

UNDERSTANDING NOMENCLATURE OF CHEMICAL COMPOUND: MEASURING CONTRIBUTION OF TEAMS GAMES TOURNAMENT WITH NAME CARD

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ABSTRACT

This study aims to determine student learning outcomes in the nomenclature of chemical compounds that are taught using the *Teams Games Tournament* (TGT) learning model equipped with name cards as media. The learning outcomes measured were cognitive aspects, affective aspects, and psychomotor aspects. The research design used *Quasi-Experimental Design* with *Pretest-Posttest Control Group Design*. The sample in this study amounted to 53 students consisting of 27 students in the experimental class and 26 students in the control class. The experimental class uses the TGT learning model with the help of name cards, while the control class uses a conventional learning model. The results of the test validity test showed that 15 questions were valid and the test reliability results were in the high category, which is 0.92. The results of hypothesis testing using a t-test with separated variants. The results show that at a significant level of 0.05 with $dk = 51$ obtained $t_{\text{count}} (4.01) > t_{\text{table}} (1.67)$, then H_0 is rejected and H_1 is accepted. This shows that there is an influence of the TGT learning model equipped with name cards media on student learning outcomes. In the cognitive aspect, the average value of the experimental class is 90.46 and the control class is 80.03. The results of the affective aspect of the two classes were categorized as good, the average of the experimental class was 82.2% while the control class was 73.8%. In the psychomotor aspect of the two classes categorized as skilled, the average psychomotor aspect between the experimental class is 81.9% and the control class is 69.2%.

Keywords: *Teams Games Tournament, Name Cards, Compound Nomenclature*

INTRODUCTION

Teams Games Tournament (TGT) type cooperative learning model is a learning model that acculturates independent learning in groups with games. The model can be equipped with learning media so that students are interested and motivated in learning. The use of media in learning can increase student interest which affects the emergence of student learning motivation. One of the media that can be used in learning is cards, the form and type of cards are adjusted to the conditions of students and teaching

materials so that learning objectives can be achieved. (Suprpto, 2013).

One of the learning models that can be applied to increase student interest and learning outcomes is the cooperative learning model. In cooperative learning students learn and work in small groups consisting of three to four people. This learning model holds that students will find and understand difficult concepts more easily if they discuss these concepts with their peers. One of the chemical materials that requires an understanding of the concept is the nomenclature of compounds. In

this material students must be able to classify compounds based on IUPAC rules, give names according to naming compounds based on IUPAC rules. (Putu, Made, & Sudarma, 2018).

The selection of *the Teams Games Tournament* (TGT) cooperative learning model with name card media as an effort to overcome the problem of chemistry learning in class X SMA Negeri 1 Telaga because this learning model has advantages in improving student learning outcomes such as: (1) this learning model combines elements of education and games and contains elements of tournaments so that students are more challenged and enthusiastic in participating in lessons (Slamet & Made, 2018). The existence of games and tournaments in learning also makes learning not boring and relaxed but the learning process carried out is still serious, with such a learning atmosphere, students are expected to be interested or have an interest in learning, (2) this learning model encourages students to be more daring in expressing an opinion in front of the class, (3) can train students to work together in teams that are formed

heterogeneously, and (4) increase students' competitiveness in learning chemistry so that learning outcomes increase (Susanna, 2017).

Based on this description, the authors chose to conduct research using the TGT learning model on compound nomenclature material. TGT uses a learning-by-play system. With the game, it is hoped that students will be more active in learning chemistry and can direct students in a cooperative atmosphere so that they can improve student learning outcomes.

RESEARCH METHOD

The population in this study were all students of class X, while the samples in this study were students of class XM IA 6 which amounted to 27 people as the control class, and students of class XM IA 7, which amounted to 26 people as the experimental class. This study uses a *Quasi-Experimental* research design with two classes as research objects. The design used is a *nonequivalent control group pretest-posttest*. The research design is described in Table 1.

Table 1. Pretest - Posttest Non-Equivalent Control Group Design

Class	Pretest	Treatment	Posttest
Experiment Class	O ₁	X ₁	O ₂
Control Class	O ₁	X ₂	O ₂

Description: O₁ = Pretest, O₂ = Posttest, X₁ = TGT model, X₂ = conventional model

The research was conducted using two classes with different learning models. The control class uses conventional learning and the experimental class uses the TGT cooperative learning model equipped with name cards. Conventional learning in question is a learning model that is usually applied in school, namely the

lecture method. This research is classified as quantitative research. The research was conducted with the aim of knowing student learning outcomes in the nomenclature of chemical compounds taught with TGT and conventional learning.

The data collected in this study include data on cognitive, affective and

psychomotor learning outcomes. Collecting data on cognitive learning outcomes using multiple-choice tests on the material nomenclature of chemical compounds. The results of the test validity test showed that 15 questions were valid and the test reliability results were in the high category, is 0.92. The test was given before and after treatment. Individually, student learning outcomes are said to have completed learning if

they reach standard minimum of value 70 with the following calculations:

$$Student\ Score = \frac{Score}{max\ score} \times 100\%$$

The learning outcomes of affective and psychomotor aspects were obtained from observations during the learning process. Student achievement scores range from 0 to 100 which are categorized into 5 levels of success as shown in Table 2.

Table 2. Value of Student Affective and Psychomotor Learning Outcomes Skills

Student Score	Level of Success	Value by Letter
0-29	Very less	E
30-64	Not enough	D
65-74	Enough	C
75-84	Well	B
85-100	Very good	A

RESULTS AND DISCUSSION

A. Cognitive Learning Outcomes

Cognitive learning outcomes were obtained from the results of the pretest and posttest. The pretest was given before the treatment which served to determine the students' initial abilities, while the posttest was given after learning with *the Teams Games Tournament* (TGT) for the experimental class and conventional learning for the control class. In the experimental class,

the average pretest result obtained was 62.57 while in the control class averaged the pretest result obtained was 53.58. The average post-test result for the experimental class was 90.46 and for the control class was 80.03. This shows that the learning model TGT is superior to conventional learning models. The data from the *pretest* and *posttest* results for the experimental class and the control class can be seen in Figure 1.

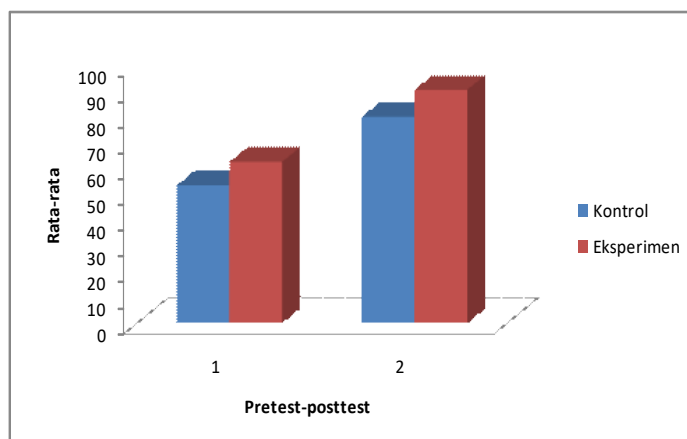


Figure 1. Pretest and Posttest Result Data for Experiment Class and Control Class

B. Affective Learning Outcomes

Data on students' affective learning outcomes were obtained from observing student attitudes during the learning process by using observation sheets. Affective aspects that are measured include self-confidence, honesty, participation, and courtesy. The results of the comparison of students' affective learning outcomes in the experimental class and the control class can be seen in Figure 2.

Figure 2 shows that the affective results of students in the experimental class are higher than the control class,

the average number of students' affective scores in the experimental class is 82.21. Based on the rubric for assessing students' affective learning outcomes in the experimental class, they are in the good category. In the control class the average value of students' affective learning outcomes is 73.84 and is included in the sufficient category. The difference in affective learning outcomes is thought to be due to requiring students to concentrate, train a sense of togetherness, be active in following and understanding learning materials, and be able to discuss in groups.

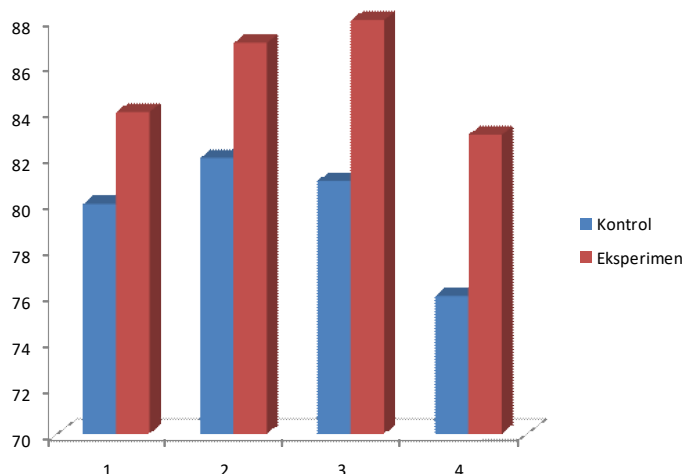


Figure 2. Comparison of Student Learning Outcomes in Experiment Class and Control Class

C. Psychomotor Learning Outcomes

Psychomotor learning outcomes are obtained from observations of student activities during the learning process using observation sheets. The comparison of students' psychomotor learning outcomes can be seen in Figure 3.

Based on Figure 3 shows that the average psychomotor learning outcomes of students in the experimental class is

higher than the control class. The average number of learning outcomes obtained by the experimental class was 81.97 which was included in the good criteria while the control class obtained 69.21 so that it was included in the sufficient criteria. This is because in the experimental class there are discussions and games that can train students to participate actively in the learning process.

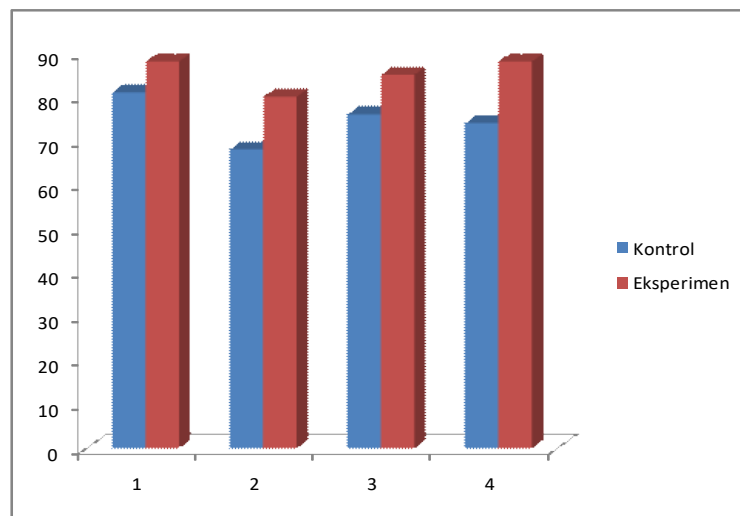


Figure 3. Comparison of Psychomotor Learning Outcomes in Experiment Class and Control Class

The results of hypothesis testing using a t-test with separated variants showed that at a significant level of 0.05 with $dk = 51$ obtained $t_{count} (4.01) > t_{table} (1.67)$, then H_0 was rejected and H_1 was accepted. This shows that there is an effect of the TGT cooperative learning model equipped with name card media on student learning outcomes. The effect can be seen from the learning outcomes of students who are taught with TGT equipped with name cards are higher than the learning outcomes of students who are taught conventionally.

TGT learning trains students to work together among members to solve problems given by the teacher with the help of the media that has been provided. TGT learning also trains students' readiness and activeness during the learning process. The advantages that exist in the TGT are suspected to be the reason that the application of TGT equipped with name cards improves student learning outcomes including cognitive, affective, and psychomotor aspects.

CONCLUSIONS

The results of the research that has been carried out show that the application of the *Teams Games Tournament* (TGT) learning model equipped with name cards has improved student learning outcomes compared to using conventional learning. Based on the results of the study, it is recommended for teachers in the field of chemistry to apply *Teams Games Tournament* (TGT) learning with name cards to other chemical materials in order to improve student learning outcomes.

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