

YEAR ONE STUDENTS' TEST ANXIETY AS A CORRELATE OF THEIR INTEREST IN CHM 111 AT NNAMDI AZIKIWE UNIVERSITY, AWKA, NIGERIA

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Abstract

Following the fluctuation of students' performance in CHM 111 course, this study examined Year One Students' Test Anxiety as a Correlate of Interest in CHM 111 at Nnamdi Azikiwe University. Two purposes, two research questions and two null hypotheses guided the study. The study adopted a correlational survey design. The sample for the study comprised of Chemistry students in the department of Chemistry and Chemistry education students in the department of science education. The sample constituted 368-Year one student. Two instruments were used for data collection, test anxiety inventory (TAI) and Chemistry interest inventory (CII). TAI and CII indicated a reliability 0.75 and 0.80 respectively using Cronbach alpha. This is an indication that the instruments were reliable. The data were analyzed using Pearson product moment r and R^2 to answer the research questions while p value was used to test the null hypothesis at 0.05 alpha level. The findings from the study revealed among others that there exists a low positive relationship between year one students test anxiety and interest in CHM 111 course in federal university. However, no significant relationship. The study also revealed a low positive relationship between year one students test anxiety and interest in CHM 111 course in federal university. Thus, no significant relationship between year one students' test anxiety and interest in CHM 111 in university in university when moderated by gender. Based on the findings, it was recommended that CHM 111 lecturers should focus on factors beyond test anxiety to boost CHM 111 interest enhance relevance, instruction, and engagement. Tailor inclusive curricula with real-world applications, varied assessments, formative feedback, and mentorship. From the recommendations, conclusions were made,

Keywords: Test Anxiety, Academic Interest, Gender, CHM 111, Undergraduate Chemistry

Introduction

Chemistry courses study in the university tends to blends broad to scholarly development with discipline-specific competencies. In a university setting, Chemistry students engage with a diverse curriculum designed to build foundational knowledge, critical thinking, and professional skills essential for scientific inquiry and future careers (Obikezie et al., 2023). Some of the year one university Chemistry courses includes advanced organic Chemistry CHM 101 and inorganic Chemistry CHM 111, basic physical Chemistry CHM 102 and practical Chemistry CHM 112 (Nnoli et al., 2026). But as a result of this study, inorganic Chemistry CHM 111 was the area of focus.

In the first year of university, CHM 111 an inorganic Chemistry course lays a foundational bedrock for understanding how elements beyond carbon behave, organize matter, and enable technologies essential to modern society. The course underpins catalysts for greener processes, materials for energy storage, and coordination compounds that drive advances in chemical sciences (Ozoenemuo et al., 2025). Through studying minerals, metals, and versatile inorganic frameworks, CHM 111 equips students with tools for sustainable materials design, energy efficiency, and environmental stewardship (Adeyemi & Nwafor, 2022; Adeyemi & Okonkwo, 2023; Ozoenemuo et al., 2025). In a world confronting climate change, resource scarcity, and health challenges, this curriculum is not simply academic; it is a gateway to transformative technologies and responsible engineering practices (Adeyemi & Nwafor, 2022; Ozoenemuo et al., 2025). Yet, despite its societal value, student learning in CHM 111 often fluctuates in year-one cohorts, a pattern that scholars attribute partly to emotional and motivational factors, including test anxiety and varying levels of interest (Adeyemi & Nwafor, 2022; Adeyemo, 2021; Adeyemo & Nwafor, 2022).

Test anxiety is a prominent barrier to CHM 111 performance. Defined as excessive worry, tension, and apprehension in evaluative settings, it produces physiological and cognitive symptoms racing heart, sweating, and impaired concentration that disrupt essential reasoning during problem solving (Ogunleye & Salami, 2023). Empirical work in chemistry education reveals a consistent negative link between test anxiety and achievement. Akanazu and Okoli (2021) report that higher test anxiety correlates with lower chemistry achievement, suggesting that affective factors, alongside cognitive content, shape outcomes. Samuel and Okonkwo (2023) extend these findings, showing that test anxiety interacts with self-esteem and interest to influence secondary students' academic results in chemistry. Obasanya (2022) identifies a nuanced picture where anxiety and interest display only moderate associations in some contexts, while Nwafor et al. (2021) find a low positive link between anxiety and interest, with no robust predictive relationship

between the two constructs across all settings. This body of work points to a practical implication: reducing anxiety and fostering interest could bolster CHM 111 success by stabilizing attention, working memory, and motivation like interest during challenging inorganic topics such as ligand field theory, oxidation states, and solid-state structures.

The term interest refers to a psychological state of getting an effective reaction to any topic of focus. At the same time, it deals with engaging and re-engaging with the same ideas, objects, or events. Students' interest can also be seen as the inclination of the student towards a particular subject in which he or she is easily able to connect without any hassle or hurdle. A study by Mappadang et al. (2022) stated that academic interest determines the academic performance of undergraduate accounting students. That is to say that when students are genuinely interested in a concept, they are more likely to invest time and effort in learning, participate actively in class, and pursue further studies in that field. Conversely, a lack of interest could lead to disengagement, surface-level learning, and suboptimal performance not minding gender. A study by Nwafor et al. (2023) emphasized the importance of metacognitive learning strategies in enhancing students' understanding and interest in Chemistry, suggesting that traditional, content-heavy teaching approaches may contribute to students' lack of deeper understanding of the subject. This is to say that students' academic interest can be influenced by several factors such as location, cultural stereotypes and gender.

Gender serves as moderating variable in this study. Gender refers to the socially constructed roles, behaviours and expectations associated with being male or female. Gender differences in science education have been widely studied, with mixed findings. Some research, such as that by Thompson (2020), suggests that male students often outperform female students in science subjects due to societal and educational biases. Research by Achor et al. (2023) in Benue State reported moderate positive relationship between male and female students test anxiety and their interest in Physics with no significant gender differences in test anxiety and interest levels among secondary school students. Meanwhile, Okoiye et. al. (2018) reported a low positive relationship between male and female secondary students test anxiety and interest in secondary school Chemistry. Thus, relationship was significant. From the above reviews could be observed that most of the studies were done in secondary school Chemistry. The present study established the moderating effect of gender on the correlation between test anxiety and year one university undergraduate students' interest in CHM 111 course.

Statement of the Problem

CHM 111 which covers introductory aspect of inorganic Chemistry is a year one university course which is taken by almost all the science incline disciple

department in the university circle as a result of its wide importance to these disciplines across society and human. The complexity inherent in CHM 111 contributes to a perception of difficulty among undergraduate students. For example, among the 114 students that registered CHM 111 in 2020/2021 academic session in industrial Chemistry and science education department, the result shows that the number that scored A is 10, the number that scored B is 15, those that scored C are 20, the number that scored D is 30, the number that scored E is 16 and those that scored F is 23. More so, among the 97 students that registered CHM 111 in 2021/2022 academic session, the result shows that the number of industrial Chemistry and science education undergraduates that scored A is 8, the number that scored B is 15, the number of students that scored C is 42, the number of students that scored D is 14, the number that scored E is 11, the number that scored F is 7.

In addition, among the 99 students that registered CHM 111 in 2022/2023 academic session, the result shows the number that scored A is 13, the number of persons that scored B is 16. The number of students that scored C is 13, the number that scored D is 10, the number that scored E is 15 and the number that scored F is 32. Considering A to C to be pass mark, D to F as fail, the percentage of pass for the 2020/2021, 2021/2022 and 2022/2023 academic sessions were 39%, 67% and 42% respectively. Conversely, the percentage of failure for the corresponding periods were 61%, 33% and 58% respectively (Ozoenemu et. al., 2025). Studies believed that the likely factors that could cause fluctuations in academic performance of the students at any level could be test anxiety and students' interest in the said subject. On this note the researchers carried out this study to know if what the reviewed studies said is true and also to move the study in the university level since most of the studies reviewed were done in secondary school level. It is on this premise that the researchers investigated on year one students' test anxiety as a correlate to interest in CHM 111 course in federal university.

Research Questions

The following research questions guided the study:

- What is the relationship between year one students' test anxiety and interest to CHM 111 course in university?
- What is the relationship between year one students' test anxiety and interest to CHM 111 course in university as moderated by gender?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant relationship between year one students' test anxiety and interest to CHM 111 course in university.

2. There is no significant relationship between year one students' test anxiety and interest to CHM 111 course in university as moderated by gender.

Method

The study adopted correlational research design. The area of study was Anambra State. The population of the study comprised of the year one students that offers CHM 111 as a course in all departments in the sole federal university in Anambra State. The sample size of the study was made up of 368 year one students; one hundred and thirty-four (134) male students and two hundred and thirty-four (234) female students from all the departments offers CHM 111. The proportionate stratified random sampling technique was used to select the sample from the entire population which was considered to be representative of the whole population.

Two instruments were used for data collection namely Chemistry test anxiety inventory (CTAI) and Chemistry interest inventory (CII). CTAI was adapted from Chemistry Test Anxiety Inventory as used by Akanazu and Okoli (2020). The instrument is divided into three sections A, B and C. Section A contain items design to elicit demographical information of the respondents. Section B was broken into four clusters A to D covering the research questions with a total of 10 statement, the responses to the clusters were structured on a 4 point rating scale of Strongly Agree (SA)=4, Agree (A)=3, Disagree (D)=2 and Strongly Disagree (SD)=1.

CII was adopted from chemistry interest inventory scale as used by Obikezie (2023). The instrument was divided into two section A and B. Section A contains items design to elicit demographical information of the respondents. Section B was broken into four clusters A to D covering the research questions with a total of 36 items statement, the responses to the clusters were structured on a 4 point rating scale of Strongly Agree (SA) = 4, Agree (A) =3, Disagree (D) = 2 and Strongly Disagree (SD) = 1. To test the consistency and reliability of the instruments used, the two instruments were administered to 30 undergraduate Chemistry Education in the Department of Science Education Delta State University Abraka, Delta state which is outside the area of study and reliability of 0.75 and 0.80 were yielded using Cronbach alpha. In analyzing data, Pearson product moment correlation (r) and (R^2) were used to answer research questions and to test the hypotheses at 0.05 level of significant. The interpretation of the relationship (r), in the research questions, was based on a 4-way guide posited by Nworgu (2015) as follows: $\pm 0.80 - \pm 1.00$ = High positive or negative relationships, $\pm 0.31 - \pm 0.79$ = Moderate positive or negative relationship, $\pm 0.00 - \pm 0.30$ = Low positive or negative relationship. In interpreting the null hypotheses, the decision rule was that when P-value is less than or equal to 0.05 ($P < 0.05$) the null hypotheses was rejected. On the other hand, when P-value is greater than the alpha level 0.05 ($P > 0.05$), the null hypotheses was

not rejected (accepted).

Results

Research Question 1: What is the relationship between year one students' test anxiety and interest to CHM 111 course in university?

Tables 1: Pearson Correlation Coefficient for the Relationship between Year One Students' Test Anxiety and Interest to CHM 111 Course in University.

Variables	N	r	R ²	Magnitude & Direction	Sig	Decision
Test Anxiety	368	.040 ^a	.002	Low Positive	.445 ^b	NS
Interest						

NS= Not significant

Table 1 above indicates a low, positive relationship between year-one students' test anxiety and their interest in CHM 111 (N = 368). The Pearson $r = .040$ shows a negligible association, and $R^2 = .002$ means only 0.2% of the variability in interest is explained by anxiety. Despite statistical significance implications from the sample size, the practical impact is minimal. In interpreting the research question, test anxiety explains virtually no variance in interest, suggesting other factors (e.g., relevance, teaching quality, and self-efficacy) likely shape students' interest more than anxiety in CHM 111.

Research Question 2: What is the relationship between year one students' test anxiety and interest to CHM 111 course in university as moderated by gender?

Tables 2: Pearson Correlation Coefficient for the Relationship between Year One Students' Test Anxiety and Interest to CHM 111 Course in University as Moderated by Gender.

Variables	N	r	R ²	Magnitude & Direction	Sig	Decision
Test Anxiety	368	0.11	0.009	Low positive	0.54 ^b	NS
Interest						

NS= Not Significant

The table 2 shows a low, positive link between year-one students' test anxiety and interest in CHM 111, with 368 participants. The Pearson $r = .11$ indicates a low positive relationship, and $R^2 = .009$ means only 0.9% of the variance

in interest is explained by anxiety. When moderated by gender, this modest association suggests gender might not drastically alter the overall pattern, but a full test of moderation is needed. Practically, anxiety explains little about interest; other factors (e.g., relevance, teaching quality, prior CHM 111 experience) are likely more influential.

Hypothesis 1

There is no significant relationship between year one students' test anxiety and interest to CHM 111 course in university.

Table 1 shows a very weak, positive link between year-one students' test anxiety and interest in CHM 111 ($N = 368$, $r = .040$, $R^2 = .002$). With a significance value of .445, the relationship is not statistically significant. Therefore, the hypothesis no significant relationship between test anxiety and interest is supported. Practical influence of anxiety on interest appears negligible.

Hypothesis 2

There is no significant relationship between year one students' test anxiety and interest to CHM 111 course in university as moderated by gender.

The table indicates a small, positive association between year-one students' test anxiety and interest in CHM 111 ($N = 368$, $r = .11$, $R^2 = .009$). With gender as a moderator, the effect remains non-significant ($\text{Sig} = .54$), supporting the hypothesis of no significant relationship when accounting for gender. Practical impact is minimal, as only about 0.9% of variance in interest is explained by anxiety. Suggested focus: explore other factors influencing interest beyond anxiety and gender.

Discussion

The study observed a low, positive relationship between year-one students' test anxiety and their interest in CHM 111. The relationship between the variables was also observed not to be significant. This could be as a result that students with higher anxiety might still find chemistry engaging due to perceived course relevance or curiosity, while others with low anxiety may remain indifferent. Measurement issues (scale sensitivity, timing), sample heterogeneity, or unmeasured confounds (teaching quality, prior knowledge) could attenuate the association, yielding non-significance. The findings discussed align with Nwafor et al. (2021), who reported a low positive correlation between test anxiety and students' interest in secondary-school Chemistry and found no significant relationship between test anxiety and interest in that subject. By contrast, Obasanya (2022) reports a moderate positive correlation between test anxiety and interest, though the present observation supports the authors' broader conclusion of no significant correlation in secondary-

school Chemistry contexts. Similarly, Samuel and Okonkwo (2023) contend that test anxiety, self-esteem, and interest are significant correlates of secondary-school students' Chemistry achievement, a view not mirrored by the current year-one CHM 111 findings. Consequently, this study aligns with scholars noting a low positive link between year-one students' test anxiety and interest in CHM 111, while also echoing those who find no significant relationship between the two variables in university settings. The findings are consistent with prior work showing non-significant relationships in some contexts, yet they diverge from studies reporting notable positive correlations, highlighting context-specific dynamics across levels of education and subject matter.

Additionally, the study observed a low, positive relationship between year-one students' test anxiety and their interest in CHM 111 as moderated by gender. Thus, there is no significant relationship between year one students' test anxiety and interest to CHM 111 course in university as moderated by gender. No significant relationship between year one students' test anxiety and interest to CHM 111 course in university as moderated by gender could be that, anxiety and interest might be driven by common factors (course relevance, teaching quality) that affect both genders similarly. Or cultural/institutional support might equalize experiences, reducing gender-based variance in these relationships. The findings of this study align with Okoiye et al. (2018), who reported a low positive relationship between test anxiety and interest among male and female secondary students in Chemistry, while also noting no significant gender differences in anxiety and interest. In contrast, the study's moderation by gender shows a non-significant relationship between year-one students' test anxiety and CHM 111 interest overall (Table 2), consistent with Okoiye et al.'s emphasis on negligible gender-driven variation in some contexts. The pattern diverges from Achor et al. (2023), who found a moderate positive relationship between test anxiety and interest in Physics, though their emphasis on significance differs from ours. Thus, the current findings are consistent with non-significant gender-moderated effects in CHM 111, supporting the null hypothesis that there is no significant relationship between test anxiety and interest when moderated by gender.

Recommendations

Based on the findings of the study it is recommended that:

1. CHM 111 lecturers should focus on factors beyond test anxiety to boost CHM 111 interest

The observed small, non-significant relationships suggest anxiety explains little variance in interest, so interventions should target relevance, instructional quality, and active engagement.

2. University curriculum planners should tailor supports to build inclusive learning environments without assuming gender differences drive engagement. Implement strategies like real-world chemistry applications, varied assessment formats, formative feedback, and mentorship programs. They should support plans for further research to examine other predictors (self-efficacy, prior knowledge) and potential moderating roles beyond gender.

Limitations of the Study

First, the correlational design cannot establish causality between test anxiety and interest in CHM 111, only association. Second, the sample comes from a single federal university in Anambra State, which may limit external validity to other regions, institutions, or curricula. Third, instruments (CTAI and CII) rely on self-report, introducing social desirability and response biases; though reliability was acceptable, measurement error remains. Fourth, timing of data collection and potential unmeasured confounds (teaching quality, prior chemistry exposure, classroom environment) could attenuate observed relationships. Finally, cultural factors and gender dynamics may influence responses differently across contexts.

Conclusion

This study embarked on the year one students' test anxiety as a correlate to interest in CHM 111 course in university. Through a systematic exploration the study indicated a small, positive relationship between year-one test anxiety and interest in CHM 111, but the association is not statistically significant. When considering gender as a moderator, the relationship remains weak and non-significant, suggesting that neither test anxiety alone nor its interaction with gender meaningfully predicts course interest. Collectively, the study suggests that factors beyond anxiety and gender such as instructional quality, perceived relevance, and prior knowledge likely play more substantial roles in shaping CHM 111 interest among first-year students.

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Data Availability Statement

The data supporting the findings of this study are available upon request from the corresponding authors. The data set includes the responses from 368 year one Chemistry students collected through CTAI and CII, and it is intended to be used for further research on year one students' test anxiety as a correlate to interest in CHM 111 course in university.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this festschrift article. There were no financial or personal relationships that could influence the research outcomes, and all authors have disclosed any potential conflicts to ensure transparency and integrity in the study's findings.

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