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The Relationship Between Students' Interest in Science and Their Selection of Science-Related Elective Subjects in Senior High Schools

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Abstract

The selection of science-related elective subjects in senior high schools plays a pivotal role in shaping students' engagement in STEM disciplines and their future career trajectories. This study examines the relationship between students' interest in science and their choice of science electives, including Physics, Chemistry, Biology, and Elective Mathematics, among public senior high school students in a selected region of Ghana. A quantitative correlational design was employed, with data collected from 300 second-year students using a structured questionnaire measuring demographic characteristics and science interest. Descriptive statistics summarized students' interest levels and elective selections, while Pearson correlation and binary logistic regression assessed the strength, direction, and predictive influence of science interest on elective choice. Results indicate a moderate, positive correlation between science interest and elective selection ($r = 0.52$, $p < 0.01$). Further, logistic regression demonstrates that students with higher science interest are significantly more likely to choose science electives (odds ratio = 6.36, $p < 0.001$). These findings highlight the critical role of intrinsic motivation, curiosity, enjoyment, and perceived relevance in guiding students' academic decisions. The study underscores the need for teachers, school administrators, curriculum planners, and policymakers to implement strategies that enhance science interest, foster student engagement, and promote enrollment in STEM-related courses, thereby contributing to the development of a sustainable STEM workforce in Ghana.

Keywords: Science Interest, Elective Subject Choice, STEM Education, Senior High School Students, Ghana

1. Introduction

Choosing elective subjects at the secondary school level is a critical academic decision that shapes students' future educational pathways and career trajectories. In the context of science education, understanding the factors that influence students' selection of science-related electives is essential, especially in countries striving to expand participation in Science, Technology, Engineering, and Mathematics (STEM). Among the several factors identified in the literature—such as teacher effectiveness, classroom experiences, parental influence, and career aspirations—students' interest in science consistently emerges as one of the strongest predictors of engaging with science subjects [14].

Science interest refers to the personal value, curiosity, enjoyment, and intrinsic motivation learners associate with scientific ideas and activities. Researchers argue that interest is not only a powerful motivator for learning but also a key driver of long-term engagement in STEM fields [3]. Students who demonstrate higher levels of interest in science are more likely to take part in science-related classroom activities, exhibit higher persistence in challenging tasks, and consider future opportunities in science-based programs [12]. This makes interest a crucial variable in explaining why some students willingly choose science electives while others avoid them.

Studies across diverse educational systems show significant relationships between students' science interest and their enrollment in subjects such as physics, chemistry, biology, and advanced mathematics [16]. In Ghana and similar developing contexts, the challenge of low enrollment in science electives persists despite continuous reforms aimed at improving science instruction and enhancing STEM participation [13]. Many students who demonstrate high achievement in science do not necessarily select science electives, suggesting that cognitive ability alone is insufficient without strong interest and positive science attitudes. This reinforces the need to explore how interest shapes elective decisions, especially in environments where science subjects are often perceived as abstract, difficult, or irrelevant to everyday life.

Additionally, literature indicates that science interest develops from a combination of classroom experiences, practical work, peer influence, and perceived relevance of science to future careers [15]. When students find science meaningful, enjoyable, and well-connected to real-world applications, they are more inclined to pursue it at advanced levels. Conversely, when learning experiences are dominated by rote memorization, lack of hands-on inquiry, or teacher-centered pedagogy, interest declines—leading to fewer students choosing science electives.

Given the growing global emphasis on STEM human resource development, exploring the relationship between students' interest in science and their choice of science-related elective subjects becomes not only timely but also necessary. This study seeks to contribute to this discourse by examining how students' science interest influences their elective decisions, thereby offering insights that can support curriculum planners, science educators, and policymakers in designing interventions to strengthen STEM engagement.

Purpose of the Study

The purpose of this study is to examine the extent to which students' interest in science predicts their selection of science-related elective subjects at the senior high school level. Specifically, the study seeks to determine how dimensions of science interest—such as enjoyment of science activities, perceived relevance of science, and intrinsic motivation—shape students' willingness to enroll in subjects like physics, chemistry, biology, and elective mathematics. By empirically analyzing these relationships, the study aims to provide evidence on how interest functions as a motivational driver influencing students' academic decision-making within the science domain.

Study Gaps

Although prior research recognizes that students' interest in science influences their attitudes and future academic aspirations, several critical gaps remain. First, there is limited empirical evidence directly linking science interest to actual elective subject selection; most studies focus on attitudes, intentions, or perceptions without examining whether interest translates into concrete behavioral choices. Second, existing studies are predominantly conducted in Western contexts, where educational resources, teaching methods, and cultural perceptions of science differ considerably from those in Sub-Saharan Africa. Consequently, there is a paucity of context-specific research investigating how Ghanaian students' science interest shapes their elective decisions, despite ongoing concerns over low enrollment in core science subjects. Third, few studies in Africa have employed rigorous quantitative designs using validated interest scales and predictive models, such as correlation or regression analysis, to assess the influence of interest on elective choice. This study seeks to fill these gaps by adopting a quantitative approach to examine the predictive relationship between students' science interest and their selection of science-related electives in the Ghanaian context.

Justification

This study is justified by the pressing need to expand participation in science-related electives in Ghana, where persistently low enrollment threatens the development of a future workforce equipped for STEM-driven national growth. Examining the motivational factors that shape students' subject-selection decisions is therefore essential for designing informed educational policies and interventions. Although science interest is widely acknowledged as a key predictor of sustained engagement in STEM pathways, its direct influence on students' elective choices remains insufficiently examined within the Ghanaian context. Generating empirical evidence on this relationship will provide a foundation for developing instructional practices and learning experiences that effectively foster students' intrinsic motivation and deepen their engagement with science. Finally, curriculum reforms alone cannot increase participation in science if students remain uninterested in the subject. This study thus provides a timely and practical rationale by linking psychological motivation (interest) with educational outcomes (elective choice), helping schools develop interventions that strengthen students' engagement with science.

Significance of the Study

The findings of this study hold considerable value for multiple stakeholders within the science education ecosystem. For science teachers, the results will provide insights into the interest-related factors that shape students' academic decisions, enabling them to design instructional activities that promote engagement, enjoyment, and perceived relevance of science learning. School administrators and curriculum planners may also benefit, as the evidence generated can inform targeted intervention programmes aimed at increasing student enrollment in science-related electives and strengthening STEM-oriented curriculum planning. At the policy level, the study offers empirical support that can guide national strategies intended to broaden the science talent pipeline and promote STEM participation. Students stand to gain indirectly as well, since a deeper understanding of the determinants of science interest can contribute to more supportive and motivating learning environments that align with their academic and career aspirations. Finally, the study enriches the research community by providing context-specific, quantitative data from Ghana, thereby addressing an important gap in the literature on how science interest influences subject selection in secondary education.

Research Objectives

1. To examine the relationship between students' interest in science and their selection of science-related elective subjects.
2. To determine the predictive influence of students' science interest on their likelihood of choosing specific science-related electives (e.g., physics, chemistry, biology, elective mathematics).

Research Questions

1. What is the relationship between students' interest in science and their selection of science-related elective subjects?
2. To what extent does students' science interest predict their likelihood of choosing specific science-related elective subjects?

Hypothesis 1

- **H_{01}:** There is no statistically significant relationship between students' interest in science and their selection of science-related elective subjects.
- **H_{11}:** There is a statistically significant relationship between students' interest in science and their selection of science-related elective subjects.

Hypothesis 2

- **H_{02}:** Students' interest in science does not significantly predict their likelihood of choosing specific science-related elective subjects.
- **H_{12}:** Students' interest in science significantly predicts their likelihood of choosing specific science-related elective subjects.

Theoretical Framework (Journal-Ready Paragraph)

The theoretical foundation for this study is anchored in the Expectancy–Value Theory (EVT) of achievement motivation developed by Eccles et al. [9], which posits that students' academic decisions—

including course enrollment choices—are strongly influenced by their expectations of success and the subjective value they attach to learning tasks. EVT identifies four key value components: intrinsic value (personal interest and enjoyment), utility value (perceived usefulness), attainment value (personal importance of doing well), and cost (perceived effort, anxiety, or lost opportunities). Within the context of science education, students who find science intrinsically engaging or perceive it as useful for future careers are more likely to pursue science-related electives. This framework therefore provides a robust basis for understanding how students' interest shapes their elective choices by explaining the motivational processes that underlie decision making. Additionally, the study draws on Hidi and Renninger's [11] Four-Phase Model of Interest Development, which conceptualizes interest as progressing from triggered situational interest to well-developed individual interest through repeated engagement and supportive learning environments. Integrating EVT with the interest-development perspective allows this study to theorize that students' interest in science is not merely an emotional preference, but a motivational construct shaped by value beliefs and cognitive appraisals that influence their academic choices. Together, these theories offer a coherent lens for interpreting how interest acts as a motivational driver for selecting science-related electives, while also illuminating the processes by which such interest can be cultivated and sustained in school settings.

Conceptual Framework

This study is grounded in the assumption that students' interest in science is a critical motivational factor that shapes their academic decision-making, particularly their choice of science-related electives. Building on the Expectancy–Value Theory of Eccles et al. [9], the framework assumes that students' decisions to pursue particular subjects are influenced by the value beliefs they hold about those subjects—specifically intrinsic value, utility value, attainment value, and perceived cost. When students find science enjoyable, meaningful, or useful for future careers, they tend to attach greater value to it, which in turn increases their likelihood of selecting science-based elective subjects. Complementing this view is Hidi and Renninger's [11] Four-Phase Model of Interest Development, which suggests that interest evolves from temporary situational triggers to deep, long-term individual interest. This progression is driven by repeated engagement, supportive environments, and positive learning experiences, implying that the school context can cultivate or suppress sustained interest in science.

Within this conceptualization, students' interest in science is positioned as the independent variable**,** and it is operationalized through indicators such as enjoyment of science activities, curiosity, willingness to engage with science tasks, and sustained motivation to understand scientific ideas. The choice of science-related electives functions as the dependent variable**,** reflected in students' actual enrollment in physics, chemistry, biology, elective mathematics, or other STEM-focused courses. The framework proposes a direct, predictive relationship in which increased interest enhances the likelihood of choosing science electives, while low or unstable interest reduces this likelihood. This relationship is further informed by the theoretical understanding that interest serves as a motivational lens through which students evaluate the personal relevance and utility of academic subjects.

To illustrate this relationship, the conceptual framework is represented in a simplified model that highlights the directional pathway from interest to elective choice:

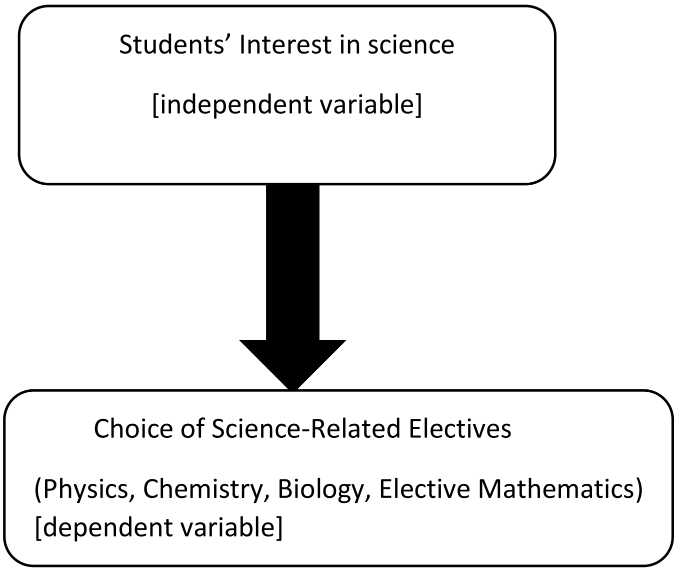

Figure 1:Conceptual Framework on Science Interest and Elective Subject Selection

This framework integrates motivational theory and interest development to provide a coherent explanation of how students make elective choices in the science domain. It also guides the formulation of hypotheses, selection of variables, and interpretation of findings by situating elective choice within a broader motivational process. Ultimately, the conceptual framework underscores the central premise that strengthening students' interest in science is essential for increasing enrollment in science-related electives and supporting long-term STEM participation.

Literature Review

Concept of Students' Interest in Science

Students' interest in science can be conceptualized as a multifaceted construct encompassing intrinsic motivation, curiosity, enjoyment, and the personal significance learners assign to scientific ideas and activities. This form of interest not only shapes the way students engage with science tasks but also influences their perceptions of the subject's relevance to their personal and academic goals, thereby sustaining engagement even when faced with challenging content [3]. From a cognitive and affective perspective, interest functions as a motivational driver, guiding learners toward meaningful participation in scientific learning experiences and fostering a long-term commitment to STEM fields [12].

Research indicates that interest in science develops through a combination of instructional, environmental, and personal factors. Positive classroom experiences, inquiry-based and hands-on learning, teacher support, and the perceived applicability of science to real-world contexts all contribute to the cultivation of interest [14],[15]. When students perceive science as enjoyable, relevant, or connected to their future aspirations, they exhibit higher levels of engagement, persistence, and willingness to select science-related courses, including elective subjects. Thus, interest is not merely a transient preference but a critical motivational and cognitive construct that has significant implications for students' academic decisions and continued participation in STEM disciplines.

Science Interest and Students' Learning Outcomes

A substantial body of research underscores the significant role of students' interest in shaping learning outcomes within science education. Interest has been shown to enhance students' comprehension, foster persistence in problem-solving, and contribute to higher achievement across various scientific domains [14]. Students who exhibit stronger interest in science are more likely to engage voluntarily in extracurricular or supplementary science activities, maintain greater attention during classroom instruction, and develop more positive attitudes toward future science studies and potential STEM careers [16].

Beyond behavioral engagement, interest is closely linked to cognitive and emotional involvement in learning tasks. Students who find science stimulating or relevant demonstrate higher levels of concentration, reflection, and strategic thinking when tackling complex scientific concepts. Moreover, the design and delivery of science instruction play a critical role in sustaining interest; learning experiences that are interactive, inquiry-based, or contextualized within real-world applications tend to amplify students' engagement and motivation [3]. In this way, interest not only functions as a facilitator of immediate academic performance but also serves as a predictor of long-term participation and persistence in science, making it a central factor in shaping both educational and career trajectories within STEM disciplines.

Students' Elective Subject Selection in Science

The selection of elective subjects at the secondary school level represents a pivotal academic decision that can significantly influence students' future educational and career trajectories. Decisions to pursue science-related electives—such as physics, chemistry, biology, and elective mathematics—play a critical role in determining students' eligibility for admission into STEM-focused programs at tertiary institutions [17]. Despite national efforts in many developing countries, including Ghana, to bolster participation in STEM fields, low enrollment in core science electives remains a persistent concern, posing challenges to the development of a skilled science and technology workforce (Ministry of Education [13].

Empirical studies indicate that a variety of factors shape students' elective choices, including prior academic achievement, career aspirations, teacher effectiveness, parental expectations, and the perceived difficulty or workload associated with science subjects [1]. Nevertheless, accumulating evidence suggests that students' interest in science often exerts a stronger influence on long-term engagement with STEM disciplines than achievement metrics alone. When learners find science subjects intrinsically motivating or personally relevant, they are more likely to select these courses, persist in their study, and maintain commitment to STEM-related pathways, highlighting the centrality of interest as a determinant of elective selection.

The Relationship Between Science Interest and Elective Choice

While it is widely acknowledged that students' interest significantly influences their academic behaviors, there remains a notable scarcity of research directly examining how interest translates into concrete decisions, such as the selection of science-related elective subjects. Most existing studies have primarily explored students' attitudes toward science, their intentions to pursue STEM fields, or career aspirations, rather than investigating actual enrollment patterns in elective courses [16]. Although evidence suggests that interest is a strong predictor of students' STEM aspirations, empirical studies linking interest to actual elective choices are still limited, particularly in non-Western contexts.

In Ghana, research addressing the role of motivational factors, especially science interest, in shaping students' elective selection is particularly sparse. Few studies have quantified how intrinsic motivation, enjoyment, or perceived relevance of science predicts whether students opt for electives such as physics, chemistry, biology, or elective mathematics. Addressing this gap, the present study adopts a quantitative approach to investigate the predictive relationship between students' science interest and their elective subject choices, thereby providing context-specific evidence that can inform curriculum planning, instructional strategies, and policies aimed at increasing participation in science education.

Methodology

Research Design

This study will adopt a quantitative research approach within the positivist research paradigm, which emphasizes the systematic measurement of variables, hypothesis testing, and the identification of patterns or relationships that can be generalized [8]. Quantitative research is particularly suitable for investigating relationships among measurable variables and for making predictions based on observed data [5].

Specifically, a correlational research design will be employed. This design allows researchers to assess the strength and direction of associations between variables, in this case, students' interest in science and their choice of science-related elective subjects [7]. Correlational designs are advantageous in educational research because they enable the identification of predictive relationships without manipulating variables, providing insights into natural patterns of behavior in real-world contexts [10]. By employing this design, the study seeks not only to determine whether a statistically significant relationship exists between science interest and elective selection but also to evaluate the predictive influence of interest on students' elective decisions, thereby informing evidence-based educational planning and interventions.

Population

The target population for this study comprises all second-year students (SHS 2) in public senior high schools within the selected region of Ghana that offer science-related elective subjects. This cohort is particularly suitable because these students have already made their elective subject selections, allowing for an accurate assessment of the relationship between science interest and elective choice. To ensure representativeness, the study will include schools stratified by category, such as well-resourced schools, moderately resourced schools, and schools with limited resources, all of which provide access to core science electives. This stratified approach enables the study to capture variability in students' educational experiences, resource availability, and learning environments, thereby enhancing the generalizability and relevance of the findings across different school contexts in the region.

Sample and Sampling Technique

The study employs a stratified random sampling technique to select a representative sample from the target population. A total of 300 second-year senior high school students (SHS 2) are drawn from public senior high schools within the selected region that offer science-related elective subjects. Schools are stratified according to their resource category—well-resourced, moderately resourced, and limited-resourced schools—to ensure diversity in learning environments and equitable representation of students across different school contexts. Within each stratum, classrooms are randomly selected, and all students in the chosen classrooms who meet the inclusion criteria are invited to participate. This approach not only ensures a balanced distribution across school types but also minimizes sampling bias, thereby enhancing the generalizability and validity of the study's findings. The selected sample size of 300 provides sufficient statistical power for correlation and regression analyses in educational research of this nature [6],[10].

Instrumentation

Data for this study are collected using a structured questionnaire designed to capture both demographic characteristics and students' interest in science. The questionnaire consists of two sections. Section A gathers demographic information, including participants' gender, school category, and the science-related elective subjects they have chosen. Section B comprises the Science Interest Scale, adapted from Ainley and Ainley [11], which assesses multiple dimensions of interest, including enjoyment of science, perceived relevance, intrinsic motivation, and curiosity-driven engagement. Items on the scale are measured using a five-point Likert format, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), allowing for quantification of students' motivational and attitudinal dispositions toward science. Students' elective subject choices are coded dichotomously, with 1 representing selection of a science-related elective and 0 representing a non-science elective. To ensure the validity and appropriateness of the instrument, it is reviewed and validated by experts in science education and educational measurement, who assess the clarity, relevance, and alignment of items with the study's objectives. This structured approach facilitates the collection of reliable and quantifiable data suitable for subsequent statistical analysis, including correlation and regression modelling.

Validity and Reliability

The validity and reliability of the research instrument are rigorously established to ensure the accuracy and consistency of the collected data. Content validity is confirmed through a comprehensive review by experts in science education and educational measurement, who evaluate each item for clarity, relevance, and alignment with the study's objectives. Construct validity is further examined using factor analysis to verify that the scale items accurately represent the underlying dimensions of students' science interest, including enjoyment, intrinsic motivation, perceived relevance, and curiosity. To assess the internal consistency reliability, Cronbach's alpha coefficient is computed for the scale, with a value of 0.84 obtained, exceeding the commonly accepted threshold of 0.70 for educational research instruments. This high reliability coefficient indicates that the scale consistently measures the intended constructs and can be confidently used for quantitative analysis, including correlation and regression procedures.

Data collection procedure

Data for the study were collected after obtaining formal permission from the heads of the selected schools, ensuring that all institutional approvals and administrative protocols were observed. Before administering the questionnaire, students were informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any point without any negative consequences. The questionnaires were administered during students' free periods to minimize disruption to instructional activities. To maintain ethical standards, all responses were collected anonymously, and no personally identifiable information was recorded, thereby safeguarding participants' privacy and confidentiality. Additionally, the study adhered to established ethical guidelines for educational research, including principles of informed consent, voluntary participation, and data protection, ensuring that participants' rights and well-being were fully protected throughout the research process.

Data Analysis

The collected data were analyzed using both descriptive and inferential statistical techniques to address the research questions and test the study hypotheses. Initially, descriptive statistics, including means, standard deviations, and frequency distributions, were computed to summarize students' demographic characteristics, levels of science interest, and patterns in elective subject selection. To examine the first hypothesis, which postulated a significant relationship between students' science interest and their choice of science-related electives, Pearson's correlation coefficient was calculated to determine the strength and direction of the association. For the second hypothesis, which proposed that science interest predicts students' elective choices, binary logistic regression analysis was conducted, with elective selection coded as a dichotomous dependent variable (1 = science elective chosen, 0 = non-science elective chosen) and science interest scores as the predictor variable. This analytical approach allowed the study to quantify both the relational and predictive influence of science interest on students' elective decisions, thereby providing robust evidence to address the research questions and support or refute the stated hypotheses.

Results

This section presents the descriptive and inferential findings of the study, addressing the two research questions and testing the associated hypotheses. Data analyses included descriptive statistics to summarize students' demographic characteristics, levels of science interest, and patterns in elective subject selection. Inferential statistics, comprising Pearson correlation and binary logistic regression, were conducted to examine the relationship between students' science interest and their selection of science-related electives, as well as the predictive influence of science interest on elective choice.

Descriptive Statistics

Table 1 presents the descriptive statistics for students' science interest and their selection of science-related electives. The analysis includes 300 second-year senior high school students and examines overall science interest, as well as its dimensions: enjoyment, perceived relevance, intrinsic motivation, and curiosity/engagement.

Table 1:Descriptive Statistics of Science Interest and Elective Selection

Variable	N	Mean	SD	Min	Max
Science Interest	300	4.12	0.56	2.0	5.0
Enjoyment of Perceived	300	4.20	0.61	1.0	5.0
Relevance Science	300	4.05	0.58	2.0	5.0
Intrinsic Motivation	300	4.10	0.60	1.0	5.0
Curiosity & Engagement	300	4.15	0.62	2.0	5.0
Science Elective Chosen (1=Yes)	300	0.68	0.47	0	1

Note: Science Elective Chosen coded as 1 = Science elective selected, 0 = non-science elective selected.

As shown, students generally reported high levels of interest across all dimensions (means > 4.0), with curiosity and engagement slightly higher than intrinsic motivation. Approximately 68% of students selected science electives, suggesting a moderately strong interest-driven preference for STEM courses. These descriptive results provide context for further inferential analyses, including correlation and binary logistic regression, which address the study's research hypotheses.

Relationship Between Science Interest and Elective Choice

To answer the first research question, Pearson correlation analysis was conducted to determine whether a significant relationship exists between students' science interest and their selection of science-related electives. Results, presented in Table 2, indicate a moderate, positive, and statistically significant correlation ($r = 0.52$, $p < 0.01$). This finding suggests that higher levels of science interest are associated with a greater likelihood of choosing science electives.

Table 2:Pearson Correlation Between Science Interest and Elective Choice

Variable	Science Interest	Science Elective Choice
Science Interest	1	0.52**
Science Elective Choice	0.52**	1

Note: $p < 0.01$; Science Elective Choice coded as 1 = Science elective chosen, 0 = non-science elective chosen.

The null hypothesis 1, that there is no relationship between science interest and science elective selection is *rejected* ($r = 0.52$, $p < 0.01$), indicating a statistically significant positive relationship."

Predictive Influence of Science Interest on Elective Choice

To address the second research question, binary logistic regression analysis was conducted to assess the predictive effect of science interest on students' selection of science-related electives. As shown in Table 3, science interest emerged as a **significant predictor** of elective choice (B = 1.85, SE = 0.31, Wald = 35.56, $p < 0.001$). The odds ratio (Exp(B) = 6.36) indicates that for each one-unit increase in science interest, the likelihood of selecting a science elective increases more than sixfold.

Table 3:Binary Logistic Regression Predicting Science Elective Choice from Science Interest

Predictor	B	SE	Wald	df	P	Exp(B)
Science Interest	1.85	0.31	35.56	1	<0.001	6.36
Constant	-2.20	0.45	23.95	1	<0.001	0.11

Note: Exp(B) represents the odds ratio; $p < 0.001$ indicates statistical significance. Science Elective Choice coded as 1 = Science elective selected, 0 = non-science elective selected

These results indicate that science interest is a strong predictor of students' selection of science electives. Consequently, the null hypothesis—that science interest does not predict science elective choice—is *rejected*, providing evidence that intrinsic motivation, curiosity, and engagement play a significant role in influencing students' elective subject decisions.

Summary of Findings

The results of this study reveal a meaningful relationship between students' interest in science and their selection of science-related elective subjects. Specifically, the findings indicate a moderate and positive correlation ($r = 0.52$, $p < 0.01$), suggesting that students who demonstrate higher levels of intrinsic motivation, enjoyment, curiosity, and perceived relevance of science are more likely to opt for science electives. Furthermore, the predictive analysis using binary logistic regression shows that science interest significantly influences elective selection, with an odds ratio of 6.36. This indicates that for every one-unit increase in students' science interest, the likelihood of choosing a science-related elective increases more than sixfold, highlighting the strong predictive power of motivational factors in shaping academic decisions. Collectively, these findings underscore the critical role of fostering students' interest in science within secondary school settings, as it directly affects engagement in STEM-related courses and may have implications for developing the future STEM workforce. These results provide empirical support for educational interventions and curriculum strategies aimed at enhancing students' enthusiasm for science, thereby promoting higher enrollment and sustained participation in science electives.

Discussion

The primary purpose of this study was to examine the relationship between students' science interest and their selection of science-related elective subjects in senior high schools in Ghana, as well as to determine the predictive influence of science interest on elective choice. The findings provide robust evidence that students' motivational dispositions toward science—such as intrinsic interest, curiosity, enjoyment, and perceived relevance—play a pivotal role in shaping their academic decisions.

Relationship Between Science Interest and Elective Choice

Consistent with the first research hypothesis, a moderate, positive, and statistically significant correlation ($r = 0.52$, $p < 0.01$) was found between students' science interest and their selection of science electives. This finding aligns with prior studies indicating that students' interest in science is a critical determinant of academic engagement and behavioral outcomes [14],[16]. When students perceive science subjects as enjoyable, relevant, and intrinsically motivating, they are more likely to engage with the content and make elective choices that reinforce their interests.

The findings also support Zimmerman's [19] theory of self-regulated learning, which posits that students' intentional control over their learning—manifested through motivation, goal-setting, and strategic engagement—shapes academic behaviors. In this study, students who were more interested in science demonstrated a greater propensity to select science-related electives, suggesting that interest operates not only at an affective level but also translates into concrete academic decisions. These results are further supported by the work of Ainley and Ainley [3], who emphasize that interest enhances sustained engagement, which in turn increases the likelihood of pursuing STEM-related pathways.

Predictive Influence of Science Interest on Elective Choice

The second hypothesis, tested using binary logistic regression, revealed that science interest significantly predicts students' choice of science electives ($B = 1.85$, $Exp(B) = 6.36$, $p < 0.001$). The odds ratio indicates that a one-unit increase in science interest multiplies the likelihood of selecting a science-related elective more than sixfold. This finding underscores the strength of motivational factors in influencing educational decision-making and corroborates earlier research indicating that interest is a stronger predictor of long-term STEM engagement than academic achievement alone [12],[15].

In the Ghanaian context, where enrollment in core science electives remains below national targets (MoE,) [13], these findings highlight the necessity of fostering intrinsic interest in science to increase STEM participation. Programs and interventions that promote hands-on learning, inquiry-based activities, and relevance-oriented instruction are likely to enhance students' science interest, thereby influencing elective selection and ultimately contributing to the development of the STEM pipeline.

Implications for Science Education

The study's findings have several practical implications. For science teachers, the results suggest that instructional strategies should go beyond content delivery to include approaches that cultivate curiosity, relevance, and enjoyment. For example, incorporating project-based learning, laboratory experiments, and real-life applications of science can strengthen students' intrinsic motivation and engagement.

For school administrators and curriculum planners, understanding the predictive role of science interest can inform targeted interventions to increase enrollment in science electives. Policies that provide adequate resources, mentorship programs, and career guidance emphasizing STEM opportunities may encourage students to pursue science-related courses. Moreover, at the national level, these findings offer evidence-based support for STEM policy initiatives, particularly those aimed at enhancing student motivation and addressing the underrepresentation of students in science courses.

Finally, this study contributes to the literature by providing context-specific quantitative evidence from Ghana, filling a critical gap in research that often relies on Western contexts. Unlike prior studies that primarily examined attitudes, intentions, or aspirations, this research directly links science interest to actual elective subject selection, offering both theoretical and practical insights for educational stakeholders.

Delimitations and Limitations

This study is delimited to second-year senior high school students in public schools offering science-related elective subjects within a selected region of Ghana, which limits the generalizability of the findings to other student populations, regions, or private institutions. The study focuses primarily on students' interest in science as a predictor of elective selection, thereby excluding other potential influences such as parental guidance, peer influence, and prior academic achievement. Despite these delimitations, the study provides valuable insights into the motivational factors affecting elective choices. In terms of limitations, the use of self-reported questionnaires may introduce response bias, and the cross-sectional design limits the ability to infer causal relationships. Additionally, variations in school resources, teaching quality, and socio-cultural contexts across the region may affect students' responses. Nonetheless, the study's rigorous sampling strategy, use of a validated instrument, and robust quantitative analyses enhance the reliability and relevance of the findings, offering meaningful contributions to understanding factors that shape STEM participation in Ghana.

Conclusion and Recommendations

Conclusion

The study demonstrates that students' interest in science significantly influences their selection of science-related electives, both in terms of association and predictive strength. Higher levels of curiosity, enjoyment, intrinsic motivation, and perceived relevance increase the likelihood of choosing science electives, highlighting the pivotal role of motivational factors in shaping academic decisions. These findings underscore the importance of fostering science interest through targeted teaching strategies, supportive school programs, and policy initiatives to enhance STEM engagement and enrollment. By addressing these motivational dimensions, educators, administrators, and policymakers can strengthen students' participation in science, contributing to the development of a skilled STEM workforce in Ghana.

Recommendations

Based on the study findings, the following recommendations are proposed:

Recommendations

Based on the study findings, the following recommendations are proposed:

- ❖ Teachers should use active instructional approaches, such as inquiry-based learning, hands-on activities, and real-world applications, to enhance students' curiosity, enjoyment, and intrinsic motivation in science.
- ❖ School Administrators and Curriculum Planners should implement initiatives that promote science elective enrollment, including mentorship programs, STEM clubs, and career guidance, while ensuring sufficient laboratory and teaching resources.
- ❖ Policymakers should enact STEM policies that emphasize student motivation and interest, broaden access to quality science education, and establish clear links between science learning and future STEM careers.
- ❖ Researchers should investigate additional motivational and contextual factors affecting science elective selection and employ longitudinal or comparative study designs to support evidence-based, context-specific interventions.

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