

Environmental Factors, Undergraduate Science Education Students' Achievement, and Interest in Nigeria Universities: Implications for Funding

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Abstract

This study investigated the effects of environmental factors on the academic performance and interest of undergraduate scientific education students in Nigerian universities, as well as the funding implications. A descriptive survey research design was used in the study. The study included 270 final-year undergraduate students from the Department of Science Education at two Nigerian universities: Chukwuemeka Odumegwu Ojukwu University, Igbariam, and Nnamdi Azikiwe University, Awka. Both universities are located in the sixth state of Anambra. The study used a sample of 161 students, 56 of whom were male and 105 of whom were female, that was drawn by chance sampling methods. Three experts verified the questionnaire, which was used as the data gathering tool. Using the Cronbach Alpha formula, the dependability of 0.90 was determined. The hypothesis was examined using t-test statistics at the 0.05 level of significance, and the research topic was addressed using mean and standard deviation. The study's conclusions showed that, while gender had no discernible impact on how science education students responded to the aforementioned environmental factors, socioeconomic background, good school infrastructure, extracurricular activities, class size, accommodations, attitudes of teachers and parents, appropriate teaching methods, and poor lighting in school buildings and hostels could all affect students' interest and achievement in science education at universities. Further strategies for enhancing the environmental elements that affect academic achievement and interest of science education students in universities include the government's and alumni's funding of science labs and infrastructure, fostering university competition, using appropriate teaching methods, and properly citing of schools.

Keywords: *Environmental Factors, Undergraduate Science Education Students, Achievement, Interest and Funding.*

Introduction

One of the biggest issues facing higher education in Nigeria is money. The Federal Government of Nigeria (FGN) and other private entities' lack of commitment is the cause of this. The FGN has allocated between 5 and 9% of the nation's yearly budget to

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education for the last eight years (2015–2023), which is less than the 26% that the United Nations Educational, Scientific, and Cultural Organisation (UNESCO) recommends. Therefore, her degree of dedication does not match the nation's aspiration for educational progress as expressed in the National Policy on Education. The increasing number of federal universities and the abolishment of tuition fee in 1977 posit the other angel to the major causes of inadequate funding. This is in line with assertion of Ogbogu (2011) that “the problem of underfunding of Nigerian universities is a consequence of the expansion of the system in response to the growing demand for university education”

The Academic Staff Union of Universities (ASUU) which is a body in charge of the academic staff of Nigeria universities has within the last two years (2022-2023) embarked on an eight months strike to seek for better funding of the universities in addition to other welfare packages. The above assertion showed no improvement in the past years as Ogbogu (2011) stated that the universities are in a state of disrepair with lack of physical facilities, with ill equipped laboratory and libraries, several abandoned research projects lack of research grant and lack of attendance to conferences by academic staff. Educational financing is a social investment which ignites all other development in a nation and hence, should be a priority of not just all government but different sectors of the economy. This is against what is obtainable in Nigeria, as the government is major sponsor of education. However, the best model of education funding all over the world involves the government, alumni association, donor bodies and students’ tuition. This will go a long way towards creating a better school environment especially for science education by providing facilities like science laboratories and infrastructures for enhancing students’ achievement and interest.

Science education is a field that involves science content, science process and teaching pedagogy. For science learning to be effective its teaching and learning must be done in conducive environment, hence, improving students’ achievement. Students’ achievement is a means of quantifying learning outcomes done through effort, courage or skills. Hence, it is the extent students, teachers or institution has accomplished a stated educational goals. Similarly, Bossaert et al (2011) posited that achievement is an accomplishment or extent of success attained by an individual on a task or activity exposed to. In Nigerian universities, students’ achievement is usually evaluated by their scores in test, assignments, examination and grade point averages (GPAs). Gender and interest are two elements that are linked to achievement because children who are motivated to learn can succeed in school regardless of their gender.

Imoko and Agwagah (2006) defined interest as a persistent inclination to pay attention, feel focused, and enjoy a certain activity or piece of material. Interest is both an in-the-moment psychological state of involvement and a propensity to interact frequently with specific concepts, events, or things across time. The emotions that define interest are generally positive: a feeling of being energized and captured. It facilitates faster information absorption and the application of more effective learning strategies, such as critical thinking, making connections between previously learnt content and new



information, and focusing on underlying structure rather than surface details. According to the experts, college students with developed interests, regardless of gender, attend class and do better. Since learning happens when students engage with their surroundings, this might not occur if the setting is not conducive to science learning. Hence, a functional environment is needed for a meaningful science learning of students in not just the universities but all the levels of learning.

"The quality and characteristics of school life, both social and physical aspects of the school, which can positively promote behaviour, school achievement, and the social and emotional development of students" is what Okoye et al. (2021) define as the school environment. According to Sangodapo and Ola (2020), the school environment consists of several amenities such as classrooms, libraries, technical workshops, labs, quality teachers, school management, teaching techniques, peers, school topography, and environmental tranquility. Studies based on actual data have been conducted about the surroundings of students. For example, Wagner (2017) claims that providing a suitable environment in schools might affect kids' behaviour and academic progress as well as giving their senses a sense of balance. Similar to this, Olufemi, Adediran, and Oyediran (2018) proposed that a number of factors, including the school environment, peer pressure, the calibre of the teachers, the students' learning abilities, parental background, and infrastructure, among others, can influence students' academic achievement using students from colleges of education in southwest Nigeria. According to Fajar et al. (2019), environmental antecedents including learning facilities, instructors' competency, and congenial classrooms, among others, need to be addressed and understood in order for kids to do better in mathematics. "Improper upkeep and an inadequate ventilation system result in poor health among students as well as teachers, which leads to poor performance and higher absentee rates," claims Frazier (2020). Furthermore, Williams et al. (2018) asserted that the physical attributes of the school, noise, classroom conditions, excessive levels of carbon dioxide in the classroom, inadequate lighting, and fluctuating temperatures all have an impact on the teaching and learning process. According to Farambi (2015), a school's location, size of classes, quality of teachers, lack of instructional materials, small class sizes, and an excessive number of students in each classroom can all have a negative impact on students' academic performance and interest.

In government owned universities in Anambra State, Nigeria, some students see themselves through school by involving in some legitimate businesses. Aside from the fact that universities lack lecture halls and other physical amenities, these students arrive at class exhausted and have no time for reading. Because government-owned universities in Nigeria, and Anambra State in particular, lack lecture halls and force students to attend classes in uncomfortable locations like under trees or in poorly maintained laboratories, the low academic achievement and disinterest of students in science classes have become serious concerns. The rate at which students in science education fail in large numbers and their growing disinterest in academics serve as evidence of this. Consequently, it is important to examine the environmental elements that have a significant impact on their academic performance and interest in

universities in Nigeria and to suggest actions that may be made to improve the environment that supports science education.

Research Questions

The following research questions guided the study:

1. What are the environmental factors that influence the academic achievement of science education students?
2. What are the environmental factors that influence the interest of science education students?
3. What are the strategies for improving the environmental factors that influence academic achievement and interest of science education students?

Hypotheses

The following hypotheses guided the study and were tested at 0.05 levels of significance.

- Gender has no significant influence on science education students' response of the environmental factors that influence their academic achievement.
- Gender has no significant influence on science education students' response of the environmental factors that influence their interest.

Research Methodology

The study's research design was a descriptive survey. The study involved 270 final-year students from the Department of Science Education at Chukwuemeka Odumegwu Ojukwu University in Igbariam and Nnamdi Azikiwe University in Awka, both in the Nigerian state of Anambra. They stood for the six disciplines: physics, computer science, integrated science, chemistry, biology, and mathematics. An incidental sampling strategy was used to gather a sample of 161 students, 56 of whom were male and 105 of whom were female, for the study.

The researchers designed and employed a questionnaire titled "Environmental Factors, Undergraduate Science Education Students Achievement and Interest in Nigeria Universities" as the means of gathering data. The instrument was broken down into four sections: Section A held the student biographies; Section B had eighteen items; and Section C had three clusters based on the goals of the research. Strong Agree (SA) was worth four points, Agree (A) was worth three, Disagree (D) was worth two, and Strongly Disagree (SD) was worth one on the four-point Likert scale employed in the test.

The instrument was validated by two experts from the Department of Science Education and one from the Department of Education Foundations (Measurement and Evaluation Unit) at Nnamdi Azikiwe University in Awka, Anambra State. The reliability index was estimated using the Cronbach Alpha formula, yielding a value of 0.90. The study questions were answered using the mean and standard deviation, and the hypothesis was tested at a significance level of 0.05 using the t-test statistic. A positive reaction or agreement was indicated by any item with a mean rating of 2.5 or higher, and a negative

response was indicated by any item with a mean rating of 2.49 or lower, based on the interpretation of the mean rating.

Results and Discussion

What are the environmental factors that influence the academic achievement of science education students?

Table 1: Mean and standard deviation scores of the respondents on the environmental factors that influence the academic achievement of science education students

S/N	ITEMS	SA	A	D	SD	N	$\bar{X}$	S.D	REMARK
1	The location of school influences the academic achievement of students.	87	50	21	3	161	3.37	0.78	Accepted
2	Extra-curricular activities influence the academic achievement of students.	85	56	19	1	161	3.40	0.72	Accepted
3	Class size influence students' academic achievement.	79	52	20	10	161	3.24	0.91	Accepted
4	Accommodation facilities like classroom influence students' achievement academically.	85	46	30	-	161	3.34	0.78	Accepted
5	Poor lightening in school buildings and hostels influence students' achievement academically.	97	51	10	3	161	3.50	0.7	Accepted
Grand Mean:							3.37		

From result in the table 1 above, items 1, 2, 3, 4 and 5 with mean scores 3.37, 3.40, 3.24, 3.34 and 3.50 respectively were accepted since they were above 3.0 cut off point. This indicates that environmental factors such as school location, extra-curriculum activities, class size, accommodation facilities and poor lightening in school buildings and hostels can influence the achievement of science education students in the universities.

What are the environmental factors that influence the interest of science education students?

Table 2: Mean scores on what are the environmental factors that influence the interest of science education students

S/N	ITEMS	SA	A	D	SD	N	$\bar{X}$	S.D	REMARK
6	Teachers' attitudes towards students influence their interest.	103	50	5	3	161	3.57	0.64	Accepted
7	Parents' attitudes towards education students' influence interest.	96	67	4	4	161	3.71	0.71	Accepted
8	Appropriate teaching methods, laboratory material and their effective usage influence the interest of science education students.	96	54	10	1	161	3.52	0.62	Accepted
9	Parents inculcating discipline in their children have an influence over their children interest in learning.	80	65	10	6	161	3.36	0.76	Accepted
10	The socio economic backgrounds of students influence students' interest of learning.	93	54	11	3	161	3.47	0.7	Accepted
Grand Mean:								3.52	

The result in table 2 shows that items 6, 7, 8, 9, and 10 with mean response of 3.57, 3.71, 3.52, 3.36 and 3.47 respectively were accepted. This shows that the environmental factors such as teachers' attitudes towards students, parent's attitudes towards education, appropriate laboratory material and their effective use, parents inculcating discipline on their children, and the socio economic background of students influence the interest of science education students in the universities.

What are the strategies for improving the environmental factors that influence academic achievement and interest of science education students?

Table 3: Mean and standard deviation scores on the strategies for improving the environmental factors that influence the academic achievement and interest of science education students

S/N	ITEMS	SA	A	D	SD	N	$\bar{X}$	S.D	REMARK
11	Funds should be provided by the	104	53	4	-	161	3.62	0.53	Accepted



	Government in order to make available science laboratories with appropriate equipment in the universities to enhance students' interest, achievement and effective laboratory practical.								
12	Opportunities should be created for competition between science education students in the universities to ensure cooperation learning.	97	57	6	1	161	3.55	0.6	Accepted
13	Government should allocate enough funds to education for building of infrastructures such as classroom with enough space and lightening.	118	35	7	1	161	3.68	0.58	Accepted
14	Teachers should avoid displaying wrong attitudes like using abusive word on their students particularly in the classroom.	100	37	21	3	161	3.45	0.79	Accepted
15	Parents should endeavor to inculcate discipline in their children so as to increase students' value and interest in academics.	95	42	6	18	161	3.33	0.98	Accepted
16	Use of varying teaching methods to suit particular topic would help towards improving students' interests.	99	42	20	-	161	3.49	0.70	Accepted
17	Laws should be made by government against building industries where schools are located and ensure the	91	49	21	-	161	3.43	0.70	Accepted

	creation of industrial areas.								
18	Seminars should be organised for teachers and students on important of environment in science education.	99	42	20	-	161	3.49	0.71	Accepted
Grand Mean:							3.50		

From the result in table 3, items 11 - 18 with mean rating 3.62, 3.55, 3.68, 3.45, 3.33, 3.49, 3.43 and 3.49 respectively were accepted. This shows that the items which are provision of funds for science laboratories by school and government, creating opportunities for competition between universities, provision of funds for building of infrastructures like classrooms by the government, teachers avoiding the display of wrong attitudes, parents endeavor in inculcating discipline in their children, use of varying teaching methods, making laws by government against building industries near school location and organizing seminars for teachers and students on important of environment in science education are the possible strategies for improving the environmental factors that influence the academic achievement and interest of science education students in the universities.

Gender has no significant influence on science education students' response of the environmental factors that influence their academic achievement

Table 4: T- test statistics of the gender influence of the science education students' response of the environmental factors that influence their academic achievement

Gender	N	Mean	Standard Deviation	Df	T	Sig.	Remark
Male	56	16.70	2.22	159	0.63	0.99	Not Sig.
Female	105	16.46	2.31				

The result in table 4 reveals that gender has no significant influence on science education students' response of the environmental factors that influence their academic achievement ($P = 0.99$). Therefore, the hypothesis was not rejected because the p-value of 0.99 is greater than the 0.05 level of significance. This implies that both male and female science education students' agreed that the listed environmental factors influence their academic achievement.

Gender has no significant influence on science education students' response of the environmental factors that influence their interest.

Table 5: *T- test statistics of the gender influence of the science education students' response of the environmental factors that influence their interest*

Gender	N	Mean	Standard Deviation	Df	T	Sig.	Remark
Male	56	16.82	2.11	159	0.09	0.96	Not Sig.
Female	105	16.76	2.18				

The result in table 5 reveals that gender has no significant influence on science education students' response of the environmental factors that influence their interest ($P = 0.96$). Therefore, the hypothesis was not rejected because the p-value of 0.96 is greater than the 0.05 level of significance. This implies that both male and female science education students' agreed that the listed environmental factors influence their interest.

The study found that school locations, class size, extra-curricular activities, lack of school accommodation facilities and poor lightening in school buildings are environmental factors that influence academic achievement of science education students. This is because students' achieve more when they learn new information and skills through activities and have proper accommodation for sound habitation and learning. This finding was agreed by both male and female students since gender have no significant influence in their response. This finding is in agreement with Okoye et al (2021) and Igbinoba and Aigbedion (2015) who found out that environmental factors, proximity of home to school, level of training/professionalism attained by teachers and school structure play significant roles in students' academic achievement. Moreover, the finding is in agreement with that of Sangodapo and Ola (2020) and Gilavand (2016) that school facilities, the serenity of school environment, open space and noise in classrooms, overcrowded classes, inadequate light, improper classroom layout, unsatisfactory temperature and misplaced boards are significant learning environment factors that affect students' learning outcome. Also, according to Martin (2004), suggested for a balance between stressful academic attainment in the university and social activities. However, Martin (2004) stressed that the social activities should be monitored and maintained in order to avoid negative result.

Moreover, the study opined that factors like discipline from home, teachers' attitudes towards students, parents' attitudes towards education, the socio economic background and appropriate teaching methods, laboratory materials and their effective usage influence students' academic interest. Therefore, the home, teachers, parents and students provides the foundation for science learning and are elements that will enhance students' interest in sciences, as a parent who is learned will always have good attitude towards "science" education. The teacher's personality is an important element in the learning and teaching towards ensuring a better environment. The supreme value of teacher is not in the regular performance of the routine duties but in the power to lead and to inspire the students through their personality and in making science learning interesting. Further analysis showed that both male and female students agreed

that the above factors influence their interest, since gender have no significant influence in their response. This is in line with Ezeudu et al (2019), who advocated the need for science teachers to use and adopt various innovative teaching methods to develop students' interest and invariably ensure better achievement.

The study showed that provision of funds for science laboratories by school and government, creating opportunities for competition between universities, provision of funds for building of infrastructures like classrooms by the government, teachers avoiding the display of wrong attitudes, parents endeavor in inculcating discipline in their children, use of varying teaching methods, making laws by government against building industries near school location and organizing seminars for teachers and students on important of environment in science education are the strategies for improving the environmental factors that influence the academic achievement and interest of science education students in the universities. This is in consonant with Okoye (2012), who is of the view that school environment must be inviting, welcoming, conducive, accommodating, stable building furnished and well equipped for habitation and learning.

The findings of this study have some implications to funding. Since, school location, accommodation facilities, comfortable and healthy school environment in general are important components for improving science education students' achievement and interest, there is an urgent need for funding towards the provision of these facilities in schools. In Nigeria, the need for an improved government funding of higher institutions cannot be over emphasized, because they are the major source of funding. However, universities and departments within, are advised to create and nurture an alumni to ensure effective financial support from former students, since, the government have failed in allocating the needed percentage of fund to education as stated by international bodies like United Nations Educational, Scientific and Cultural Organization (UNESCO) and Millennium Development Goals (MDGs), which the country is signatory to.

Conclusion

The study concluded that environmental factors such as healthy school environment, functional school facilities/infrastructures, parents' attitudes to learning, school location, social activities, class size and teachers' factors influence science education students' academic achievement and interest in universities. Also, a number of strategies were posited like the provision of funds, school facilities, teachers' use of innovative teaching methods as possible ways of improving the environmental conditions for effective teaching and learning which will improve academic achievement and interest of the students. In addition to its implications to funding, the researchers recommended based on the findings that teachers' should endeavor to use appropriate teaching method to enhance students' achievement and interest. Also, students must be disciplined to either accept relevant things or reject non-relevant ones to foster their interest in science learning.

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