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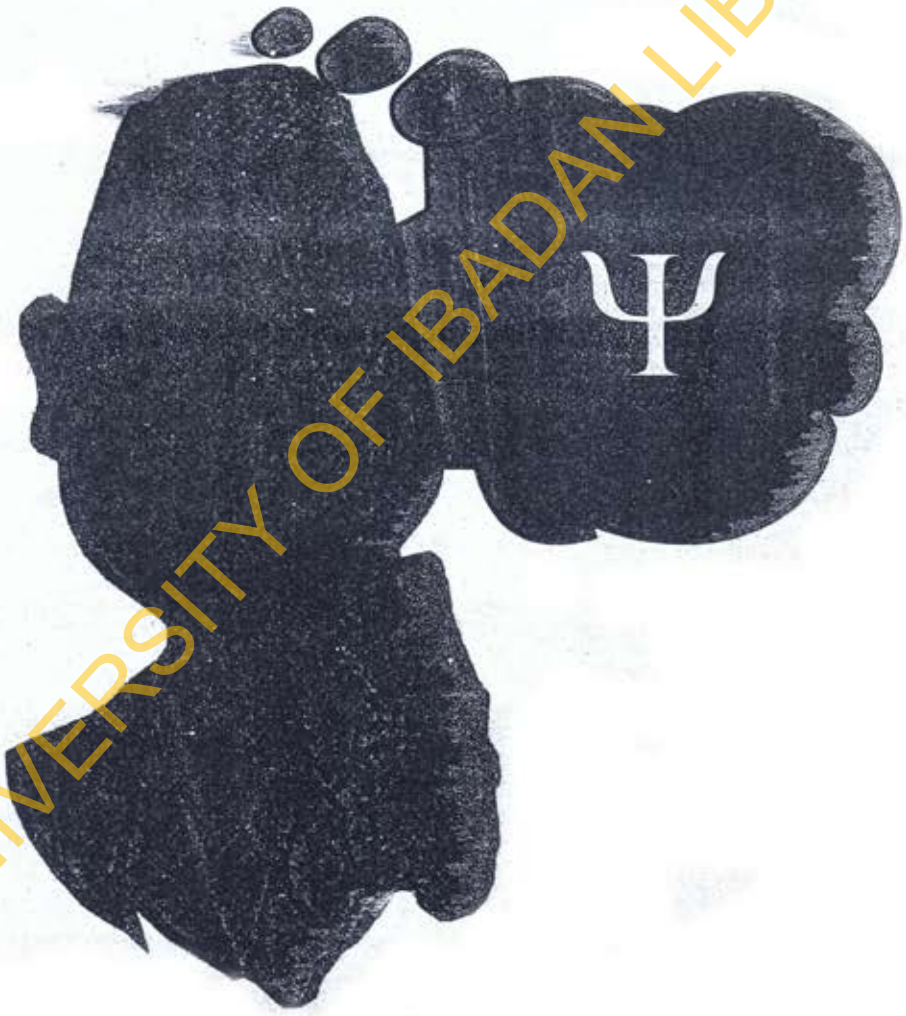

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Editorial Comments

The Society for Psychology in Sport and Human Behaviour is pleased to announce the stability and continuous impact of the International Journal of Emotional Psychology for meeting the yearnings and dreams of our ever increasing and widely spread and articulate readership. This edition of the journal has added the benefits of continuous numbering starting from the last edition. The Society is therefore pleased to introduce the **12th Volume, 2010** of the International Journal of Emotional Psychology and Sport Ethics (IJEPSE).The IJEPSE is peer-reviewed and accessible online through the **ajol web site at** (http:www.ajol/journal). The Journal e-mail: mtnlpsychlgy@yahoo.co.uk

The International Journal of Emotional Psychology and Sport Ethics (IJEPSE) is a professional journal of the Association of Psychology in Sport and Human Behaviour. The IJEPSE had metamorphosed from the old name of the Nigerian Journal of Emotional Psychology and Sport Ethics to reflect its versatility with foreign contributors. It publishes a wide variety of original articles and reports relevant to feelings and/or emotions, human behaviour in diverse forms as in sexual harassment, battery/battering, bullying etc.Theoretical propositions, research outcomes summarizing studies in behaviour disorders, marriage and family issues, disabling behaviour in learning/adjustment, (otherwise, education generally), workplace behaviours as well as sport-related regulations and ethics from different parts of the World. Other related areas of health psychology, mental health studies, Anthropological investigations as well as ecumenical behaviours also form part of its focus.

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Articles or manuscripts submitted for review are assessed on the basis of the followings-

1. **Title Page**: This should contain the title of the paper, a short running title, the name and full postal address of each author and an indication of which author will be responsible for correspondence, reprints and proofs. **The title of the manuscript** is assessed acceptable after a critical comparison of the contents and adequacy of reviews otherwise; a reverse suggestion is made to the author(s) for appropriateness and consideration. Using such descriptive terms as "Mr"or "Mrs" should be avoided.
2. **Abstract**: A summary of the contribution for consideration in the abstract column should normally not exceed 200 words and this should constitute the first page of the article.
3. **Keywords.** Immediately after the abstract, authors are expected to provide a maximum of 5 keywords, reflecting the essential topics of the article and may be taken from both the title and the text. These keywords will be used for information retrieval systems and indexing purposes.
4. **Introduction**: This should be well focused and directly related to the title. The themes and sub-themes should share relevant proximity as well as the theories and, or assumptions upon which the study is built. The language of communication should be lucid and without ambiguities. The **aims of the study** should be well construed and stated while testable and measurable research questions and hypotheses should be provided where necessary.

Research Methods

Authors are expected to be definite in the choice of **designs, population, sample and the sampling techniques, research measures (or data collection techniques), as well as the statistical methods** used. The **IJEPSE** in collaboration with their reviewers will be interested on how the samples for each of the submitted articles are selected, screened and used if any; particularly for empirical studies.

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The IJEPSE will consider empirical studies as well as theoretical propositions and case summaries on human emotions and/or feelings, family issues, battery/battering, disabilities, problem of underachievement/ learning-difficulties, intellectual disabilities, behaviour disorders, Psychosomatic conditions, issues in sports and regulations and health.

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All manuscripts submitted for publication including any scientific correspondence, should be sent to: **IJEPSE** correspondence Manager:1. Dr. J.Aizoba email: jaizoba2002@yahoo.co.uk **or:** mtnlpsychlgy@yahoo.co.uk 2. International Correspondence Editors: Professor Dele Braimoh, University of South Africa, Pretoria (dbraimoh@yahoo.com).

Manuscripts should be typewritten on one side of the paper, double-spaced and in quadruplicate (one original and three copies). Manuscripts should not exceed 5000 words including tables and references. Whenever manuscripts are accepted and are already published, original manuscripts

Students' Abilities and Attitude as Correlates of Achievement in Senior Secondary School Physics in Bayelsa State: A Study in School Effectiveness

J. G. Adewale, J.G.; Ph.D* & Ayibatari, J. M.**
**International Centre for Educational Evaluation,*
Institute of Education, University of Ibadan, Ibadan-Nigeria
*** Akpalakpa Grammar School, Ukubie,*
Silga, Bayelsa State – Nigeria

Abstract

Students' achievement is one of the measures of school effectiveness; schools have been labelled ineffective because of poor achievement of students in school subjects like physics both at school and public examinations. This poor performance has been a concern to science educators and the society because of the importance of the subject. The failure rate may be due to students' abilities and attitude to the subject. This study, therefore, the study examined the composite and relative contributions of three personality variables (students' reasoning ability, mathematical ability and students' attitude to physics) to students' achievement in physics. The study adopted a survey research of the expo facto type. A multista sampling technique was employed to obtain a sample of 225 senior seconda three students from three educational zones in southern Ijaw Local Government. Two instruments used in this study were the Student Questionnaires (SQ) and Physics Achievement Test (PAT). The data collected were subjected to parentages and multiple regression analysis at $p < 0.05$. The combination of the predictor variables students' reasoning ability and mathematical ability and attitude explained 90.5 percent of the variance in students' achievement in physics as shown by the coefficient of determination ($R^2 = 0.905$). The relative contributions of each of the three predictor variables shows that students' reasoning ability had the highest contribution of ($\beta = 0.355$, $p < 0.05$) on students' achievement in physics, followed by the students' attitude, which had a relative contribution of ($\beta = 0.341$, $P < 0.05$) and students' mathematical ability with ($\beta = 0.274$, $P < 0.05$) contribution to students' achievement in physics. The standardized regression associated with each variable reveals the order of contribution as follows reasoning ability > attitude > mathematical ability. The potent predictor variables to student's achievement in senior secondary school physics is students' reasoning ability. Therefore, physics teachers should in corporate high order cognitive skills into demonstration classes such that activities therein are tailored to develop critical thinking skills.

Key words
Students' Reasoning Ability, Students' Mathematical Ability, Students' Attitude to Physics and Students' Achievement in Physics

Introduction

Physics has been defined as the study of the physical laws governing the universe (Barton & Raymer, 1967). Physics is a basic physical science which deals with fundamental questions on the structure of matter and the interaction of the elementary constituents of nature that are susceptible to experimental investigation and theoretical inquiry. There is a general belief among educators that physics is a very important and useful school subject for technology and manpower development of every nation (Emovo, 1985 & Okpala, 1995). Physics is highly needed for any nation's technological break through. According to Okeke (1997), physics is the heart of science and the hub of all technological activities. Physics keeps transforming the world. Physics draws awe and respect from people because of its contributions to knowledge, growth and development of individuals in particular and the society in general.

The numerous applications of physics to which its concepts are being used to improve man's environment, hence, makes it occupy unique position among other science subjects. That is why attention has been turned to the schools, as the most equipped agency for disseminating the knowledge of physics. As important as physics is, not many students register for the subject (Adewale, 2002). Apart from students' enrolment, physics in secondary education in Nigeria is associated with unfavourable performance of students in the subject (Ariyo, 2005; Adewale, 2002; Orji, 1999 & Iroegbu, 1998). Physics appears to be one in which students experience the greatest difficulty (Adeoye, 1992). This is because the perception of students that physics is a difficulty subject affected their interest and subsequently led to declining enrolment and poor performance in national examination like the West African Senior School Certificate Examination (WASCE) and University Matriculation Examination (UME) (Femi & Raimi, 2005; Emmanuel, 2003; Okpala & Onocha, 1995).

This problem of students under achievement in physics has also engaged the attention of many scholars over the years (Bojuwoye, 1985; Fidelis & Akinyemi, 2005; Evans & Akinyele, 2007). Major factors which have been identified as contributing to the persistence of poor level of achievement in physics are; ineffective teaching methods adopted by the physics teachers in the field (Adeyegbe, 1993; Ivowi, Okebukola, Oludotun, and Akpan, 1992); learner variables such as gender, poor attitude and low numerical aptitude (Okeke & Nwanna, 1992); lack of organized strategies for problem solving, poor reasoning and mental skills (Maloney & Sigler 1993).

There is therefore a need to search for more effective explanations why the performance of students have not improved significantly even with all the research efforts along this direction. Although, mathematical

ability was investigated by Okeke and Nwanna (1992), this is almost 2 decades ago; there is a need to find out if the situation has changed significantly since then. Out of the nine student variables considered by Okpala and Onocha (1988), mathematical ability appeared to be the best predictor. Young (1990) also finds that the average student mathematical ability was found to substantially influence student achievement in science. Mathematical ability level of physics has also been found to be fairly reliable predictor of success or failure in sciences. Mathematics is known as a language of science. It is a language through which scientists express their ideas, laws and principles. Adetula (1990) defined mathematics as a language which uses number or symbols (nouns) (0, 1, 2, 3); operative symbols includes counting symbols (preposition) +,-, ×, ÷) and relational symbols (verbs) (=, e", d",). These symbols are mathematical vocabularies. Mathematics was identified as one of the difficulties hindering the learning of physics. A poor student in mathematics is not likely to be a good physics student since there are lot of mathematical expressions in physics. In the higher institutions of learning, a credit pass in mathematics is a pre-requisite for entry into any science related discipline (Abayomi & Daniel, 2004). Any student who has low mathematical ability may invariably have difficulty in understanding basic physics. Apart from students' mathematical ability, another variable that impedes students' achievement in physics is students' reasoning ability.

The development of reasoning ability in individuals has been shown to be correlated with a multitude of variables, some related directly or indirectly to Piaget's cognitive theory of development (Inhelder & Piaget, 1958). Prior knowledge (Resnick & Gelman, 1985), processing capacity (Finegold & Mass, 1985), cognitive styles (Stuessy, 1989), age (Helgeson, 1992), sex (Hernandez, Marek, & Renner, 1984), IQ (Lawson, 1982), culture (Cherian, Kibria, Kariuki, & Mwamwenda, 1988), socio-economic status (Acuna, 1983), majority/minority status (Lawson & Bealer, 1984), as well as a number of individual aptitude (Owen, 1987), achievement, and personality factors (Cloutier & Goldschmid, 1976) have all been found to influence the development of science reasoning. The existence of the construct of reasoning ability, defined as ways in which persons prefer to conceptualize and organize an external stimulus, has been well documented in literature. Physics deals with abstraction, conceptual thinking, generalization of facts all of which require the use of cognitive (mental) process. For students to achieve this, they must have attained at least the last level of Piagetian's intellectual development, the period of formal operations the child's thought process becomes quite systematic. At period of formal operations the child's thought process becomes quite systematic and reasonably well in targeted. The child thinks formally, logically and

in abstraction. Much of the contents taught in physics appear to require formal reasoning that is, reasoning based on abstraction that transcends concrete experience. Poor performance in physics can therefore be attributed to lack of appropriate reasoning ability of the students. The reasoning ability level requires for the effective learning of many secondary school subjects does not go beyond mere remembering or recall of facts. However, in physics, remembering is necessary but not sufficient for complete success. Hence, understanding and critical thinking are other very important ingredients that can guarantee success in physics.

Another students' factor that affect achievement in physics is attitude. Attitude is a predisposition to respond in a certain way to a person, an object, an event, a situation or an idea. An attitude towards something consists of a person's collection of facts about the subject, which may enable her to feel antipathy towards it and manifest in either acceptance or avoidance of the subject. Oguntade (2000) defined attitude as the effective disposition of a person or group of persons to display an action towards an object based on the belief that such a person or groups of persons have about the object. Attitude towards a subject greatly affects achievement in that subject (Okpala 1988; Abe, 1995; and Olagunju, 1996). Daily experiences do show that many Nigerian school students develop very negative attitude towards physics as a school subject and subsequently their performance in the subject is poor both in the daily classroom activities and at external examinations. Okoye (1985) argued that students are fond of categorizing school subjects into liked and disliked subjects. Therefore, if a student is not favourably disposed to physics, the students' attitude towards every thing about the subject will be negative.

Although, school effectiveness research pays high premium on teachers as the only workforce that can produce quality instruction, student variables such as mathematical ability, reasoning ability and attitude to physics could be used to raise students' achievement in physics. It is against this background that the researchers contend to conduct this research to find out if there is any significance relationship between the personality factors discussed and students' academic achievement in physics. Therefore, this study sought to establish the composite and relative contributions of the three independent variables (mathematical ability, reasoning ability and attitude to physics) on students' achievement in senior secondary school physics.

Research Questions

This study is interested in finding answers to the following three research questions.

1. What is the composite contribution of mathematical ability, reasoning ability and attitude towards physics to students' achievement in physics?
2. What is the relative contribution of the independent variables to the students' achievement in physics?
3. Which of the three variables (mathematical ability, reasoning ability and attitude towards physics) has the highest predictive value on students' achievement in physics?

Methodology

The study adopted a survey research using the correlational design. The population for this study consists of all the SS III science students (990 students) in Senior Secondary Schools in Southern Ijaw Local Government Area of Bayelsa State which was randomly selected out of the eight Local government areas in Bayelsa State. The choice of SS III was based on the fact that this category of students had covered a substantial part of the curriculum.

The multistage sampling technique was used in selecting the sample for the study. Ijaw Local Government Area (LGA) was randomly selected out of the eight LGAs in the State The LGA was stratified into three (Southern Ijaw, Ukubie and Diebu) and simple random sampling technique was used to select five schools from each stratum. This made a total of 15 schools out of thirty-three public senior secondary schools in the area. In each of these schools, 15 physics students were randomly selected per school, making a total of 225 science students that were used for the study.

Table 1: Multi-Stage Sampling Technique

Zone	Available Schools in the selected zone	No of schools selected
Southern Ijaw	14	05
Ukubie	11	05
Diebu	08	05
Total	**33**	**15**

Research instruments:

The following instruments were be used for the purpose of data collection in this study.

(1) Students' Questionnaire (SQ)
(2) Physics Achievement Test (PAT)

Students' Questionnaire (SQ)

The student questionnaire was developed by the researchers. The SQ elicits information on the students' mathematical ability, reasoning ability and attitude towards physics as a subject. It consists of four sections A, B, C and D. Section A dealt with students' demographic information such as name of school, age and sex of the student. Section B contained 20 items which focused on students' mathematics ability. Section C had 20 items which focused on students reasoning ability while Section D also contained 20 items that focused on students' attitude towards physics as a subject. In Sections B to D, students were required to indicate their agreement/ disagreement on a four point Likert Scale; Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). Positive statements were awarded 4 for SA, 3 for A, 2 for D and 1 for SD. The scores were reversed for negative statements.

Physics Achievement Test (PAT)

Physics Achievement Test (PAT) which is a multiple choice objective test was developed by the researchers. PAT was made up of thirty items with options A, B, C and D. Each item had one correct option (the key) and three distractions. The questions were adapted for use from the West African Senior Secondary Certificate Examination, paper 1. The test was specifically drawn to cover the concepts of mechanics, motion, conservation principles, heat and wave concepts in physics as presented in the table of specification or test blue print (Table 1). An initial pool of 50 items was trial tested on a similar group of students in Igboginni Community (not part of the sample). Comment from the trial testing exercise was used to enrich the test. The items in the test with facility indices ranging from 0.2 to 0.6 as suggested by Thorndike (1997) were retained, and those outside this criterion were discarded. The items were pruned to 30 as shown in Table 1. The 30 items discriminated between strong and weak students. A K-R 20 (a measure of internal consistency and construct validity, Thorndike (1997)) of 0.76 was obtained. The value is high and could be used for the study. PAT was scored using 1 for correct option and zero for wrong option. Each correct item was awarded one mark; hence, the maximum mark obtainable was 30 while the minimum score was zero.

Table 1 Table of Specification for 30 Items of Physics

No of weeks for teaching the topics*	Content areas	Knowledge 40%	Comprehension 30%	Application 30%	Total 100%
3	Motion (40%)	5	3	4	12
1	Conservation principles (13%)	2	1	1	4
1.5	Wave (20%)	2	2	2	6
1	Mechanics (13%)	1	2	1	4
1	Heat (14%)	2	1	1	4
7.5	Totals	12	9	9	30

* questions were obtained for a topic that is taught in one week.

The instruments were shown to some higher degree students and lecturers in the Science Education Unit of Teacher Department, University of Ibadan for amendment and comment before administration of the questionnaires. The researchers visited all the schools selected for the sample. The questionnaire and PAT were administered personally to the students after taking appropriate permission from the schools authorities.

The information gathered from respondents was analyzed using multiple regression analysis to examine the joint and relative contributions of the students' variable taken as causes on the physics achievement test scores.

Results

Research Question 1

What is the composite contribution of mathematical ability, reasoning ability and attitude towards physics on students' achievement in physics?

Table 2 shows the total contribution of the independent variable to the prediction of the dependent variable (achievement in physics)

Table 2a: Multiple Regression Summary of Joint Contribution of the Independent Variables to Students' Achievement in Physics.

R	= 0.952
R^2	= 0.906
Adj R^2	= 0.905
Std error	= 3.99045

Source: Field surrey, 2009

Table 2b ANOVA

Source of Variation	df	Sum of Squares	Mean Square	F	Sig F
Regression	3	11990.366	3996.789	70.938	0.000
Residual	221	12451.582	56.342		
Total	224	24441.948			

Results in Table 2a show that the combination of all the predictor variables: students' reasoning ability and mathematical ability and attitude have a multiple correlation of 0.952 with students' achievement in physics. However, the combination of these variables explained 90.5 percent of the variance in students' achievement in physics as shown by the coefficient of determination ($R^2 = 0.905$). The $F_{(3;221)} = 70.938$ $P < 0.05$ shown in Table 2b reveals that there is a strong joint contribution of the students' reasoning ability and mathematical ability and attitude to students' achievement in physics.

Research Question Two

What are the relative contributions of the independent variable to the students' achievement in physics?

This research question was answered by regressing the three variables: students' mathematical ability, reasoning ability and attitude towards physics on students' achievement in physics. The relative contributions (Betas) of the independent variable to students' achievement in physics are presented in Table 3.

Table 3 Relative contributions of the independent variable to the prediction of students' achievement in physics

	Unstandardized Coefficient			Std coefficient		
Variable	B	Std Error	Rank	Beta	T	Sig
Constant	-4.025	1.145				
Mathematical ability	0.209	0.090	3rd	0.274	3.449	0.001
Reasoning ability	0.393	0.102	1st	0.355	3.841	0.000
Attitude towards physics	0.380	0.072	2nd	0.341	5.274	0.000

Source: Field Surrey 2009

Research Question Three

Which of the three variables has the highest prediction?
Table 3 reveals that students' reasoning ability has the highest predictive value of 0.393 of the students' achievement in physics, followed by the students' attitude to physics and finally the students' mathematics' ability.

Discussion

Table 2 reveals that 90.5% (adj $R^2 = 0.905$), variance in the students achievement was due to prediction of the three predictor variables – students' mathematical ability, reasoning ability and attitude towards physics. The multiple regression summary also shows a significant joint contributions of the predictor variables on students achievement in physics ($F_{3,221} = 70.938$, $P<0.05$) This confirms the fact that the variance accounted for is truly due to effect of the three predictor variables and not to change. The fact that the variable contributed significantly in achievement (90.5%) is a pointer to the fact that they are variables that must be considered seriously if improved learning is to be achieved in physics.

The relative contributions of each of the three predictor variables on students' achievement in physics was observed from Table 3 and all the three variables – students' mathematical ability, reasoning ability and attitude towards physics had high and positive relative contribution to students' achievement in physics. The result shows that students' reasoning ability had the highest contribution of $\beta = 0.355$ to students' achievement in physics, followed by the students' attitude, which had a relative contribution of $\beta = 0.341$ and students' mathematical ability with $\beta = 0.274$ contribution to students' achievement in physics. The standardized regression associated with each variable reveals the order of contribution as follows reasoning ability > attitude > mathematical ability.

Most of the students who dropped physics before they write their terminal examination in secondary schools faulted physics as being abstract and this led to their inability to continue with it (Farombi, 1997). Since the nature of physics is abstraction, then, it implies that for students to do well in the subject, their reasoning ability should be good. However, those students with low reasoning ability are likely to find physics difficult. The significant contributions of reasoning ability of students to achievement in physics collaborated with Umeoduagu (1995) and those of Emeke & Adegoke (2001), Adu (2002), and Falaye (2006).

Attitude being predisposition of students to respond in a certain way to a person, an object, an event, a situation or an idea has implication for students' achievement in physics because an attitude enable students to be hostile or responsive towards physics and this manifests in either avoidance or acceptance of the subject. In this study, the significant contribution of

attitude towards physics indicates that the sample used for this study developed positive attitude to the subject as this correlated positively and significantly with their achievement in physics. The finding of this study is in agreement with the findings of Oguntade (2000), Abe (1995) and Olagunju (1996) that positive attitude is needed to perform well in science.

Since Mathematics is known as a language of science, that is, a language through which scientists express their ideas, laws and principles, if a physics student is not good in mathematics, it is unlikely that s(he) will be able to do well in physics concept and this will have a lot of implication for national development. The finding of this study on the prediction of physics achievement reinforces the findings of Adetula (1990) Iroegbu (1998) and Abayomi and Daniel (2004) that high numerical ability students achieved significantly higher mean score than either medium ability and low ability students. Hence the findings stems from the fact that mathematics is useful in expressing the physics laws of nature as well as providing scientists with some physics insights about natural Phenomena.

Conclusion and Recommendations

This study examined the personality variable as correlates of students' achievement in senior secondary school physics in Bayelsa State. The personality variables are mathematical ability, reasoning ability and attitude. Using a sample of two hundred and twenty five students it is discovered that all the predictor variables used in the study contributed positively and significant to students' achievement in physics. The potent predictor variables to student's achievement in senior secondary school physics is students' reasoning ability followed by the students' attitude and finally students' mathematical ability. Therefore physics teachers and curriculum developers in physics education need to consider these very important variables when planning their instructions and curricula contents in secondary school physics for the benefit of the students.

Based on the result of the findings, the following recommendations are hereby put forward as a way of ensuring better achievement in physics as a subject in the senior secondary schools. Physics teachers should present their lessons in such a way that the connections of mathematical concepts with physics concepts would be appreciated. Physics teacher should in corporate high order cognitive skills into demonstration classes such that activities therein are tailored to develop critical thinking skills. Physics teachers should give room for interaction with their students in order to encourage them to develop positive attitude towards the subject and do away with the conception that physics is an abstract subject and only meant for intelligent students.

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