

# Effect of Learning-Together Technique on Pupils Achievement in Primary Mathematics

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## ABSTRACT

*The purpose of this study is to determine the effect of learning together technique or cooperative learning method on pupils' achievement in mathematics. The study employs an experimental design with control group. It was carried out in Owerri Municipal Area of Imo State. A sample of 58 primary six pupils is used for the study. Two hypotheses were postulated to guide the study. A 20 item multiple choice Mathematics Achievement Test (MAT) was utilized to collect data. T-test statistics is used to test the hypotheses at 0.05 level of significance. The results of the study reveal that learning-together technique or cooperative learning method is more effective and there is no significant difference in mean scores achievement of male and female in learning-together technique or cooperative learning. It is recommended that cooperative learning method be used in mathematics teaching at all levels of education and mathematics laboratory should be designed for the use of cooperative learning method in mathematics teaching at all level of education. These laboratories should be designed in the way of providing the groups for special tasks.*

**Keywords:** *Learning together technique, co-operative learning method, mathematics, pupils*

## INTRODUCTION

Moving with the 21st century learning, under the impact of global forces, all nations are facing a range of political, social, economic, technological and educational changes. With the growth in science and technology, it is widely accepted that the world is increasing only becoming more scientifically and technologically advanced. Towards revolutionizing Nigeria education system, the 1969 conference gave birth to the National Policy on Education which brought about significant changes to the Nigerian educational system (Alebiosu and Ifamuyiwa, 2008). The Nigerian government came up with 6-3-3-4 policy on education while in 2004 the system was reviewed and the 9-3-4 system of education was introduced replacing the 6-3-3-4 system that was in operation at the time.

Moreso, Nigerian government also came up with a policy that 60 per cent of the students seeking admission into the nation's universities, polytechnics, and colleges of education should be admitted for science-oriented programmes, while 40 percent of the students should be considered for Arts and Social science programme (Ajibola, 2008). Educators understand that changes in student outcomes must be supported by parallel changes in curriculum and instruction. Also, lack of mastery in mathematics is less successful in the subject, improper use of instructional materials, lack of proper text books are the major causes of poor performance of pupils in mathematics. The teaching method used in the classroom is another factor that makes pupils become passive and have less interaction with each other in doing task. Many teachers today were educated in the era where the role of the students was to memorize information, conduct well-regulated experiments and were then tested on their ability to repeat these tasks (Dogru and Kalender, 2007). Today's teachers across the nation are challenged to address and use different techniques in the teaching and learning especially in this 21st century of ICT dominance. Dorgu (2008) reports on the National Council for Teachers Assessment Task Force recommended a more effective use of innovative technique in teacher education programs. Teacher's ability to select appropriate learning technique is an essential component of the ultimate success in the classroom. Therefore, teaching pupils how to communicate effectively, cooperate with others and engage in self-learning have become the basis of education (Cheng, 2003b). Teaching and learning approaches such as jigsaw method, experimental learning, inquiry learning which, especially cooperative learning attracts the attention of many educators and constitutes a better alternative to the traditional learning methods.

According to Wendy (2005), cooperative learning is a process in which students learn by working in several groups and helping each other's learning for a common goal. It requires a small number of students to work together on a common task, supporting and encouraging one another to improve their learning through interdependence and cooperation with one another (Lamy and Hartman, 2002). The cooperative learning group usually comprises two or five students in a group that allows everyone to participate in a clearly designed task (Sarah and Cassidy, 2006 and Wendy, 2005). Students within small groups' cooperative learning are encouraged to share ideas and materials and divide the work when appropriate to complete the task. Small group competitive learning provides students with opportunity to explore and discuss topics with peers in a Bonds-on, interactive environment (Lamy and Hartman, 2002). Gillies (2004) affirms that students benefit academically and socially from cooperative small group learning. In order to construct a lesson with co-operative method, five basic principles that must be provided as outlined by Johson D. and Johson R. (1991) include:

- Positive interdependence.
- Face to face primitive interaction.
- Individual accountability

- The appropriate use of social skills.
  - Processing how well the group is time framing
- Co-operative learning method includes many techniques. Some of them are:

- Learning Together (LT).
- Teams-games-tournaments (TGT).
- Group Investigation (GI).
- Constructive Controversy (CC).
- Jigsaw Producers (JP).

This study focuses on learning together which is a branch of co-operative learning. The learning together method of co-operative learning was originally developed by David Johnson and Roger Johnson at the University of Minnesota. Learning together technique is a strategy which student's work as in four or five heterogeneous group on a group assignment sheet. During discussion, if students ask the teacher a question, the teacher will refer such students to their groups to find answer. After the group discussion; a leader is chosen to present group's result to the entire class, and groups receive reward together. Scores are based on both individual performance and the success of the group, but individuals do not compete with one another. The learning together strategy of co-operative learning provides a conceptual framework for teachers to plan and tailor cooperative learning strategy according to their students needs. Also, it encourages pupils to interact and communicate with peers in harmony; it promotes values, such as honesty, cooperation, mutual respect, responsibility, tolerance, and willing to sacrifice a consensus. Learning-together method can develop self-confidence in pupils (Ghazi, 2003). When learning together technique is applied the following options must be put in place:

- Determining of instructional objectives.
- Deciding the group size.
- Dividing the pupils into groups
- Class space.
- Planning of educational materials to provide dependence.
- Explaining of the academic work.
- Creating the positive objective dependence.
- Individual evaluation.
- Ensuring co-operation among the groups.
- Explaining the criteria necessary for achievement.
- Determining the required behaviours for success.
- Shaping the pupils behaviours.
- Assisting the pupils in their group work.
- Finishing the lesson.
- Evaluation for students learning qualitatively and quantitatively.
- Evaluating the performance of the group.
- Forming academic contrasts.

The challenges of teaching mathematics are to teach it in a way that enables pupils to learn mathematical concepts while acquiring skills and positive ability to analyze, and make powerful decisions. One of the effective ways of accomplishing these objectives is through involving students in hands-on-activities of learning together. David and Stanley (2000) conduct a met-analysis on the effectiveness of cooperative learning strategies. When the impact of co-operative learning lessons were compared with competitive learning, Learning Together (LT) promoted the greatest effect followed by Academic Controversy (AC), Student-team Achievement (STA), Team-Game-Tournaments (TGT), Group Investigation (GI), Jigsaw, Team Assisted Individualization (TAI) and Cooperative Integrated Reading and Composition (CIRC). When they compared the impact of co-operative learning lessons with individualistic learning, LT promotes the most effect, followed by AC, GI, TGT, TAI, STA, jigsaw and CIRC.

Chiu (2002) observes a teacher who used three co-operative learning methods (LT, STA and TGT) to solve the instructional problems and found out that Learning Together (LT) of the other cooperative methods had a positive effect on the student's achievement in junior high school English. Ghazi (2003) investigates the effects of learning together technique of cooperative learning in improving English as a Foreign Language reading achievement and academic self esteem. The researcher employs pre-test-post-test control group experimental design. The result indicated a statistically significant difference in favour of the learning together strategy on the variable of EFL reading achievement. The above discussion suggests that when learning together of cooperative and constructivist learning environment are fused together in a classroom situation, students achievement can be improved. Based on the foregoing, this study sets to explore the effect of learning together technique on pupils' achievement in primary mathematics. Consequently, the following research hypotheses were formulated for the study.

1. There is no significant difference between the mean scores of pupils taught mathematics using learning together (LT) and those taught using traditional teaching Approach Group (TAG)
2. The mean scores of pupils taught with Learning-Together (LT) of cooperative learning techniques do not significantly depend on gender.

## METHOD

The study adopted a quasi-experiment research design. A sample of 68 primary six pupils was randomly selected from Alvan Ikoku Federal College of Education staff primary school in Owerri Municipal Council Area of Imo State. The participants in the study were pupils in two streams primary six classes. One of the two classes called traditional teaching approach group (TTAG) was taught with the traditional teaching approach (TTA) and the other class called learning together group (LTG) was taught with the learning together strategy (LTS). The TTAG had 30 pupils (14

boys and 16 girls). A well validated 25 items multiple-choice Mathematics Achievement Test (MAT) on the topics algebra, geometry, number and numeration scored over 100% served as the instrument for data collection. A test-retest method was utilized to test the reliability of the instrument using KR-20. The co-efficient was 0.82 showing that the instrument was reliable and acceptable for the study. In administering the instrument, both groups were pre-tested to ensure equal cognitive background after which the TTAG did their lesson without the use of innovative strategies. After two weeks of treatment, a post-test was administered to both groups using the re-arrangement pre-test instrument. The results obtained were analyzed using t-test statistics.

## RESULTS AND DISCUSSION

The z-test analysis result shows that the calculated value (8.776) is greater than the critical value (2.000) at 0.05 level of significance, the null hypothesis that there is no significant difference between the mean scores of pupils taught mathematics using Learning Together (LT) and those taught using traditional teaching approach is rejected. Therefore, there is a significant difference between the achievement of pupils taught mathematics with learning together and those taught traditionally. The results show a non-significantly difference between the achievement of male and female in LTG. The t-test analysis reveal a statistical significant difference between the mean scores of pupils taught with the Learning- Together strategy and those taught traditionally. The result is in agreement with the findings of David *et al* (2000) who conducted a met-analysis on the effectiveness of cooperative learning strategies.

When the impact of co-operative learning lessons were compared with competitive learning, Learning Together (LT) promoted the greatest effect followed by Academic Controversy (AC), Student-team Achievement (STA), Team-Game-Tournaments (TGT), Group Investigation (GI), Jigsaw, Team Assisted Individualization (TAI) and Cooperative Integrated Reading and Composition (CIRC). When they compared the impact of cooperative learning lessons with individualistic learning, LT promotes the effect, followed by academic controversy, group investigation, team-game-tournaments, team assisted individualization, student-team achievement, jigsaw and cooperative integrated reading and composition. The result of the study also reveals non-significant difference between mean scores of male and female pupils taught mathematics using learning together strategy. This implies that this teaching strategy created an environment that is equally formulated to both the male and female LTG students' tend to work more co-operatively with their peers and teachers to complete the tasks assigned to them.

**Table 1:** Summary of t-test analysis for the post tests scores for the (TAG) and (LTG)

Group	N	Mean	SD		$T_{cal}$	$T_{tab}$	Decision
TAG	30	46.30	6.5	0.05	8.776	2.000	Reject
LTG	28	58.70	6.3				

**Source:** Quasi-experimentation, 2014

**Table 2:** Summary of test- analysis on gender

Gender	N	Mean	SD		$T_{cal}$	$T_{tal}$	Decision
Male	10	48.4	7.8	0.05	0.4403	2.056	Reject
Female	18	47.5	7.5				

*Source:* Quasi-experimentation, 2014

## CONCLUSION AND RECOMMENDATIONS

This study was conducted to examine the effect of learning together technique or cooperative learning method on pupils' achievement in mathematics. The results of the study reveal that learning- together technique or cooperative learning method is more effective and there is no significant difference in mean scores achievement of male and female in learning together technique of cooperative learning. Hence, this study concludes that learning together technique of cooperative learning method is more effective than traditional method. In addition, there is non-significant difference between the mean scores of male and female pupils taught mathematics using learning together strategy. In the light of conclusion obtained in this study and result reached, the following recommendations were made:

1. Co-operative learning method should be used in mathematics teaching at the level of primary, secondary and tertiary schools.
2. Taking results more successful when compared to traditional teaching methods cooperative learning method and its techniques should be incorporated into the curriculum and taught at the lesson of special teaching methods in the Education sector.
3. Mathematics laboratory should be designed for the use of cooperative learning method in mathematics teaching at all levels of education. These laboratories should be designed in the such a way that promotes peaceful co-existence between members of the groups.
4. Conferences and Seminars about co-operative learning method and teaching should be held from time to time for the teachers.
5. Comprehensive projects which the experts in mathematics teaching and experienced teachers participate should be done in order to improve mathematics teaching.

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