

# Interest and Text Anxiety as Correlate of Secondary School Students' Academic Achievement in Chemistry in Ogidi Education Zone

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The study examines interest and test anxiety as correlates of secondary school students' academic achievement in chemistry in Ogidi Education Zone. Two research questions guided the study and two null hypotheses were tested at 0.05 level of significance. A correlational research design was adopted for the study. The population of the study consisted of all the 1,754 senior secondary school two (SS2) chemistry students in the 40 public secondary school in Ogidi education zone in Anambra state. 375 SS 2 chemistry students were sampled using multi-stage sampling procedures. Chemistry Interest Scale (CIS), Chemistry Text Anxiety Assessment inventory (CTAAI) and the 2023/2024 SS2 cumulative examination results in Chemistry were used for data collection. The instruments were validated. The reliability of the instruments was established using Cronbach Alpha with coefficients of 0.87 for CIS and 0.83 for CTAAI. Pearson Product Moment Correlation was employed for analysis of the data collected using Statistical Package for Social Sciences (SPSS, version 25). The findings of the study showed a moderate positive relationship ( $r = 0.413$ ) between interest scores and academic achievement scores of secondary school students in Chemistry. It equally revealed that the relationship between test anxiety scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education Zone is a moderate negative relationship ( $r = -0.513$ ). This means that students with higher test anxiety tend to perform less well academically in Chemistry, while students with lower test anxiety generally perform better. Based on the findings it was recommended amongst others that teachers should incorporate student-centered instructional methods, such as inquiry-based learning, problem-solving approaches, and hands-on laboratory activities, to spark students' interest in Chemistry. Schools should organize workshops and training sessions aimed at helping students manage test anxiety. Techniques such as mindfulness, relaxation exercises, and effective study habits should be taught to equip students with skills to handle the pressure of assessments and examinations effectively

**Keywords:** Text anxiety, Interest, Academic Achievement, Chemistry

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## 1. Introduction

Knowledge of science is crucial for national development, economic growth, and productivity World Bank (2010). It helps countries innovate, solve problems, and improve efficiency, leading to a better quality of life for everyone. The National Research Council (2012) emphasizes that science is fundamental to education because it teaches critical thinking, problem-solving skills, and a methodical approach to understanding the world. It encourages curiosity, inquiry, and evidence-based reasoning, which are essential for making informed decisions in everyday life. Science education equips individuals with the knowledge, skills, and mindset needed to thrive in a rapidly changing world and make informed decisions that benefit society. Additionally, science education fosters innovation, technological advancement, and a deeper appreciation for the natural world. It equips individuals with the skills needed to navigate complex issues and contribute positively to society, (Bybee, 2010). The Federal Republic of Nigeria (FRN, 2013) in its national policy on education set as a goal for science in Nigeria that government shall popularize the study of science and

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production of adequate number of scientists to inspire and support national development. This emphasis by the Federal government on science and technology is due to the expected outcome of science programmes at the secondary school level. Science is primarily taught in schools through subjects such as Chemistry, Physics, Biology, and Mathematics.

Chemistry, as a core subject in secondary education, plays a crucial role in developing a scientific and technological culture. By studying Chemistry, students gain insights into the chemical processes that influence everyday life, from the food we consume to the medications we use. This foundational knowledge enhances critical thinking and problem-solving skills while promoting innovation and the application of scientific principles in technology and industry (National Research Council, 2012). Therefore, Chemistry is a key discipline that connects scientific concepts to practical applications, significantly contributing to national development and technological advancement (World Bank, 2010).

Chemistry is vital for human development, as it connects knowledge to real-life situations (Jegede, 2012). Knowledge of Chemistry opens diverse career paths in research, healthcare, engineering, education, and industry, serving as a prerequisite for fields like medicine and pharmacy (Ojokuku, 2017). The versatility of Chemistry skills is a valuable asset in today's job market. It involves the utilization of natural substances and the creation of artificial ones, underpinning the infrastructure that delivers the essentials of modern life (Samuel, 2008; American Chemical Society, 2015). The objectives of chemistry education at the senior secondary level are to demonstrate its links with industry, everyday life benefits, and hazards, as well as to offer a comprehensive course for individuals not pursuing higher education (Federal Ministry of Education, 2012). Chemistry education requires students to apply problem solving technique, analytical reasoning and a deep understanding of fundamental principles. These skills are crucial not only in Chemistry but across various academic subjects. The challenges posed in chemistry such as balancing equations, understanding reaction mechanism and analyzing data help improve critical thinking and analytical skills which are transferable to other disciplines and Academic task and thus help in improving academic achievement. Research shows that students who excel in chemistry tend to achieve better academically overall, benefiting from the enhanced cognitive skills developed through studying the subject (Peters and Barlow, 2018).

Academic achievement is generally regarded as the outcome of learning. Okoli and Egbunonu (2012) opined that achievement in teaching-learning means the attainment of set objectives of instruction. Steinmayer, Meibner, Weidinger, and Wirthwein (2018) asserted that academic achievement can determine whether a student will have the opportunity to continue their education. Academic achievement is vital for students' opportunities in education and career advancement, influencing access to scholarships and prestigious institutions. Poor performance can limit these opportunities and perpetuate cycles of poverty, affecting self-esteem and motivation. Factors such as socioeconomic status, home environment, teaching quality, and student motivation significantly impact academic achievement. The West African Examinations Council (WAEC) has reported inconsistent Chemistry performance from 2015 to 2019, raising concerns about achievement levels (WAEC, 2019). The inconsistent performance of students in chemistry, as highlighted by the West African Examinations Council (WAEC, 2019), may stem from issues such as teaching quality, curriculum relevance, and socioeconomic challenges. To address these problems, it is essential to provide professional development for teachers to enhance their effectiveness, revise the curriculum to include real-life applications and hands-on learning (National Research Council, 2012), and establish tutoring programs for students from disadvantaged backgrounds. Addressing academic challenges requires targeted interventions and improved teaching quality. Academic achievement is driven by interest, which boosts engagement and persistence (Schunk and Zimmerman, 2012). Passionate students invest more time and effort, leading to better performance and higher success (Miller and

O'Rourke, 2021). When students are passionate about a subject they are more inclined to invest time and effort, leading to deeper understanding and higher academic achievements (Ainley, 2012). This intrinsic motivation drives them to actively participate in class, take out additional resources and tackle complex problems with enthusiasm. Consequently, their increased engagement and efforts translate into better grades and higher levels of academic achievements. For instance, students who find chemistry intriguing are more likely to experiment with concepts, participate in discussion and overcome difficulties which not only improves their grasp of Chemistry but also positively affect the overall academic achievement. Thus, cultivating interest in subject can be a powerful strategy to boost academic achievements and enhance learning outcomes. Interest plays a crucial role in academic achievement and learning outcomes.

Interest refers to a student's curiosity and enthusiasm for specific subjects or areas of study, significantly influencing their engagement and motivation in learning. It enhances their desire to explore concepts in depth, leading to improved academic performance (Schiefele and Schaffner, 2015). A high level of interest is a key factor in academic achievement, as engaged students invest more time and effort in their studies, leading to improved performance (Schiefele and Schaffner, 2015). When students find a subject fascinating, they actively participate in discussions, seek additional resources, and engage in independent study, enhancing their understanding and retention of knowledge. Students who are passionate about their studies tend to show greater resilience and perseverance, driven by intrinsic motivation to overcome challenges. Research indicates a significant correlation between teachers' instructional choices aligned with student interests and increased engagement (Schiefele and Schaffner, 2015). Educators can foster interest by designing relevant curricula, incorporating interactive learning experiences, and creating supportive classroom environments. By nurturing students' interests, educators cultivate lifelong learners who are curious and motivated, ultimately leading to improved academic achievement and personal fulfillment. When students are genuinely interested, they derive satisfaction from the learning process, promoting intrinsic motivation and deeper understanding (Schunk, 2019).

Students who are more interested in what they are learning tend to exhibit higher levels of engagement, motivation, and persistence, which in turn positively influence their academic outcomes, Smith (2020). Personal relevance, curiosity, and intrinsic motivation are factors that contribute to the development and maintenance of interest. Zhang and Ziegler (2016) uncover that improvements in academic self-concept precede increases in academic interest, suggesting that positive perceptions of one's academic abilities serve as a precursor to developing interest in the corresponding academic domain. Interest in a subject can significantly impact test anxiety and academic achievement. When students are genuinely interested in a subject, they often experience lower levels of test anxiety, as their engagement and passion can mitigate feelings of stress and apprehension (Pekrun and Linnenbrink-Garcia, 2012). This is because interest fosters greater engagement and preparation, making students feel more confident and less apprehensive about tests (Baker and Inventado, 2014). Conversely, a lack of interest can lead to insufficient preparation and increased test anxiety, as students may feel less motivated to engage with the subject (Pekrun, 2017; Putwain and Symes, 2018). This heightened test anxiety can impair their test achievement, creating a cycle of stress and poor outcomes.

Test anxiety is a psychological condition characterized by excessive worry, fear, and apprehension experienced before, during, or after taking tests or exams. It involves cognitive, emotional, and physiological reactions that can interfere with an individual's ability to perform effectively in evaluative situations (Zeidner, 2020; von der Embse, 2018). Test anxiety can significantly hinder academic performance and overall well-being, as it often leads to excessive worry and stress during assessments, impacting students' ability to succeed (Nwosu, 2017). Symptoms of test anxiety may include racing thoughts, difficulty concentrating, sweating, trembling, rapid heartbeat, and feelings of dread or panic. This condition can have detrimental

effects on academic achievement, leading to underachievement and negatively impacting overall well-being (Putwain, 2021; Zeidner, 2020). Test anxiety is a situation specific trait that refers to the anxiety states and worry conditions that are experienced during examinations (Spilbeger and Sarason, 2019). Test anxiety can negatively impact academic performance and overall well-being, making it an important area of study in psychology and education (Remedios, 2019). Strategies for managing test anxiety include relaxation techniques, cognitive-behavioral therapy, and effective study habits. Student level of test anxiety can cause a student academic performance to suffer even more depending on the length of time they suffer from test anxiety (Zadeh, Ebrahimi and Mahdinejad, 2012). However, text anxiety according to some researchers may be influenced by varied factors such as environmental factors (Aremu and Sokan cited in Owonwami, Sakiyo and Filgona, 2017); teacher factor and psychological factors (Ngwoke, 2010). Ngwoke, Ossai and Obikwelu (2013) observed that many Nigerian students at all levels exhibit high level of test anxiety in test conditions. This often resulted in debilitating anxiety, high proneness to cheating in examination and consequently low achievement.

A student's level of test anxiety can significantly impact academic achievement. High test anxiety often interferes with performance, leading to lower grades as students struggle to concentrate and recall information during exams. Negative thoughts and self-doubt further exacerbate the issue (Nwosu, 2017). Techniques such as relaxation exercises and cognitive-behavioral strategies can help manage anxiety, while alternative assessment methods focusing on understanding can alleviate test anxiety and enhance academic success (Putwain, 2019).

Although, literature abounds on interest, text-anxiety and academic achievements, the researcher observed that there seems to be paucity of empirical investigations in which academic achievements is used as a dependent variable against interest and text-anxiety as independent variables among secondary school students in Ogidi Education Zone. It is against this backdrop the researcher sought to study interest and text-anxiety as correlates of secondary school Chemistry students' academic achievement in Ogidi Education Zone. Specifically, the study sought to examine the relationship between;

1. Students' interest and their academic achievements in Chemistry in Ogidi Education zone.
2. Students' test anxiety and their academic achievement in Chemistry in Ogidi Education zone.

### Research Questions

Two research questions were raised to guide the study.

1. What is the relationship between interest scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education zone?
2. What is the relationship between test anxiety scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education zone?

### Hypotheses

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

1. There is no significant relationship between interest scores and academic achievement scores of secondary schools students in Chemistry in Ogidi Education zone.
2. There is no significant relationship between test anxiety scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education zone.

## 3. Research Method

Correlation survey research design was adopted for this study. Nworgu (2015) defined correlation research design as a type of research design that seeks to establish the relationship that exists between independent and dependent variables. The choice of correlational survey design is because the study seeks to examine the relationship between two or more variables in order to explain or predict the result. The study was

carried out in Ogidi Education Zone of Anambra State, Nigeria. The population of the study comprised of 1,754 senior secondary school two students (SS 2) offering Chemistry. The sample size for this study consisted of 375 SS2 Chemistry students using multi-stage sampling procedures. Chemistry Interest Scale (CIS), Chemistry Text Anxiety Inventory (CTAI) and the 2023/2024 cumulative examination results in Chemistry were used for data collection. The instruments were validated. The reliability of the instruments was established using Cronbach Alpha with coefficients of 0.87 for CTAI and 0.83 for TAAS. Pearson Product Moment Co-relation analyses were employed for analysis of the data collected using Statistical Package for Social Sciences (SPSS, version 25). The original interest scale developed by Wong and Wong (2019) was designed to assess students' general academic interest and motivation across subjects. For the present study, it was adapted into the "Chemistry Interest Scale," focusing specifically on students' interest and motivation in learning Chemistry. The adapted version comprises 25 items categorized into four sections: interest in science, science learning motivation, science career aspirations, and science related activities. The 25 statements were rated on a four-point Likert scale: Strongly Agree (SA), Agree (A), Disagree (D), Neutral (N) and Strongly Disagree (SD). Higher scores indicate higher interest. The second instrument Chemistry Text Anxiety Assessment inventory (CTAAI) developed by Afolabi (2015) was modified to assesses test anxiety among chemistry students and includes 20 items measured on a four-point scale: Strongly Agree (SA), Agree (A), Disagree (D), Neutral (N) and Strongly Disagree (SD). Higher score indicates greater Chemistry text anxiety. Students' academic achievement in Chemistry was assessed using the 2023/2024 SS2 cumulative examination results in Chemistry. The instruments were validated. The internal consistency of CIS and CTAAI using Cronbach's alpha method gave a reliability index of 0.87 and 0.83 respectively. A total of 375 copies of each instrument were directly administered to the respondents by the researcher, with the assistance of secondary school Chemistry teachers who were the research assistants. 375 were validly completed and returned for analysis. The data collected were analysed using Pearson Product Moment Correlation. Higher scores indicate greater interest in science, in the same manner; higher scores indicate greater chemistry test anxiety.

#### 4. Results

**Research Question 1:** What is the relationship between interest scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education Zone?

**Table 1:** Pearson r on the relationship between interest scores and academic achievement scores of secondary school students in chemistry in Ogidi Education zone

Sources of Variation	n	Interest r	Academic Achievement r	Decision
Academic Interest	375	1.	0.413	Moderate positive relationship
Academic Achievement		0.413	1	

Table 1 reveals a correlation analysis between interest scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education Zone. The result showed a moderate positive relationship ( $r = 0.413$ ) between interest scores and academic achievement scores of secondary school students in Chemistry. This indicates that as students' interest in Chemistry increases, their academic achievement in the subject tends to improve as well.

**Research Questions 2:** What is the relationship between test-anxiety scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education zone?

**Table 2:** Pearson r on the relationship between test anxiety scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education zone

Sources of Variation	N	Academic		Decision
		Test Anxiety r	Achievement r	
Test Anxiety	375	1.	-.513**	Moderate Negative Relationship
Academic Achievement		-.513**	1	

Table 2 shows a correlation analysis between test anxiety and academic achievement scores. The relationship between test anxiety scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education Zone is a moderate negative relationship ( $r = -0.513$ ). This means that students with higher test anxiety tend to perform less well academically in Chemistry, while students with lower test anxiety generally perform better.

**Hypothesis 1:** There is no significant relationship between interest scores and academic achievement scores of secondary schools students in chemistry.

**Table 3:** Summary of Pearson r analysis on the significant relationship between interest scores and academic achievement scores of students in Chemistry

Sources of variationsn	Interest Scores r	Achievement Scores r	p-value	Decision
Interest Scores	1	0.413	.028	Sig.
Achievement Scores	0.413	1		

Table 3 reveals a moderate positive correlation ( $r = 0.413$ ) between interest scores and academic achievement scores of students in Chemistry. The p-value of 0.028 is less than the 0.05 level of significance, indicating that the relationship is statistically significant. Therefore, reject the null hypothesis. Thus, there is a significant relationship between academic interest scores and academic achievement scores of students in Chemistry.

**Hypothesis 2:** There is no significant relationship between test anxiety scores and academic achievement scores of secondary schools students in Chemistry.

**Table 4:** Summary of Pearson r analysis on the significant relationship between test anxiety scores and academic achievement scores of students in Chemistry

Sources of variationsn	Test Anxiety Scores r	Achievement Scores r	p-value	Decision
Test Anxiety Scores	1	-0.513**	0.000	Sig.
Achievement Scores	-0.513**	1		

The analysis in Table 4 reveals a statistically significant moderate negative relationship ( $r = -0.513$ ,  $p < 0.01$ ) between test anxiety scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education Zone. Since  $P < 0.05$ , the null hypothesis is rejected. Thus, there is a significant relationship between test anxiety scores and academic achievement scores of secondary school students in Chemistry.

## Discussion of Findings

The findings of this study revealed a moderate positive relationship between interest scores and academic achievement scores of secondary school students in Chemistry in Ogidi Education Zone. This indicates that as students' interest in Chemistry increases, their academic achievement in the subject tends to improve as well. This findings agreed with the study of Onah and Anamezie (2022), which showed that academic interest relatively contributed 18% to the prediction of academic achievement of secondary school Physics. Similarly, another study by Agoesina, Melan, Khusaini, Elizabeth (2022) showed that academic interest was proved to determine significantly the academic performance. Alternatively, the study of Arhin and Yanneh (2020) showed that there is no relationship between interest and academic achievement in mathematics.

In relation to the hypotheses raised, the findings of this study revealed a significant moderate positive correlation between interest scores and academic achievement scores of students in Chemistry. This finding is in agreement with the study of Adebisi, Adekunle, and Oyewumi (2010) whose result revealed that there is significant relationship in the students' interest in Biology and students' academic performance in Biology. On the other hand, the findings of this study opposed that of Isiah, Yusuf and Zakariyah (2024) which revealed that learning interest does not have significant influence on the Academic Performance of senior secondary schools Islamic Studies Students.

The findings of this study equally revealed a moderate negative relationship between test anxiety and academic achievement scores in Chemistry. This means that students with higher test anxiety tend to perform less well academically in Chemistry, while students with lower test anxiety generally perform better. The findings of this study aligns with that of Mittu and Nandana (2020) which revealed test anxiety exhibited a negative relationship with academic achievement, although the relationship was not statistically significant. Similarly, this finding is supported in another study by Chukwu (2016) who explored the relationship among test anxiety, academic achievement, and interest among senior secondary school students in geometry in Enugu State. The findings revealed that there was a moderate positive relationship between test anxiety and academic achievement in geometry. Also, the findings of this study agrees with that of Nwafor, Eke, and Ibe (2023) who conducted a study to explore the correlation between test anxiety and student achievement in chemistry, with a particular focus on the moderating effects of school location and gender on this relationship. The result of the study revealed that there is a negative correlation between test anxiety and Chemistry achievement among students.

The corresponding hypothesis revealed that there is a statistically significant negative relationship between test anxiety scores and academic achievement scores of secondary school students in Chemistry. The findings of this study is in alignment with the findings of Chukwu (2016) which showed that There was a significant relationship between test anxiety and students' interest in geometry. Similarly, the findings are supported by Effiom and Bassey (2018) which revealed both test anxiety had direct and significant influences on academic achievement among secondary school students. Likewise, the study aligns with Nwafor, Eke, and Ibe (2023) which revealed a significant negative correlation between test anxiety and chemistry achievement among students. The findings of this study contradict the findings of Mittu and Nandana (2020) which revealed that test anxiety exhibited a negative relationship with academic achievement, although this relationship was not statistically significant. Also, the findings of this study is not supported by Mohammed and Mohammed (2017) which showed that the analysis did not find any significant effects of examination anxiety on students' academic achievements.

## 5. Conclusion

The study examined interest and test anxiety as correlates of secondary school students' academic achievement in Chemistry in the Ogidi Education Zone. Based on the findings, the study concluded that students' interest and test anxiety are important factors associated with their academic achievement in Chemistry. The findings further indicate that students with higher levels of interest tend to achieve better academically, underscoring the importance of fostering engaging and supportive learning environments. Conversely, test anxiety was found to be negatively related to academic achievement, suggesting the need for appropriate interventions to help students manage anxiety during assessments. Based on the findings of the study, it was recommended that;

- a. Teachers should incorporate student-centered instructional methods, such as inquiry-based learning, problem-solving approaches, and hands-on laboratory activities, to spark students' interest in Chemistry. These strategies can make learning more engaging and relatable, thereby improving academic performance.
- b. Schools should organize workshops and training sessions aimed at helping students manage test anxiety. Techniques such as mindfulness, relaxation exercises, and effective study habits should be taught to equip students with skills to handle the pressure of assessments and examinations effectively.
- c. Guidance counselors and educators should design and implement programs that build students' self-esteem. Activities such as leadership training, peer mentoring, and positive reinforcement can enhance students confidence, which is critical for their academic success.
- d. Collaborative partnerships among teachers, guidance counselors, and parents should be fostered to create a support system for students. Regular communication and joint efforts in identifying and addressing students psychological and academic needs can lead to holistic development and improved academic outcomes.
- e. Researchers should explore additional psychological and environmental factors that influence academic achievement in Chemistry, such as motivation, peer support, and family background. Findings from such studies could provide deeper insights and inform more targeted interventions to enhance student outcomes.

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