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Effect of Teacher- directed Play Teaching Strategy on Academic Achievement of Physics students in Abia state.

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Abstract

The study investigated the effect of teacher play teaching strategy on academic achievement of physics students in Abia State. The design of the study is quasi-experimental design using pretest and posttest control groups. The population of the study consist of two thousand, three hundred and twenty six (2,326) senior secondary school one (SSS1) physics students' from two co-educational public secondary schools in Abia State. Fifty-four(54) senior secondary school one students (SSS1) from two intact classes in public secondary schools in Abia State were obtained using simple random sampling technique. The experimental group were taught Physics using Play teaching strategy while the control group were taught using conventional teaching method. The instrument for Data collection was a twenty-five (25) item multiple choice Physics Achievement Test (PAT), the PAT was adopted from the West African Senior Secondary Certificate Examination (WASSCE). The Instrument was both content and face validated by two experts and reliability index of .76 was obtained using Kuder-Richardson (K-R 20).Two research questions and two hypotheses, formulated and tested at 0.05 level of significance, guided the study. The research question was answered using mean and standard deviation while the null hypotheses was tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance. The Result of the findings showed that students taught Physics with Play teaching strategy outperformed those taught physics using conventional teaching method. Recommendations made were that teachers should use of play method with other methods to boost academic achievement in physics.

Keywords: *teacher-directed, Play, teaching strategy, Physics, Physics students, Achievements.*

Physics is a branch of science that deals with the study of the physical nature, energy and matter. It is one of the science subjects that is taught in the senior secondary schools in Nigeria. Physics play a vital role in career selection in many disciplines. The gap physics fills in the nation's economic and technological development cannot be undermined. Physics remains the foundation for engineering and technology. The principles and laws of physics must be clearly understood before the design of my kind of device such as, torchlight, TV, telephones, CD/DVD, flash drive, computers, satellite devices, watches, refrigerators, air conditioners, among others. The study of physics can be very challenging most times, frustrating, difficult, rewarding, and equally satisfying, this can be attributed to some factors observed that physics is mathematical and abstract in nature (Young & Freedman, 2014). However, Physics being an integral subject in the science-oriented careers as a matter of necessity should be given a priority in the teaching and learning process to ensure that learners are properly equipped with the basic skills required to understand the basic theories, laws and principles on which physics knowledge is built. The knowledge which physics can provide would be of immense benefit to the entire society not only to the learners in the classrooms or our secondary schools. Therefore teachers, should utilize every approach to expose learners to varied learning opportunities both digital, visual, audio and audiovisual materials, hand-on experience among others. Some factors such as Physical facility, environmental facilities, teachers' qualification, technical competitiveness, experience and the teaching methods accounts for proper preparation of physics students. Other challenges include lack of facilities, lack of qualified physics teachers, poor in-service teachers training, poor technological knowledge of teachers and poor teaching methods and strategy. Negligence of these factors continually leaves the students with minimal and low level of achievement which affects their results in Physics examination (West Africa examination council (WAEC) (Chief Examiners Report 2019-2021).

It is the responsibility of the teacher to employ a rewarding teaching method, think out the different strategies to apply in other to maximize student's understanding of the Physics concepts. It is in the light of this challenges that this study employed a teacher-oriented play teaching method to enhance students' academic achievement in physics.

Teacher oriented play method is a type of teaching where students learn through play method. In this strategy the teacher introduces the concept to be learnt in a play form either with the use of musical/ sing games, computer game based, simulation, Physics concept software among others. The strategy is a more of student-centered strategy. The teacher serves as an instructor

in the strategy, guiding the learners where necessary. Puyate and Emekenemi (2017) state that learning by play method facilitates learners' curiosity and brings out the desired changes in the learners. Play method of teaching stimulates students/ learner creative ability, problem solving skills and motivate learners to actively participate which in turn enhances students' academic achievement. Omwirhiren (2015) stated that in conventional teaching approach, the priority is basically in content coverage. The acquisition of essential and required skills is the duty of the learner while it is the responsibility of the teacher to boost students' academic achievement (Obike, 2017).

Academic achievement is the extent to which a learner has obtained the expected learning outcomes. Academic achievement may be accessed through test or examination to ascertain the learners proficiency in the skill or concept exposed to them, level of successful attainment and completion through maximum effect (Ronald & Remma, 2015). Omivirhiren, (2013) on his own part sees academic achievement as the competence possessed by the learner in the content area. Academic achievement are observable and measurable indication of the learners' outstanding performance. Academic achievement can to an extent be influenced by the students' gender.

Gender has to do with the biological characteristics that make up the women or men and girls or boys socially exist in a society. Gender differences have become critical issues of concern in our world today, especially to educators and researchers. Gender issues such as domestic chores being attributed to be female jobs while harder and complex jobs such as repairs of electronic devices, Engineering, Medicine and other technical courses to the male. The issue of gender has raised a lot of conflict making gender parity inconclusive. Oludipe, (2020) stated gender has no effect on student academic achievement when exposed to equal opportunity. Aina (2013) is of the view that males outperformed their female counterparts mostly in mathematical concepts. Ullah and Ullah (2019) are of the view that females perform better than the males under same instructional situation. However a strong perception of human activity and differences have been observed through their attitudes, behaviours, and achievement of males and females, distinguishing differences in the cognitive, affective, and psychomotor skill achievements of students with respect to gender (Okeke & Nwosu, 2018). Some report argues no difference in academic achievement, others maintain that there exist a gap between male and

their female counterparts. Hence a need to examine gender parity in teaching strategies as an intervening variable in this study

In other to ameliorate this situation there is a need to employ various teaching strategies and more innovative teaching strategies therefore, the need to undertake this study. This study investigated the effect of teacher-directed play teaching strategy on academic achievement of Physics students.in Abia State.

Purpose of the study.

The purpose of the study is to investigate the effect of teacher-directed play teaching strategy on academic achievement of Physics students in Abia state. Specifically the study aimed to:

1. determine the mean achievement scores of students taught Physics with play teaching strategy and those taught using conventional teaching method.

2. Determine the mean achievement scores of male and female students taught Physics using Play teaching strategy

Research Questions

The following research questions guided the study

1. What are the mean achievement scores of students taught Physics with teacher-directed Play teaching strategy and students taught physics using conventional teaching method?
2. What are the mean achievement scores of male and female students taught Physics using Play teaching strategy?

Research Hypotheses

The null hypotheses formulated guided the study and was tested at the 0.05 level of significance.

Ho_1: There is no statistically significant difference between the mean achievement scores of students taught Physics using play teaching strategy and those taught using conventional teaching method.

Ho_2: There is no statistically significant difference between the mean achievement scores of male and female students taught Physics using play teaching strategy.

Method

The study investigated the effect of teacher-directed play teaching strategy on academic achievement of physics students in Abia State. The design of the study is quasi-experimental design using pretest and posttest control groups. The population of the study consist of two thousand, three hundred and twenty six (2,326) senior secondary school one (SSS1) Physics students' from two co-educational public secondary schools in Abia State. Fifty-four (54) senior secondary school one students (SSS1) from two intact classes in public secondary schools in Abia State were selected using Simple random sampling technique and the same was used to select one education zone (Umuahia Education zone) out of the three education zones in Abia State. Same techniques was also used to select a local government area out of the four local government areas in the zone. Simple random sampling was used to select two schools out of six-teen (16) co-educational secondary schools in the area. The same simple random sampling was used to select two schools and same techniques was employed to assign the two schools to experimental group and control group. The experimental group were taught Physics using Play teaching strategy while the control group were taught using conventional teaching method. The instrument for Data collection was a twenty-five (25) item multiple choice Physics Achievement Test (PAT), the PAT was adopted from the West African Senior Secondary Certificate Examination (WASSCE) past questions. The Instrument was both content and face validated by two experts and reliability index of .76 was obtained using Kuder-Richardson (K-R 20). Two research questions and two hypotheses, formulated and tested at 0.05 level of significance, guided the study. The research question was answered using mean and standard deviation while the null hypothesis was tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance.

Result

The results were presented in line with the research questions and its corresponding hypotheses as shown in the tables below.

Research question one:

What are the achievement mean scores of students taught Physics with Play teaching strategy and those taught with conventional teaching method?

Table 1: Mean pretest, posttest and gain achievement scores of students taught Physics using play strategy and those taught using conventional method.

Instructional Method	N	Pre-Test		Post-Test		Gain Score
		$\bar{X}$	SD1	$\bar{X}$	SD2	$\bar{X}$
Play strategy	30	27.73	1.74	69.03	2.31	41.30
Conventional	24	15.54	1.50	46.08	1.91	30.54

Result in Table 1 shows the mean achievement scores of students taught Physics using play teaching strategy is 69.03 while those taught using conventional teaching method is 46.08.

Hypothesis one: There is no significant difference between the mean achievement scores of students taught Physics using play teaching strategy and those taught with conventional method.

Table 2: Analysis of covariance (ANCOVA) of student's achievement in Physics.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7044.479[a]	2	3522.239	827.726	.000
Intercept	713.629	1	713.629	167.703	.000
PRE	21.779	1	21.779	5.118	.028
TM	289.101	1	289.101	67.939	.000
Error	217.021	51	4.255		
Total	194175.000	54			
Corrected Total	7261.500	53			

a. R Squared = .970 (Adjusted R Squared = .969)

Result in Table 2: shows a significant difference between the achievement mean scores of student taught physics with play teaching strategy and those taught using conventional teaching method, the F-ratio of 67.939 was obtained with associated probability value of (0.000). Since the associated probability (0.000) was less than 0.05 set as level of significance, the null hypothesis (Ho_1) which stated that there is no significant difference between the mean achievement scores of students taught physics using play teaching strategy

and those taught with conventional teaching method is rejected. Hence the inference drawn is that there is significant difference between the mean achievement scores of students taught physics using play teaching strategy and those taught with conventional teaching method.

Research question two

What are the mean achievement scores of male and female students taught Physic using Play teaching strategy?

Table 3: The mean achievement scores of male and female students taught physics with Play teaching strategy

GENDER	N	PRE-TEST		POST-TEST		GAIN SCORE
		$\bar{X}$	SD1	$\bar{X}$	SD2	$\bar{X}$
Male	16	27.81	1.80	69.63	2.25	41.81
Female	14	27.64	1.74	68.36	2.27	40.71

Table 3 shows the achievement mean score of 69.63for male while female students had 68.36

Hypothesis Two

What are the mean achievement scores of male and female students taught Physics using play teaching strategy?

Table 4: Analysis of covariance (ANCOVA) of male and female students taught physics with Play teaching strategy.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	17.861[a]	2	8.930	1.759	.191
Intercept	434.084	1	434.084	85.483	.000
PRE	5.858	1	5.858	1.154	.292
Sex	11.159	1	11.159	2.198	.150
Error	137.106	27	5.078		
Total	143123.000	30			
Corrected Total	154.967	29			

a. R Squared = .115 (Adjusted R Squared = .050)

Result in Table 4 shows that there is no significant difference in the mean achievement scores of male and female taught Physics using play teaching strategy.

F-ratio of 2.198 was obtained with associated probability value of .150. Since the associated probability value of (2.198) was greater than 0.05 set as bench mark, the null hypothesis

Which stated that there is no significant difference in the mean achievement scores of male and female taught Physics using play teaching strategy was not rejected. Thus the inference drawn shows that the male and female taught Physics using play teaching strategy did not differ significantly in their achievement mean score in Physics when taught using play teaching method. This may be due to students' hand-on Physics activities through the teacher –directed play strategy.

Discussion of Findings

The results show that students taught Physics using play teaching strategy performed better than students taught using conventional teaching method; there exist a significant difference in the mean scores of students taught Physics with play teaching strategy. Hence the inference drawn is that there is significant difference between the students taught Physics with play teaching strategy and those taught using conventional teaching method. This agrees with Oludipe, (2020). who ascertain that the use of activity-based or game-based teaching strategy enhances students' academic achievement. Also there was no significant difference between the mean achievement scores of the male and female students taught physics with the use of play teaching strategy. This concurs with Adegoke (2010) who stated that no significant difference in the mean achievement scores of male and female students taught Physics under the same instructional conditions. However, a contrary finding by Okeke and Nwosu (2018) maintained that male students performed better than their female counterparts when exposed to practical learning situations. This is in contrast to Aina (2013) who opined that there is significant difference in students' academic achievement in favor of the males. However, in

the work of Ullah and Ullah (2019) gender difference exists in favor of the females.

Conclusions

From the findings of the study, it was concluded that utilizing play teaching strategy was effective in enhancing students achievement in Physics than using the conventional teaching method. The results revealed that students taught Physics using play teaching strategy performed better than students taught using conventional teaching method. Again, there was no significant difference between the mean achievements scores of the male and female students taught Physics with Play teaching strategy.

Recommendations

Based on the findings of the study, the following recommendations were made:

1.Teachers should be encouraged to use Play teaching strategy with other methods to boost academic achievement in Physics.

2. Government and other education stakeholders should make available some technological devices and facilities in the schools to enable teachers use variety of strategies to enhance performance of students in Physics.

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