

ATTITUDE AS A CORRELATE OF ACHIEVEMENT IN SCIENCE AMONG COLLEGES OF EDUCATION STUDENTS IN NIGERIA

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Abstract

The continuing trend of students' wider-achievement in science examination in Nigeria at all levels calls for concern. Causes of this retrogressive phenomenon have been investigated and the list of culprit factors is in exhaustive. A preponderance of researches show that students' attitude towards science determine their achievement in science. The present research provides answers to the following research question: To what extent does students' attitude towards science alone correlate with their achievement in science? The recommendations are meant to provide needed solutions. Governments, science teachers and students all have vital roles to play in redressing the ills.

Introduction

Individuals and government have acknowledged the roles of science and technology in development. This explains why the governments and relevant agencies, to boost and sustain education in science, have invested a lot of human and material resources. Unfortunately, evidences from different examinations in the science at all levels of education shows that there is abysmal failure/poor achievement (Daramola, 1955; Soyibo, 1985).

The implications of this negative trend are worrisome, crucial and retrogressive. It indicates wastage of scarce human and material resources and leads to the development of anti-science culture (Ogunniyi, 1986).

In an attempt to isolate the causes of this under-achievement in science, overwhelming evidence from the works of Aghenta (1982), Hassan and Sogbetun (1982), Ogunniyi (1986) and Eriba (1991) show that students' attitude towards science determine their science achievement. The implication is that Nigerian students under-achieve in science examinations because they have poor/unfavourable attitudes towards science. Thus, to raise achievement levels by improving students' attitudes towards science-seems to be the needed solution.

This research has established the extent to which attitude to science alone determine achievement in science, and suggested other causative factors in the cognitive and psycho-motor domains whose predictive influence on achievement cannot be ignored. Improvement strategies have been recommended for implementation by stakeholders in the enterprise.

Research Question

In order to find solution to the problem of the research question was formulated: To what extent does the following attitudinal variables of students towards science correlate with their achievement in science?

- I. Career interest in science?
- II. Students' enjoyment of science lesson?
- III. Students' view of the social implications of science?
- IV. Students' perceptions of the image of science/scientist?
- V. Male students' gender-related attitudes towards science?
- VI. Female students' gender-related attitude towards science?

vii. Students' general attitudes towards science?

Methodology

Research Instrument

An attitude to science scale (ASS) using 5-point Likert format was used to measure the attitudes of students towards science. The full scale of the instrument as designed by Akpan (1985) to measure the attitude of Nigerian students to science had a reliability coefficient of 0.92. It was validated using science educators judgment on the items.

Only four of the sub-scales were adapted for this study. Each sub-scale had ten related statements on the questionnaire giving a total of 40 items.

The 40 simple attitudes of science statements were constructed in both the positive and negative senses. Respondents were required to express their opinions either as Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D) or Strongly Disagree (SD), by placing an x in the appropriate box provided.

Sample and Data Collection Procedure

The Sample for the study was made up of 200 final year students randomly selected from science department of four Colleges of Education in Benue, Kaduna and Plateau States of Nigeria.

The author administered the instrument to the randomly selected students in their classes. Their moderate scores in the science subjects were obtained from the offices of the Deans and used for this study as achievement scores.

Data and Data Analysis

In order to obtain each student's achievement score (Y), a mean score was calculated on the basis of the two raw scores in two major science subjects offered in year II, for the study. These scores were correlated with their attitude scores (X) using the Pearson product-moment correlated coefficient".

In order to answer the research question, a coefficient of determination was obtained by squaring the V obtained for each attitudinal variable and multiplying the squares by 100, in line with the procedure suggested by Alvord (1972). This value thus estimates the degree to which each attitudinal variable determines students' achievement in science. The difference in percentage is attributed to other factors apart from attitude.

Table 1 : Summary of Result from the Analysis[^]

Attitudinal Variable	No. of Cases (N)	Degree of Freedom (df)	Correlation Coefficient, r	Coefficient of Determination (r ² %)
1	200	198	0.08	1.0
2	200	198	0.57	32.5
3	200	198	0.39	15.2
4	200	198	0.03	0.1
5	150	148	0.51	26.2
6	50	48	0.66	34.4
7	200	198	0.37	1.7

Significant at P.05 and P.01

Discussion

The result in Table 1 show that some attitude variables correlated significantly with achievement in science, whereas, the correlation of others is not statistically significant. The coefficient of determination values indicates the extent to which each attitude variable determines achievement in science.

Career Interest in Science

The coefficient of determination (r²%) value of 1 for career interest in science (r²%) indicates that all factors determining/affecting achievement in science, only 1 percent is attributed to the students' career interest in science. This research therefore establishes that fact that career interest in science alone is not significant enough to determine achievement in science. Nigerian students, who have been in love with the big-title producing careers such as medicine and engineering, etc would know that they need more than the choice of such careers to achieve well in them.

The role of some factors has been noted in this regard. These include: Students qualifications and requirements for admission (Eshiet & Inyang, 1984); communication skills (Okeke, 1986; Ali 1987; Akpan,

1989) Teachers' experiences (Igwue, 1989), and the need for hard-work, perseverance (Gbamanja, 1980) and the discipline demanded to excel in science careers.

Enjoyment of Science Lessons

This research found enjoyment of science lessons a significant correlate of achievement in science among students at this level. This corroborates earlier findings by Akpan (1991). This means that enjoyable science lessons are very much likely to enhance understanding and learning in science for improved achievement.

The coefficient of determination ($r^2\%$) indicates that of all other factors influencing science achievement, enjoyment contributes 32.5 percent. This is found to be particularly significant at p.05 and p.01 levels. Thus, enjoyment as a measure of interest is an important stimulant to learning. Its absence gives way to boredom, drudgery, frustration and truancy in learners, leading to low achievements in science.

Certain factors tend to enhance enjoyment of science lessons. These include availability of science instrumental facilities which play down on the teacher's excessive verbalism, difficulty level of lesson, use of simple science language and vocabulary of the teacher, use of simple examples and giving of feedback (Akpan, 1991).

Social Implications of Science

The social implications of science correlated significantly with achievement in science. The coefficient of determination (15.2%) indicates the extent to which it could determine achievement in science. This is statistically significant as an important determination or contributor to science achievement.

The fact is that if learners are pre-occupied with mundane prejudice about science in society they are likely not going to be interested in studying it. They would not like to be part of discipline (science) that often wrecks human life and property. It is sad to note that some of these prejudices are carried down from un-enlightened home backgrounds and misinformed individuals. These are certainly important predictors of science achievement.

Perceptions of Image of Science/Scientists

The image of science and scientists actually refers to the perceptions, which students have of science and its intent for society and who the practitioners of the discipline are, and their role in society. Nigerian students have not focused attention on this variable enough to make it significant in determining their science achievement. Hence, its correlation value was not significant and the value of ($r\%$) (i.e. 0.1) is rather too low for consideration.

Gender-Related Attitudes Towards Science

The gender-related attitudes of boys and girls were found significant in determining their science achievement. The results showed that the extent to which femininity determines science the achievement is higher than masculinity. This is the implication of the 34.4 per cent value of the coefficient of determination for the girls and 26.2 per cent for the boys. It means that any positive change in attitude towards science is more likely to yield a better achievement in science for the girls than the boys. However, other important factors need to be considered for a meaningful outcome. These include the teacher's competence and knowledge of the factors that aid learning especially motivation, students' learning and cognitive styles. He needs to use appropriate pedagogical approaches, which foster learning for application.

General Attitudes Towards Science

To a very appreciable extent (i.e. $r^2 = 13.7\%$), students' general attitudes towards science determine their science achievement. The con-elation is significant in consonance with Akpan's (1991) assertions.

The value of the determination coefficient (13.7%) does indicate that attitude is only significant, and important as it seems, in determining science achievement to this given extent, other cognitive and psychomotor variables are potent in determining science achievement. These may include intelligence/creativity and some physical abilities. Their roles in this regard are worth investigating as well.

Attitude as an affective needs to be coupled with other related attributes in the cognitive and psychomotor domains, for predicting favourable achievement levels in science.

Recommendations

The general attitudes of students towards science should be improved, especially those of the girls, to raise achievement levels in science. This can be done through:

- a) More frequent and step-wise evaluation of learning in science with regular feed back on performance. After all, Akpan (1991) said that feedback corrects and confirms errors, and eventually improves achievement.
- b) Changing the wrong concepts among girls that science is masculine and that girls are not suited to some science-based careers. Successful women scientists in the communities should be invited to the schools to give pep talks to the female students.
- c) Simplifying the science language, using simple and familiar examples, and checking the mathematical levels of science, as suggested by Akpan (1991), will be helpful steps here too.
- d) The teaching of science. Efforts should be stepped up by government to provide funds, even if it is on piece-meal basis, for the procurement of basic instructional facilities in science. Improvisation is good but it is not enough.
- e) The personality of the science teacher, which includes his attitudes towards his work, his colleagues and his pupils, should be properly tuned.
- f) Science teachers should be well grounded in the psychological basis of science teaching and learning. Knowledge and application of relevant psychological theories by the teacher can help him to improve learners' attitudes towards science.
- g) Government should improve teachers' incentives by giving them opportunities to attend science seminars, workshops and conferences. Awards should also be given at various levels to reward the best science-teachers of the year.
- h) The present practice whereby unqualified teachers are made to teach science subjects is unacceptable. A teacher can hardly be expected to effectively teach a subject he was not himself taught and/or trained to teach. Therefore, this practice should be actively discouraged. Instead, government should employ more science teachers.

The maxim therefore, is that, improvement in students' attitudes towards science is very likely to raise their levels of science achievement to an extent. There is need to check other factors whose influence on science achievement could be substantial.

Conclusion

This study has found attitude to be a significant correlate of students' achievement in science. To improve the present poor performance of students in Nigerian schools therefore, efforts should be made by the stakeholders to provide factors that could lead to an improvement in students' attitude. towards science.

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