

# Student and Teacher Related Variables as Determinants of Secondary School Students' Academic Achievement in Chemistry in Lagos State, Nigeria

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## Objectives of the Study

The study aimed at constructing and testing a model for providing causal explanations of secondary school achievements in chemistry in terms of student variables – gender, study habit, mathematical ability and teacher variables – gender, age, qualification and year of experience. Based on the objective, the study attempts to provide answers to the following questions:

1. What is the most meaningful causal model for students' achievement in chemistry?
2. What are the directions as well as estimate of the strengths of the causal path (Path coefficients) of the various variables in the model?
3. What are the direct and indirect effects of the independent variables on achievement in chemistry?
4. What are the composite and relative contributions of the seven independent variables ( $X_1 - X_7$ ) to the prediction of students' academic achievement ( $X_8$ )?

## Significance of the Study

The study would throw more light into the causal relationships between the student and teacher related variables under investigation and achievement of students in chemistry. The outcome of the study is therefore expected to assist all stakeholders in the teaching of chemistry particularly at the senior secondary school level, to fashion out appropriate strategies that would enhance the teaching and learning of the subject.

## Underlying theoretical framework

The focus of the study is hinged on teacher and student; therefore, theories that have to do with the characteristics of both of them as they affect learning would be applicable. Students are at the center of learning because it is the belief of the authors that teacher cannot control learning, which is the prerogative of the student. He can only control his teaching. This claim supports constructivist's view that learners are actively

engaged in making meaning and in the construction of ideas. And this could be said to be affected by variables that have to do with them; these include, gender, study habit and mathematical ability that are considered in the study.

The theories of Piaget, Ausubel, and Gagne would therefore provide theoretical basis for the study.

## Research design

An ex – post facto research design was adopted for the study. This was because there was no manipulation of independent variables.

## Procedure

The population for the study was made up of all senior secondary school year two students and their teachers in Epe and Ibeju-Lekki, local government areas of Lagos state. Six and four schools were used in Epe and Ibeju-Lekki local government respectively. A total of two hundred and one students were used in the selected schools. All chemistry teachers in the selected schools took part in the study. The four instruments used for data collection were: (i) Personal Data Questionnaire for Teachers (PDQT) (ii) Study Habit Inventory (SHI) (iii) Mathematical Ability Test (MAT) and (iv) Chemistry Achievement Test (CAT). The administration and collection of all the necessary information were done during the normal class periods. Multiple regression and path analysis were employed to analyze the data.

The hypothesized model was initially designed based on the three factors for generating the causal model according to Blalock (1964) Duncan (1966), Bryant and Doran (1977). These are, temporal order, research findings and theoretical grounds.

## Findings

The results revealed that 7.6% ( $R^2 = 0.076$ ) of the total variation in students' achievement was accounted for by the seven independent variables. Thirteen out of

the eighteen paths in the hypothesized model were found to be significant at 0.05 levels. This resulted in trimming and consequently, the production of the parsimonious causal model. It was also detected that the significant paths through which the independent variables caused variation in the dependent variable are four, and they are all direct paths. However, 5.82% of the total effects are found to be direct.

Teacher's age has a significant causal effect on students' achievement in chemistry. The direct effect accounts for 4.40%, which is the highest of the total effect of all the seven independent variables. Teacher qualification has the second most potent causal influence on students' achievement in chemistry. Its direct effect accounted for 4.37% of the total effect whereas its indirect effect accounted for 5.0%. Thus, altogether, teacher qualification accounted for 0.63% of the total effect of the seven independent variables on students' achievement. Teacher experience also has significant causal effect on students' achievement. The direct effect accounted for 3.46% of the total effect of all the variables. Its indirect effect accounted for 0.12% of the total effect. Altogether, teacher experience ( $X_4$ ) accounted for 3.58% of the total effect of the seven independent variables on students' achievement. The variable also significantly affected student study habit.

Teacher gender was found to have direct effect on students' achievement in chemistry. Its direct effect accounted for 0.97% of the total effect of the seven variables whereas its indirect effect accounted for 3.37% of the total effect. Thus, altogether, teacher gender accounted for 2.40% of the total effect of the independent variables.

Furthermore, the study revealed that the student variables- gender ( $X_5$ ), study habit ( $X_6$ ) and mathematical ability ( $X_7$ ) had no direct and indirect effect on academic achievement in chemistry. This is not to say that they did not have effect but their effects are not significant particularly in the presence of the teacher variables. This finding established the importance of teacher in a teaching – learning situation.

## References

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