

## Think-Tac-Toe Game Strategy: Its effect on the Students' Performance in Chemistry

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### Abstract

*This study sought to find out the effectiveness of Think-Tac-Toe game strategy on the students' performance in Chemistry. Think-Tac-Toe game strategy uses the familiar three-by-three grid of a tic-tac-toe board. Students choose three activities to create 'three in a row,' just like playing a game. Tic-Tac-Toe choice boards give students the opportunity to participate in multiple tasks that allow them to practice skills they have learned in class or to demonstrate and extend their understanding of concepts. This study aimed to (1) find out the significant difference between the pretest scores in Chemistry of the students when grouped to Think-Tac-Toe game strategy and lecture method; (2) find out the significant difference between the posttest scores in Chemistry of the students when exposed to Think-Tac-Toe game strategy and lecture method; (3) find out the significant difference between the pretest and posttest scores in Chemistry of the students when exposed to Think-Tac-Toe game strategy and lecture method. The study used a true experimental design, the pretest posttest control group design. Wilcoxon Signed-Rank test revealed that there was a significant difference between the students' pretest and posttest scores in Chemistry when exposed to Think-Tac-Toe game strategy and lecture method. This study concluded that Think-Tac-Toe game strategy can improve the students' performance in Chemistry.*

**Key words:** Think-tac-toe game strategy, performance, lecture method, experimental group, control group

### 1. Introduction

Chemistry is a world filled with interesting phenomenon, appealing experimental activities, and fruitful knowledge for understanding the natural and manufactured worlds. Not only do students need to understand the symbols, terminologies, and theories used in learning chemical concepts, but they also need to transform instructional language or materials that teachers use in the Chemistry classroom into meaningful representations (Chiu, 2005). Teachers should learn new ways to make Chemistry interesting and fun for their students. For a qualified Science education, the curriculum should be planned according to the interests of students. It does not only motivate students but also make them learn the subject in an effective way.

Teachers have the challenge to enhance future intellectual capabilities of the learners no matter what a child's present capabilities area (Emendu & Udogu, 2013). The challenge for the Chemistry teachers, especially those teaching high school Chemistry, is on how to introduce the subject lesson in an effective and enjoyable way to the learners (Villaflor, 2013). Teaching through the application of games makes the teaching/learning process enjoyable, alive, visible, attractive, and motivating (Honarmand, 2015). Think-tac-toe game strategy uses the familiar three-by-three grid of a tic-tac-toe board. Students choose three activities to create 'three in a row,' just like playing a game. Tic-Tac-Toe choice boards give students the opportunity to participate in multiple tasks that allow them to practice skills they have learned in class or to demonstrate and extend their understanding of concepts. Tic-tac-toe or think-tac-toe game strategy is one of creative technique to attract the students' interest in learning activity (Susanti & Zainuddin, 2013).

## 2. Methodology

There were forty (40) students of Initao National Comprehensive High School, Initao, Misamis Oriental, and Mindanao, Philippines who were involved in the study. The study used the true experimental design, the randomized pretest-posttest control group design. Two groups were involved in the study, twenty (20) students exposed to Think-Tac-Toe game strategy and twenty (20) students to lecture method. Random assignment was used to form the groupings. The performance of students was measured through giving of test before the conduct and after the implementation of the study. Both pretest and posttest were composed of fifty (50) items multiple choice test.

## 3. Results and Discussions

Table 1 shows the Mann-Whitney U test result on the difference between the students' pretest scores in Chemistry when grouped to Think-Tac-Toe game strategy and lecture method. Data shows that there is no significant difference between the pretest scores in Chemistry when grouped to Think-Tac-Toe game strategy and lecture method as shown in their z-value of 0.14 and p-value of 0.8914. This means that the two groups are comparable to each other. Today's teacher knows that the ways in which students learn vary greatly. Individual students have particular strengths and weaknesses which can be built upon and enhanced through effective instruction. The main focus of educative process is to improve the performance or learning of the students. The learning outcomes of the students are measured with the help of their achievement or performance. Performance assessment is the process of measuring the terminal behaviors of the students at the end of instruction. It is the job of the teacher to measure whether the students have acquired the component concepts, as on achievement, before proceeding with the instruction which arranges these concepts in proper relationship for the learning of the principles. (Sharma & Neetu, 2011)

**Table 1: Mann-Whitney U Test result on the difference between the students' pretest scores of the two groups**

Group	N	Median	z-value	p-value	Remarks
<b>Pretest</b>					
Think-Tac-Toe game strategy	20	14	0.14	0.8914	Not Significant
Lecture method	20	14			

$p < 0.05^*$

Table 2 presents the Mann-Whitney U test result on the difference between the students' posttest scores in Chemistry when exposed to Think-Tac-Toe game strategy and lecture method. The data show that there is a significant difference between the posttest scores in Chemistry when exposed to Think-Tac-Toe game strategy and lecture method as shown in their z-value of 2.04 and p-value of 0.0416. And that the null hypothesis is rejected. Teaching through the application of games makes the teaching/learning process enjoyable, alive, visible, attractive, and motivating. Think-Tac-Toe choice boards give students the opportunity to participate in multiple tasks that allow them to practice skills they have learned in class or to demonstrate and extend their understanding of concepts. This indicates that the Think-Tac-Toe game on the students' performance in Chemistry has a higher effect than the lecture method (Honarmand, et.al 2015). This is evident that Think-Tac-Toe game strategy and lecture method are incomparable with each other based on the posttest results on the students' performance in Chemistry. Students' exposed to Think-Tac-Toe game performed better than the students' exposed to lecture method.

**Table 2: Mann-Whitney U Test result on the difference between the students' posttest scores of the two groups**

Group	N	Median	z-value	p-value	Remarks
<b>Posttest: Think-Tac-Toe game strategy</b>	20	17.5	2.04	0.0416*	Significant
Lecture method	20	16.5			

$p < 0.05^*$

Table 4 shows the Wilcoxon Signed-Rank test result on the difference between the students' pretest and posttest scores in Chemistry when exposed to Think-Tac-Toe game strategy and lecture method. Data show that there is a significant difference between the pretest and posttest scores in Chemistry when exposed to Think-Tac-Toe game strategy and lecture method as shown in their z values of -5.31 and -2.85 and p-values of 0.000000108 and 0.0044 respectively.

Therefore, the null hypothesis is rejected. This implies that there is a significant improvement in the score of the participants exposed to think-tac-toe game strategy after introducing the topics. Honarmand, et.al (2015), revealed that games benefit the pupils in the experimental group in their vocabulary learning compared to the control group. In other words, one can argue that there was a significant difference between the two traditional and innovative teaching methods. Although students in both groups enhanced their performance after being exposed to experimental and control groups, the think-tac-toe game strategy proved better than the lecture method. This study reveals that Think-Tac-Toe game strategy has highly significant result in terms of students' performance in Chemistry. This follows that Think-Tac-Toe game strategy is more effective in teaching Chemistry.

**Table 4: Wilcoxon Signed-Rank Test result on the difference between the students' pretest and posttest scores of the two groups**

Group	N	Median	z-value	p-value	Remarks
<b>Think-Tac-Toe game strategy</b>					
Pretest	20	14	-5.31	0.000000108*	Significant
Posttest	20	17.5			
<b>Lecture method</b>					
Pretest	20	14	-2.85	0.0044*	Significant
Posttest	20	16.5			

$p < 0.05^*$

#### 4. Conclusion

Based on the findings of the study, it was concluded that the experimental and control groups were comparable before the start of the experiment. There was a significant difference between the students' posttest scores in Chemistry when exposed to Think-Tac-Toe game strategy and lecture method. Wilcoxon Signed-Rank Test revealed that there was a significant difference between the students' pretest and posttest scores in Chemistry when exposed to Think-Tac-Toe game strategy and lecture method. This study concluded that Think-Tac-Toe game strategy can improve the students' performance in Chemistry.

#### 5. Recommendations

Based on the findings and conclusions of the study, the researcher would like to recommend that Think-Tac-Toe game strategy can enhance students' performance when it is used appropriately and correctly. A study can be conducted using Think-Tac-Toe game strategy by having other intervening variables like the demographic profile of the participants (e.g. age, sex, socio economic status, etc). For the teachers to find ways on how to deliver learning in meaningful way and improve the performance of the students. For the students who intended to have similar to this study, it should be conducted with at least five topics in Chemistry. Think-Tac-Toe game strategy makes students get better academic performance and should be used in other disciplines.

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