

Influence of Laboratory Facilities and Teachers' Work Attitude on Performance of Secondary School Students in Physics in Ekiti State

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Abstract: *This study examined the impact of laboratory facilities and teachers' work attitude on the academic performance of secondary school physics students in Ekiti State. A combination of descriptive survey and ex-post-facto research designs was adopted. The sample included 30 physics teachers and the WASSCE results of 1600 students, selected through multistage sampling from 30 schools. Three instruments were utilised: the Physics Laboratory Facilities and Work Attitude Questionnaire for Teachers (PLFWAQT), Physics Laboratory Facilities and Teachers' Work Attitude Questionnaire for Students (PLFTWAQS), and A Year Examination Result Template (AYERT). The instruments were validated by science education experts, while test-retest reliability produced coefficients of 0.79 and 0.81 for the questionnaires. Data were analysed using Pearson Product Moment Correlation and regression analysis at a 0.05 significance level. Findings revealed that laboratory facilities significantly correlated with students' academic performance in physics, while teachers' work attitude showed no significant relationship. However, both laboratory facilities and teachers' work attitude jointly contributed to students' academic performance. The study concluded that laboratory facilities and positive teacher attitudes are vital for improved physics performance. It recommended training workshops for teachers on modern laboratory usage, fostering positive work attitudes, and ensuring the provision of adequate laboratory facilities by stakeholders to enhance students' performance*

Keywords; laboratory facilities, teacher work attitude, academic performance, physics

INTRODUCTION

Science and Technology has contributed significantly to the development of a nation. Through the application of science, scientific knowledgeable professionals have been able to invent equipment

and machines used in industries and homes. In addition to this, science and technology has helped in ease stress brought by the movement of goods and services from one place to another, by inventing easy transportation equipment like automobiles, aircrafts among others. Furthermore, science and technology has helped in the area of medicine, communication, food production, electricity, good road and lots more. It is incontrovertible to say that science and technology play important roles in the development of any nation.

In the contemporary world education practices, science education occupies a revered position in science and technology, this is because science subjects are taught all over the world and educators believe that no nation of the world must neglect the teaching of science in schools (Fafunwa, 2004). The learning of science subjects (Physics, Chemistry and Biology) at the level of senior secondary school could be influenced by many environmental variables such as availability of laboratory and library facilities.

There is no controversy among scholars, researchers, educational planners, and administrator about the fact that educational facilities such as laboratory and library are essential ingredients in the effort to realize effective teaching learning outcomes. It should be noted that the quality of facilities has an impact not only on educational outcomes but on the well-being of the students and teachers. Laboratory is at the centre of scientific studies and/or sciencing so long as science remains both a product and process. The availability of laboratory equipment, facilities and materials play a vital role in determining the extent of best laboratory practices that will ensure acquisition of science process skills and competence in science concepts by the learners.

Conversely, Mimiko (2010) attributed lack of modern science laboratory in schools to the poor performance of students in science subjects. The researcher observed also that most of the public schools are using one laboratory for physics, chemistry and biology. In addition most of the so-called laboratory is just a room marked for that purpose. The issue of material, equipment, specimen and reagents is always a problem as most of the secondary schools can hardly boast of these scientific instrument and reagent that are germane to the carrying out of practical laboratory activities in schools; hence have an overbearing influence on the general academic performance of science students in our schools.

Attitude has been conceptualized as a relational mental state that directs the behaviour of an individual. Different individuals have different mental dispositions such as experiences, beliefs, desires, hopes, likes, dislikes and intentions. All these mental dynamics are essential components of attitude (Bain and Ken cited in Iqbal, Hamdan, Alam, Sihatullah & Khalil, 2013). Schaller (2008) opined that attitude is often formed by the judgments we make as a result of information we receive from various sources. He further explained that when we find this information credible and congruent with our predisposition and previous judgments, we develop a favourable or positive attitude towards a new object, idea, or person. Attitude is thus regarded as a strong

component in human personality (Podsakoff, LePine & LePine, 2007). Teachers' work attitude however, refers to the level of preparedness, commitment and diligence teachers have for the teaching job. It is seen as teachers' opinions, beliefs, and feelings about their job (Miller, Rutherford & Kolodinsky, 2008). Melvina (2013) described teachers' work attitude as a set of evaluations of the teaching job that informs teachers' commitment, effectiveness, diligence, attachment, and dedication to teaching. The work attitude comprises behaviours, ideas and values related to work, being a synthesis among the community vision and the individual vision (Constantin, 2004). Teachers' work attitude is usually informed by the way they see the work, either as an accomplishment or a compulsory duty (Erdem & Demirel, 2007).

The teaching profession is one which is very sensitive as it involves centrally the shaping of minds, which is why many often refer to it as a noble profession. Ideally, a teacher's work attitude should be enthusiastic and passionate about the teaching job and sometimes go beyond his or her job description and take pride in the fact that he or she is taking part in the shaping of students that would lead the future generation. Baxter cited in Iqbal, Hamdan, Alam, Sihatullah and Khalil (2013) stressed that teachers with positive work attitude have stable emotions and feelings. They demonstrate affection, patience, sincerity and care while interacting with students, parents or school staff. They do not work in isolation. Such teachers work in collaboration and they have high emotional intelligence and students do not hesitate to meet them as they are accessible to everyone (Bain, 2004).

Teachers are expected to be serious in their task of helping others gain knowledge, acquire skills, and values. They are to be dedicated and apt in the dispensation of their duties as teachers. But reverse is often the case. Teachers have been observed to display nonchalant attitude to work, they usually come late to school and leave before the school closes for the day. Some are reluctant to teach and attend to students' needs, while others would always absent themselves from duties without permission from their superiors or formally requesting for leave of absence from work. Academic performance of students in science subjects has been observed to be on the down side over the years in Ekiti State as observed by the researcher, many reasons have been adduced in literature for this poor performance of students but it seems as if much emphasis has not been placed on the students' learning through laboratory and library facilities.

Based on this premise, the researcher is set out to investigate if laboratory facilities and teachers' work attitude could have influence on the academic performance of students in physics.

The purpose of the study was to;

1. determine the influence that laboratory facilities have on academic performance of secondary school students in physics
2. investigate the influence of teachers' work attitude on the academic performance of secondary school students in physics

The following null hypotheses tested at 0.05 level of significance guided the study;

1. Laboratory facilities do not significantly relate to students' academic performance in physics in Ekiti state.
2. Teacher's work attitude do not significantly relate to students' academic performance in physics.
3. Laboratory facilities and teacher's work attitude do not jointly contribute to students' academic performance in physics.

METHODOLOGY

The two research designs employed in this study were; the descriptive research design of the survey type and Ex-post-facto descriptive research design. The population of the study consisted of the physics students in public senior secondary schools that sat for WASSCE in Ekiti State in the year 2019 and their physic teachers.

A total number of 30 physics teachers and 1600 students' WASSCE results were used as sample for the study. Multistage sampling procedure was adopted in the selection of the sample. Stage one involved random sampling of six local government areas across the three (two from each) senatorial district with random sampling technique using ballot option. Stage two involves random sampling of schools (five secondary schools) in each of the chosen local government with random sampling technique using ballot option. Lastly the physics teachers and intact classes were used. Three sets of instruments were used in this study. Physics Laboratory Facilities and Work Attitude Questionnaire for Teachers (PLFWAQT), Physics Laboratory Facilities and Teachers' Work Attitude Questionnaire for Students (PLFTWAQS) and A Year Examination Result Template (AYERT). PLFWAQT comprised of two sections; A and B. Section A dealt with demographic background of the physics teachers such as sex and area of specialization among others while section B contained 40 items to evaluate the influence of physics Laboratory and on students' academic performance with 4-point Likert scale response and scoring system to be Strongly agreed SD = 4 points, Agreed A =3, Disagreed D =2 Strongly Disagreed SD = 1. The *PLFQS* also comprised of two sections; A and B. Section A dealt with demographic background of the physics teachers such as sex and area of specialization among others while section B contained 40 items to evaluate the influence of physics Laboratory and on students' academic performance with 4-point Likert scale response and scoring system to be Strongly agreed SD = 4 points, Agreed A =3, Disagreed D =2 Strongly Disagreed SD = 1. AYERT is a template used for obtaining SS3 Students WASSCE Results for the year 2019 in the thirty schools.

The face and content validity of the PLFWAQT and PLFQS were ensured by experience science teachers and experts in science education and test, measurement and evaluation. The WASSCE result is a standardized result from West African Examinations Council. The method of test-retest was used to establish the reliability of PLFWAQT and PLFQS administered to ten science teachers

and 30 students selected from five schools outside the study area sample with the interval of two weeks. The obtained scores were subjected to Pearson Product Moment Correlation and a reliability coefficient of 0.79 and 0.81 were obtained respectively. The third instrument (WASSCE Result) is a standardized result from WAEC. The statistical tools used for test of hypotheses are Pearson Product Moment Correlation and regression statistics, at 0.05 level of significance.

RESULTS

Hypothesis 1: Laboratory facilities do not significantly relate to students' academic performance in physics in Ekiti state.

Table 1: Relationship between laboratory facilities and students' performance in physics

Variables	N	Mean	Stand Dev	r-cal	P-value
Laboratory Facilities	1630	25.40	3.83	0.453*	0.000
Performance in Physics	1600	45.65	9.37		

*P<0.05

Table 1 showed that the r-cal value of 0.453 is significant at 0.05 level of significance because the P-value (0.000) < 0.05. The null hypothesis is rejected. This implies a significant relationship exists between the laboratory facilities and students performance in physics. The laboratory facility is moderately related to students' performance in physics.

Hypothesis 2: Teacher's work attitude do not significantly relate to students' academic performance in physics in Ekiti state.

Table 2: Relationship between Teacher's work attitude and students' performance in physics

Variables	N	Mean	Stand Dev	r-cal	P-value
Teachers' Work Attitude	1630	30.25	3.76	0.538*	0.000
Performance in Physics	1600	45.65	9.37		

*P<0.05

Table 2 showed that the r-cal value of 0.538 is significant at 0.05 level of significance because the P-value (0.000) < 0.05. The null hypothesis is rejected. This implies a significant relationship exists between the teacher's work attitude and students' performance in physics. The teacher's work attitude is moderately related to students' performance in physics.

Hypothesis 3: Laboratory facilities and teacher's work attitude do not significantly jointly contribute to students' academic performance in physics in Ekiti state.

Table 3: Regression Coefficients of Predictor Variables on the Criterion Variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	3.559	.412		8.630	.000
	Laboratory	.231	.155	.128	3.488	.009
	Teacher work attitude	.209	.054	-.328	-3.848	.000

a Dependent Variable: performance

The result presented in table 3 shows that laboratory facilities, teacher work attitude have contributions to students' academic achievement in physics. Between the two, laboratory facilities, teachers work attitude is reveal to have significant contribution to the physic Grade Point of Students at 0.05 level of significance. The derived regression equation is: $PGP = SAP = 3.559 + 0.231(LF) + 0.209(TWA)$.

DISCUSSION

There was significant relationship between availability of laboratory facilities and academic performance in schools. The finding is favourably supported by Mimiko (2010) that schools with well-equipped laboratories have better results in the school certificate science examinations than those that are ill-equipped. Gana (1997) reiterated that students instructed entirely by the laboratory methods had higher attitude's scores but lower achievement scores than students instructed entirely by the traditional lecture or textbook mode. Yadar (2007) opined that no course in science and mathematics can be considered as complete without including some practical work. Scientific practices and applications are thus rendered more meaningful. Farombi (1998) argued the saying that "seeing is believing" as the effect of using laboratories in teaching and learning of science and other science related disciplines as students tend to understand and recall what they see than what they hear or were told.

The finding of the study further revealed that teacher's work attitude do relate to students' academic performance in physics. This is an indication that a teacher with positive work attitude will produce students with better performance while teachers with negative work attitude could produce students with poor performance. This is in line with the findings of Baxter cited in Iqbal, Hamdan, Alam, Sihatullah and Khalil (2013) who stressed that teachers with positive work attitude have stable emotions and feelings and thus demonstrate affection, patience, sincerity and care while interacting with students in class which invariably improve their performance in class.

CONCLUSION

Teachers' work attitude has been conceptualized as the level of preparedness, commitment and diligence teachers have for the teaching job. It is seen as a set of evaluations of the teaching job that informs teachers' commitment, effectiveness, feelings, attachment, and dedication to teaching. It is common for some teachers to display nonchalant work attitude, coming late to school and leaving the school before the closure time. Some are reluctant to teach and attend to students' needs, while others would always absent themselves from duties without permission from their superiors or formally requesting for leave of absence from work. It was concluded that laboratory facilities and teacher's work attitude are crucial for better performance of students.

Recommendations

1. Teachers should be trained through various workshops and seminars on the use of modern laboratory facility for effective laboratory practical activities in schools.
2. Teacher should develop positive work attitude so that students' performance can be greatly improved.
3. Efforts should be geared towards provision of adequate laboratory and laboratory facilities in schools by the stake holders.

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