



Evaluation of Teachers Pedagogical Method of Teaching Physics and Its Effects on Academic Performance of Physics Students in Senior Secondary School in South West Nigeria

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Abstract

The study examines Teachers teaching method and its Effect on Academic performance of physics students in Senior Secondary Schools in South West Nigeria, with a view of improving effective teaching and learning of physics .This study is based on survey research design. The population comprised of all physics teachers in public secondary schools in Ekiti and Ondo States in South West Nigeria. The instrument used was Physics Programme Evaluation Questionnaire for Teachers (PAT) with a reliability coefficient $r = (0.73)$ was obtained using Crumbach Alpha. One research hypothesis and one research question were posed to guide the study. Findings from this study revealed that majority of physics teachers in South West Nigeria often using recommended teaching method, and a significant relationship between teachers teaching method and academic performance of physics students. It is recommended that government should be given teachers symposium and regular work shop on the recommended teaching methods and provide teaching aids to facilitate effective teaching and learning of physics.

Keywords: Teachers; Academic Performance; Pedagogical Method; Effect

Introduction

Physics is the study of matter and energy and how they affect each other. It is also referred to as the study of natural phenomena in its fundamental state. However, the method of teaching influence the achievement of students in physics education [1,2]. Physics is the basis of technology and for effective living in the modern age of science and technology [3,4], it is essential that every child should be given the opportunity to acquire at least basic knowledge and the concept of physics as a science. The fact that a lot of factors are responsible for students' underachievement in physics is not new to researchers but amongst those factors could

be teachers and students perception of physics concepts and availability of material resources .Recent studies indicate that there is a substantial impact of teachers teaching method on students' achievement in physics learning. According to Atandi BC, et al. [5] who confirmed in their study that teaching methods influence students academic achievement .Teaching method refer to the way teachers and learners interact with each other and use variety of tools and information resources with each other in their pursuit of learning activities [6,7]. Learning is a process which produces series of changes in behavior or it is more or less a change in behavior that result from activities, training or observation. It is a change in behavior that confirms learning,

According to Jeffs T, et al. [8] and Okonkwo P, et al. [9] learning is a process which produces progressive series of changes in behavior or it is more or less a change in behavior that results from activity. The amount of learning and knowledge imparted such as this, lack proper moral content, and physical facilities are in conducive to effective learning being either non-existence or in a deplorable state, However, there has been a wide range of problem with the methods by which teachers are impacting knowledge into students in the senior secondary schools in Nigeria which prevents effective learning to take place. Many teachers are still using didactic methods and materials in imparting knowledge which are still teacher centered method. It is henceforth imperative to study teachers pedagogical methods and its effect on academic achievement of physics students. Since science without physics is incomplete and because there can be no technological advancement without physics. This study will be more effective at this time when the country needs more scientists to advance technology.

Statement of the Problem

Over the years, the problem of underachievement of science students in physics has been a general problem for example many researchers in Nigeria have conducted series of research to actually find out what could be responsible for the problem. Factors such as lack of adequate laboratory equipment, lack of qualified teachers and school factors have been identified as major causes of under achievement of physics students. Despite all these efforts the poor performance of students still exist. However, little emphasis has been laid on the effect of teaching method used by the teachers. This hence fort justifies the need for the study of the teachers pedagogical method and its effect on academic achievement of physics students in South West Nigeria.

Objective of the study

The study investigated pedagogical effects on academic achievement of physics students specifically aimed to:

- Find out the level of compliance of teachers with the recommended teaching methods as 2 indicated in the physics curriculum.
- find out if there is any significant relationship between the teachers teaching methods and academic performance of physics students in South West Nigeria.

Our research question (RQ) can be defined as follows:

RQ: What is the frequency of use of teaching methods by

physics teachers in teaching physics curriculum objectives in senior secondary schools in South West Nigeria?

Our hypothesis (H) can be defined as follows:

H: There is no significant relationship between the teachers teaching methods and the academic performance of physics students in South West Nigeria.

Research Method

Descriptive survey research method was utilized for the study. This enables the researcher to capture large sample size the population of this study comprised all physics teachers in Ondo and Ekiti states. Multistage sampling procedure was used to select 200 physics teachers from all the three senatorial districts each in Ondo and Ekiti States. Physics programme Evaluation Questionnaire for Teachers (PPEQT) adapted from Ifeibu HN [10] was used by the researcher to gather information from the teachers on the method of teaching employed by the physics teachers. The instrument was validated by experts in the Department of science Education Adekunle Ajasin University Akungba Akoko. Afield trial of PPEQT was attempted to 20 physics teachers who were not participants in the study. Cronbach Alpha was used to determine the internal consistency of the instrument. This yielded reliability coefficient of 0.73. This shows that the instrument is reliable. The questionnaire was administered by the researcher and research assistants. The data collected were analysed using Likert conversion and correlation matrix at 0, 05 alpha levels.

Results

Research Question

In answering the research question (What is the frequency of use of teaching methods by physics teachers in teaching physics curriculum objectives in senior secondary schools in South West Nigeria?) The data obtained from PPEQT Questionnaire were summerised and converted to objective views using likers t conversion method. The scores were distributed as very often used (vou), often used (ou), seldom used (su), not used (Nu) and ranged as follows: Vou=4, ou=3, su=2 and Nu =1.

The result is presented in Table 1

Research Question: What is the frequency of use of teaching methods by physics teachers in teaching physics curriculum objectives in secondary schools in South West Nigeria?

S/No	Teaching methods	Responses					Likerts Conversion					MWV	Decision
		VOU	OU	SU	NU	Total	4	3	2	1	Total		
1.	Laboratory/ experimentation	44	65	62	29	200	176	195	124	29	524	2.62	A
2.	Cooperative learning	32	79	60	29	200	128	237	120	29	514	2.57	A
3.	Collaborative learning	28	82	58	32	200	112	246	116	32	506	2.53	A
4.	Questioning	26	83	57	34	200	104	249	114	34	501	2.51	A
5.	Problem solving	29	79	57	35	200	116	237	114	35	502	2.51	A
6.	Inquiry/discovery method	25	83	56	36	200	100	249	112	36	497	2.49	A
7.	Assignment	23	81	63	33	200	92	243	126	33	494	2.47	A
8.	Lecture method	24	85	52	39	200	96	255	104	39	494	2.47	A
9.	Discussion method	24	80	52	44	200	96	240	104	44	484	2.42	A
10.	Demonstration method	17	88	57	38	200	68	264	114	38	484	2.42	A
11.	Experimentation	22	81	54	43	200	88	243	108	43	482	2.41	A
12.	Inquiry method	16	86	56	42	200	64	258	112	42	476	2.38	A
13.	Programmed instruction	11	92	47	50	200	44	276	94	50	464	2.32	A
14.	Role playing	29	39	59	73	200	116	117	118	73	424	2.12	R
15.	Computer assisted	28	42	56	74	200	112	126	112	74	424	2.12	R
16.	Excursion/field trip	29	35	59	77	200	116	105	118	77	416	2.08	R
17.	Simulation and games	29	32	59	80	200	116	96	118	80	410	2.05	R
18.	Use of analogies	29	30	59	82	200	116	90	118	82	406	2.03	R
19.	Project method	16	49	45	90	200	64	147	90	90	391	1.96	R
20.	Team teaching	29	23	56	92	200	116	69	112	92	389	1.95	R
21.	Concept mapping	14	43	47	96	200	56	129	94	96	375	1.88	R
											GMWV	2.3	

Keys meaning: VOU= Very Often used, OU= Often used, SU= Seldom used, NU= Not used

Table 1: Summary of the teachers responses on the frequency of their Compliance with the Recommended Teaching Methods.

The teachers were asked to indicate the types of teaching methods they adopted in teaching physics in order to identify the level of teachers compliance with the recommended teaching methods in physics curriculum in secondary schools in the study area. The responses of the 200 teachers to the stated statements under identified teaching methods are as shown in Table 1. The subjective views of the 200 teachers were summarized and converted to objective views using Likerts conversion method (Table 1).

With GMWV of 2.30, as a rule, out of the twenty one teaching methods recommended in physics curriculum to teach physics in secondary schools, the teachers complied

with the usage of thirteen (13) teaching methods in the study area. Ranking first and second among the accepted recommended teaching methods are Laboratory/ Experimentation (MWV= 2.62) and Cooperative learning (MWV= 2.57). These are followed by Collaborative learning (MWV=2.53), Questioning (MWV= 2.51), Problem solving (MWV= 2.51) and Inquiry/discovery method (MWV= 2.49) that rank third, fourth and fifth respectively.

Other accepted teaching methods are: Assignment (MWV= 2.47), Lecture (MWV= 2.47), Discussion (MWV= 2.42) and Demonstration methods (MWV= 2.42). These methods rank sixth, seventh, eighth, ninth and tenth respectively

while, Experimentation (MWV= 2.41), Inquiry (MWV= 2.38) and Programmed instruction (MWV= 2.32) followed to rank eleventh, twelfth and thirteenth respectively.

The rejected teaching methods include; Role playing (MWV= 2.12), Computer assisted (MWV=2.12), Excursion/ field trip (MWV= 2.08), Simulation and games (MWV= 2.05), Use of analogies (MWV= 2.03), Project method (MWV= 1.96), Team teaching (MWV= 1.95) and Concept mapping (MWV= 1.88).

The aforementioned indicate that the most practiced teaching methods in the study area are Laboratory/

Experimentation, Cooperative learning, Collaborative learning, Questioning, Problem solving and Inquiry/ discovery teaching methods. It was observed from table one that majority of the respondents assigned that the recommended teaching methods were often used.

Research Hypothesis

Our research hypothesis states that there is no significant relationship between the teachers teaching methods and academic performance of physics students in South West Nigeria (Table 2).

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
1. Assignment	1																						
2. Problem Solving	.405**	1																					
3. Programmed instruction	.892*	-.841*	1																				
4. Discussion method	.384**	-.844*	0.049	1																			
5. Lecture Method	.895**	-.086*	0.003	-.137*	1																		
6. Experimental	.941**	-.868*	.142*	-.228**	.689**	1																	
7. use of analogies	.925**	-0.07	.955*	.957*	.981*	.987*	1																
8. Project method	.925*	-.906*	.904*	.907*	.950*	.940*	.944*	1															
9. Role playing	.961*	-.912*	.002*	.905*	.957*	.937*	.939*	.894*	1														
10. Cooperative learning	.974*	-0.02	.897*	.899*	.452*	.631*	.934*	.487*	.893*	1													
11. Simulation and games	.267*	-.424	.890*	.892*	.944*	.923*	.926*	.977*	.384*	.290*	1												
12. inquiry discovery method	.063*	-.624*	.890*	.892*	.944*	.923*	.926*	.237*	.084*	.990*	.682*	1											
13. Demonstration Method	.378*	-.905*	-0.082	0.037	-0	-0.08	-.365*	-.894*	.960*	.965*	.274*	.274*	1										
14. Laboratory Experiment	.634*	-.926*	.892*	.895*	.941*	.922*	.925*	.361*	.474*	.367*	.963*	.963*	.978*	1									
15. Team Teaching	.964*	-.926*	.879*	.881*	.929*	.709*	.512*	.959*	.565*	.971*	.880*	.980*	.987*	.964*	1								
16. Collaborative learning	.948*	-.939*	.867*	.869*	.916*	.897*	.500*	.943*	.850*	.355*	.364*	.964*	.964*	.970*	.983*	1							
17. Computer assisted	.371*	-.864*	.885*	.886*	.223*	.508*	.710*	.938*	.950*	.242*	.938*	.948*	.971*	.936*	.982*	.920*	1						

18. Excursion / Field Trip	.892*	.891*	.406*	.604*	.207*	.750*	.940*	.944*	.561*	-.206*	.904*	.927*	.871*	.834*	.821*	.823*	.948*	1				
19. Questioning	.782*	-.939*	-0.012	.302*	.905*	.357*	.437*	.439*	.894*	-.912*	.902*	.871*	.782*	.671*	.671*	.902*	.872*	.872*	1			
20. Concept mapping	.687*	-.864*	-0.017	.897*	.899*	.552*	.341*	.534*	.287*	-.917*	.897*	.321*	.782*	.781*	.781*	.672*	.714*	.902*	.817*	1		
21. Inquiry method	0.452	0.023	0.561	0.067	0.087	0.324	.762*	.078"	.532*	.321*	0.06	0.087	0.085	0.08	0.078	0.075	0.068	0.059	0.055	0.04	1	
22 Academic perfor	0.710**	.621*	0.450*	.442*	.352*	.221*	.210*	.140*	.030*	.013*	.002*	-.027*	-.080*	-0.02	-0.02	-0.04	-0.05	-0.05	-0.06	-0.02	-0.02	1

Table 2: Correlation Matrix showing the Relationship between Teaching methods and academic performance of Physics Students.

Table 2 shows that all the tested teaching methods had significant relationship with academic performance of physics students, assignment with $r = 0.710$ $p < .05$ is the teachers teaching method that has the highest positive correlation with academic performance of physics students in the study area and the highest influence or variation of 0.710 followed by problem solving method with 0.62 influence or variation on the academic performance of physics students.

These results indicated that teachers teaching methods have effect on the academic performance of physics students. The null hypothesis is hereby rejected.

Discussion

The results of this study showed that majority of the respondents are often using the recommended teaching methods. This is in line with the recommendation of Federal Ministry of Education [11], Zeyrep T [12] and Ulriksen L, et al. [13] on the use of field studies, guided inquiry and laboratory techniques for teaching physics subject.

The results of this study also showed that there was a significant relationship between teachers teaching method and the academic performance of physics students. The result of this study is in line with Atandi BC, et al. [5], Faberic C, et al. [14] and Moakler MW, et al. [15] who concluded in their study that teaching methods influence students academic achievement.

Conclusion and Recommendations

Majority of the physics teachers are often using recommended teaching method, there existed a significant relationship between teachers teaching method and academic performance of students. Based on the findings, it is recommended that physics teachers should be giving symposiums and workshops seminars on the use of the recommended teaching methods in teaching physics and teachers should be provided more teaching aids to facilitate

teaching and learning [16-20].

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Declaration of Interest

The author declares no competing interest.

Data Availability

Data generated or analysed during this study are available from the author on request.

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