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Analysis of factors influencing students' attitudes towards practical aspect of secondary school physics in Ekiti state

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Abstract

The outcome of students' performance at certificate examinations in physics recently has not justify the efforts put into its study. The consequent of this would implies failure in achieving the purpose of studying physics at the secondary school level and invariably affects the national technological growth plan. The attitude of students to practical aspect of physics appears not encouraging. This study analysed factors that are influencing students' attitudes towards physics practical in secondary schools in Ekiti state. It was a survey type of descriptive research design. The sample for the study comprised 1200 physics students selected from 48 secondary schools in Ekiti state. Three research questions were raised for the study, which were answered using descriptive analysis of mean and percentages. A self-developed questionnaire was used to collect data from the respondents. Analysis of the data showed that the students attitudes towards physics practical in secondary schools in Ekiti state include being scared by the measurements involved, lack of interest, annoyance during physics practical classes and therefore do not prepare for them. Also, the factors influencing students' attitudes towards practical aspect of secondary school science in Ekiti state can be categorized into students-related factors, teachers-related factors and laboratory related factors. Based on this, recommendations were made to positively change the attitudes of the students towards practical aspect of secondary school physics in Ekiti state.

Keywords: Attitude, physics practical, factors, students

1. Introduction

The concept of attitude is crucial when dealing with the way one response to an issue. The attitude could be considered as the outcome of one's impression about something or better still, one's perception of something. Attitude was defined by Gagne (1979) ^[10] as an internal state that influences the personal actions of an individual, a major factor in subject choice, a mental and neutral state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's responses to all objects and situations with which it is related. Attitudes are related to coping with and management of the emotions occurring during learning process, and they play an important role in directing human behaviour (Hasan & Uğur, 2012) ^[12]. Pearson (2010) ^[16] also defines attitude as someone's opinions and feelings about something or someone, especially when this shows in the behaviour. It can then be adjudged that one's attitude to something manifests in the way he/she would response to issues that pertain to the thing. This is applicable to learning, especially in physics, which involves full concentration of the learners' attention. Thus, the attitude of students contributes immensely to their progress. Whatever form attitudes may take, whether occurring as part of a system of values and beliefs, has direct positive or negative effects on learning process and influences future lives of individuals (Seferoglu, 2004; Sunbul *et al.*, 2004) ^[18, 19]. The development of positive attraction or negative feeling towards other people or object essentially means that an attitude has been formed about the object. In essence, the attitude towards an object is a function of the perception of the object.

Physics is a physical science that involves lots of practical activities. The aim of physics learning at the secondary schools in Nigeria is to bring about the technological development needed by the nation through the production of young scientists who would be able to produce the technological devices to make day-to-day activities and life easier and more comfortable (Federal Ministry of Education, 1985; NPE, 2004) ^[9]. Perhaps, this is why Egbugara (1986) ^[7] strongly advocated for priority of physics in the development of scientific and technological programmes of a nation. Thus, physics teaching in secondary schools should develop essential scientific skills in the learners capable of infusing into them creative mind to enhance their technological applications. It thus requires that adequate laboratory facilities needed be provided

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for effective teaching and learning of practical physics. This is synonymous to the submission of Ajayi (2008)^[2] that where there is lack of necessary teaching materials and poor laboratory as being prevalent at the secondary schools in Nigeria, teachers and school administrators are losing focus on the objectives of physics education at such level. He therefore concluded that Nigeria could not yet make her environment more comfortable and life more interesting. From the discourse, one can adduce the reason to be due to laboratory-associated problems.

Although physics is in every area in our life and facilitates our lives, national and international studies show that success in physics education is lower than other disciplines (Gok and Silay 2008; Dieck 1997; Rivard and Straw 2000, Mattern and Schau, 2002)^[11, 6, 17, 14]. Research reports (Soyibo, 1986; Ajayi, 2008)^[20, 2] have it that most secondary schools have no science laboratories and the few that have them are ill equipped and poorly maintained. This is sub-standard to the recommendation of the Federal Inspectorate Service of the Federal Ministry of Education (2002)^[8] that each science subject must have a separate well equipped laboratory. It follows therefore that practical activities would be negatively affected or avoided as a result of non-availability of necessary laboratory facilities. Invariably, neglect of practical activities in physics would subject physics teaching too hard to comprehend and very boring for the learners. In effect, the aims and objectives of physics education at the secondary school level will not be achieved.

Aside the issue of laboratory facility is the teachers. The action or inaction of the teacher has a considerable influence on the attitude of the students to the subject taught by such a teacher. This is why Carson (1990)^[5] opined that teachers have the opportunity of structuring lessons to influence students' attitudes, among others. Moreover, Carson (1990)^[5] believed that a natural tendency to socialize with the students on a professional level could be created by the teacher through approaches to problem solving and about activities and attitudes, which influence performance in class. In effect, when students perform better, the subject matter is considered with a positive attitude which eventually turn out more interest in the subject and consequently, higher performance. It was the submission of Anjo (1990), that students' poor performance in physics globally is basically due to lack of involving the students in the practical activities very early, lack of qualified teachers as well as experiences in teaching. Ibe, *et al.* (2013)^[13] submitted that Effective use of teaching aids, use of varieties of teaching methods, allowing only professionally trained physics teachers, recommendation of physics textbook for students will improve attitude of students towards physics. Other factors capable of improving students' attitudes towards physics in secondary school include conducting physics practical often and allowing students to use material and aids, teaching physics with related stories and arranging classroom and laboratories properly to fascinate the students.

The students' attitude towards a subject is another crucial factor capable of influencing their interest in activities involved in the learning of the subject, physics inclusive. Reports of research revealed negative attitudes of students to science learning (Ogunleye, 1993, Adedayo, 2010)^[15]. Hasan & Uğur (2012)^[12] reported that students have negative attitude towards physics lessons, and they have a low rate of interest, expectation and success in physics lessons. They discovered further that students' attitude towards physical experiments is that most of the students think that physics

experiments are *boring* and *not exciting*. The negative attitude of the students might be due to the fact that many of the students have been misinformed that physics is a difficult science subject, either by their elderly ones or friends. Physics students thus needed to be discouraged from notion that physics is a difficult subject so as to improve their attitudes towards physics (Ibeh, *et. al.* 2013)^[13]. Alao (1990)^[4] showed that there is positive correlation between attitudes and performance in the science subjects. However, attitudes can be changed by forming a new one or modify the present attitude through exposure to new information (Adesina & Akinbobola, 2005)^[1].

1.1. Statement of the Problem

Reports from Researches revealed that the attitude of students towards practical class in physics is worrisome. Their lukewarm response is a threat to their academic achievement in the subject since the practical aspect carries a heavy percentage of their final grading at the certification level. It is therefore needful to find out what could be responsible for the poor attitude of the students towards practical physics in the secondary schools. The question then arouse: what factors could be influencing the students attitude to practical physics in the secondary schools in Ekiti state, Nigeria

1.2. Purpose of the Study

The study intended to analyse the factors influencing students' attitudes towards physics practical in secondary schools in Ekiti state. It dwelt into factors relating to the students, teachers and the laboratory facilities.

1.3. Research Questions

2. What is the attitude of students towards Practical Physics in secondary schools in Ekiti state?
3. What are the possible students-related factors influencing the students' attitude towards Practical Physics in secondary schools in Ekiti state?
4. What are the possible teachers-related factors influencing the students' attitude towards Practical Physics in secondary schools in Ekiti state?
5. What are the possible laboratory-related factors influencing the students' attitude towards Practical Physics in secondary schools in Ekiti state?

2. Methodology

The study was a survey type of descriptive design. The targeted population was all the physics students in secondary school (SS) class 2 in Ekiti State, Nigeria. Out of this, a sample of 1200 SS 2 physics students were selected through multistage sampling technique. The first stage was three schools randomly picked from each of the 16 Local Government areas of Ekiti State 48 secondary schools. From each of the schools, 25 SS 2 physics students were purposively selected comprising 15 male and 10 female. Three research questions were raised for the study. A self-developed questionnaire tagged "factors influencing students' attitudes towards physics practical in secondary school" was employed to elicit responses from the sample while the data collected were subjected to descriptive analysis of mean and percentages to answer the research questions. The instrument was considered for face and content validities by Test and Measurement experts as well as science educators. The reliability of the instrument was ensured through test re-test method. This was done by administering the instrument on 50 students who were not part of the sample for the study twice

at an interval of two weeks. The responses at these two separate times were correlated using Pearson Product Correlation Analysis which yielded 0.74. This value was considered high enough to adjudge that the instrument was reliable.

The researchers personally administered the instrument with the aid of the physics teacher in each of the sampled schools as the research assistance. All the copies of the instrument

distributed were retrieved back immediately after completion by the students. The responses of the respondents constituted the data for the study and were subjected to mean and percentages to answer the research questions.

3. Results

3.1. Question 1: What is the attitude of students towards Practical Physics in secondary schools in Ekiti state?

Table 1: Means and percentages of students’ attitude towards Practical Physics in secondary schools in Ekiti state

S/N	Items	NO		YES		\bar{X}	Decision
		N	%	N	%		
1	I am afraid whenever I have physics practical class	884	73.7	316	26.3	1.26	Disagree
2	I am scared by the measurements involved	487	40.6	713	59.4	1.59	Agree
3	I do not have interest in attending physics practical class	491		709		1.58	Agree
4	I am annoyed whenever I have physics practical class	423	35.4	777	64.6	1.66	Agree
5	I do not often prepared towards practical class in physics	538	44.8	662	55.2	1.55	Agree
Average % & \bar{X}						1.53	Agree

From table 1 above, a mean of 1.26 are afraid whenever it is physics practical class, 1.59 are scared by the measurements involved, 1.58 lack the interest of physics practical, 1.66 are feel annoyed during physics practical class and 1.55 do not prepare for it. Thus, is it evident that students attitude include being scared by the measurements involved, lack of interest, annoyance during physics practical class and therefore do not

prepare for it. On the average, the mean is 1.53, meaning that the factors can be considered as the attitudes of students towards Practical Physics in secondary schools in Ekiti state.

3.2. Question 2: What are the possible students-related factors influencing the students’ attitude towards Practical Physics in secondary schools in Ekiti state?

Table 2: Means and percentages of students-related factors influencing students’ attitude towards Practical Physics in secondary schools in Ekiti state

S/N	Items	NO		YES		\bar{X}	Decision
		N	%	N	%		
1	Students’ intelligent level cannot cope with physics practical activities	766	63.8	434	36.2	1.36	Disagree
2	I have prior negative impression about practical physics as being difficult	444	37.0	756	63.0	1.63	Agree
3	I don’t have Interest in practical physics	592	49.3	608	50.7	1.51	Agree
4	Practical physics is very tedious	509	42.4	691	57.6	1.58	Agree
5	Practical physics consumes too much of time	425	35.4	775	64.6	1.65	Agree
6	Students are Lazy when it comes to practical class	347	28.9	853	71.1	1.71	Agree
7	Students’ population is larger than the available apparatus during physics practical class	480	40.0	720	60.0	1.60	Agree
Average % & \bar{X}						1.58	Agree

Table 2 revealed that the mean rating of that students’ intelligent level cannot cope with physics practical activities is 1.36, prior negative impression about practical physics as being difficult is 1.63, lack of Interest in practical physics is 1.51, practical physics is very tedious is 1.58, Practical physics consumes too much of time is 1.65, students’ laziness when it comes to practical class is 1.71 while large students’ population than the available apparatus during physics practical class is 1.60. Hence, students’ related factors include prior negative impression about practical physics as being

difficult, lack of Interest in practical physics, considering practical physics as very tedious, practical physics consumes too much of time, students’ laziness when it comes to practical class and large students’ population than the available apparatus during physics practical class.

3.3. Question 3: What are the possible teachers-related factors influencing the students’ attitude towards Practical Physics in secondary schools in Ekiti state?

Table 3: Means and percentages of teachers-related factors influencing students’ attitude towards Practical Physics in secondary schools in Ekiti state

S/N	Items	NO		YES		\bar{X}	Decision
		N	%	N	%		
1	The teacher’s poor knowledge of practical work	348	29.0	852	71.0	1.71	Disagree
2	Low qualification of physics teachers	612	51.0	588	49.0	1.49	Agree
3	Non-availability of Competent physics teacher	336	28.0	864	72.0	1.72	Agree
4	Absenteeism of the teacher at practical classes	451	37.6	749	62.4	1.62	Agree
5	The teacher’s method of teaching; too advanced than the students.	358	29.8	842	70.2	1.70	Agree
6	The teacher’s bias interest on fair students during lab work	794	66.2	406	33.8	1.34	Disagree
7	Unfriendly attitude of the teacher with the students	515	42.9	685	57.1	1.57	Agree
8	Late commencement of teaching practical class	553	46.1	647	53.9	1.54	Agree
Average % & \bar{X}						1.59	Agree

It is evident from table 3 that the mean rating of the teacher’s poor knowledge of practical work is 1.71, low qualification of physics teachers is 1.49, non-availability of Competent physics teacher is 1.72, absenteeism of the teacher at practical classes is 1.62, teacher’s method of teaching as too advanced than the students is 1.70, teacher’s bias interest on fair students during lab work is 1.34, unfriendly attitude of the teacher with the students is 1.57 and Late commencement of teaching practical class is 1.54. Thus, teachers-related factors influencing the students’ attitude towards Practical Physics in secondary schools in Ekiti state are teacher’s poor knowledge of practical work, non-availability of Competent physics teacher, absenteeism of the teacher at practical classes, teacher’s method of teaching as too advanced than the students, unfriendly attitude of the teacher with the students and late commencement of teaching practical class.

3.4. Question 4: What are the possible laboratory-related factors influencing the students’ attitude towards Practical Physics in secondary schools in Ekiti state?

Table 4: Means and percentages of laboratory-related factors influencing students’ attitude towards Practical Physics in secondary schools in Ekiti state

S/N	Items	NO		YES		— X	Decision
		N	%	N	%		
1	Lack of separate physics laboratory	542	45.2	658	54.8	1.55	Agree
2	Lack of equipment in the laboratory	508	42.3	692	57.7	1.58	Agree
3	Inadequate instructional materials	216	18.0	984	82.0	1.82	Agree
4	Lack of practical physics text book	719	59.9	481	40.1	1.40	Disagree
5	Lack of competent laboratory attendant	876	73.0	324	27.0	1.27	Disagree
6	Ineffective maintenance of laboratory	688	57.3	512	42.7	1.43	Disagree
7	Too short period for practical work	337	28.1	863	71.9	1.72	Agree
Average % & \bar{X}						1.54	Agree

Table 4 above shows that the mean rating for lack of separate physics laboratory is 1.55, lack of equipment in the laboratory is 1.58, inadequate instructional materials is 1.82, lack of practical physics text book is 1.40, lack of competent laboratory attendant is 1.27, ineffective maintenance of laboratory is 1.43 and too short period for practical work is 1.72. It shows that the possible laboratory-related factors influencing the students’ attitude towards Practical Physics in secondary schools in Ekiti state include lack of separate physics laboratory, lack of equipment in the laboratory, inadequate instructional materials and too short period for practical work.

4. Discussion

The result of analysis showed that the attitude of students towards Practical Physics in secondary schools in Ekiti State include being scared by the measurements involved, lack of interest, annoyance during physics practical class and therefore do not prepare for it. If physics teaching in secondary schools would develop essential scientific skills in the learners capable of infusing into them creative mind to enhance their technological applications as discussed in the background of this study, then, students need to develop a positive attitude towards practical physics at the secondary school level.

It was also revealed from this study that even though the students’ intelligent level can cope with physics practical activities, yet, prior negative impression about practical physics as being difficult, lack of Interest in practical physics, considering practical physics as very tedious, too much of time spent during practical physics, students’ laziness when it comes to practical class and large students’ population than the available apparatus during physics practical class were identified as students-related factors influencing the students’ attitude towards Practical Physics in secondary schools in Ekiti state.

This finding further showed that while the teachers are professionally qualified and were unbiased in their teaching, students attitudes towards Practical Physics in secondary schools in Ekiti state are influenced by the teachers’ poor knowledge of practical work, non-availability of competent physics teacher, absenteeism of the teacher at practical classes, teacher’s method of teaching being too advanced than the students, unfriendly attitude of the teachers with the students and late commencement of teaching practical class.

The outcome of this study also revealed that the possible laboratory-related factors influencing the students’ attitude towards Practical Physics in secondary schools in Ekiti state were lack of separate physics laboratory, lack of equipment in the laboratory, inadequate instructional materials and too short period allocated for practical work. This agreed with the reports of Soyibo (1986) and Ajayi (2008) ^[2] that most secondary schools have no science laboratories and the few that have them are ill equipped and poorly maintained. In effect, this situation of the laboratories is inadequate with the recommended standard by the Federal Inspectorate division of the Federal Ministry of Education in Nigeria (2002) ^[8] that each science subject must have a separate well equipped laboratory. No wonder, the students are negatively disposed to practical physics in the school.

5. Conclusion

Based on the outcome of this study, it can be concluded that:

- students are scared by the measurements involved in physics practical, do not have interest in it and atimes felt annoyed when it is time for physics practical class, hence, they do not often prepare for physics practicals;
- students-related factors that influence students’ attitude towards Practical Physics in secondary schools in Ekiti state include prior negative impression about practical physics as being difficult, lack of Interest in practical physics, considering practical physics as very tedious, too much of time spent during practical physics, students’ laziness when it comes to practical class and large students’ population than the available apparatus during physics practical class;
- teachers-related factors are teachers’ poor knowledge of practical work, non-availability of competent physics

teacher, absenteeism of the teacher at practical classes, teacher's method of teaching being too advanced than the students, unfriendly attitude of the teachers with the students and late commencement of teaching practical class; and

- Laboratory-related factors are lack of separate physics laboratory, lack of equipment in the laboratory, inadequate instructional materials and too short period allocated for practical work.

6. Recommendation

In other to re-orientate the students at exhibiting positive attitudes towards practical aspect of physics, the following steps were recommended:

- the teacher should endeavour to be closer and friendly with the students aimed at creating their interest in physics practical;
- the teacher should unfold to the students the relevance of practical aspect to theoretical concept of physics;
- the teacher should involve the students while preparing for physics practical class;
- the teacher should diffuse the negative impression embedded in the students that practical physics is difficult;
- in case where the students outnumbered the available apparatus for a type of experiment, the teacher should apply grouping method of instruction;
- the teachers should attend to their physics practical classes regularly and punctually;
- the students are encouraged to respond positive to the guiding principles of the teachers, especially in relation to practical physics;
- students should be diligent and actively involved in the activities that pertain to physics practical;
- The schools' authority should make provision for a separate laboratory for physics and stock it with needed apparatus;
- The government on their part should recruit skilled physics teachers who could handle practical aspect of physics competently;
- Workshops and seminars should be organized for the teachers on conducting physics practical classes.

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