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Impact of Peer Tutoring and Co-Operative Learning on the Academic Achievement of Adolescents in Education District II of Lagos -State (Assessment implication for Evaluators)

OLUBUKOLA OLUTOSIN AKANNI
University of Lagos, Akoka, Nigeria

Abstract. The current paradigm shift in teaching-learning processes of the 21st century education space is the student centered approach of keeping the students actively engaged and involved within the limited learning time. It is no more the teacher centered approach, whereby teachers to do all the talking while students watch and listen during class time of lessons. 'With the aim of sustaining this paradigm shift, the study examined the impact of peer tutoring and cooperative learning on academic achievement of adolescents in Education District II of Lagos State. The descriptive survey research design was employed. Three hypotheses were formulated to guide the study. The instrument for the study was a self-constructed questionnaire "Impact of Peer Tutoring and Cooperative Learning on students' Academic Achievements (IPTCLSAA) questionnaire, and Mathematics Achievement Test (MAT). Findings from the study revealed that cooperative learning, peer tutoring exerts a significant influence on students' achievement in Mathematics lastly, the joint effect of students' use of cooperative learning and peer tutoring towards Mathematics was significant on their academic achievement, when such effect accounted for 27.6% of the variance in the students' academic achievement; such significant effect emanated from the individual significant contribution or influence which the culture of using peer tutoring had on academic achievement, while the culture of using cooperative learning had no significant effect on academic achievement. It was recommended among others that the Nigerian Government/Ministry of Education/all well-meaning education stakeholders should encourage the school teachers with financial aids or incentives in order to attend seminars and capacity building workshop in relation to best practices of using cooperative learning and peer tutoring to impart knowledge in mathematics, and that curriculum planners should replicate this research in order to authenticate the findings obtained.

Keywords: Impact, Peer Tutoring, Cooperative learning, Adolescents', Academic Achievement.

1. Introduction

Education plays a pivotal role in maximizing an individual's potentials and is important for a meaningful and sustained economy both at the state and national levels Differences in individual abilities have caused variation in human learning. Several activities such as group work, private tuition, mentoring and peer tutoring have been known as one of the best methods to enhance students 'learning (Ali, Anwer, and Jaffar. 2015). Educationists had made efforts in improving teaching-learning processes. But teachers are still searching and experimenting to get the best methods for the optimal academic performance of the students. This is because, in the conventional approach of teaching, most of the class time is spent by teachers talking while students are watching and listening. However, educationists have proposed that learning should shift from teachers-centered, to students-centered, so that learners can be actively involved in the learning process. Several pieces of research have shown that Cooperative learning and peer tutoring has been highly effective in enhancing both tutor and the student's achievements in a range of educational settings

Cooperative learning is a teaching strategy that organizes students in small groups so that they can work together to maximize the learning of others. Cooperative learning has been used by many researchers as instruction strategy with positive and improved results. The main advantage of this method over other teaching methods is mainly in terms of its effectiveness for improved cognition, social skills and

motivation (Ajaja & Mezieobi, 2018). Johnson and Johnson (2009) defines cooperative learning as the instructional use for small groups in which pupils/students work together to maximize and gain from each other. In cooperative learning, pupils are expected to help, discuss and argue with each other, assess each other's current knowledge, and fill any gaps in each other's understanding (Slavin, 2015). Students who participate in cooperative learning have been shown to perform significantly better on critical thinking than students who studied individually. Bruffee (2015) sees cooperative learning as a set of processes that help people interact in order to accomplish a specific goal or develop a product, which is usually content specific. Kagan (2019) describes cooperative learning as a small group of learners who work together as a team to solve a problem, complete a task or accomplish a common goal. When students are in a cooperative learning environment, it is assumed that they seek information and understanding through active mental search without discrimination in gender or ability and the learning is long term (Lefrancois, 2014).

Cooperative learning is one of the two ways of organizing the learning environment of a classroom, the other being competitive. In a cooperative learning environment, the goals of separate individuals become so linked that there is a positive correlation between them; on the contrary, in a competitive conventional environment, the goals of the students are so linked that there is a negative correlation between their goal achievements. It should be noted that cooperative learning share similarities with peer tutoring as the two methods seek to abandon the conventional approach (Hossain and Tarmizi 2013). Cooperative learning is an educational approach which aims to organize classroom activities into academic and social learning experiences. There is more too cooperative learning than merely arranging students into groups, and it has been described as "structuring positive interdependence". Students must work in groups to complete tasks collectively toward academic goals. Unlike individual learning, which can be competitive in nature, students learning cooperatively can capitalize on one another's resources and skills (asking one another for information, evaluating one another's ideas, monitoring one another's work, etc.). Furthermore, the teacher's role changes from giving information to facilitating students' learning. Everyone succeeds when the group succeeds. Ross and Smyth (2015) describe successful cooperative learning tasks as intellectually demanding, creative, open-ended, and involve higher order thinking tasks. Cooperative learning has also been linked to increased levels of students' satisfaction.

Five essential elements are identified for the successful incorporation of cooperative learning in the classroom. These are: positive interdependence; individual and group accountability; promotive interaction (face to face) teaching the students the required interpersonal & small group skills and lastly, group processing.

A learning environment that allows active participation of students in the learning process makes it possible for the students to have control over their learning and this leads to improvement in students' learning and retention to both the developmental and cognitive theoretical bases (Johnson, Johnson, & Stane, 2020; Rossini & Jim, 2019), thereby prevailing classroom climate of cooperation. Cooperative learning environment assumes that students seek information and understanding through active mental search with each group mirroring the make-up of the class in terms of ability, background and gender (Armstrong, 2018). Among all the instructional strategies for enhancing science achievement, emphasis is laid on the importance of group work (Alebiosu, 2018).

Proponents of cooperative learning claims that the active exchange of ideas within small groups not only increases interest among the participants but promotes critical thinking. According to Johnson and Johnson (2016), there is persuasive evidence that cooperative teams achieve at higher levels of thoughts and retain information longer than the students who work quietly as individuals. Some studies have recommended the efficacy of cooperative structures in that they lead to increase cohesiveness among the students involved, which are beneficial in classes that are diverse in ethnic composition, ability level or because of the inclusion of mainstreamed handicapped students (Crooks, 2018).

There are many different cooperative learning strategies; however, all of them have certain elements in common as established by Johnson, Johnson and Holubec (2021). These elements are the ingredients necessary to ensure that when students work in groups, they work cooperatively. Cooperative learning is not simply a synonym for students working in groups. A learning exercise only qualifies as cooperative learning to the extent that certain elements are present. These elements/strategies are:

Positive Interdependence: Team members are obliged to rely on one another to achieve the goal. If any team members fail to do their part, everyone suffers the consequences.

Individual Accountability: All students in a group are held accountable for doing their share of the work and for mastery of all of the material to be learned. Each member of a team is assessed individually. Teammates work together, but the learning gains of individuals form the basis of a team score.

Equal Opportunities for Success: Individual improvement over prior performance is more important than reaching a pre-established score (90 percent on a test, for example). A student who moves from 60 percent on a test one week, to 68 percent (8 percent improvement) the next week, contributes just as much to a group as a student who moves from 82 percent to 90 percent (also 8 percent improvement).

Face-To-Face Promotive Interaction: Although some of the group work may be parceled out and done individually.

However, some must be done interactively, with group members providing one another with feedback, challenging one another's conclusions and reasoning, and perhaps most importantly, teaching and encouraging one another.

Appropriate Use of Collaborative Skills: Students are encouraged and helped to develop and practice trust-building, leadership, decision-making, communication, and conflict management skills.

Group Processing: Team members set group goals, periodically assess what they are doing well as a team, and identify changes they will make to function more effectively in the future. Teams work to earn recognition for the improvement of each member of a group. The members of a group must perceive that they are part of a team and that they all have a common goal. Group members must realize that the problem they are to solve is a group problem and that the success or failure of the group will be shared by all members of the group. To accomplish the group's goal, all students must talk with one another to engage in discussion of all problems; finally, it must be clear to all that each member's individual work has a direct effect on the group's success. Teamwork is utmost important. However, the ultimate success of cooperative learning is based on a single and very important principle: Students must be taught how to participate in a group situation. Teachers cannot assume that students know how to behave in a group setting. These elements are the guiding principles of cooperative learning strategy which contribute to the success as a teaching and learning strategy.

Arends (2011) and Lefrancois (2014) described some of the models of cooperative learning as:

Student- Team Achievement Divisions (STAD): Students are assigned to permanent four-member learning teams that are mixed on the basis of gender, ethnicity and performance level. Lessons are presented in a traditional manner, but students work together to ensure that all team members master materials. Students work in pairs but on the worksheets tested individually and each student's score is compared to his or her past average. Team points are awarded based on the degree to which members exceed their earlier performance (Owen, 2015)

Teams-Games-Tournaments (TGT): TGT approach is identical to STAD, except students compete with those teams who are at the same performance level. Low and high achievers from each team compete with their counterparts and the top scorers in these tiered tournaments win points for their teams (Slavin, 2015).

Jigsaw II: The Jigsaw approach is like STAD except that each student is assigned expository material and each team member is randomly assigned to become expert in some aspect of the assignment i.e. they change teams at random. If the topic is a country, for example, one member might specialize in history, another in geography, another in economics and so on. Students interact with members of other teams who have the same specialization and then return to impact the content that have gathered to their teammates.

Team Accelerated Instruction (TAI): Students study individually but are assigned to teams whose members check and help each other. Students are tested individually, but team rewards are given based on the number if individual assignments and tests those members complete. The method is useful in highly structured subjects where success depends on mastering pre-requisites.

Peer tutoring is a teaching strategy where a group of students interacts to help each other learn with one of the students occupying the role of tutor and the other the role of tutee (Ullah, Tabassum and Kaleem,.2018). Peer tutoring instructional method has been described as a type of cooperative learning which has been extremely effective at increasing students' academic achievement at various educational levels. Basically, peer tutoring involves the linking of intelligent students with less-intelligent ones.

Peer tutoring is important for the tutor, in that learning is encouraged through teaching. Tutoring is a process in which trained people are required to assist and support other people who are less skilled and have a low level of knowledge in an interactive, meaningful and organized way (Bombardelli, 2016). Usually, shy children learn effectively through the means of tutoring by sharing their opinions with their friends in class. Peer tutoring serves as an effective way to improve self-esteem in students, aids interaction among peers not only academically but also socially

(AbdulRaheem, Yusuf, and Odutayo, 2017). Peer tutoring (also referred to as peer learning, cooperative/collaborative learning and peer collaboration), refer to the 'use of teaching and learning strategies in which students learn with and from each other without the immediate intervention of a teacher' (Boud, 2017). Peer tutoring can increase students learning outcomes by improving the understanding of students with mastery of concept. The more effective role of a tutor in the group, can help improve students' mastery of concept, so that the students are able to understand the interrelation between environmental chemical with environment. Implementation of peer tutor learning approach, can improved students' participation in learning. According Edward (2018), peer tutoring was a method in which one of the students became tutors from other members in the group. There are six strategies that need to be considered in the implementation of peer tutor. These are:

- Defining and planning a peer tutoring program,
- Training peer tutor,
- Monitoring daily results,
- Assessing peer tutoring,
- Finding support for peer tutoring,
- Sustaining a peer tutoring program.

Peer tutoring as a method of cooperative learning is based on the creation of pairs of students with a lopsided relationship; that is, the tutor and tutee do not have equal academic ability but they share a common goal which is good academic performance. Academic performance is the measurement of students' achievement across various academic subjects. Teachers and education officials typically measure achievement using classroom performance, graduation rates and results from standardized tests. This goal must be achieved through a relationship framework organized by the teacher. This method has proved effective in several studies aimed to increase the academic success of students.

Romano and Walker (2020) opined that Peer tutoring is when one pupil leads another through a task or concept. However, in cooperative learning, students learn alongside one another, whilst in peer learning they learn from one another, when used effectively, the two approaches provide a number of benefits. These benefits are:

- Students can develop their oral communication and leadership skills
- Their self-esteem is boosted
- They benefit from taking increased responsibility over their learning
- Attitudes towards teamwork improve,
- Helping the learning process and preparing for future employment and social scenarios

One of the advantages of the peer tutoring method was that serious minded students will be assisted in subjects they have difficulties; student can tell the tutor to re-explain for better understanding. Implementation of peer tutoring methods and mind mapping was expected to increase the activity and understanding of the students in the learning process.

Peer tutoring is a teaching strategy that use students as tutor. The student pairs might work on academic, social, behavioural, functional, or even social skills.

There are many different ways you can pair/group students to tutor each other. It's important that the teacher should make sure that any material being reviewed by tutor groups is accurately assessed in these groups. Peer tutoring is not meant for introducing new materials or concepts. You need to monitor for understanding on both ends. There have been different models of peer tutoring. These are:

Class Wide Peer Tutoring (CWPT): In this model, the whole class is divided into pairs or small groups no larger than five. The groups should include students with different ability levels. For example, you would use this model if the whole class were preparing for a school-wide spelling bee.

Cross-Age Peer Tutoring: Younger students are paired with an older student. The older student is there to model good behavioral, functional, adaptive, or social skills. For example, a second grader could be paired with a kindergarten student to show them how to walk to the cafeteria, get a lunch tray, select foods, and find a place to sit. (Okilwa and Shelby, 2020).

Peer Assisted Learning Strategies (PALS): Students are paired with students around the same ability level. The tutee and tutor roles can change based on which student needs help on a particular skill. For example, one student may help their partner with science vocabulary words, and then the partner may change roles and help the other student with multiplication facts.

Peer tutoring involves one or more students teaching other students in a particular subject area and builds on the belief that to teach is to learn twice (Whitman, 2018). "Peer tutoring can enhance learning by enabling learners to take responsibility for reviewing, organizing, and consolidating existing knowledge and material; understanding its basic structure; filling in the gaps; finding additional meanings; and reformulating knowledge into new conceptual frameworks" (Dueck, 2014).

Peer tutoring is often an effective way of managing the different rates at which students learn. Faster learners can take the role of the explainer, developing their own understanding and helping other members of the class. These roles can then be reversed to ensure everyone benefits from a similar experience. Both methods can also prove informative for teachers building their careers. They provide an alternative approach to teaching that differs from the traditional teacher-student relationship, which can be stimulating for both parties. Far from being a way of getting students to do the teachers' work for them, lesson planning remains vital for both methods. In order for the approaches to generate positive results, teachers must provide students with an intellectual framework in which to contribute (Philip and Council ,2020). Cooperative learning and peer tutoring work best in differing situations. The cooperative learning approach often works well after introducing the class to a new concept, whether it is through teacher's explanation, a video or some reading material. By generating discussion in groups, students are likely to absorb new content more effectively and address each other's questions and misunderstandings.

Achievement is defined as a thing done successfully, typically by efforts, courage or skill. It is the process of actualizing something. Academic Achievement is described by Adeyemi, (2021) as the scholastic standing of a student at a given moment which states individual abilities. It refers to a person's learning ability which could be positive or negative performance. Academic achievement is used to measure a student's cognitive, affective and psychomotor domains. Students' academic achievement can be explained in form of grades obtained from tests or examination on courses taken. Academic achievement as described by Adeyemo (2015) as the scholastic standing of a student at a given moment, which states individual abilities. Students' academic achievement can be explained in form of grades, obtained from tests or examinations on courses taken. In Nigeria, the level of students' academic achievement in junior secondary schools is determined through external examinations like Basic Education Certificate Examination (BECE), Senior School Certificate Examination (SSCE) organized by WAEC/NECO.

Cooperative and peer tutoring can be used within the same class, and each method can be used briefly to add lesson variety or as an ongoing approach. It all depends on what's effective for each group of students (Whitman, 2022). In the past decade, attempts have been made to address the underlying causes of poor academic performance among students, especially in Nigeria. It has been reported that the majority of teachers in the secondary education still employ conventional methods in classroom teaching. However, these methods are found to be ineffective and non-result oriented. It is based on this background that this study was conducted to investigate the impact of peer tutoring and cooperative learning on the academic achievement of students in Education District II of Lagos-State.

1.1 Statement of the Problem

There are many potential problems associated with grouping students for learning instruction which have been documented by many researchers. There are also many alternatives to teaching and learning without grouping students. The alternatives available include: whole group learning, flexible grouping, mastery learning, literature based heterogeneous programs, and independent learning. Employing different pedagogical practices for different attainment levels can unintentionally create a barrier to a low-attaining student's opportunity to develop as a learner. This, in turn, can create a general culture at a school which assumes different rigid traits about learners purely based on their learning group.

However, many disadvantages of peer grouping have been shown by researchers. Among the most detrimental of them is the effect on low track students' self-esteem and their stigmatization. It can also cause the mal-distribution of ethnic and racial groups in the lower track classes which may lead to severe social problems. The socio-economically deprived students were also found to be more predominant at the lower end of the grouping. It has also been said that the learning at the lower end may be reduced to nothing more than rote learning of basic skills. It was found that higher order thinking skills like analyzing, making inferences and evaluating are not taught to students of below average abilities. Teachers assigned to these classes tend to have low expectations of their students and this may inadvertently lead to "dumbed down" instruction which may reinforce existing weaknesses; some teachers may even refuse to teach such classes. In another study based on students' views of peer grouping, students were found to be unhappy with their placement in groups. However, studies have shown that peer groupings have little or no effect on student achievement. An earlier study was found that peer grouping has no effect on students regardless of ability level. It appears that the effect of peer grouping may depend on other factors mentioned earlier such as age, criteria used in forming the groups, and subject major.

It was found that peer grouping appears to be more beneficial than in other subjects.

1.2 Purpose of the Study

Specifically, the study was guided by the following objectives:

- To determine the impact of cooperative learning on the academic achievement of students in Education District II of Lagos-State.
- To ascertain the impact of peer tutoring on the academic achievement in Education District II of Lagos-State.
- To assess the contributory impact of cooperative learning and peer tutoring on the academic achievement of students in Education District II of Lagos-State.

1.3 Research Hypotheses

The study was guided by the following hypotheses:

- There is no significant impact of cooperative learning on the academic achievement of students in Education District II of Lagos-State.
- There is no significant impact of peer tutoring on the academic achievement of students in Education District II of Lagos-State.
- Cooperative Learning and Peer Tutoring have no significant influence on the academic of students in Education District II of Lagos-State.

2. Methodology

2.1 Research Design

The study adopted descriptive survey research design as well as a correlational research design. According to Best (2021), descriptive survey research design is a research method which enables the researcher to obtain the opinions (i.e. opinions on peer tutoring, cooperative learning) of a representative sample of a target population (i.e. adolescents in selected senior secondary schools) so as to infer the perception or view of the entire population.

2.2 Population of the Study

The target population for this study were the senior secondary students in Education District II of Lagos-State.

2.3 Sample and Sampling Technique

A multistage sampling technique was used for selection of the participants for this study. In the first stage, Education District II was chosen by purposive sampling. Secondly, Education District II was stratified into three zones namely Somolu, Kosofe and Ikorodu. Simple Random Sampling Technique was used to select one school one school from each zone. To make a total of three schools used for the study. In order to ensure good representativeness of the research participants, stratified random sampling was used to select 80 respondents from each school, totaled two hundred and forty senior secondary students were randomly selected. However, at the administering of questionnaire only 230 were found usable why ten were mutilated

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2.4 Research Instruments

Two research instruments were used in collecting data. The first instrument is a self-developed questionnaire titled; “Impact of Peer Tutoring and Cooperative Learning on students’ Academic Achievements (IPTCLSAA) and the second is an achievement test titled “Mathematics Achievement Test” (MAT).

The IPTCLSAA questionnaire has four sections; Section A contains some demographic variables measured which includes name of school, sex, age group, religion, and class type; the section B contains items that measure peer tutoring and the use of cooperative learning. The items in the section B were subjected to a 4-point rating using the following values (i.e. 4= Strongly Agree, 3= Agree, 2= Disagree, 1= Strongly Disagree).

The second instrument is the Mathematics Achievement Test (MAT). The MAT was a 20-item objective test. constructed from past question papers of WASSCE (2016-2022). The research instruments were given to experts in the field of measurement and evaluation. The experts helped to ascertain whether the items in the instruments were well structured to measure the variables of interest in the study, thereby ensuring the content validity of the research instruments. The instruments have a reliability coefficient for each of two subscales in the questionnaire were respectively 0.801 (Peer Tutoring), and 0.082 (Cooperative Learning Subscale). With the aid of Split-half reliability analysis, the Spearman-Brown reliability coefficient was 0.866, while the Pearson correlation between the halves of the MAT was 0.764.

3. Data Analysis and Results

Table 1: Demographic Information of the Students

Variables	Levels of Variables	No of Students (n)	Percentage (%)
Gender	Male Female	110	47.8%
		120	52.2 %
	Total	230	100.0%
Age Group	13-15 years	0	0.0%
	16-18 years	0	0.0%
	Above 18 years	230	100.0 %
	Total	230	100.0 %

Hypotheses Testing

Hypothesis 1: There is no significant impact of cooperative learning on the academic achievement in Education District II of Lagos State, Nigeria.

Table 2: An "r" statistical table showing the impact of students' use of cooperative learning on their academic achievement (in Mathematics)

Variables	N	Mean	SD	d.f	r-cal.	Sig. Value (p)	Decision
Students' Use of Cooperative Learning	230	32.70	4.25				
Students' Academic Achievement (in Mathematics)	230	10.96	0.91	228	- 0.512**	0.01	Rreject Ho

$p = 0.01 = 0.01$

Table 2 reveals that the average (mean) on students' use of cooperative learning towards mathematics (32.70) was above the expected mean value of 20.00 (obtained from a 10-item subscale on the Use of Cooperative Learning rated on a 4-point response keys – SA, A, D, SD); Also, the average (mean) of students 'academic achievement in Mathematics (10.96) was above the expected mean value of 10.00 (obtained from a 20-item multiple-choice Mathematics test).

While using Pearson Product Moment Correlation (PPMC) technique to compute the relationship between students 'use of cooperative learning and their academic achievement in Mathematics, r-calculated value of -0.512** emerged. This implies that a small negative as well as indirect relationship was observed between students 'use of cooperative learning and the academic achievement in Mathematics. The calculated ―r‖ (r-cal. = -0.512**) was with 228 degrees of freedom given that the obtained level of significance (p-value) is 0.01= 0.01 (statistical benchmark). By implication, the null hypothesis is therefore rejected; hence, there is a significant impact of students 'use of cooperative learning on the academic achievement (in Mathematics) in Education District II of Lagos-State.

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Hypothesis 2: There is no significant impact of peer tutoring on their academic achievement (in Mathematics) in Education District II of Lagos-State.

Table 3: An "r" statistical table showing the impact of students' use of peer tutoring on their academic achievement (in Mathematics)

Variables N	**N**	**Mean**	**SD**	**d.f**	**r-cal.**	**Sig. Value (p)**	**Decision**
Students' Use of Peer Tutoring	230	31.30	4.75				
				228		0.01	Reject
Students' Academic Achievement (Mathematics)	230	10.90	0.91		-0.522*		Ho

p=0.01 =0.01

Table 3 reveals that the average (mean) on students 'use of peer tutoring towards mathematics learning (31.30 was above the expected mean value of 20.00 (obtained from a 10-item subscale on the Use of Peer Tutoring rated on a 4-point response keys – SA, A, D, SD); also, the average (mean) of students 'academic achievement in Mathematics (10.96) was above the expected mean value of 10.00 (obtained from a 20-item multiple-choice Mathematics test).

While using Pearson Product Moment Correlation (PPMC) technique to compute the relationship between students 'use of cooperative learning and their academic achievement in Mathematics, r-calculated value of -0.522** emerged. This implies that a small negative as well as indirect relationship was observed between students 'use of peer tutoring and their academic achievement in Mathematics. The calculated ―r‖ (r-cal. = -0.522**) was with 228 degrees of freedom given that the obtained level of significance (p-value) is 0.01= 0.01 (statistical benchmark). By implication, the null hypothesis is therefore rejected; hence, there is significant impact of students 'use of peer tutoring on the academic achievement (in Mathematics) in Education District II of Lagos-State.

Hypothesis 3: Cooperative Learning and Peer Tutoring have no significant impact on the academic achievement (in Mathematics) of students in Education District II of Lagos-State.

Table 4: Multiple Linear Regression Model of Independent Variables (i.e. Cooperative Learning and Peer Tutoring) and their Relative Contributions on Students' Academic Achievement in Mathematics)

Dependent Variable: Students' Academic Achievement in Mathematics Method: Multiple Linear Regression Sampled Observations: 230

Variables	B- Coefficient	Std. Error	t-statistic	Prob.
(Constant)	14.452	0.399	36.240	0.000
Cooperative Learning	-0.048	0.027	1.763	0.079
Peer Tutoring	-0.062	0.024	2.536	0.012

- R-Squared	0.283	F-statistic	44.704
- Adjusted R-Squared	0.276	Prob. for the (F-statistic)	0.000
- Std. Error of the Estimate	0.77403	d.f. for Regression	2
Sum of Squares Residual	135.999	d.f. for residual	227

The Estimated Function is stated as: Students' Academic Achievement in Mathematics = 14.452 + (-0.048) Cooperative Learning + (-0.062) Peer Tutoring

The table 4 indicates that coefficient of determination (Adjusted R2) = 0.276, which gives proportion of variance (Adjusted R^2 x 100) = 27.6%. This implies that the independent variables (i.e. students 'use of cooperative learning, students 'peer tutoring) accounted for 27.6% of the variance in the dependent variable (Students 'Academic Achievement in Mathematics). Besides, the joint effect of the independent variables (i.e. students' use of cooperative learning, students' peer tutoring) was observed to be significant on students' academic achievement in Mathematics (F = 44.704; df. = (2; 227); significant value p = 0.000 < 0.05).

In addition, the table reveals the individual contribution of the independent variables (i.e. students' 'use of cooperative learning, students 'peer tutoring) to students 'academic achievement in Mathematics. It was observed that students peer tutoring had significant effect on students 'academic achievement in Mathematics [students 'peer tutoring: B= 0.062, t= 2.536, p=0.012 < 0.05], while students 'cooperative learning had no significant effect on students 'examination cheating behavior [students 'self-concept: B= -0.048, t= 1.763, p=0.079 > 0.05].

4. Discussion of Research Findings

Finding 1 revealed there is a significant impact of students' use of cooperative learning on their academic achievement (in Mathematics) in Education District II of Lagos-State. This present finding agrees with that of Hudgins (2020) who found that fifth grade students working in groups made higher scores in mathematic tests than students who worked individually. More agreement was that of Whicker, Bol, and Nunnery (2017)'s empirical finding which bordered on secondary pre-calculus classes, they concluded that cooperative learning promotes mathematics achievement. Mcclintock and Sonquist (2019) studied undergraduate college sociology students and found students participating in cooperative groups received higher than average grades on term papers than working individually. Cooperative learning strategies were found to improve students' performance (Chang & Mao, 2019) and cognitive achievement (Okebukola & Ogunniyi, 2014) in science classes. Augustine, Gruber, and Hanson (2010) reported higher achievement resulting from cooperative groups in a wide variety of subject areas including spelling, social studies, health and language. As for Alebiosu (2018), among all the instructional strategies for enhancing science achievement, emphasis is laid on the importance of group work.

Finding 2: revealed there is a significant impact of students' use of peer tutoring on their academic achievement (in Mathematics) in Education District II of Lagos-State.

This present research was in agreement with that of AbdulRaheem et al (2017) when he discovered that peer tutoring serves as an effective way to improve students academically, socially, in their self-esteem, and aids interaction among their peers. In the same vein, Ali, N., Anwer, and Jaffar, (2015) corroborated with the present research finding when he noted that group work, private tuition, mentoring and peer tutoring have been known to enhance student learning. Adekoya & Olatoye (2021) supported the present research finding when they discovered that peer-tutoring has a positive impact on academic outcomes such as reading, spelling and other subjects. Johnson and Ward (2011) in Comfort (2021) found that mathematics students achieved greater success in practical activities and new skill development when feedback and tutoring was provided by their peers, with similar findings in applied sports science undergraduates. D'Arripe-Longueville et al. (2022) found that higher skill levels in physical education tutors resulted in tutees setting themselves higher goals and increasing levels of participation in practical activities, with a resultant increase in achievement by tutees. . Peer tutoring has been shown to be highly effective in enhancing both tutor and tutee achievements and skill development (Topping et al., 2017; Houston and Lazenbatt, 2019; Johnson and Ward, 2021; Maynard and Almarzouqi, 2016), especially in mathematics (Ward and Lee, 2005) and coaching (D'Arripe-Longueville et al., 2022).

Finding 3a: revealed the joint effect of the independent variables (i.e. students' use of cooperative learning, students' peer tutoring) was observed to be significant on students' academic achievement in the Mathematics ($F = 44.704$; df. = (2; 227); significant value $p = 0.000 < 0.05$), when such effect accounted for 27.6% of the variance in the dependent variable (Students' Academic Achievement in Mathematics).

Finding 3b: The individual contribution of the independent variables reveals that students' peer tutoring had significant effect on students' academic achievement in Mathematics
[Students' peer tutoring: B= -0.062, t= 2.536, p=0.012 < 0.05], while students 'cooperative learning had no significant effect on students' examination cheating behaviour [students' self-concept: B= -0.048, t= 1.763, p=0.079 > 0.05].

This present research finding is in consonance with that of Adesoji and Ibrahim (2019) who studied the effects of Student Team Achievement Division (STAD) strategies and mathematics knowledge on learning outcome in chemical kinetics. The result shows that STAD (Student Teams Achievement Divisions) cooperative learning strategy had the potential to improve students' learning outcome in secondary school mathematics. This finding provided empirical support to earlier findings of Fuyun-yu, (2018), Popoola (2022), and Omosehin (2014) that established that cooperative learning strategy promoted better achievement and productivity than the conventional lecture method. Research on peer tutoring has demonstrated that peer tutoring can be successfully implemented with tutors of various ability levels, including children with advanced skills and children with learning disabilities (Fuchs, Fuchs Yazdin, & Powell, 2022).

5. Conclusions

Based on the research findings, it could be inferred that, the culture of using cooperative learning among students exerts a significant influence on their achievement in Mathematics; likewise, this culture of

using peer tutoring exerts a significant influence on their achievement in Mathematics.

Lastly, the joint effect of students' use of cooperative learning and peer tutoring towards Mathematics was significant on their academic achievement, when such effect accounted for 27.6% of the variance in the students' academic achievement. Such significant effect emanated from the individual significant contribution or influence which the culture of using peer tutoring had on academic achievement, while the culture of using cooperative learning had no significant effect on academic achievement.

6. Recommendations

Based on the findings and conclusion in this study, it would be appropriate to recommend that:

- Head Teachers/head of Academic Units in schools should take proper scrutiny into the lesson plans which these school teachers submit to them, they should always emphasize that subject teachers plan their lessons with the use of either cooperative learning or peer tutoring in mind.
- The Nigerian Government/Ministry of Education/ all well-meaning stakeholders should encourage these school teachers with financial aids or incentives to attend paid and expensive top-notch seminars and workshop in relation to best practices of using cooperative learning and peer tutoring to impart knowledge in mathematics. This will discourage them from the idea of depending on their years of teaching experience and academic qualification which hold no waters in the 21st century education space.
- Curriculum Planners should replicate this research in order to authenticate the findings obtained from this present research. This will help to ascertain the true state on the culture of using cooperative learning and peer tutoring in impacting knowledge in Mathematics.

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