

## Introduction of Games (One Stay, Two Stray) in Teaching Trigonometry

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### Abstract

Games are considered as an activity engaged in for diversion or amusement (Webster, 2017). It is an activity mostly enjoyed and participated in by everybody. This study aimed to determine the effect of insertion of games during classroom interaction on the performance of students in Trigonometry. Measures of significant difference between the mean-gain scores of the two groups were also tested. Twenty-four (24) Grade-10 students of Tabango National High School were considered subject of the study. True-experimental cross-over design was used, as it tries to validate the subject's performance. Data were gathered by means of a standardized test, designed to measure the performance of the two groups. This questionnaire was used as the pre-test and posttest instruments. The inconsistency in the scores between these tests was utilized to measure the performance in Trigonometry of the control group and experimental group. Results revealed that the mean score of the two groups on their pre-test and posttest have significantly increased. During Part 1 & 2 of the experiment, as groups were exchanged, it was revealed that the mean-gain score of the experimental group was significantly higher than the traditional group. The researchers concluded that both strategies were effective, evidence of this is the increase from the pre-test and posttest, however more emphasis may be considered on the insertion of games (One Stay, Two Stray) on classroom instruction, as it contribute significant change in Trigonometry performance.

**Keywords:** game-based learning, one stay, two stray, design, Tabango, Leyte.

### Introduction

Game is an activity that makes us enjoy, challenged and it also developed teamwork (McGonigal, 2011). It encourages the students to participate in classroom activities (Clements, Ahmed, & Henderson, 2017). Games also are way of student's socialization within the classroom scenario. A game structured form of play and sometimes it usually used as an educational tool. Teacher in different fields can use games as an instructional tool in enhancing the teaching-learning process (Yong & Gates, 2017). According to Valdez (2017) teaching thru gaming, promote active participation of the students in the learning activities. It can develop some practical skills; educational simulation, intellectual skills, exercises and sometimes it involve

physical stimulation. Teaching through games also assesses student capacity of students in problem solving and answering question. Game is usually distinct from work and arts; however, the distinction was not clear-cut because some games are usually considered as work such as professional players of spectator and arts just like jigsaw puzzle or games involving an artistic layout such as Mahjong, solitaire, or some video games. This can be part of human experiences and some old games are known. The interaction, rules and challenges are some key component of the game.

The idea of gaming in a classroom to make students active in a class discussion is not new (Choi, Pursel, & Stubbs, 2017). As we observe now, teachers used gaming instruction because students nowadays are fun in games especially in classroom (Ewing, 2017; Wiburg, Parra, Mucundanyi, Torres, & Latorre, 2017). Students easily got bored when teachers only use lecture discussion especially in math subject. Although gaming is a time consuming and yet a very challenging to students that will make them participate in the class actively. Teacher can facilitate the students through gaming activities which is the One Stay Two Stray instruction.

In this study, game was used as instructional material in teaching mathematics. The game used in the study named as one stay two stray. Through this game, students who dislike math will favourably love mathematics at the end of the game. In this research, the researcher promote students active participation in the math class making them alive, active and attentive in math subject. One stay two stray is a collaborative strategy that students involve and enjoy with the other students moving around the room while working to solve problems and answer questions. It also encourage students to be attentive in the class. This also allows the students to take the opportunity to be the teacher, which they love to do. This can be useful to develop their deeper understanding of the concept, ideas and critical thinking process towards the others. They can share and impart ideas into their classmate.

One Stay, Two Stray game is a suitable teaching technique to be used in the classroom to improve students' academic performance not only in math but promote also their speaking ability. The writer say that, first all students can be active when speaking lesson started. Second, students can accustom talk in small groups first, then talk in front of the class so that they can speak with confidence without scared the wrong grammar. Sukmayati (2014) said that One Stay Two Stray promote cooperative strategy, students were more encourage, understand the material easily, concentrated more and spoke more confidently (p.xii). Furthermore, gaming techniques in teaching develop student's confidence to express their opinion when learning in progress. Lastly, students also learn many new words from their friends, learn how to use the right grammar when they speak and learn how to correct pronunciation. Students will improve their speaking skills and they will learn how to cooperate each other towards success. Other researcher have formulate their own strategy in improving mathematical capability, Larisma, Centillas, Lumbay, & Pajaron (2017); Firdaus & Herman (2017); Castro (2017) and found out that it improve significantly the mathematics academic performance of students.

Thus, the researchers were challenged to explore the effectiveness of gaming teaching strategies by combining three skills in a game "one stay two stray" and that is speaking ability, reading comprehension and skills in computing at given period of time. Specifically it will investigate if will this be effective in learning and enjoyable? That's the reason why researchers wanted to pursue this study aiming that this technique will improve mathematics performance of the students.

### **Statement of the problem**

In many cases among secondary schools, there are students who really hate math because they considered it as a difficult subject. They easily get bored when teachers started talking about numbers. However, when students are engaged in classroom activities, they are active in classroom activities rather than discussing in the whole period. In our observation, we found out that some students get easily tired and that is one of the teacher's problems now that students are unfocused and sleepy in math discussion. In this given instances, the researcher's decided to conduct this study which is Game in Mathematics (One Stay Two Stray in Trigonometry) and engage the students in gaming activities in math subject specifically finding how effective is the game itself in promoting students mathematics performance.

### **Significance Of The Study**

This study has a huge importance to the educators, school administrator, parents and youth all over the country and internationally. For some who are interested in the educational games which is Game in Mathematics (One Stay Two Stray in Trigonometry), this study showed the effectiveness of varied instructional materials in teaching that are very useful for the teachers, students, curriculum makers and school administrators to develop instructional materials that promote positive learning-teaching environment.

### **Methods**

#### **Research Design**

This study utilized experimental research design through cross-over design method of research using the pre- test-post- test for both experimental and control group design. Since the expected output is to engage the students in classroom activities and at the same time, they can be active in classroom scenario experimental crossover design is the appropriate technique to use. The researchers used random sampling in determining the respondents for the research which include the whole students in one section of Tabango National High School for the school year 2017-2018.

#### **Research Locale and Participants**

This study was conducted in Tabango National High School, Tabango Leyte. The participants were purposively selected from Grade 10 Section Rose Students of the said school. These participants were selected due to a reason that they are students in mathematics learning trigonometry.

#### **Collection Of Data**

This study made use of two data gathering techniques which was data mining in a Pre-post test from the standardized test adapted from Dr. Daantos, (2013). Participants were informed personally and were guaranteed of utmost confidentiality as with regards to their identity for better data reliability and retrieval. Researchers also asked the permission of the school principal in gathering the data of the research.

#### **Treatment Of Data**

Data gathered were analyzed using the t-test for independent samples. Since the study utilized the crossover experimental design, t-test for two correlated samples were specifically applied.

#### **Findings**

On the first part the pretest mean scores of the control group were 4.17 and the experimental group were 4.5. In the second part, there were 2.08 for the control group and 1.33 on the experimental groups. The posttest mean score of the control and experimental groups were

7.08 and 10.7, and 3.92, on the first part and 4.25 on the second part respectively. Base on the result, it was found out that each group increase their score and therefore there was a significant difference between the pretest and posttest mean score of the group. On the first part, the main gain for two groups was calculated and that there were 3 for the control group and 6.17 for the experimental groups, and for the second part it was also calculated and that there were 2.25 main-gain for the control group and 3.08 for the experimental group. The mean gain scores of the two groups for the firstpart were 3 and 6.17 while 2.25 and 3.08 for the second part respectively.

As a result the performance of the control and experimental group increased. This was due to the method of instruction used in each group. Using the t-test for independent samples at 0.05 levels of significance, the computed t-value was 0.06 for the first topic and 0.0003 for the second topic, which was less than the critical t-value of 2.074. Base on the result we can conclude that there was no significant difference between the main-gain scores of the two groups. Therefore, the performance of the control group which utilized the traditional method of instruction, was nearly equivalent to the performance of the experimental group which utilized the gaming instruction (One Stay, Two Stray). However, despite of its no significant difference, the mean gain of the experimental group, which is much higher than the control group could not be neglected and could imply that this gaming method is very effective because it can be used in all subjects and for all levels of learners age.

**Table 1:** Pre-Test, Post-Test and Mean Gain Scores of the Gaming and the Traditional Groups

**1<sup>st</sup> part**

Group	Number of Cases	Pre-Test Mean Scores	Posttest Mean Scores	Mean-Gain Scores
Traditional Group	12	4.17	7.08	3
One Stay, Two Stray	12	4.5	10.7	6.17

**2<sup>nd</sup> part**

Group	Number of Cases	Pre-Test Mean Scores	Posttest Mean Scores	Mean-Gain Scores
Traditional Group	12	2.08	3.92	2.25
One Stay, Two Stray	12	1.33	4.25	3.08

Table 1 show the scores of the two groups consisting of 12 subjects each. Each method shows a remarkable increase from the pre-test to the posttest scores, which signifies improvement. The pretest mean score of each group in first part differed by 0.33 in favor of gaming instruction. The pretest mean score of each group in second part differed only by 0.75 in favor of Traditional instruction. The posttests mean score of the subjects exposed to two methods of instruction varied for a couple of margin.

**Table 2:** t- Test Score of the Pretest Scores of the Gaming and the Traditional Groups**1<sup>st</sup> part**

Pretest Mean Scores		Critical t-value	Computed t-value	Interpretation at $\alpha= 0.05$
Traditional Group	One Stay, Two Stray			
4.17	4.5	2.201	0.26	Not Significant

**2<sup>nd</sup> part**

Pretest Mean Scores		Critical t-value	Computed t-value	Interpretation at $\alpha= 0.05$
Traditional Group	One Stay, Two Stray			
2.08	1.33	2.201	0.41	Not Significant

**Table 2** highlights the homogeneity of the two groups in terms of their performance in the pretest. The interpretation of the means of the two group are not significant, meaning each group which were the subject of the study were identical in terms of their performance in Trigonometry.

**Table 3:** T-Test Score of the Mean Gain Scores of the Experimental and the Control Groups**1<sup>st</sup> part**

Group	Number of Cases	Mean Gain Scores	Critical t-value	Computed t-value	Interpretation at $\alpha =0.05$
Traditional	12	3	2.074	0.06	Not Significant
Experimental	12	6.17			

**2<sup>nd</sup> part**

Group	Number of Cases	Mean Gain Scores	Critical t-value	Computed t-value	Interpretation at $\alpha =0.05$
Traditional	12	2.25	2.074	0.0003	Not Significant
Experimental	12	3.08			

Table 3 shows the differences of the mean gain scores of the two groups. The experimental group has a couple of points higher than the traditional group. This may mean that traditional instruction was less effective than the Gaming instruction. But there is a need to verify this by finding if there was a significant difference in the mean gain scores of the two groups. A t-test for independent samples at a level of significance,  $\alpha =0.05$ , was done and obtained a t-value of 0.06 for the first topic and 0.0003 for the second topic. This is lower than the critical t-value of 2.074, so, the null hypothesis is accepted and thus, the mean gain score of the experimental group is not significantly higher than that of the traditional group. Hence, the null hypothesis is not rejected; thus, both traditional and gaming methods of instruction are equally effective.

**Table 4:** T-Test correlated Score of the Mean Gain Scores of the Experimental-Control and Control- Experimental Groups

Group	Number of cases	Critical value	Computed t-value	Interpretation at $\alpha = 0.05$
1 <sup>st</sup> group Control-experimental	12	2.201	0.88	Not Significant
2 <sup>nd</sup> group Experimental-control	12	2.201	0.81	Not Significant

Table 4 shows the differences of the mean gain scores of the two groups. The first part shows that there is no significant difference of the students in a control group then to experimental group. The second part shows that there is no significant difference of the students in a experimental group then to control group.

### Conclusion and Recommendation

This study utilized a cross over experimental design to compare the achievement in Trigonometry of the experimental group which was exposed to gaming instruction and the control group which was exposed to the traditional method of teaching. Both groups were assigned randomly. The control group was composed of twelve (12) students while the experimental group was composed of twelve (12) students. The students of Grade 10 – Rose was the subject of this study and divide them into two groups, for experimental and control group. Each group covered the same topics. The study was conducted during the second grading of School Year 2017-2018 at the Tabango, National High School, Tabango, Leyte.

The researcher utilized a standardized test questionnaire with the help of the panel. This questionnaire was used as the pretest and posttest instruments. Difference in the scores between these tests was utilized to measure the performance in Trigonometry of the control and experimental groups. The statistical tool used to evaluate whether there was a significant difference in the pretest and posttest scores of each group was the t-test for dependent samples at 0.05 levels of significance. To determine if there was a significant difference in the achievement (mean gain) between the two groups, the t-test for independent samples was utilized at 0.05 levels of significance.

Based on the findings of this study, the researcher concluded that both the traditional and the gaming methods of instruction were effective in teaching in trigonometry because there was no significant difference between the pretest and posttest scores of each group. However, despite of the no significant difference, findings clearly showed that experimental group performed better than the control group resulting to have a higher mean gain compared to the control group. The no significant difference of the results might attributed by other factors like in this study, probably was the very limited number of participants. As such, it is recommended that further study on this aspect will be conducted using greater number of participants to triangulate the findings of this study.

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