

EFFECT OF CO-OPERATIVE LEARNING TECHNIQUE ON PHYSICS ACHIEVEMENT OF SENIOR SECONDARY STUDENTS IN ANAMBRA CENTRAL SENATORIAL DISTRICT

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ABSTRACT

This study was on effect of co-operative learning technique on physics achievement of senior secondary school students in Anambra Central Senatorial district of Anambra State, Nigeria. The design adopted for the study was Quasi-experimental design. Three research questions guided the study. The population of the study was all the Senior Secondary Students in the senatorial district and the sample size consisted of 2000 students obtained using multi-stage sampling technique, 1200 for experimental group and 800 for control group. A physics achievement multiple test questions that were 30 in number was developed. The reliability of the developed instrument was established using split half method and administered on an independent group and was found to yield reliability co-efficient of 0.74. Twenty briefed assistants helped in the research. Apart from administering the physics achievement test, they served as resource persons to animate the learning strategy. The data collected was analysed using average mean score difference ($\bar{x}_2 - \bar{x}_1$). The finding revealed among others that co-operative learning strategy has high efficiency in enhancing the physics achievement of senior secondary school students in Anambra Central Senatorial district. Among the recommendations proffered include creating enabling atmosphere for co-operative learning, integration and encouragement of usage by staff and students.

Keywords: effect, co-operative learning technique, physics, achievement, secondary schools, students.

INTRODUCTION

Globalization is one of the common features of the society of our time. Through globalization, the world has become a small village. It apparently looks like a spider web linked together by science as a precursor. One among the numerous significant areas of science responsible for such was the breakthrough in physics.

The secondary knowledge of physics will present it is as a branch of science concerned with the nature and properties of matter and energy whose subject matter includes, mechanics, heat, light and sound, electricity, magnetism and atomic physics. According to the Cambridge Advanced learners dictionary, it is defined as the scientific study of matter and energy and the effect that each has on the other. According to Ike (2014), Okeke and Anyakaoha (2000), physics is defined as the science that deals with the structure of matter and the interactions between the fundamental constituents of the observable universe. It was derived from the Greek word “Physikos” and having to do with all aspects of nature both on the macroscopic and microscopic levels.

Physics as a subject is majorly offered at the senior secondary school level. The foundation for the study of physics is laid at the Junior Secondary School through studying subjects such as basic science and basic technology. However, it has been observed that the learning of physics is encapsulated with some challenges such as myths and bias. Learning according to Ormrod and Jones (2018) is defined as a relatively permanent change in behavior due to experiences. These constitute strong obstacles to young students who either withdraw or switch to another subject after few times of study or that they were never part of the learning “ab initio”. The root to these has been traced to some limitations experienced by these students. Such challenges include the very seldom abstract nature of physics, the notion that physics is a very complex subject, the inability to have proficient and enough qualified teachers and textbook from indigenous authors who would be able to express and communicate knowledge in familiar terms etc. These have made learning of physics difficult for most students.

However, in the recent time some teachers have discovered that the traditional teaching method has failed. In the views of Inanyang & Ekpeyoung in Obiajulu (2014) traditional method of teaching have been found grossly deficient in creating meaningful learning. Trans & Lewis (2012) suggested an alternative with an improved outcome. This view was collaborated by Oloja (2021), Johnson & Johnson (2013). They were of view that children learn faster in group and when they co-operate among themselves (Eraikhuemen & Akpbroka, 2023). According to them, co-operative learning rewards better than most learning techniques. According to Igboanugo (2011) co-operative learning technique is a strategy in which students learn by helping each other in a social setting rather than a competitive manner. This strategy emphasizes team work among the children rather than individual learning. This is achieved by organizing the students into learning groups. Within these groups are found students of different intellectual capacities, abilities and competences. These students are responsible for their learning and they work under the guide of an instructor, animator or teacher. The proficiency of this method was stated, by many literatures notably among them include (Oloja, 2021, Igboanugo, 2011 and Eraikhuemeu&Akpobroka, 2023).

Furthermore, co-operative learning technique has an efficiency which reflects in both gender and location. Concerning location, especially the urban and rural setting, cooperative learning

technique has been found to yield excellent results among students of different localities. This is because it is group of programme whereby the individual in the group is the active facilitator of learning. The advantage falters the traditional view which held that rural students perform poorly than their urban counter parts because of the disadvantage of amenities, infrastructures, facilities and qualified staff Opuku Asare and Siaw (2015).

Concerning the effect of co-operative learning on gender, there is no consensus on the impact of Gender on students achievement which some maintained that gender has no significant impact on students achievement, (Oludipe, 2012) , others such as Maryam (2011), Igboekwu and Okonkwo (2012), Markumari and Ajai (2017) argued strongly that Gender is a significant factor in the learning achievement of adolescents. However, above all, co-operative learning has been found to impact meaningfully on both genders since it is a group activity where the individuals are the active facilitator of the learning programme.

PROBLEM OF THE STUDY

The economic viability of any country is anchored on the human resources of the same country. Human resources are direct product of learning. Hence when the learning goals and objectives are not achieved, the country is seen not to be stable. However, when it is achieved the country's present and future is rated high in terms of viability. Consequently, the stakeholder, government and the educational sectors struggles to make meaningful impact in the learning environment of their nation since it will boast their economic viability. Based on the above a lot of research is put into strategies for effective learning among which is co-operative learning technique. Giving this backdrop, the main purpose of this study is to investigate the effect of cooperative learning technique on physics achievement among Senior Secondary Schools in Anambra Senatorial district.

The study sought specifically to determine the effect of co-operative learning among senior secondary school students of Anambra state Senatorial district, putting to consideration the locations and gender hence

- (1) It seeks to determine effect of co-operative learning techniques among senior secondary school students in Anambra central senatorial district.
- (2) It seeks to determine the effect of co-operative learning techniques among urban and rural students from Anambra central senatorial districts.
- (3) It seeks to determine the effect of co-operative learning techniques among male and female students from Anambra central senatorial district.

RESEARCH QUESTIONS

The following research questions guided the study, and they include:

- (1) What is the difference in the pretest and post test mean achievement scores between the students taught physics using co-operative learning techniques and the control group?
- (2) What is the difference in the pretest and post test mean achievement scores between urban and rural students taught physics using co-operative learning technique?
- (3) What is the difference in the pretest and post test mean achievement scores between male and female students taught physics using co-operative learning techniques?

METHOD OF STUDY

The study was carried out using a quasi-experimental design adopting pretest and post-test design. Three research questions guided the study. The population of the study was all the senior secondary students in public secondary schools in Anambra central senatorial districts made up of 13,260 students. The sample size for the study was (2000 students consisting of 1200 experimental group, 800 control group) 1,200 students drawn using multi step sampling techniques.

The sample was first stratified on gender and then on location. Purposive sampling technique was used to select two urban schools (male and female) and two rural schools (male and female) all at the ration 350 male students to 350 female students. The control group was randomly selected from two rural schools and two urban schools and it comprises of 200 students each, 120 male and 80 male students. A physics achievement multiple test thirty (30) in number was developed by the researcher and administered on sixty (60) students from Nnewi South local government area. Thirty (30) of the students did not receive any training while thirty were subjected to group learning activities. The result of the pilot test was subjected to validation using split half method and Cronbachs alpha which yielded a co-efficient (α) of 0.74. the achievement test was adopted as an instrument for the research. Thereafter, the experimental group was subjected to three weeks intensive group learning activities after which the physics achievement test was administered on both the control group and the experimental group. Average mean scores were used to answer the research questions.

RESULTS

The data collected was analysed and the result of the analysis presented in a table form as follows:

Research question one: what is the difference in the pre-test and post-test mean achievement scores between students taught physics using co-operative learning techniques and the control group?

Table one: average mean and standard deviation scores of students on the effect of co-operative learning technique.

Source of Control group						Experimental group						
variation	N	X	$\bar{X}$	$(\bar{x}_2 - \bar{x}_1)$	SD	Decision	N	X	$\bar{X}$	$(\bar{x}_2 - \bar{x}_1)$	SD	D
Pre-test	800	1992	2.49		0.62		1200	2952	2.46		0.74	
				- 0.9		NS				1.23		S
Post-test	800	1904	2.38		0.69		1200	4,428	3.69		0.76	

The table above revealed two groups (control and experimental group) and both were subjected to two modules of test (pre-test and post-test). While the control group had the two without any specific form of training, the experimental group was subjected to co-operative learning technique and the table revealed that the control group had an average mean score of 2.49 in the pre-test and in the post-test, scored an average mean score of 2.38 indicating $(\bar{x}_2 - \bar{x}_1)$ to be (-0.9). On the contrary, the experimental group which was subjected to co-operative learning technique scored an average mean score of 2.46 in the pre-test and 3.69 on

the post-test revealing an average difference $(\bar{x}_2 - \bar{x}_1) = (3.69 - 2.46) = 1.23$. Hence, indicating a positive significant difference.

Research question two: what is the difference in the pre-test and post-test mean achievement scores of urban and rural students taught physics using co-operative learning technique.

Table two: average mean and standard deviation scores of urban and rural students on the effect of co-operative learning techniques

Source of Urban						Rural						
variation	N	X	$\bar{X}$	$(\bar{x}2 - \bar{x}1)$	SD	Decision	N	X	$\bar{X}$	$(\bar{x}2 - \bar{x}1)$	SD	D
Pre-test	600	1470	2.45		0.25		600	1482	2.47		0.74	
				1.14		S				1.32		S
Post-test	600	2154	3.59		0.76		600	2274	3.79		0.78	

The table above revealed the effect of co-operative learning technique on location (urban and rural) students' physics achievement. While the $(\bar{x}_2 - \bar{x}_1)$ of the urban students was 1.14, the $(\bar{x}_2 - \bar{x}_1)$ of the rural students was 1.32 indicating a slight increase in rural students co-operative learning as well as a significant impact on both locations.

Research question three: what is the difference in the pretest and posttest mean achievement scores between (gender) male and female students taught physics using co-operative learning technique?

Table three: average mean and standard deviation scores of male and female students on the effect of co-operative learning on their physics achievement

Source of Male						Female						
variation	N	X	$\bar{X}$	$(\bar{x}2 - \bar{x}1)$	SD	Decision	N	X	$\bar{X}$	$(\bar{x}2 - \bar{x}1)$	SD	D
Pre-test	500	1225	2.45		0.73		700	1725	2.47		0.75	
				1.18		S				1.28		S
Post-test	500	1815	3.63		0.76		700		3.75		0.77	

The table above revealed the effect of co-operative learning technique on gender (male and female) among physics students from Anambra central senatorial district. The table revealed that co-operative learning technique has a significant effect on the physics achievement of students from Anambra central senatorial district. It also revealed female average mean score (1.28). the score is slightly above the males average mean scores (1.18) with a negligible margin of 0.10.

DISCUSSION OF FINDINGS

The discussion of findings was carried out in line with the main purpose of study which sought to determine the effect of co-operative learning technique among secondary school students in Anambra state putting into consideration gender and location. With respect to research question one, which sought to determine the effect of co-operative learning technique on student's physics achievement, the table one revealed that the control group had an average mean score of 2.49 in the pretest and an average mean score of 2.38 in the post-test indicating a (-0.9) value difference in their achievement. On the contrary, the experimental

group which was suggested to a co-operative learning technique had an average mean score of 2.46 in the pretest an average mean score of 3.69 in the post-test, indicating a value difference of $(3.69 - 2.46) 1.23$, consequently showing that co-operative learning strategy had great impact on the physics achievements of secondary school students in Anambra Central Senatorial district. This view was supported by numerous literatures which held that co-operative learning strategy is effective in the achievement of secondary students (Obiajulu, 2014, Trans & Lewis 2012; Oloja, 2021, Johnson & Johnson 2013). In a similar manner Eraikhuemen and Akpbroka (2023) also noted that co-operative learning rewards better than most learning techniques.

Concerning the effect of co-operative learning technique on location (urban and rural) and gender (male and female), the research question 2 and 3, table 2 and 3 addressed these respectively. With respect to the effect of co-operative learning strategy on location (urban and rural), the table two revealed that the average mean difference in the pretest and post-test of both urban and rural students exposed to co-operative learning was 1.14 and 1.32 respectively, indicating a significant change and a slight increase in difference between the rural and urban students. Unlike what most literature held, that urban students are more achieving than rural students because of infrastructures, amenities and staff (OpukaAsare and Siaw, 2015), the findings revealed that rural students had a high score hence could be said to have profited highly on the co-operative learning strategy. This could be accounted for by the cohesion in the village, the calm atmosphere, and little distraction which pervade and prevail in the village.

Concerning the effect of co-operative learning technique on gender (male and female), the table three revealed a value difference of 1.18 $(3.63 - 2.45)$ for the male and 1.25 $(3.75 - 2.47)$ for the female indicating a positive influence for both genders (male and female) even though the female score was higher than the male by a significant difference of 0.10. Consequently, affirming the view of Oludipe (2012) who argue that the gender of a child does not contribute so much on the child's academic achievement implying that there are some boys that perform better than girl's ad that there are girls that perform better than boys.

CONCLUSION

Co-operative learning strategy is a technique that puts the student at the center of the learning activities. Here, it is the student that does the entire work in the learning field but under the direction of an animator. Based on the above studies, the findings reveal that students that were formed using this technique perform better than their counterpart formed using traditional learning methods. The strategy also revealed that it transcends both location (urban and rural areas) of the students since significant results were obtained for both. Furthermore, the study revealed that gender is not biased against it since the result revealed a strong influence on the physics achievement of both male and female students from Anambra Central senatorial district.

RECOMMENDATIONS

- (1) Co-operative learning technique is an effective strategy for learning students should be encouraged to adopt
- (2) Stakeholders and Government should include as a curriculum, this method of learning.
- (3) Individual teachers should adopt it and create enabling environment for it.
- (4) Administrators should encourage co-operative learning and usage among students and teachers.

REFERENCES

- Eraikhumen, I and Akpobroka .S (2023). *Effect of co-operative learning strategy on senior secondary school students' achievement in Geometry*. African Journal of Studies in Education vol 18 (1) 245 – 255.
- Igbanugo, B. I (2011). *Effect of co-operative learning and peer teaching on Senior Secondary School Students achievement and interest in some difficult chemistry concepts*. Thesis submitted to faculty of Education, University of Nigeria, Nsukka.
- Igbonekwa, E. N and Okonkwo I.G (2012). *Influence of gender and location on students' achievement in chemistry*. Journal of Research in Education 1 (1)
- Ike, E.E (2014). *Numeric problems and solutions in physics*. Jos Enic publishers.
- Johnson, D and Johnson. T (2013). *The impact of co-operative, competition and Individualistic learning environment on achievement in*J. Hattie I& E Anderman (Eds). International handbook of students' achievement (pp 1 – 10) New York, Roulledge publishers.
- Mankumari, P and Ajayi .T (2017). *Gender differences in the academic performance of students*. Journal of Development and Social Engineering 3 (1) 39 – 47.
- Maryam. M. (2011). *Relationship between emotional intelligence and academic success*. Journal of Technology and Education 5 (3) 201 – 204.
- Oloja O. A (2021). *Effect of co-operative learning and concepts mapping strategies on students' achievement and retention in mathematics*. An unpublished Ph.D Thesis, University of Benin. Benin city.
- Oludipe D. I (2012). *Gender difference in Nigeria, Junior Secondary student academic achievement in basic science*. Journal of Educational and social research. 2 (1) 93 – 99.
- Okeke. P. N and Anyakoha M. W (2000). *Senior Secondary School Physics*. Lagos pacific printers.
- Opoku-Asare.N and Siaw A (2015). *Rural/urban disparity in students' academic performance in visual art education*. Evidence from six senior high schools in Kumasi Ghana. Doi 10 1177/2158244015612523.