



Teacher-Student Relationships: Understanding the Impact on Science Students' Academic Performance from Both Sides of the Classroom

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Abstract

The study investigated the influence of teachers-science relationship on science students' academic performance. It also explored the extent of the relationships, factors and solutions affecting these relationships. A descriptive survey research design was adopted. The population size comprised all the science teachers and students in the 50 secondary schools in Aguata Education Zone of Anambra State, Nigeria. 60 science teachers and 300 science students were randomly sampled while a questionnaire was used for data collection. Data collected were analyzed using mean, standard deviation and t-test. The findings of the study revealed that both the students and teachers agreed that cordial relationship between them influences students' academic performance by increasing students' attention and ability to ask questions in their classrooms. Also, cordial relationship among teachers and science students in secondary schools in Aguata Education Zone is to a low extent. The factors affecting cordial relationships between teachers and science students in secondary schools include students' hatred of their teachers, laziness, students' unwillingness to do their take-home assignments and establish good relationships with the students, and truancy. Furthermore, the possible solutions to the factors affecting teacher-student relationships in secondary schools are that teachers should use student-centered teaching methods and avoid flogging as the only means to discipline the students among others. Therefore, the researchers recommended among others that there is a need for science teachers to create a conducive environment that will develop, enhance and sustain good relationships with their students towards better academic performance.

Keywords: Teacher-student relationships, science, academic performance and classroom

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Introduction

Over the last ten years, research has shown an ongoing trend of poor performance among science students in secondary schools. Students' performance explains how they demonstrate their intellectual capacity. It shows how much information a certain learner has in a particular subject (Nwafor et al, 2024). This suggests that success, particularly in science disciplines, is the product of a teaching and learning process that may lead to a better society. Therefore, for every country to flourish to its full potential, high performance in science courses is required. Oloyede and Johnson (2020) define science as a systematic endeavour that constructs and arranges knowledge in the form of verifiable explanations and predictions about the natural world. It is the systematic, evidence-based pursuit and application of knowledge and comprehension of the natural and social worlds. Since science is learned by doing and involves studying nature, curricula in various schools appropriately incorporate hands-on activities for students, teachers, and learning materials at every level of the learning process. Poor relationships between students and their teachers have been highlighted as one of the numerous elements that can affect students' success in science, according to studies (Liu, 2024; Eleje et al, 2022).

Teachers play a crucial impact in their students' lives and careers. Therefore, no educational system can surpass the quality of its teachers, according to the Federal Government of Nigeria (2014) in her National Policy on Education. This is because, they work with the children for over seven hours every day based on the secondary school system in Nigeria. By raising the standard of men and women who are desirable to society, teachers' services are vital and critical in determining the future of the country (Ekechukwu & Ifeanyichukwu, 2021). The learning outcomes of students may be significantly impacted by teachers influence. Jones and Jones (2016) assert that teachers must recognize that their work is not limited to improving the quality of education and the learning environment, but also to cultivating positive connections between teachers and students. To achieve academic goals, students and teachers must have a good relationship that supports each student's overall growth. The connection that exists between teachers and students to enhance the student's learning outcomes and accomplish the teacher's learning objectives is known as the teacher-student relationship. It is the kind of interaction that serves as a bridge between a teacher and a student, enabling either a favourable or unfavourable learning environment, claim Rimm-Kaufman & Sandilos (2018). The teacher-student relationship is the most fundamental interpersonal relationship in the teaching process, according to Yan (2019). It creates a calm and joyful learning environment, reduces emotional barriers and learning anxiety in students, and encourages their motivation and self-directed learning consciousness. Positive teacher-student relationships in the classroom foster close interaction, mutual trust, respect, and open communication. In contrast, unfavourable interactions can result in disengagement, conflict, and unsatisfactory academic performance. Building a strong relationship with students is crucial for promoting academic performance, according to great teachers (Croristine et al., 2022, pg. 34).

Despite the complexity of the relationship between learning behaviours, learning outcomes, and the teacher-student relationship, Lihong et al. (2017) contended that students' motivation to learn is correlated with the quality of the teacher-student relationship. Furthermore, it is still challenging to describe and measure the relationship from the viewpoints of teachers, students, or both, according to Brinkworth et al. (2019). To build on that trust over time, a

science teacher must first gain the trust of the students. Exact literature has shown that students who have strained connections with their teachers are more dependent on themselves, have unstable lives, and do not have close relationships, all of which are factors in their subpar academic achievement (Means & Pyne, 2017). While Mohamed et al. (2018) found no correlation between the factors, Lihong et al. (2017) found a substantial association between teacher-student relationships and students' academic achievement. According to Xu et al (2020),

when there is a strong and positive relationship between students and their teachers, students participate more actively in class interactions and learning activities. Therefore, the researchers concluded that the following factors have the greatest influence on the relationship between teachers and students: teaching methods, authority, an optimistic and cautious affection, a student's positive response to the teacher, promptness, and the way the teacher treats a student. If these characteristics are absent, the interaction between students and teachers will suffer. Eleje et al. (2022) investigated how the teacher-student connection affected the learning outcomes of secondary school economics students. The researchers discovered a connection between learning results and teacher-student relationships. Liu (2024) asserted that in addition to being directly and favourably correlated with academic engagement, teacher-student relationships are also indirectly and favourably correlated with academic engagement through university students' perceptions of academic pressure and social support. According to Sodje et al. (2023), teachers in the majority of secondary schools in Enugu State's Udu Local Government Area physically assault their students anytime they break the rules. Additionally, some teachers treat their students harshly, particularly when they ask questions during class. A friendly relationship between teachers and students helps students perform better academically, and when the teacher jokes and makes the class laugh, it makes the lesson more engaging.

In light of the foregoing context, a thorough analysis of the empirical research for this study showed that students who have positive relationships with their teachers perform better in their academic endeavours, which inevitably impacts their performance, whereas, teachers who frequently punish their students harshly, causes them to hate them and pay less attention in class. Additionally, it is concerning when students are consistently performing poorly in science classes since poor teacher-student relationships can have an impact on the country's planned development goals. Given this, the researchers want to empirically ascertain the following objectives; the influence of teachers-science relationship on science students' academic performance; the extent to which these ties contribute to the subpar scientific performance of students; and the factors affecting cordial relationship among teachers and students in secondary schools and their possible solutions.

Methodology

Research design

A descriptive survey research design was adopted for this study. The design was used because the researchers are only interested in describing certain variables about the population. This is in line with Nworgu (2018) who stated that a descriptive survey research design is often suitable when a study is aimed at collecting data on and describing systematically the characteristics, features and facts about a given population. This type of design is that in which a

group of people or items is studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group

Participants

Aguata Education Zone of Anambra State, Nigeria was used as the study area. The population of the study consisted of all the senior secondary two (SS2) science students and their teachers in the 50 secondary schools in the Zone. The sample size of this study consisted of 360 science teachers and students (comprising 60 science teachers and 300 students) from ten randomly sampled secondary schools in the Zone. Also, the simple random sampling technique was used to select the respondents used for the study.

Instruments

The instrument used for data collection was a questionnaire developed by the researchers. The questionnaire comprised of two sections A and B; Section A gathered information about the bio-data of the respondents while Section B consisted of four parts based on the research questions. The questionnaire comprised of four-point Likert scale of Strongly Agreed (SA) = 4, Agreed (A) = 3, Disagreed (D) = 2 and Strongly disagreed (SD) = 1 was used. Moreover, face validation was done for the instrument and reliability was conducted using Cronbach alpha to generate an overall reliability of 0.89. Three experts namely one person from the Department of Education Foundations (Measurement & Evaluation Unit), and two persons from the Department of Science Education, all from Nnamdi Azikiwe University, Awka, Anambra State validated the instrument.

Data collection

The researchers through the approved letter from the Department of Science Education, Nnamdi Azikiwe University, Awka sought the approval from the principals of the 10 sampled before the commencement of the research. Therefore, the questionnaire was administered by the researchers to the respondents using the face-to-face approach. This is to enhance the efficiency of a 100% return rate which was achieved. The respondents were briefed on the researcher's aims and motives through an introductory letter which equally enabled the researcher to gain access to the respondents. This lasted for ten days as the sampled schools were visited once per day.

Data analysis

Data collected was analysed using mean and standard deviation to answer the research questions while a t-test was used to test the hypotheses at a 0.05 level of significance. The analysis was done using Statistical Package for the Social Sciences 25 (SPSS, Version 25).

Results

This section showed the results of the study based on the objectives of the study. Table 1 illustrated how teacher-student relationships influence science students' academic performance while Table 2 showed the extent cordial relationship exists among teachers and science students. Tables 3 and 4 were used to show the factors affecting cordial relationship among teachers and students in secondary schools and their possible solutions.

Table 1. Mean and standard deviation of the influence of teacher-student relationships on science students' academic performance

S/N	Item Statement	Mean	SD	Remark
1.	I feel that science students who like their teachers pay attention whenever the teacher is teaching.	3.10	0.79	Accepted
2.	I think that good relationship between the teachers and their students helps make the students pay attention in classes and ask questions when they do not understand certain things.	3.03	0.88	Accepted
3.	Poor relationships among teachers and their students can hinder the achievement of the instructional objectives in sciences.	2.93	0.93	Accepted
4.	Teachers often award unmerited marks to students they are friends with.	2.23	1.12	Rejected
5.	I believe that a student does not necessarily need to have a good relationship with the teacher for the student to excel academically.	2.27	1.13	Rejected

The result in Table 1 shows that items 1, 2 and 3 were accepted since their mean scores were above the mean cut-off points of 2.50, whereas, items 4 and 5 were rejected because their mean scores were below the mean cut-off points of 2.50. This indicates that teacher-student relationships influence science students' academic performance in Aguata Education Zone of Anambra State by increasing students' attention whenever the teacher is teaching and helping them ask questions when they do not understand certain things, however, poor relationships between teachers and their students can hinder the achievement of the instructional objectives in science subjects.

Table 2. Mean and standard deviation of the extent cordial relationship exists among teachers and science students in secondary schools in Aguata Education Zone

S/N	Item Statement	Mean	SD	Remark
6.	My teachers are not just academic instructors, but also have good relationships with the students.	1.95	0.81	Low Extent
7.	I respect my teachers the same way my parents and elderly ones at home are respected	2.94	0.89	Moderate Extent
8.	My teachers are mean, hardly joke with us and usually shout at us whenever we fail to answer a question accurately.	3.03	1.02	Moderate Extent
9.	My teachers create a safe, inclusive and interactive classroom environment.	2.20	0.95	Low Extent
10.	My teacher provides academic support and emotional well-being through effective feedback.	2.10	1.05	Low Extent
Overall mean and Standard Deviation		2.44	0.43	Low Extent

Table 2 shows that items 7 and 8 were to a moderate extent while items 6, 9 and 10 were to a low extent. Moreover, 2.44 and 0.43 were obtained as the overall mean score and standard

deviation respectively. This indicates that cordial relationship between teacher and science student in secondary schools in Aguata Education Zone is to a low extent.

Table 3. Mean and standard deviation of the factors affecting cordial relationships among teachers and science students in schools

S/N	Item Statement	Mean	SD	Remark
11.	Apart from lesson periods, we do not have any other time to interact with the teachers as they barely join school social groups	2.40	1.05	Rejected
12.	Some teachers believe that joking with their students will make the students disrespect them.	2.47	1.06	Rejected
13.	Some students hate their teachers for no reason.	3.07	0.93	Accepted
14.	Lazy students would be in class but would not copy notes and when they go home, they hardly do their take-home assignments and no teacher loves such students.	2.80	1.08	Accepted
15.	Truancy hinders a student from being academically active and such act creates a barrier between the truant student and the teacher.	3.03	0.95	Accepted
16.	Teachers are not interested in establishing good relationships with the students.	2.50	1.15	Accepted

Table 3 shows that items 11 and 12 were rejected while items 13, 14, 15 and 16 were accepted as factors affecting cordial relationships among teachers and science students in schools. This indicates that the factors affecting cordial relationship among teachers and science students in secondary schools include students' hatred of their teachers, students' laziness, students' unwillingness to do their take-home assignments, students' truancy and unwillingness of teachers to establish good relationships with the students.

Table 4. Mean and standard deviation of the possible solutions to the factors affecting teacher-student relationships in secondary schools

S/N	Item Statement	Mean	SD	Remark
17.	Teachers should also join school social groups like; drama, music and sports teams to enhance teacher-student relationship	2.77	0.96	Accepted
18.	Teachers should deploy more friendly (student-centered) ways of teaching.	3.33	0.95	Accepted
19.	There should be campaigns and seminars for students, about the merits and demerits of loving or hating their teachers	3.23	0.96	Accepted
20.	Teachers should not resort to flogging as the only means to discipline or correct the students.	3.00	0.78	Accepted

21.	Parents and guidance should check their children take-home assignments and ensure that they are always done.	2.77	0.89	Accepted
22.	Teachers should have in mind that whatever the students become tomorrow might have an effect on the society of which the teacher is part, either directly or indirectly.	2.87	1.18	Accepted

The result in Table 4 shows that all the items 17, 18, 19, 20, 21 and 22 with mean scores of 2.77, 3.33, 3.23, 3.00, 2.77 and 2.87 were all accepted since their mean scores were above the mean cut-off of 2.50. This indicates that the possible solutions to the factors affecting teacher-student relationships in secondary schools are that teachers should be encouraged to join school social groups like; drama, music and sports teams to ensure teacher-student interaction, teachers should use students-centered teaching methods, campaigns and seminars should be carried out for the students on the advantages and disadvantages of loving or hating their teachers, teachers should avoid flogging as the only means to discipline the students, parents and guidance should check their children's take-home assignments and ensure that they are always done, and finally teachers should always have in mind how importance they are in the life of the students for their overall development for students to positively affect the society.

Discussion

The findings of the study showed that teacher-student relationships influence science students' academic performance in Aguata Education Zone by increasing students' attention whenever the teacher is teaching, helping them ask questions when they do not understand certain things, however, it was revealed that poor relationship among teachers and their students can hinder the achievement of the instructional objectives in science subjects. Further analysis showed that there is no significant difference between the responses of the teachers and students on the influence of teacher-student relationships on science students' academic performance. Hence, both science teachers and their students agreed that teacher-student relationships influence students' academic performance. This could be because cordial relationship enhances interactions, feedback, critical thinking and problem-solving skills. This finding aligns with the self-determination theory (Ryan & Deci, 2000) which postulated that positive teacher-student relationships are vital for students' education through enhanced competence, autonomy and other basic needs which will result in improved academic performance. The implication of this finding is that both the teachers and students should work towards ensuring, promoting and enhancing cordial relationships among themselves. This finding aligns with that of Roorda et al. (2017) which showed that a better classrooms teacher-student interaction leads to better academic performance. Also, Sodje et al (2023) averred that a cordial relationship between the teacher and the students produces better performance among the students. The finding is also in line with Shaukat and Iqbal (2020) who revealed that a positive teacher-student relationship and clear feedback lead to increased motivation, and engagement in academic performance, while a negative relationship can lead to decreased motivation, disengagement & poor academic performance.

The findings of the study revealed that the relationship between teachers and science students in secondary schools in Aguata Education Zone is not healthy as it is to a low extent. This could be a result of the poor relationship between science students and their teachers as teachers in most of the secondary schools in the Zone beat their students whenever they commit an offence while some others are harsh to the students, exacting authority where friendship is needed during science lessons. This implies that the entire educational stakeholders should organize a workshop or seminar on how to improve and maintain a healthy teacher-student relationship in their schools. This finding is in agreement with the finding of Mohamed, Wok and Mohamed (2018) which showed low and negative relationships between the teacher-student relationship and academic achievement. In contrast, the finding is against that of Eleje et al (2022) which revealed that there were higher levels of the teacher-student relationship in teaching and learning economics as perceived by the students.

The findings of the study showed that the factors affecting cordial relationships between teachers and students in secondary schools in Aguata Education Zone include students' hatred of their teachers, students' laziness, students' unwillingness to do their take-home assignments, students' truancy and the unwillingness of teachers to establish a good relationship with the students. This is in agreement with Rimm Kaufman (2015) who stated that students' perception of the teacher's behaviour, impacts the relationship and that students who dislike their teachers have less interest in learning and are less engaged in the classroom. Also, Sodje et al (2023) revealed that teachers' harshness, beating the students and students' inability to ask questions are some of the factors militating against the cordial relationship between teacher and student relationship.

The findings of the study revealed that the possible solutions to the factors affecting teacher-student relationship in computer studies are that teachers should be encouraged to join school social groups like; drama, music and sports teams to ensure teacher-student interaction; teachers should use students-centered teaching methods; campaigns and seminars should be carried out for the students on the advantages and disadvantages of loving or hating their teachers; teachers should avoid flogging as the only means to discipline the students, parents and guidance should check their children's take home assignments and ensure that they are always done and finally, teachers should always have in mind how importance they are in the life of the students for their overall development for students to positively affect the society. Hence, students' emotional and academic needs should be ensured by the teachers by creating, facilitating and sustaining a conducive and healthy culture among the students in the classrooms. This aligns with Rabo (2022) who stated that teachers should avoid the use of complete authority in handling students and that parents' show of concern for their children's welfare is as criterion for enhancing student-teacher relationships. Also, Brown (2020) suggested the use of students-centered teaching methods and that they should avoid flogging as the only means to discipline the students. The finding of this study is also in line with the findings of Afzal, Rafiq and Kanwal (2023) that an open flow of information, availability, communication, inspiration, and sharing of experiences on their side will help in creating cordial student-teacher relationships.

Conclusions

Based on the findings, the researchers concluded that teacher-student relationships influence science students' academic performance by increasing students' attention and ability to ask questions in their classrooms. Also, cordial relationship among teachers and science students in secondary schools in Aguata Education Zone is to a low extent. Moreover, some of the factors

affecting cordial relationships among teachers and students in secondary schools in Aguata Education Zone include students' hatred of their teachers, students' laziness, and truancy among others. The possible solutions to deal with these factors include encouraging the teachers to join school social groups like; drama, music and sports teams to ensure teacher-student interaction and to use students-centered teaching methods. The implication of these finding is that both the teachers and students should work towards ensuring, promoting and enhancing cordial relationship among themselves. The entire educational stake holders should organize workshops or seminars on how to improve and maintain a healthy teacher-Student relationship in their schools. Moreover, students should be exposed to knowledge of how their relationship with their teachers could influence their academic achievement in science subjects. The parents and guidance should also be educated on their roles in promoting and encouraging healthy relationships among teachers and students. One of the major limitations of the study is the use of self-report measure (questionnaire) which may be subject to bias, personal experience and perceptions of the teachers and students used in this study. Also, the subject was conducted in Aguata Education Zone of Anambra State, Nigeria out of the six education zone that made up the State, hence, the generalizability of the findings should be done with caution. Additionally, the study lacks triangulation by not using mixed methods which could have provided a more comprehensive and accurate understanding of the teacher-student relationship and its influence on academic performance. One these notes, future researchers could explore the influence of teacher-student relationship on students' achievement using mixed methods. Also, a broader population can be used in the future to get better finding concerning the topic that can be empirically generalized in Nigeria. Future researchers can investigate how other variables such as socioeconomic status, school infrastructure, teacher qualification levels, or parental involvement can interact with teacher-student relationships to influence students' achievement.

Conflict of Interest

The authors declare no conflict of interest.

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