

PEER-ASSISTED LEARNING AND PHYSICS LEARNING OUTCOMES OF SECONDARY SCHOOL STUDENTS IN ABIA NORTH EDUCATION ZONE

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ABSTRACT

This study was conducted to find out the academic performance of physics students using Peer-assisted learning strategy and conventional method of teaching in secondary schools in Abia North Education Zone. A total of 80 (eighty) students took part in the study and they were selected by a simple balloting technique. A structured test titled Physics Achievement Test (PAT) was used to collect the data. T-test statistic was used in analyzing the data. The result of the study was that Peer-assisted learning strategy is very effective in facilitating students learning in physics while conventional method is not very effective. It was recommended that Peer-assisted learning strategy should be used in schools to facilitate learning in physics.

Keywords: Academic Performance, Physics Students, Peer-assisted learning, Learning outcome, Abia North Education Zone.

Introduction

The usefulness of physics to the society cannot be overemphasized, evidence by our reliance on technology. Numerous technologies that are continually transforming the world we live in can be directly traced to inventions in physics, for instance the semiconductors enabled the transistor to be developed, laws of optics led to the development of optics fiber network.

But despite the benefits traceable to studying physics, the enrolment and performance of students in physics external examinations have retrogressed over the years. This may be blamed on some factors such as shortage of qualified teachers, lack of laboratory, qualified teachers leaving the service, (Oyebola, 2011) and lack of teaching materials and teachers' methodology, (Orji, 2011).

Though the government and other stakeholders have addressed these challenges, the problem continued unabated. It has therefore become quite necessary to try out instructional approaches whereby the students will act as tutors to themselves especially given the fact that some students have developed phobia for physics teachers and physics as a subject. Among all the instructional approaches Peer-assisted instructional strategy comes to mind as the only strategy that permits student-student tutoring.

Peer-tutoring is an instructional strategy that consists of pairing students together to learn or practice an academic task. The pairs of students can be of the same or deferring ability and or age range. The term Peer-Tutoring or Peer-Assisted Learning strategy is defined as assistance provided to students (learners or tutors) by non-professionals, usually students themselves, to help them attain grade-level proficiency in subjects where they have difficulties, and possibly improve their performance (Orji, 2010). It refers to learners assisting other learners

with their studies. It involves assisting classmates or learners in lower grades with homework, assignments, providing instruction and fostering good study habits. Peer tutoring refers to an instructional strategy where students are encouraged to teach other students under planned teacher direction in both formal and or informal school learning situations.

According to Johnson and Johnson, (1989), peer assisted learning experiences promote more positive attitude towards the instructional experiences. Ogunleye, (1993), reported that many students develop negative attitude to science learning probably, due to the fact that teachers are unable to satisfy their aspirations or goals and peer-assisted learning serves well here.

Peer-assisted learning strategy promotes greater academic gains than teacher instruction, (Wentzel, 1999). This may be because students feel more comfortable in peer instructions, allowing for a more easy development of cognitive growth and skill. Being a peer tutor can train a students' social skill, enhance self-efficacy and remedy skill deficiencies.

Peer-assisted learning strategy is less threatening and intimidating. There are many benefits for both the tutor and tutee in this relationship. One aspect of this is that the tutor can establish rapport with the tutee in a way that the teacher cannot. Because the tutor is seen by the tutee as being more at their own level, advice given by the tutor may ne accepted more readily than advice from a teacher.

Another key reason for this is that the tutor does not give grade on paper, whereas a teacher serving as a tutor may be perceived as someone who grades papers. Peer-assisted learning has a powerful influence on academic achievement and motivation, (Light 1999, Steinburg, Dornburch and Brown, 1992). Socialization experiences that occur during peer tutoring can benefit both the tutor and tutee by motivating students to learn and increasing their social standing among peers, (Fusch, Marthes and Martinez, 2002). When students understand the benefits of peer-assisted learning and they have tools to become effective tutors and tutees, they make greater progress than those who are not given any instruction on how to work together, (Fluech, Hamlett, Philips, Karns and Dutks, 1997). Tutors become models of appropriate behaviours, organizing work, demonstrating self-management, encouraging social interaction and facilitating better study habits, (Gaustad, 1993, Cohen, 1986, Miller and Mller, 1995).

Purpose of the Study

The general purpose of this study is to investigate the academic performance of students in physics using peer-assisted learning strategy vis-à-vis conventional method. Specifically to:

- i. Find out the academic performance of students in physics using peer-assisted learning strategy vis-à-vis conventional method.
- ii. achievement of students taught physics concepts using Peer-Assisted learning differ based on gender

Research Questions

1. How do achievement of students taught physics concepts using Peer-Assisted learning differ from their counterparts in the control group?
2. How do achievement of students taught physics concepts using Peer-Assisted learning differ based on gender?

Methods

The study adopted a quasi-experimental design. All SS2 physics students in twelve public secondary schools in Abia North Education Zone were randomly selected from the secondary schools that met the following criteria:

- (a) Availability of qualified teachers
- (b) Equipped laboratory
- (c) Availability of relevant teaching and learning materials
- (d) Evidence of participation in physics external examinations for the three consecutive years,

Random sampling technique was further used to select two secondary schools out of the twelve that met the criteria stated above. In each of the schools, 50 (fifty) SS2 physics students were chosen using table of random numbers.

Table of random numbers was used because of the difficulty in examining every member of the population intended for the study. This technique ensured that every member was given equal chance of being included in the study.

Tutors were chosen from these number of students based on their continuous assessment profile. The students were paired. The tutors taught the tutees the concepts: Equilibrium of forces, projectile, Simple Harmonic Motion, Mechanical Energy, Momentum, Heat and Gas Laws for ten weeks using peer-assisted learning strategy while the teachers taught the control group for ten weeks using conventional method. At the end of the ten weeks, the same Physics Achievement Test was administered to both the experimental and control groups. The researcher marked and collated the scores.

The Physics Achievement Test (PAT) was face validated by two experts in physics education and two science educators. The research instrument was written in simple English language in order that the respondents will understand fully the meaning of each item. These experts checked for content validity, clarity, readability, coverage of scheme, content relevance, ambiguity, and vagueness of expression. They also checked for the correctness of the PAT answers. All suggestions made by these experts were built into the PAT Validated PAT was pilot tested.

The tutors were taught how to teach them using peer-assisted learning strategy. They were provided with well written lesson notes on the theme. All the students were taught the using of the same content outline but with only two different learning strategies peer-assisted learning strategy and conventional method. The theme was taught for ten weeks and PAT was administered. Frequency count, mean and standard deviations were used to answer the research questions

Results and Discussions

The research questions and the associated hypotheses were tested using means, standard deviation and t-test statistics as basis for inferential deductions. The analyses were done as follows: The questions that sought to establish the level of students' achievement as determined by their pre-test and post-test scores are hereby presented using means and standard deviation and then followed by analysis using t-test.

Research Question

How do achievement of students taught physics concepts using Peer-Assisted learning differ from their counterparts in the control group? To answer this research question, for the analysis reported in table 1.

Table 1: Descriptive statistics of Group's Pre-test, post-test and Mean Scores in Achievement

Groups	Pre-test			Post-Test			
	N	X	SD	N	X	SD	Mean Gain
Experimental frequency count, standard deviations and means were used Group	90	8.88	3.14	90	14.50	3.53	4.90
Control Group	88	7.86	3.70	88	13.26	3.14	3.55

Results to table 1 indicate that the experimental (peer assisted learning) group had the higher mean score in the post-test than the control group. However, in the pretest both experimental and the control groups recorded comparable scores i.e. 8.88 and 7.86 respectively. On the other hand, the lecture method group, which served as the control, recorded the least mean score in the post-test.

Table 2: Analysis of Male and Female Students' Pre-test, Post-test Mean Gain Score in Achievement.

Category	Experimental Group (Peer-Assisted Learning)						
	Pre-test			Post-test			
	N	X	SD	N	X	SD	Mean Gain
Male	50	9.10	2.12	50	13.40	2.66	6.05
Female	45	8.95	2.26	45	12.73	2.45	5.24

Results in table 2 indicate that male recorded a mean achievement score of 9.10 for the pretest and 13.40 for the post-test with a mean gain score of 6.05. For the female, there were records of mean achievement score of 8.95 for the pretest and 12.73 for the post-test with mean gain score of 5.24. Again, it was observed that all pretest scores were generally low on the learning outcomes of both male and female and the apparent influence of the peer assisted learning on the achievements of students could be said to be established given the mean gains.

Discussion of Findings

Findings in the present student showed that the peer assisted learning group had the highest mean score in the post test than the group taught conventionally. But in the pretest, both groups recorded relatively low scores. However, the group taught using conventionally

recorded the lowest mean score. This implies that the use of peer assisted learning in teaching physics concepts improved students' performance in physics more than the use of conventional method.

The present findings corroborated that of Johnson and Johnson (1989) who found that peer assisted instructions enhanced students' performance in physics compared with conventional lecture-based instruction. Wentzel (1999) confirmed that using peer assisted learning was a useful way to teach science. Steinberg, Dornbusch and Brown (1992) also found that students who were taught with peer assisted instruction outperformed their peers who were not. The explanation for the present findings may not be far-fetched. In peer assisted learning, ideas are encouraged which makes the approach more interesting but personally relevant to the learner which enhances performance (Light, 1999).

Again, results from table 2 showed that all pretest scores were generally low on the learning outcomes of both male and female and the apparent influence of the peer assisted learning on the achievements of students could be said to be established given the mean gains. The reason for those finding could be linked with the fact that peer assisted learning is non gender sensitive. This buttresses the findings of Ogunleye (1993) which revealed that male and female groups taught using peer assisted instruction did not perform better than either; in fact, no significant gender difference in performance was observed. It then implies that peer assisted instruction can be employed in teaching physics concepts to both male and female students since it can improve their performance without bias.

Conclusion and Recommendations

This study reveals the extent to which peer assisted learning instruction can help improve students' understanding of physics concepts and thus enhance performance. This is evident in the post test mean achievement scores which are significantly higher than those of the control group. On this basis therefore, the following recommendations are made:

1. Curriculum designers should include and specify the use of peer assisted learning in teaching physics concepts in senior secondary schools.
2. PAL should be used in both single and mixed sex schools.
3. Teachers should be trained on how to use PAL in teaching physics concepts, as part of their in-service training.

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