Sig. (2-tailed) value of 0.001, so it is less than 0.05 ( $0.001 < 0, 05$ ). So, the null hypothesis ( $H_0$ ) is rejected and  $H_a$  is accepted. Thus, in this study there was a significant difference between the pre-test and post-test with an effect coefficient of 10.126%. The results of the percentage of students' learning motivation questionnaire found that the percentage in the experimental class (79.03%) was greater than the results of the percentage of motivation in the control class (74.62%). Giving reward and punishment method is successful in increasing student motivation. A strong sense of competition in learning is evident in the experimental class. This is also proven from the results of the analysis of students' learning motivation questionnaire which is categorized as high.

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