

Home Background and Classroom Interaction as Correlates of Basic Science Students' Achievement in Upper Basic Schools in Nasarawa State, Nigeria

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Abstract: This study examined the influence of home background and classroom interaction as correlates of students' academic achievement in Basic Science. Two research hypothesis were tested at 0.05 level of significance. A simple survey design was adopted for the study. Stratified random sampling technique was used to select 200 JSS II students drawn from five public upper basic schools in Nasarawa West Senatorial District, Nasarawa State, Nigeria. Three instruments namely; Home Background Questionnaire for Students (HOBAS), Basic Science Observation Schedule (BSOS) and Classroom Interaction Questionnaire (CIQ) were used for data collection. The instruments were trial tested and the reliability indices of 0.79, 0.81 and 0.82 respectively were determined using Cronbach Alpha formula. The data collected were analysed using Simple Regression and Bi-variate Analysis of Variance (ANOVA). It was recommended that parents should give attention to their children and teachers should dwell more on classroom interaction so as to boost students' participation levels and help them in the study of Basic Science, given its relevance to Science and Technology development.

Keywords: Achievement, Basic Science, Classroom interaction, Home background.

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Introduction

In this globalization era, Basic Science is used as a necessity for Science and Technological development. In Nigeria, Basic Science as a subject, is offered by students at the Junior Secondary School level. Basic Science consists of subjects from the core sciences of Physics, Chemistry, Biology and Agricultural Science (UNESCO, 2010). It used to be named integrated Science. The developed nations have reached their current feat because they have developed their science education and utilized it to achieve their current growth sprouts (Gonzalez *et al.*, 2016). The teaching and learning of Basic Science therefore, requires expanding its activities outside the classroom and geared towards using the acquired knowledge for creating wealth (Igbokwe, 2015). Basic Science has to play a leading role in transforming the present Nigerian society into an emerging knowledge society which implies the need to build learning communities all over the country and in particular among the younger generation in their Junior Secondary School levels (Igbokwe, 2015).

Every year, primary schools produce graduates who cannot meet up with current Basic Science trends in Junior Secondary Schools classrooms, especially in the rural setting. This has serious social repercussions which need to be identified so that solutions could be sought for them (Nwafor, 2015). Improving the teaching of Basic Science therefore, stands as a main tool in promoting quality human resources that would rejuvenate the educational and national goals of the nation (UNESCO, 2010).

Home background is the source of early stimulation and experience in children. The home influences the child at a time when his mind is most receptive. It provides the first impression which may last through the whole life of the child and also shape his attitude towards learning. The child often sees the parents, siblings and things in his/her immediate environment to be most significant and they are capable of promoting or diminishing him/her in self-worth and academic performance (Amadi and Ani, 2017). Most researchers (Osuafor and Okonkwo, 2013; Oginni, 2018) have confirmed the effect of home background on the academic development of secondary school students and also linked it to certain factors like parents becoming isolated from their children and finding it difficult to keep watch on what need to be done to help them succeed in school. It must be noted that while there are so many factors influencing the ability of students to develop or progressing academically, home background is a major factor in the development of students' achievement.

Oginni (2018) opined that what the child learns at home, how he/she is motivated by his/her family towards education goes a long way to influence the child's success or failure in school. The researcher also stressed that child's family greatly influence the ease or otherwise with which he/she can gain a place in school and total length of time he is willing to devote to school and study. Amadi and Ani (2017) States that the home and the school are the sides, the home is usually the more important of these two factors because it is the child's first school. Classroom interaction is an important part of teaching process. Interaction has been defined as a process whereby two or more people engage in reciprocal actions (Cao *et al.*, 2011). The classroom climate is build up by the pattern of interactions between students and teachers where knowledge transfer prevails through asking questions, responding and reacting. The most imperative factors therefore, in a classroom interaction are the exchanges initiated by students and teachers (Zhao, 2016; Aziz *et al.*, 2018).

Types of Classroom Interaction

Relationship between teachers and students is often due to the subject matter of the course, the atmosphere at school and the attitude of teachers towards students (Pajaja, 2011; Pisterman, 2015). Heikonen (2017) added that classroom interaction types include situations where:

- i. teachers control the interaction but not the topic;
- ii. teachers have no control over the topic and the interaction;
- iii. teachers control the topic but not the interaction; and
- iv. teachers control over the topic and the interaction.

Classroom interaction therefore stimulates involvement in the classroom. It also fuels students' motivation and help them to see the relevance of teachers and topics by increasing their participation especially, when all of them are involved. Such interaction can be between the teacher and the students. This form of classroom interaction also teaches the students to respond and respect their superiors because they are given a chance to air their opinions in the classroom (Heikonen, 2017).

The other form of classroom interaction is among the students themselves. This allows them to learn and understand how to work with partners in a cooperation manner (Wamaina, 2011). It develops and improves their skills to team work and peer relationship by encouraging them to work together in the classroom. They thus, learn the importance of working cohesively with themselves.

Another form of classroom interaction is whole class interaction, where students learn the importance of patience and value for others' view point.

Role playing, conversation, reading around, questions and answers form other classroom interaction processes. By role playing, the students are given role to act on Basic Science with others, which allows them to demonstrate creativity, knowledge as well as helping them to face situations outside the classroom (Nwalin, 2011). In conversation, the whole class is involved in small groups in the class (Gorjian and Habibi, 2015). In question and answer form, a teacher or student poses a question to assess the learner. The student may pose a question to the teacher with the purpose of obtaining more or new information (Gorjian and Habibi, 2015).

Role of Teachers in Classroom Interaction

Teachers' role in classroom interaction come in the form of facilitators, since not all students in the classroom interact well with one another (Wendy *et al.*, 2016). Such students require encouragement from teachers. In their methods, the teachers may divide the students into small groups and give them tasks, projects or assignments. This will drive the students to communicate with each other through role playing and offering ideas where shyness will be eradicated, in the excitement of accomplishing the group project successfully.

Classroom interaction is thus created by the teacher through actions that depict full participation by the students (Petek, 2013; Heikonen, 2017). In this case, the students are more likely to be happy and they can also sense the temperament of the teacher in such a manner that the way react negatively if the teacher is angry and vis versa, which can invariably impair or accelerate the learning processes (Heikonen, 2017; Petek, 2013).

Role modeling is another role of the teacher in a classroom interaction because students spent more time with their teachers (especially in boarding school). These roles can either be positive or negative depending on the behaviours of the teacher in the situations.

Teachers should therefore, endeavour to identify the elements that impede good classroom attitude in school. For instance, silencing students during classroom interaction can demoralize them thud, affecting the interaction negatively. Peer pressure have overpowering negative effects than can cause other students to be silent during classroom interaction.

Purpose of the Study

The purpose of the study was to examine home background and classroom correlates that influence students' academic achievement in Basic Science. Information on factors such as educational level of parents, type of family, parent's occupation and how they affect students in behavior, attitudes, values and interest in the school environment. Also, attempt was made to identify and critically look into some of the environmental variables such as teachers' characteristics, years of experience, school facilities, infrastructures and to determine the extent which each of these variables affects the academic achievement of students in Basic Science.

Hypothesis

The following null hypotheses were tested at 0.05 level of significance.

HO₁: There is no significant relationship between the students' home background and achievement in Basic Science.

HO₂: There is no significant relationship between classroom interaction and students' achievement in Basic Science

Methodology

A simple survey design was adopted for the study. Stratified random sampling technique was used to select 200 JSS II students drawn from five public upper basic schools in Nasarawa West Senatorial District, Nasarawa State, Nigeria.

Instrumentation

Three instruments namely; Home Background Questionnaire for Students (HOBAS), Basic Science Observation Schedule (BSOS) and Classroom Interaction Questionnaire (CIQ) were used for data collection. The instruments comprised of 2 sections each; sections A and B. A dealt with personal information while B elicited information needed. The questionnaires (HOBAS and CIQ) were rated on a 4-point scale of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Agree (1). BSOS was also rated on 4-point scale of Very good (4), Good (3), Fair (2) and Poor (1). The instruments were trial tested and the reliability indices of 0.79, 0.81 and 0.82 respectively were determined using Cronbach Alpha formula. The data collected were analysed using Simple Regression and Bi-variate Analysis of Variance (ANOVA).

Results

The data analysis and results in reference to the research hypotheses are presented in Tables 1 and 2.

HO₁: There is no significant relationship between the students' home background and achievement in Basic Science.

The hypothesis was tested using simple regression analysis since it is a measure of the relationship between the variables. Data in respect to this hypothesis is presented in Table 1.

Table 1. Simple Regression Analysis of Students' Home Background and Achievement in Basic Science

Variable		Sum of Squares	Df	R	R ²	Mean of Square	F	Sig.
Students' Home Background	Regression	37.207	1	0.142	0.020	15.463	14.510	0.001
	Residual	1683.408	199			8.149		
	Total	1720.615	200					

Result in Table 1 shows a significant relationship of F= ratio 14.510 is greater than 0.05 bench mark. The hypothesis of no significance was therefore rejected indicating a significant difference in the relationship between students' home background and achievement in basic Science.

HO₂: There is no significant difference between classroom interaction and students' achievement in Basic Science

The hypothesis was tested using simple regression analysis since it is a measure of the relationship between the variables. Data in respect to this hypothesis is presented in Table 2.

Table 2. Simple Regression Analysis of Classroom Interaction and Achievement in Basic Science

Variable		Sum of Squares	Df	R	R ²	Mean of Square	F	Sig.
Students' Home Background	Regression	235.199	1	0.293	0.086	249.352	20.180	0.001
	Residual	1593.061	199			9.509		
	Total	1828.260	200					

Result in Table 2 shows a significant difference of F= ratio 20.180 is greater than 0.05 bench mark. The hypothesis of no significance was therefore rejected indicating a significant difference in the relationship between classroom correlates and achievement in basic Science.

Discussions

The study found out that a significant relationship existed between students' home background and achievement in Basic Science. This finding is in agreement with the findings of (Osuafor and Okonkwo, 2013; Amadi and Ani, 2017; Oginni, 2018). The findings of this study revealed that classroom interaction was significant in the students' achievement. This supports the earlier findings of (Hussain *et al.*, 2012; Wendy *et al.*, 2016). The findings of this study further buttress the concepts of relationship between teachers and students which were shown to be positively beneficial—especially when the teachers emotions are positive during class interaction (Petek, 2013).

The roles of the teacher in classroom interaction are significant in harnessing the interest, competence and critical thinking of the students being taught, Basic Science inclusive (Heikonen, 2017). Similarly, the interaction between teachers and students is an integral part of the teaching and learning process, especially when it produces positive outcomes. Classroom interactions thus, stimulate the students' involvement in the classroom by fueling their motivation and helping them to see the relevance of teachers' perspective (Wamaina, 2011).

Conclusion

The result of the study clearly showed that there was relationship between home background, classroom interactions and students' achievement in Basic Science.

Recommendations

Sequel to the findings of the study, it was recommended that:

- i. Teachers should encourage more interaction in the classroom and allow more extraordinary events to happen in the classroom;
- ii. Teachers should stick to the common methods that produce acceptable results in the students' achievement;
- iii. Basic Science should be widely taught in schools in order to support its position as the basic for technological and scientific development of any nation;
- iv. Peer discussions should be incorporated into classroom interactions so as to raise the productivity of interaction and cooperation amongst them.

- v. Stakeholders in education should play their parts to create a conducive environment by providing instructional materials that student would use to learn effectively, measures should be taken to supply adequate educational facilities to schools, and ensure available school facilities making sure that they are well-utilized and properly maintained.
- vi. Parents should endeavor to look after their children and provide them with the necessities for good education.

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