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## **The Effects of Cooperative Learning in Teaching Measurement Conversion on Grade V Mathematics**

*Shiella Mae Batoy<sup>a</sup>, Mc Ivony Grace Palma<sup>a</sup>, Laiza Mae Talam<sup>a</sup>, Jovenil Bacatan<sup>a\*</sup>*

*<sup>a</sup>UM Peñaplata College, Obenza Street, Peñaplata, Island Garden City of Samal, 8119, Philippines*

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### **ABSTRACT**

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The purpose of this study is to determine the effects of cooperative learning in teaching measurement conversion in Grade 5 Pupils in Camudmud Elementary School. The researchers observed that the students are more actively participating when they are engaged into group activities where they can share their knowledge with others. The researchers used the experimental method of research employing the adopted questionnaire as a data gathering instrument. The respondents of the study were the 41 pupils from Camudmud Elementary School, Island Garden City of Samal, Philippines during the school year 2017-2018. The statistical tools used in this study were the Average Weighted Mean and t – test. It was found out the cooperative learning was more effective than traditional learning in teaching conversion to the learners. With the result of our study, it is recommended that teachers should apply Cooperative Learning strategy especially when they are teaching conversion, and the school administrator should consider cooperative learning as one of the school administrators should consider cooperative learning as one of the strategies in teaching to improve their students learning especially in teaching conversion.

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Keywords: Cooperative Learning, Conversions, Units Of Measurements, Traditional Learning

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### **1. Introduction**

Mathematics is one of the most complex situation and most difficult subject. There are maximum number of learners found that mathematics is very difficult to apprehend the topics through only chalk and board ways of teaching. A lot of learners are afraid to take answer problem and has a misconception of mathematics subject that takes to every learner to cheat in this subject. Van den Heuvel-Panhuizen & Buy (2008) the measurements can concrete by using the units or the apparent cognitive evaluations of the volume, length, and mass items. The elementary school endorsed that conversion of measurements like is, capacity, and the length must be trained in separate series to focusing the operation.

Filipinos are having the shy attitude and irritated towards mathematics. They don't have enough courage to answer the problem due to the facts that they don't understand the topics and having the anxiety of commenting errors for themselves and with Gonzales & Torres (2015) professionals education department, conducted a study on grade 8 students in private school of manila, which it stated that according to Jhonson & Jhonson (2015), "cooperative learning (CL) is the academic use of the class that has a small groups which the learners engage and work together to complete the problem and improve their personal and individual learning.

In the Island Garden City of Samal, the teacher of Grade 5 in Camudmud Elementary School Ms. Emelyn Mangalop Baryo said that in teaching mathematics are quite difficult. There are few students are not interested in the discussion because they can have the struggle of understanding the concept of the discussion. She recommended that in teaching mathematics especially in the conversion of measurements. The teacher must have the power to encourage the students and if possible give awards because through positive response have a more excellent effect.

\* Corresponding author. +639366029258

E-mail address: [jovenilbacatan@umindanao.edu.ph](mailto:jovenilbacatan@umindanao.edu.ph)

### 1.1. Hypothesis

- 1.1.1 There is no significant difference between the post-test of experimental and controlled class.
- 1.1.2 There is no significance difference in pretest and post test mean score of the students in the control group.
- 1.1.3 There no significant difference in pretest and post test mean score in the experimental group.
- 1.1.4 There is no significance difference in the mean approach and the students who were exposed to the traditional approach.

### 1.2. Theoretical Framework

This study is anchored by the three main theories cited by Johnsons and Johnsons (2002); Cooperative learning theory, Lev Vygotsky (1978) Social Learning Theory and Robert Slavin's Theory of Cooperative learning. Cooperative learning is primarily based, the systematic academic method in which small groups work together to obtain a common purpose (Jonhson and Johnson 1994). Social interdependence concept views cooperation as a result of individuals to accomplish a common goal. The strength of the group is such that exchange in any member or subgroup immediately changes each other member or subgroup.

Vygotsky's (1978) studied the social learning theories that facilitate us to recognize how people learn in the social context (learn from each different) and informs us on how we, as an instructor constructed active learning groups. Vygotsky examined how our social environments affect the learning procedure. He recommended that learning takes area via the interaction students have with their peers, teachers, and different professionals. Therefore, teachers can create a learning environment that maximizes the learners' potential to interact with every different through discussions, cooperative learning, and feedback. To support the two theory Slavin (2014) stated that interdependence advanced from common goals provided the critical essence of a group. This interdependence creates groups which a dynamic whole. The power of the group is such that an alternate in any member or subgroup at once changed every other member or subgroup.

However there a few theories that opposing the theory of cooperative learning in the classroom instead practices of teaching therefore provided for good enough tutorial guidance to improvement in a student (mind, body, and spirit). Individual education is about the usage of other strategies to connect to individual learners learning strategies. (Prem, 2012) The teacher can structured classroom environments with a purpose to cope with the variety of interest, fashion, and abilities discovered inside a classroom. On this strategy, the teacher will stick the same sample of teaching rather than adapt a new way of strategies consisting of the audio, video, discipline trip, etc. That student can have more choice in taking facts and making sense of ideas.

The goal is to see the enhancement in the student learning in using the cooperative learning in teaching conversion of measurement on Grade 5 students. The researcher wants to see the difference between Traditional teaching and the cooperative learning inside the classroom. The researchers didn't aim to compare the traditional teaching but aim to have a good combination and integration of the traditional and the cooperative learning, especially in the primary education since it is foundational of the school level.

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## 2. Literature Review

A study examined the effects of cooperative learning in teaching conversion of measurements on mathematics at grade 5 students. Conduct the conversion of measurement in grade 5 students to find what the result of their understanding and what those behavioral changes towards the topic. That the students involved in cooperative learning perform significantly better than students, who are not exposed to cooperative learning. The review of the literature on cooperative learning in conversion units of measurements shows the benefits of learners' social and academic learning by the cooperative learning.

The learners are unpredictable that the can discover it out easily on how to solve the problem. To observed observe the behavioral changes of learners towards mathematics. The learners can take goals of solving the problem to ensuring that they prove is essential (Gillies & Haynes, 2011). The formal, informal, and base groups are the three forms of cooperative learning by Johnsons and Johnson (2008). The class star to base group learning that learners observe lecture in which delivered by using the informal cooperative learning. The lecture is observed by the formal cooperative learning.

The teacher needs to consider the importance of conducting the cooperative learning the composition and size of groups. Lou (2014) cited that the learners can learn and achieve higher academic outcomes when they are working in a small group that occurs in traditional sit and gets in whole class. The learners must work better if 3-5 groups members in a one group than 6-9 members. The information and changing of ideas are transmitted rather than construct.

Cohen (2005) stated that the arriving of the contribution of each idea and the group products of the students during the activities. The group products are come out with the wider class, the structure that designs the group cohesion and to motivate the learners to complete the task. Also, the cooperative learning contributes social interdependence that learners communicate to each other well. On the other hand, Slavin (2014) cited that is critical to conduct the groups that accord of four learners to perform for flexibility and consist of heterogeneous high and low learners. The structural equation is used in this study to examine the cooperative learning. To form a group's activity inside the class can promote improvements of social and academic performance of the learners.

The cooperative learning immanent function of human and find out as promote the alternative ways of teaching (Jolliffe, 2015). He stated that kids grow

with their desire to learn without any expectation of rewards. The learners are generally tended to carry out the social sitting and mutual expectations. The researcher Slavin (2010) stated that the learners gain the high academic performance in mathematics by the using of cooperative learning than the traditional classroom. The cooperative learning strategies enhance the knowledge of the learners in the mathematics.

In the study about the measurements, Belino (2015) stated that the interaction of instruction implies discussion and sharing ideas and knowledge of the individual in the groups. He suggested through discussion and sharing can provide opportunities in learners to act to the works, knowledge, ideas, and insight to improve their critical thinking skills. According to Walshaw and Anthony (2008) using the cooperative learning the learners can overcome less their difficulties and create the social interactions of each. The environments are needs to be a positive place for the learners to work cooperatively and sharing the information where the learners can feel comfortable and inflecting on ideas of what they are doing, and the learners can focus to listen to the teacher instructions.

### **2.1 Conversion**

National Council of Teachers of Mathematics (NCTM 2000) stated that kinder garden to grade 2 measurements standard, the early teaching of measurements learning should include an understanding of measurable attributes (width, length etc.) apply the varies techniques of measurements (units, units iteration repetition, tool, common referent, etc.) system of measurements and units of measurements guide the worldwide of units (SI) stated the units is a specific quantity to describe and follow by gathering information. Which specific quantities of the equal kind is a comparison. Gruber (1994) was declaring the units of measurements is an absolute that can be used as a general quantity the entire of measurements is accommodating a set of units of measurements and derives from other units called conversion. The worldwide metric system it is primarily base on length, kilogram, temperature, etc. the system and traditional individual of units are embedded.

The research of Battista (2010) cited the importance of units of measurements is rarely to analyze that the learners using units to the numerous concepts. Those consist the understanding of units that identify the abstracting, iterating units and coordinates of units. The study of Battista et al. (2006) conduct with 40 learners it focus in 6 to 8 years old the cognitive understanding in units of measurements. Both ages of learners have an understanding of units to measure the size of units including the mass in additional the volume and distance are difficult for the earners to understand the units of measurements and the object the being measure.

Van den Heuvel-Panhuizen & Buys (2008) cited that the real state in value of integrated education about length, mass, and volume, etc. are starting with evaluating and ordering then using single units to find the quantity and using the instruments or instructions to examine. Johnson (2002) suggested that the kids are no longer having the idea of conversion of units' measurements as a part of their ordinary thinking.

### **2.2 Length**

The US elementary school proposed that conversion units of measurements the length must be taught in an isolated series rather than comparable this dimension to focus the operation, Smith et al. (2006). Some researchers examine the concept of units for measuring the higher spatial quantity that increases the knowledge of the learners. (Steffe & Olive, 2010) by establishing the used of intergraded and abstract cognitive for solving units of measurements.

### **2.3 Area**

The value of education integrated throughout the area. That starting in evaluating and observing and apply the single units to find out the quantity of the units of measurements. To set out the importance of knowledge in units of measurements the learners learns to solve and learns the numerous understanding of the area (Battista, 2010). In addition, Empson et al. (2006) cited the developing pattern of ways of noticing and the used of the structure as a quantity of area, such as the learners used the sets of squares and organized the development from disconnected squares tiles, to spiral set to uncoordinated rows of tiles after which partially coordinated units of rows.

### **2.4 Weight**

According to Papageorgiou & Johnson (2005), the education research can also lead to science education where weight and mass are discussed that depends on the knowledge of the learners involving the behavioral changes. That the learner learns better by giving the clear instruction of converting weight and differentiate the mass and weight. Johnson (2000) suggested that the learners are no longer ideas of topics in experiences as the part of their thinking.

### **2.5 Volume**

Mean the significant and general of the theoretical perspective of the units understanding of mathematics. The learner has benefits as they work on measuring the task that emphasizing of the common units and concepts across the length, perimeter, volume, and area. Mulligan (2005) that specializing the units cognitive has an evident, but fewer will understand the kinds of task layout consideration decision making that evolved learners and researchers

to investigate the unit concepts across the number context from an area, length, weight, and volume (Langrall et al. 2008).

### 3. Methods

#### 3.1 Research Design

This study utilized the experimental method of research. Karim (2014) stated that experimental research is where the researchers have the control over the independent variable, systematic and scientific approach. In this study, the researchers will gather data to identify. This was done by gathering data from the respondents through a questionnaire that identified "The Effect of Cooperative Learning in Teaching Measurement Conversion to an elementary school of the Island Garden City of Samal. The result of the gathered responses served as the basis of the study.

#### 3.2 Research Subject and Participant

The respondents of this study were consists 20 samples of the students in a control group and 21 students in experimental group from Grade 5 students in Camudmud Elementary School that used an average class of respondents' research study is to ensure the variability and balance among participants from two separated group.

#### 3.3 Research Instrument and Data Gathering Procedure

The instrument is used in gathering the data process in this study was a research-made questionnaire which was validated by experts. This was composed of 30 items statements. The researchers wrote a letter asking permission from the School Principal to conduct a study on "The Effect of Cooperative Learning in Teaching Measurement Conversion on Grade 5 Mathematics." With the approval of the said request, the researchers conducted the study for two weeks which included the conduct of pretest, delivery of instruction to the identified students in the experimental and control group and the conduct of posttest. The data collected were tallied, collated, recorded and analyzed statistically accordingly. The results of the study were interpreted based on the table below.

**Table 1-Descriptive Interpretation of the Score Interval**

Range of the Test score	Descriptive Equivalence	Interpretation
25.20 – 30.00	Outstanding	This means that the respondents show extremely high performance in the conversion of measurements.
22.80 – 25.19	Very Satisfactory	This means that the respondents show high performance in a conversion of measurements.
20.40 – 22.79	Satisfactory	This means that the respondents show a moderate performance in the conversion of measurements.
18.01 – 20.39	Fairly Satisfactory	This means that the respondents show unsatisfactory performance in the conversion of measurements.
0.00-18.00	Unsatisfactory	This means that the respondents need improvements on the performance in the conversion of measurements.

## 4. Results and Discussion

#### 4.1 The Pretest Mean Score of the Experimental and Control Groups

Table 2 below shows the pretest mean scores of both experimental and control groups. This shows that the mean score of experimental is 11.43 and the control groups is 10.15 with the respondents of twenty-one (21) and twenty (20) in the control groups. This implies that both experimental and control groups have a description equivalent of unsatisfactory and this means that students need improvements in the conversion of measurements.

Conversion of measurements embraced the important ideas about number which involve the problem activities and communication of number. Therefore the abstract objects that we feel, hold, and see. The National Institute for Education Development (2010) found the poor performance of mathematics in Grade 5 students was lack of learning support and perceived shortage of instruction resources. The causes of poor performance on the conversion of measurements during the pretest, that student have a misconception of mathematics as a difficult one especially in the conversion of measurements.

**Table 2-Pre-test Mean Scores of the Experimental and Control Groups**

Groups	N	Mean	Descriptive Equivalent
Experimental	21	11.43	Unsatisfactory
Control	20	10.15	Unsatisfactory

**4.2 The Posttest Mean Score of the Experimental and Control Groups**

Table 3 below shows the post-test mean score of the experimental and control groups with twenty-one (21) respondents in the experimental groups, and it has the posttest mean score 20.05 and twenty (20) respondents for control groups it has a posttest mean score of 11.15. The control group has a descriptive equivalence of unsatisfactory this means that the students of control groups need improvements on conversion of measurements. The experimental groups have a descriptive of an equivalent of fairly satisfactory this unsatisfactory, but there are improvements of conversion of measurements. As cited by Graham (2005), when comparing the cooperative learning and traditional learning or another method of teaching to analyze the different terms of the outcome of the students' achievements. There is a gap exists between the cooperative learning and traditional learning in the class environment.

**Table 3-Posttest Mean Scores of the Experimental and Control Groups**

Groups	N	Mean	Descriptive Equivalent
Experimental	21	20.05	Fairy Satisfactory
Control	20	11.15	Unsatisfactory

**4.3 Significance of the Difference in the Pre-test Mean Scores of the Experimental and Control Groups**

Table 4 below shows the significant of the difference pre-test mean score of the experimental and control groups that gain the mean difference of 1.28 with the computed t-value of 1.03 and the p-value of .311. This accepts the hypothesis that implies that there is no significant difference between the pre-test of experimental and control groups.

These differences of the mean score in pre-test signify in experimental and control groups performed unsatisfactory during the test of measurement conversion and not significant in the mean score of the pretest. Therefore, the experimental and the controlled are comparable on the level of performance, and there are no gaps in the knowledge between experimental and controlled groups in a conversion of measurements. Means that both experimental and the control need to improve their knowledge in a conversion of measurements. Ardisna (2006) cited that mathematics based on National Council of Teacher of Mathematics (NCTM) would raise the mathematics achievement of student knowledge and skills. That improves the academic learning of student especially in writing skills and enhances the level of performance in mathematics. This means that the experimental and control groups start at the same level of performance in the conversion of measurements.

**Table 4-Significance of the Difference in the Pretest Mean Scores of the Experimental and Control Groups**

Pretest Mean Scores		Mean Difference	Computed t-value	p-value	Remark
Experimental	Control				
11.43	10.15	1.28	1.03	.311	Not Significant

**4.4 Significance of the Difference in the Pretest and the Posttest Mean Scores of the Control Group**

The table shows the significance of the difference in the pre-test and posttest mean score of the control group that gains mean score of 10.15 of the pretest and the posttest is 11.15 with the mean difference of 1.00 and the p-value of .546. This shows that the hypothesis is accepted and implies that there is no significant difference in the pre-test and posttest of the control groups.

Siegler (2003) cited that the learner shows individual of significant differences in their ability to perform arithmetic problems. The consequential is the differences of procedural knowledge and cognitive understanding during the early stage of learning that can unlock the difficulties of the learners in academic skills. According to Huang (2006) that the teacher directed transmits the information to the learners which means that the learners achieve the situation and create their own knowledge.

**Table 5-Significance of the Difference in the Pretest and the Posttest Mean Scores of the Control Group**

Mean Scores of Control Group		Mean Difference	Computed t-value	p-value	Remark
<i>Pretest</i>	<i>Posttest</i>				
10.15	11.15	1.00	.61	.546	Not Significant

#### 4.5 Significance of the Difference in the Pretest and the Posttest Mean Score of the Experimental Groups

The table below shows the significant of the difference in the pretest and the posttest in experimental groups. The mean score is 11.43 in the pretest, and 20.05 in the posttest with the mean difference of 8.62 and the p-value of .000. This implies that the hypothesis is rejected. This means that there is significant difference in the pretest and posttest mean score in the experimental groups.

Gillies (2014) found that to create a strong environment of the cooperative learning is to less the discipline issues. Give a chance to interact, listen, to share ideas, and ask questions to each member and teacher that creates the positive relationship of academic skills and social skills. There are big differences between the cooperative learning and the traditional way of teaching the conversion of measurements in Grade 5 Mathematics. That student enhances their social interaction which promotes the relationship among students.

**Table 6-Significance of the Difference in the Pretest and the Posttest Mean Scores of the Experimental Group**

Mean Scores of Experimental Group		Mean Difference	Computed t-value	p-value	Remark
<i>Pretest</i>	<i>Posttest</i>				
11.43	20.05	8.62	8.97	.000	Significant

#### 4.6 Significance of the Difference between the Mean Gain Scores of the Experimental and the Control Groups

The table below shows the result of the mean gain score of the experimental and control groups, with the twenty-one (21) respondents in experimental and twenty (20) in control groups. The mean gain score of the experimental 8.62 and the control groups is 1.00 with a mean difference of 7.62 and p-value of .000, which means rejection of the hypothesis. Therefore, there is significant between the mean gain score of the experimental and control groups.

As cited by Johnson and Johnson's, (2008), cooperative promotes a positive environment in the class that the students show high performance in academic activities especially in mathematics. This happened when learners work together in a small group and having a responsible for their own learning and the learning of the each member of the group for the successful task of the groups (Slavin, 2010). The processing of the group has biggest effects in a contribution of the learners and sharing efforts and idea to gain the assigned task (Yamarik, 2007). This implies that the cooperative learning helps to improve the academic performance of the students rather than individual learning. In addition Siegel (2005) cited the cooperative learning are consist of two or more learners to work in the same group to complete the complex situation. The learners develop their skill of cooperation that leads to learning that they are responsibility for each learning rather than competitive learning (Lavasani & Khandan, 2011).

**Table 7-Significance of the Difference between the Mean Gain Scores of the Experimental and the Control Groups**

Mean Gain Scores		Mean Difference	Computed t-value	p-value	Remark
<i>Experimental</i>	<i>Control</i>				
8.62	1.00	7.62	4.55	.000	Significant

## 5. Conclusions and Recommendations

The following are the conclusions based from the findings.

- The experimental and control groups have the same descriptive equivalence of unsatisfactory performance in the pretest.
- The experimental group has a descriptive equivalence of fairly satisfactory which show the improvement in performance of students on conversion of measurements while in the controlled group has a descriptive equivalence of unsatisfactory which show that the students need improvement in conversion of measurements.
- The significance difference implies that the students vary in their individual learning.
- The significance of pretest of experimental and controlled groups is not significance. The pretest of an experimental and controlled group is

- comparable; there are no gaps exist between in the pretest of the experimental and controlled group.
- By having the teaching-directed approach in the controlled group, there is a difference that there is a significant improvement in the performance of the controlled group in the conversion of measurements.
  - There is a significant difference in the pretest and post test mean scores of the experimental group in defiance of the facts that the pretest of the experimental group is already high.
  - The results that were presented of the experimental show an increase performance from pretest to posttest while the controlled groups is need improvements in the conversion of measurements and this is significant enough to conclude that cooperative learning is more effective than the traditional method.

Based on the result of the study the following recommendations were offered:

- Teachers are recommended to apply cooperative learning strategy, especially in teaching mathematics.
- To the school administrator of school based on the result of our study, we would like to recommend that cooperative learning should be considered as the one of the strategies in teaching to improve their students learning especially mathematics. Other school administrators may also adopt the said strategy.
- We would like to recommend future researchers to conduct the same study in different schools to confirm the effectively of the intervention the researchers used; future researchers should conduct another study using the cooperative learning in different topics of mathematics.

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