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Graduate School,  
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THAILAND

February 2, 2022

Dear Yang Pengfei, Dr. Phithack Nilnopkoon and Dr. Suwana Juithong,

**Subject: Acceptance of Full Paper and Invitation to the NIRC V 2022**

I, on behalf of the president of Buriram Rajabhat University, acknowledged with thanks and appreciation the receipt of your full paper for presentation entitled: **The Effect of Cooperative Learning Using STAD Technique on Mathematics Achievement of the Fourth Grade Students in Primary Schools**. I am pleased to notify you that your paper has been accepted for the oral presentation at the 5<sup>th</sup> National and International Research Conference 2022: NIRC V 2022" at Buriram Rajabhat University (BRU), Thailand on February 14, 2022. You are, therefore, officially invited to present your paper via online link <http://meet.google.com/kdh-zvhe-oco> held on the mentioned date. You can find out all the details about the conference from the website at <http://www.NIRCBRU5.bru.ac.th>.

Having received the experts' comments on your paper, please revise and send it back to the organizing committee within **February 16, 2022**.

I look forward to greeting you at Buriram Rajabhat University, Thailand.

Sincerely yours,

(Assistant Professor Dr. Narumon Somkuna)  
Dean of Graduate School  
Buriram Rajabhat University

**NB:** Please strictly follow the paper writing format required by the conference host. For more details, please visit the conference website: <http://www.NIRCBRU5.bru.ac.th>.



**THIS IS TO CERTIFY THAT**

**Yang Pengfei, Phithack Nilnopkoon  
and Suwana Juithong**

has successfully made an oral presentation  
the 5<sup>th</sup> National and International Research Conference 2022

On the 14<sup>th</sup> February 2022 at Buriram Rajabhat University, Thailand

Associate Professor Malinee Chutopama  
President of Buriram Rajabhat University

## The Effect of Cooperative Learning Using STAD Technique on Mathematics Achievement of the Fourth Grade Students in Primary Schools

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### Abstract

The objectives of this research were to: 1) Compare mathematics achievement of the students before and after receiving the cooperative learning using STAD Technique, and 2) Compare mathematics achievement of students with the determined criteria set at 70 %. The sample used in this study was 30 students in the Fourth grade of Xianghe primary school in Zhumadian City, Henan Province, China. They were derived from cluster random sampling. The research instruments were: 1) 5 lesson plans adopted "Cooperative Learning Using STAD Technique" on the topics of Multiple, ray, parallel line, speed and distance. 2) Mathematics achievement test. The statistics used for data analysis were the mean, standard deviation, t-test for dependent sample and t-test for one sample.

The results of the study were as follows:

- 1) Mathematics achievement of grade 4 students after receiving cooperative learning using STAD Technique was higher than before at a statistically significant level of 0.05.
- 2) The mathematics achievement of grade 4 students after receiving cooperative learning using STAD Technique was higher than the standard of 70% at the 0.05 statistical significance level ( $\bar{x}= 86.9$  S.D=8.55).

**Keywords :** Cooperative Learning using STAD Technique, Primary School Mathematics, Teaching Model, Mathematics Achievement

### 1. Introduction

In 2020, the government of Henan Province issued the "Implementing Opinions on Deepening Education Teaching Reform and Comprehensively Improving the Quality of Compulsory Education", which proposed to "optimize teaching methods and teaching links, focus on inspiring, interactive and inquiry-based teaching, emphasize contextual teaching, and promote research-based, project-based and cooperative learning. (www.henan.gov.cn)Therefore, how to optimize

teaching methods, promote students' cooperative learning skills and improve students' academic performance has become an urgent problem to be solved. Especially for primary school students, they feel that mathematics is boring in learning mathematics. Students can't solve problems through cooperative learning, and groups can't use group cooperative learning to find answers to problems. These problems lead to their poor performance in mathematics and are not interested in mathematics learning.

Through the analysis of the current situation of mathematics classroom teaching in grade 4 of primary school, it is found that there are the following four problems: 1. Students' mathematical language expression ability is poor; 2. Lack of hands-on activities in the classroom; 3. There is a lack of communication between teachers and students, and there is a lack of group cooperative learning activities among students; 4. The results on the report card are statistically found: the mathematics scores of the fourth grade of primary school are generally low, and the Chinese scores are generally high. (<http://www.177liuxue.cn/zt/4/3900/>)

In order to solve the above four problems, the researcher considered to use the cooperative learning using STAD Technique to improve the mathematics achievement of grade four in primary school. The cooperative learning using STAD Technique is to let students rely on each other, actively discuss and explore, share and communicate. Many countries are experimenting with cooperative learning using STAD Technique, and find that the effect of cooperative learning using STAD Technique is better than traditional teaching methods in the cultivation of students' thinking ability and the lasting time of students' memory. (Wang Tan, 2019)

Cooperative learning teaching methods can't only enrich classroom communication methods, but also cultivate students' communication and cooperation ability. Therefore, cooperative learning teaching methods have been widely used in classroom teaching. It makes the subject consciousness and personality socialization development of students' learning publicized, plays an irreplaceable role in cultivating students' cooperative spirit and communication ability, creates a large space for students' independent exploration and active development, and brings a new atmosphere to classroom teaching.

Decision of the State Council on the reform and development of basic education: It attaches great importance to cooperative learning, and points out to encourage cooperative learning, promote mutual communication and common development among students, and promote the growth of teaching and learning, actively advocate the learning methods of autonomy, cooperation and exploration. (<http://www.moe.gov.cn/>)

In order to meet the needs of basic education reform and meet the new requirements of mathematics curriculum standards, this paper introduces the teaching mode of group cooperative learning in mathematics teaching in grade 4 of primary school, and discusses whether the teaching

mode of group cooperative learning can improve the mathematics performance of grade 4 students in primary school.

Therefore, the researcher wants to explore how to use "cooperative learning using STAD Technique" to stimulate primary school students' interest in learning; Improve primary school students' interest in learning mathematics and academic performance. This is a problem that the researcher always care about and hope to solve in teaching. For these reasons mentioned above so the researcher is interested in studying the effect of cooperative learning using STAD technique on mathematics achievement of the Fourth grade students in primary schools.

## 2. Research objectives

This research consisted of two objectives:

2.1 To compare mathematics achievement of the students before and after receiving the cooperative learning using STAD Technique

2.2 To compare mathematics achievement of students with the determined criteria set at 70 %.

## 3. Research hypotheses

3.1 The Fourth grade primary school students' mathematics achievement after receiving cooperative learning using STAD Technique is higher than before.

3.2 The Fourth grade primary school students mathematics achievement after receiving cooperative learning using STAD Technique is higher than 70 percent.

## 4. Research Methodology

### 4.1 Samples

4.1.1 The population in this study was 120 students (4 classrooms) in the Fourth grade of Xianghe primary school in Zhu madian City, Henan Province, China.

4.1.2 The sample for this study was 30 Fourth grade primary school students derived from cluster random sampling.

### 4.2 Research instruments

Research instruments were the tools for conducting the research to collect data. The research instruments which were used in this study were:

Instrument for measuring mathematics achievement

1) Instructional innovation : Cooperative Learning Using STAD Technique

Cooperative Learning Using STAD Technique which was comprised of four steps:

1) scenario simulation, introducing new courses and stimulating students' interest in learning new courses. 2) Study and communicate in groups, explore the answers to questions and gain new

knowledge. 3) The group will share the results and show the answers to the questions within the group. 4) Teachers evaluate the results of each group. (Liu Wen, 2016)

2) Lesson plan: A total of Five lessons with 10 hours of primary math instruction were assigned.

Instruments for collecting data

Instrument for measuring : Mathematics Achievement

- 1) Final exam results (70%)
- 2) Usual test scores (20%)
- 3) Classroom performance (10%)

#### 4.3 Data collection

The procedures of data collection were as follows:

1. The sample was given the pretest for measuring Mathematics Achievement with constructed instrument.

2. The sample was taught by using Cooperative Learning Using STAD Technique.

3. After finishing the instruction, the samples received the posttest by using the same instrument which was used in the pretest.

#### 4.4 Data analysis

In this study, data were analyzed by using the statistical program according to the research objectives.

1. Compare Mathematics Achievement before and after receiving Cooperative Learning Using STAD Technique by using t-test for dependent sample.

2. Compare Mathematics Achievement with the determined criteria set at 70 % by using t-test for one sample.

### 5. Research Results

The results were presented according to the research objectives as follows:

5.1 Section 1 Result of comparing mathematics achievement of the students before and after receiving cooperative learning using STAD technique by using t-test for dependent sample.

**Table 1** Paired samples test

Group	N	$\bar{X}$	S.D.	t	p
Experimental group	30	9.27	8.55147	12.830	0

As shown in Table 1, Students had mathematics achievement after using the cooperative learning using STAD Technique (post-test) greater than before using the cooperative learning using STAD Technique (pre-test) at .05 statistical significant level ( $t_{29} = 12.83, p < 0.05$ ).

On average, Posttest scores were 9.27 points higher than Pretest scores (95% CI [13.71, 20.09]). Thus, it was concluded that, mathematics achievement of Grade 4 students after receiving the cooperative learning using STAD Technique is higher than before.

5.2 Section 2 Result of comparing mathematics achievement of students with the determined criteria set at 70 % by using t-test for one sample.

**Table 2**

Group	N	Full score	Criteria score	$\bar{X}$	S.D.	t	p
Experimental group	30	100	70	86.9	8.55147	10.824	0

As shown in Table 2, Since  $p < 0.05$ , we rejected the null hypothesis ( $H_0$ ) and conclude that the mean Mathematics achievement of the sample was significantly different than the average Mathematics achievement of the overall student population.

Based on the results, we can state the following:

The Mathematics Achievement of the Fourth Grade Students in Primary Schools after teaching with cooperative learning using STAD Technique was 86.9 from a possible full marks of 100 and the standard deviation was 8.55 which was statistically higher than the criterion of 70% at the .05 level of statistical significance.

Thus, it was concluded that, the mathematics achievement of the Grade 4 students who received the cooperative learning using STAD Technique was higher than 70%.

## 6. Discussion

The following points based on the research results were discussed:

6.1 To form a better sense of cooperation, students should not only rely on classroom time teaching, but also help students learn to start from life and practice and cultivate in combination with life. (Zhang Yan, 2011)

6.2 Students should not only learn simple operations, but also master the methods to solve mathematical problems that require higher thinking ability. Because this is one of the abilities that primary school students must have. They should learn to innovate, not be afraid of problems, and be able to think independently. (Zhou Shuhong, 2017)

6.3 The process of learning mathematics should not be boring. Students should gradually change the current situation of learning for learning and strive to improve their interest in learning. The theoretical explanation is that students are not only required to participate in mathematics learning in their own thinking, but also to guide their emotions to participate in learning. The mathematical skills they learn are important, and more importantly, they also include their love and confidence in mathematics. (Wu Qiong, 2013)

6.4 Teachers should establish the concept of serving students. The content and form of teaching should serve students. Teachers should put students' needs first in a series of activities. (Zhang Wenyu, 2011)

6.5 Each teacher has different specialties. Mutual cooperation between teachers can not only improve the quality of teaching, but also guide students to cooperate. (Wu Qiong, 2013)

## 7. Conclusion

Through comparative analysis of grade 4 students receiving cooperative learning using STAD Technique pre-test and post-test, according to the current situation of mathematics learning at the same level, after the intervention of cooperative learning using STAD Technique, students' mathematics achievement significantly improved and statistically higher than the 70% standard, reaching the 0.05 level. Therefore, this teaching method was feasible in primary school mathematics teaching, which helped to improve students' learning effect and mathematics achievement. The experimental results verified the research hypothesis.

In addition, the cooperative learning using STAD Technique, significantly improved students' performance in class, self-learning habits, and activeness in finding and solving problems.

## 8. Recommendations

The following are some recommendations based on the research results:

8.1 The traditional concept of education is deeply rooted, so many teachers and students have not been exposed to the "cooperative learning using STAD Technique". Therefore, it is necessary to implement the "cooperative learning using STAD Technique" on a large scale, improve students' group cooperation ability and their autonomous learning ability, and let students accept the "auxiliary learning classroom" student-centered teaching mode.

8.2 Although the teaching method of "cooperative learning using STAD Technique" is simple in implementation, many teachers have problems in grouping and can't actively guide in the process of group communication, so the teaching results are not obvious. This requires our teachers to have experience and patience in the implementation of the teaching method of "cooperative learning using STAD Technique". Only with the joint efforts of teachers and students can we see the obvious effect.

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