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Analyzing the Factors Affecting Secondary and High School Students' Test Scores in Yaoundé, Cameroon

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Abstract: *This research examines the primary factors affecting test scores among secondary and high school students in Cameroon, a setting characterized by ongoing educational difficulties. It emphasizes socio-economic status, teacher quality, school resources, and family background as essential determinants of academic success. Employing a descriptive survey methodology, data were gathered from 298 students through stratified sampling techniques. A questionnaire developed by the researcher, specifically designed for the local context, aided in data collection. Analysis using multiple regression indicated significant positive correlations between student-related, school-related, and socio-economic factors and test scores. In particular, student motivation, prior knowledge, learning styles, teacher effectiveness, school climate and resources, as well as parental education and income were identified as key variables. In light of these findings, the study suggests focused professional development for teachers, better allocation of resources (such as textbooks and technology), the establishment of inclusive and supportive school environments, and increased parental involvement. It also promotes evidence-based interventions to assist underperforming students and guide policy reforms aimed at enhancing educational quality in Yaoundé. The implications of this study extend to educational policy, instructional methods, family engagement, and student support services, providing a thorough framework for improving academic performance. By recognizing and addressing the diverse influences on student achievement, this research enhances the understanding of Cameroon's educational environment and offers practical strategies for stakeholders dedicated to improving learning outcomes.*

Keywords: *test scores, secondary and high school students, classical test theory, student-related factors, school-related factors, socioeconomic factors*

INTRODUCTION

Students' test scores in secondary and high schools are affected by a range of interconnected factors that influence their academic performance and learning outcomes. These factors encompass individual traits such as motivation, study habits, and cognitive abilities, along with external aspects like the quality of teaching, access to learning resources, and the overall school environment. Moreover, socio-economic status, parental engagement, and peer influences significantly contribute to how effectively students perform on assessments. Test scores serve as a quantitative representation of a student's knowledge, skills, or abilities, usually gathered through various forms of evaluation, including exams, quizzes, or

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standardized tests. Improving students' academic performance is a key goal for all educational institutions. In a fast-changing world, students' accomplishments are frequently based on their solid academic or classroom performance. Consequently, exploring the relevant factors that influence students' academic success is a significant area of research for modern scholars. Numerous studies in recent decades have concentrated on identifying the elements that affect students' academic performance. Academic success is defined by the achievement of learning objectives, which are primarily evaluated through a grading system (Jay & Zain, 2019).

Academic performance is a vital measure of a student's overall educational experience and their potential for future achievements (Farley, et al., 2019). As the educational landscape continues to change, it is essential to identify and understand these factors in order to develop effective strategies that improve students' learning outcomes. A thorough comprehension of these elements will be crucial in shaping the future of education and creating an environment where every student can excel both academically and personally (Knight, et al., 2018). The modern education system is marked by its complexity and diversity, catering to students from different backgrounds, learning styles, and abilities. This diversity necessitates a thorough exploration of the various factors that can affect students' academic performance (Taggart, & Li, 2018).

The academic performance of students, as evidenced by their test scores, serves as a vital indicator for evaluating the effectiveness of educational systems globally. Nevertheless, the significant disparities in academic results among students have prompted a fundamental inquiry: What are the primary factors that greatly impact students' academic performance? This inquiry poses a critical challenge within the field of education, as it underscores the necessity to comprehend, identify, and tackle the underlying factors contributing to academic success. A student's previous academic accomplishments, including test scores and grades, offer important insights into their strengths and weaknesses. These scores can act as benchmarks for progress and highlight areas that may need further focus. A consistent upward trend in scores reflects a dedication to academic advancement (Suleiman et al., 2024).

As students' progress through various educational settings, it is essential to recognize and examine the numerous factors that influence their academic success. Internal elements such as cognitive skills, motivation, and self-discipline, along with external aspects like socio-economic background, family dynamics, teaching effectiveness, and curriculum structure, collectively form a complex network of influences that shape students' educational experiences (Flack, et al., 2020). A lack of thorough understanding regarding the interaction and impact of these factors on students' academic performance restricts educators' capacity to customize teaching strategies, curriculum development, and support systems to meet individual requirements. Additionally, the lack of a comprehensive viewpoint on these factors obstructs the creation of evidence-based policies that can effectively tackle the obstacles impeding students' academic success (Mulaudzi, 2023).

The educational environment in Cameroon encounters various challenges that affect the academic performance of students. Elements such as socio-economic status, the quality of teachers, available school resources, and family background play a significant role in influencing students' test scores. It is essential to comprehend these elements to formulate effective interventions aimed at enhancing academic

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performance. There exists a limited understanding of the specific factors that contribute to this issue, and effective interventions necessitate a more profound insight into the elements impacting students' test scores. Students enrolled in secondary and high schools in Cameroon are facing low academic achievement, as evidenced by their test scores. Some of the potential factors influencing test scores include motivation and engagement, prior knowledge, learning styles and preferences, teacher quality, teacher-student ratios, resource availability, school climate, parental income and education, as well as a supportive family environment that can lead to improved academic performance. The consequences of inadequate academic performance, as reflected by test scores in secondary and high schools in Cameroon are multifaceted: reduced future prospects, increased stress and anxiety, higher dropout rates, diminished quality of life, and socio-economic and societal ramifications. Addressing these consequences requires a comprehensive strategy that focuses on identifying and resolving the root causes of academic success.

Objectives of the Study

The study aims to investigate the factors influencing students' test scores in secondary and high schools. Specifically, the study will:

- Examine the impact of student-related factors, including motivation, prior knowledge, and learning styles on test scores.
- Investigate the effects of school-related factors such as teacher quality, school resources, and school climate on student test scores.
- Analyze the correlation between home socio-economic factors, such as parental education and income, and students' test scores.

The Classical Test Theory (CTT)

Classical test theory was established by Novick (1966) and elaborated upon in foundational texts such as Lord & Novick (1968) and Allen & Yen (2002). This framework encompasses a collection of interrelated psychometric theories that forecast the results of psychological assessments, including item difficulty, accuracy of estimates, and the capabilities of test-takers. It is a testing theory grounded in the premise that an individual's observed or obtained score on a test is the aggregate of a true score (error-free score) and an error score. Classical Test Theory asserts that each observed test score (X) is comprised of two elements: a true score (T) that signifies the genuine ability or trait being evaluated, and an error score (E) that accounts for random measurement inaccuracies. This relationship can be articulated as:

X=T+

The true score represents the theoretical average score a person would achieve if the test were administered an infinite number of times without any alterations, whereas the error encompasses all sources of random variability. The classical test theory is a framework used to understand the relationship between students' test scores and various factors that influences their performance. Internal factors refer to elements that are intrinsically linked to the unique characteristics, attitudes, and behaviors of individual students. These factors include, but are not limited to, cognitive abilities, motivation, study habits, self-discipline, and self-efficacy (Jung, Zhou & Lee, 2017). The inherent cognitive abilities of students, such as intelligence, memory, and problem-solving skills, are crucial in their capacity to comprehend and retain academic material. Enhanced cognitive abilities frequently result in superior comprehension, critical thinking, and problem-solving skills, which in turn lead to improved academic outcomes (Passolunghi, Cargnelutti &

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Pellizzoni, 2019). Therefore, cognitive abilities significantly affect a student's ability to understand and remember information. When combined with self-efficacy, defined as the belief in one's capability to complete tasks, these factors can greatly influence a student's determination and resilience when confronted with academic challenges

External factors include a broad range of variables that lie beyond the immediate control of the student. These factors may encompass socioeconomic status, family dynamics, peer relationships, the quality of teaching, curriculum design, access to resources, and advancements in technology (Wentzel, et al., 2021). The incorporation of technology in education has the potential to improve learning experiences through interactive platforms, online resources, and digital tools that accommodate various learning styles. Essentially, the academic performance of students is influenced by a complex interaction between their internal characteristics and the external factors that affect them. These factors engage with and impact one another, forming a dynamic environment where interventions and support systems can significantly enhance students' learning outcomes. Acknowledging the importance of these factors is vital for educators, parents, and policymakers in crafting effective strategies that create an environment conducive to students' academic and holistic success (Mulaudzi, 2023).

Student- Related Factors affecting Test Scores

Previous research has identified various factors that affect students' academic performance, including internal elements such as learning motivation (Entwistle et al., 1971), emotional responses to studying, study habits, and health status (Gilbert and Weaver, 2010). Students' past academic achievements, including test scores and grades, offer significant insights into their strengths and weaknesses. These scores can act as benchmarks for improvement and highlight areas that may need further focus. A consistent upward trend in scores reflects a dedication to academic advancement. Liu et al. (2020) highlighted the strong predictive capability of high school performance regarding college success, emphasizing the continuity of academic achievement patterns. Koçak, Göksu, and Göktaş (2021) conducted a review of several meta-analyses and discovered that prior academic performance, such as high school grades and GPA, plays a crucial role in determining future academic success. One of the key factors they emphasize is the influence of students' previous scores. Previous academic performance serves as a robust predictor of future academic success, encompassing high school grades, earlier assessment scores, and internal assessment grades (Husaini, Ahmad & Shukor, 2023).

Engagement in extracurricular activities can significantly affect a student's overall growth. Participation in clubs, sports, or community service can cultivate essential skills such as leadership, teamwork, and time management. These competencies can subsequently lead to improved academic performance by enhancing a student's capacity to manage various responsibilities. Furthermore, students involved in extracurricular activities tend to exhibit greater self-confidence, favorable teacher perceptions, and a positive outlook towards their education. Such students are also less prone to dropping out and are more inclined to attain higher academic success (Suleiman, et al., 2024). Analyzing previous exam questions and test materials can serve as a strategic method for grasping the format, content, and trends of assessments. This practice aids students in becoming acquainted with the types of questions that may arise and in honing their problem-solving abilities. Studying past questions can be an invaluable resource for exam preparation.

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The Classical Test Theory (CTT) provides insights into how motivation and engagement influence test performance, as well as estimating the impact of prior knowledge and experiences on test scores. This theory aids in recognizing biases present in test items, which may favor specific learning styles, and assesses the effects of anxiety and stress on test performance. CTT estimates the true score, representing a student's actual ability, alongside the error score, which can be affected by elements such as anxiety, motivation, and prior knowledge. Gaining an understanding of student-related factors can enhance test design and item development, enabling educators to interpret test scores considering these factors. Identifying these student-related factors can guide interventions aimed at supporting students and enhancing their test performance.

School related factors affecting Test Scores

The effectiveness of teaching and the structure of the curriculum significantly affect the learning experience, making it essential to analyze their impact on academic performance (Kahu & Nelson, 2018). This is due to the fact that both are vital factors influencing student performance and academic results. Each aspect directly affects how students interact with the learning materials, grasp concepts, and ultimately succeed in their academic pursuits (Mulaudzi, 2023). An effectively designed curriculum links academic theories to real-life scenarios, rendering the learning process more relevant and applicable for students (O'Neill & Short, 2023). When students recognize the significance of their studies, their engagement and motivation tend to rise. A well-organized curriculum that advances from basic concepts to more intricate ones aids students in establishing a solid foundation. This orderly progression enhances their comprehension and performance in more advanced subjects. A varied curriculum that introduces students to a broad spectrum of subjects, viewpoints, and experiences enriches their educational journey (O'Neill, & Short, 2023). It promotes comprehensive development and enables students to identify their interests and strengths.

Effective teaching practices, which encompass clear communication, engaging instructional techniques, and prompt feedback, have a profound effect on students' comprehension and enthusiasm for the subject matter. High-quality teaching can boost students' motivation and their readiness to engage actively in their learning journey. Effective educators convey concepts with clarity, simplifying complex ideas into digestible parts (Khair & Misnawati, 2022). Clear communication facilitates students' ability to understand and remember information more efficiently, resulting in enhanced comprehension and academic performance. Additionally, timely and constructive feedback from instructors aids students in pinpointing areas that require improvement (Huang, Silitonga & Wu, 2022). This feedback steers their learning path and allows them to enhance their understanding and skills, ultimately leading to improved performance. Engaging teaching strategies, such as interactive discussions, practical activities, and multimedia presentations, capture students' attention and increase their participation in the educational process (Li, 2023). Active involvement fosters greater motivation and better retention of knowledge.

Incorporating technology into the educational curriculum can significantly improve learning experiences. Digital resources, online tools, and multimedia content can address various learning styles and offer interactive learning opportunities. Curriculum designs that include project-based learning actively involve

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students in hands-on, collaborative activities. This methodology fosters problem-solving abilities, teamwork, and critical thinking, leading to enhanced performance. Assessments that are aligned with curriculum goals and teaching strategies provide a clear framework for students to showcase their understanding (Bolden et al., 2020). An effectively aligned assessment strategy enables students to accurately gauge their progress. A flexible curriculum that can be modified according to students' interests, abilities, and learning pace caters to diverse learners. This customization boosts engagement and supports individual performance.

According to Albarico et al. (2023), numerous factors affect academic performance, including teachers' expertise in their subjects, student absenteeism, the availability and accessibility of textbooks, library resources, practical laboratory facilities, meal provision, and many other aspects. Schools play a crucial role in fostering the development and academic success of students, especially regarding the institution's physical conditions. The academic success of students may be associated with the school environment. The physical characteristics of the school, such as libraries, outdoor and indoor sports facilities, and the design and equipment of classrooms, include areas like meeting rooms, exhibition spaces, science laboratories, map rooms, foreign language classrooms, science and technology classrooms, and study centers. The aesthetics, furnishings, and safety features of the school building, the surrounding neighborhood, the sports center, the library, the staff's dedication to hygiene and cleanliness, the appearance of staff members, and the presence of green spaces within the school all reflect the physical conditions and infrastructure of the institution (Nartgun & Kaya, 2016). Furthermore, a significant factor contributing to students' low academic performance is the teacher-to-student ratio, which is disproportionately low (Riegle-Crumb, 2010).

In order for education to achieve its intended goals, Brown (2017) asserts that educators are essential in interpreting, presenting, and setting standards in alignment with educational programs during school hours. As a result, teachers have a significant impact on the dynamics of teaching and learning (Brookfield, 2017). The study carried out by Hong et al. (2017) can be employed to pinpoint factors associated with teachers' behavior and classroom environments that may substantially forecast students' academic entitlement.

In the realm of school-related factors, Classical Test Theory (CTT) can help in determining how aspects such as curriculum design, teacher quality, school resources, and school climate affect test scores. This theory highlights the extent to which a test yields consistent results across multiple administrations, the accuracy with which a test measures the specific skill, trait, or attribute it aims to assess, and an individual’s true position regarding the trait or attribute of interest, free from measurement error. It also considers the variability introduced by various elements, including test administration, scoring, and individual differences. The experience and expertise of teachers, along with a well-structured curriculum, can significantly improve student comprehension and performance. The availability and quality of resources, such as textbooks, technology, and a positive school climate, can also impact student learning, thereby creating a nurturing educational environment. CTT aids educators in comprehending how school-related factors influence test scores by estimating the true score and error components of test scores, which may be affected by these factors, assessing the reliability and validity of tests, which can also be influenced by school-related elements, and identifying biases in tests that may advantage certain student groups.

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Home socio economic factors affecting Test Scores

Socio-economic status frequently affects the availability of resources, educational opportunities, and support systems, which in turn impacts a student's access to quality education. Socioeconomic status can determine access to resources such as tutoring, educational materials, and technology. Students hailing from higher socioeconomic backgrounds typically enjoy greater opportunities and support systems that enhance their academic success. The presence of resources, including libraries, internet access, and educational tools, can significantly affect students' capacity to conduct research, obtain supplementary materials, and engage in self-directed learning (Mathana & Galdolage 2023). The family environment and support are vital in shaping a student's attitude towards learning, with parental involvement and encouragement serving as strong indicators of academic success (Kartel, et al., 2022). A nurturing family environment, characterized by parental involvement and encouragement, has a beneficial effect on a student's learning attitude. Family expectations and values concerning education can influence a student's motivation and commitment.

The family plays an essential role in shaping a student's academic success. Research shows that students who encounter family difficulties are less likely to take a proactive stance towards learning (Mustaq & Khan, 2012). Beyond the stress linked to academic responsibilities, familial pressures such as the degree of parental support, family income, parents' educational levels, and other negative home circumstances can greatly affect a student's motivation to learn. Additionally, the immediate environment of the student is another element that can impact their academic performance.

However, parents have the ability to foster environments that improve the student's academic results (Roman, 2014). To achieve a higher level of academic success, various researchers have indicated that students who excel largely rely on the educational influence of their parents (Shifrer, 2013). Similarly, a study by Corak (2013) found that students from economically disadvantaged backgrounds often engage in labor-intensive tasks, which restricts their study time, as they prioritize household duties over their education. Numerous families in developing nations face challenges in providing two meals a day, despite their relentless efforts throughout the day (Albarico, et al., 2023).

Connecting Classical Test Theory (CTT) with home socio-economic factors that influence test scores, CTT provides an estimate of the true score, which represents a student's genuine ability. Nonetheless, home socio-economic factors such as parental income, parental education, and family resources can affect the true score, as students from wealthier families often have better access to resources that can enhance their capabilities. The theory also calculates the error score, which may be affected by elements such as test anxiety, motivation, and prior knowledge. Home socio-economic factors can play a role in these errors, as students from lower-income households might face increased stress or have limited access to test preparation resources.

Furthermore, home socio-economic factors can indirectly affect test scores by shaping students' access to resources, parental engagement, and the overall learning environment. CTT can assist in predicting student performance in relation to home socio-economic factors. However, it is crucial to acknowledge that these factors are not the only determinants of student success. Gaining insight into the connection between CTT

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and home socio-economic factors can guide targeted interventions aimed at supporting students from various backgrounds, and assist test developers in creating more equitable assessments that reduce biases associated with home socio-economic factors. Policymakers can leverage CTT to formulate policies that cater to the needs of students from lower-income families and foster greater educational equity.

METHODS

Participants

A total of 298 students from Form Four, Form Five, Lower Sixth, and Upper Sixth, representing both Anglophone secondary and high schools, including public and private institutions within the Yaounde VI Sub Division of the Mfoundi Division in the Center region of Cameroon, made up the study sample. The participants were chosen through the stratified random sampling method.

The majority of respondents were female, with 206 participants (69.1%) identifying as female and 92 (30.9%) as male, which indicates a significant gender imbalance. This may be indicative of either a higher enrollment of females or a greater willingness among females to participate. Most respondents (74.8%) were aged between 16 and 20, followed by 22.8% who were aged 12 to 15, and only 2.3% were aged 21 and above. This suggests that the sample predominantly comprised adolescents and young adults, which aligns with the typical demographic of secondary school students. In terms of school type, 63.1% attended private institutions while 36.9% were enrolled in public schools, indicating a predominance of private school attendees, potentially due to demographic influences or higher rates of participation. The distribution across class levels was relatively balanced: upper sixth (30.5%), form four (28.2%), lower sixth (26.2%), and form five (15.1%). The slight overrepresentation of advanced classes may reflect either greater availability or heightened interest in the study.

Material and Design

The research data was collected from participants via a questionnaire formulated within a descriptive survey research framework. The factors influencing students' test scores were examined using a questionnaire crafted by the researchers, specifically designed to correspond with the research variables and adapted for the respondents and their context. All instruments were developed using a four-point Likert scale format to assess educators' responses for each pertinent section (strongly agree =1, agree =2, disagree=3, strongly disagree =4).

The content and face validity of the questionnaire instrument were confirmed. The research instrument was submitted to various experts and professionals in the field of measurement and evaluation for validation. They implemented the necessary adjustments to ensure the instrument's validity. Test-retest reliability was utilized to evaluate the reliability of the research instrument. Initially, the questionnaire was administered to a group of 20 students, and after a two-week period, the same questionnaire was given again to the same group before its distribution to the sampled participants. The correlation of their responses and the subsequent analysis of results demonstrated a high level of consistency. The aim was to confirm the validity and reliability of the instruments employed. Reliability was assessed using Cronbach's alpha, resulting in a value of 0.87.

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Concerning ethical considerations, all requisite permissions were obtained from the administrators of the secondary and high schools. The research participants, consisting of students from Form Four, Five, Lower Sixth, and Upper Sixth, were informed about the research beforehand, and their anonymity was preserved. The student respondents filled out the questionnaires within the classroom setting. They needed approximately 15 to 20 minutes to complete a paper-pencil-based questionnaire format. Their identities and personal information were kept confidential to further safeguard their anonymity. The researchers did not ask for their names, and the questionnaires were not handed directly to the researcher. Instead, they were submitted to the school administrators for collection by the researchers. The researchers explained the purpose of the study to them and offered instructions on how to complete the questionnaires.

Data Analysis

Version 27.0 of the Windows Statistical Package for Social Sciences (SPSS) was employed for the analysis of data. To interpret the research findings, a range of statistical tools were utilized, including descriptive statistics such as mean, standard deviation and regression analysis, to assess the data and evaluate the research hypotheses. The results of the regression analysis were considered statistically significant at a 95% confidence level ($p<0.05$).

RESULTS

Table 1**:** *Model Summary table of multiple regression analysis*

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.922[a]	.849	.848	1.59822	.849	552.300	3	294	.000

a. Predictors: (Constant), Home socio-economic factors (HSEF), School-related factors (SCRF), Student-related factors (SRF)

The model summary indicates an R value of 0.922, which signifies a strong positive correlation among the predictors—Home Socio-Economic Factors (HSEF), School-Related Factors (SCRF), and Student-Related Factors (SRF)—and the dependent variable, which is likely academic performance. The R^2 value of 0.849 reveals that 84.9% of the variance in academic outcomes can be attributed to these combined factors, demonstrating an excellent fit for the model. This implies that variations in home, school, and student conditions predominantly explain differences in performance, while the remaining 15.1% may be due to unmeasured factors such as community context, teacher quality, peer influences, or random variation.

The Adjusted R Square (.848) is in close alignment with the R Square, suggesting that the model is not over fitted and that the predictors effectively account for the outcome. This slight difference reinforces the model's reliability and stability. The Standard Error of the Estimate (1.59822) indicates the average deviation between the observed and predicted values; its relatively low figure implies strong predictive accuracy. The F Change (552.300) along with its significance level (.000) validates the model's overall

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statistical significance. The addition of HSEF, SCRF, and SRF significantly improves the prediction of the dependent variable. A p-value of .000 ($p < .001$) further suggests that these findings are highly improbable to have occurred by chance and are statistically sound.

The findings suggest that the academic performance of students is significantly influenced by three interconnected areas: home socio-economic conditions, school environments, and individual student characteristics. This framework highlights the complex nature of learning outcomes, which rely not only on the students themselves but also on the support systems that surround them. Home Socio-Economic Factors (HSEF) encompass parental education, income, occupation, access to educational resources, and both emotional and academic support. Students hailing from stable and resource-abundant households generally perform better academically. School-Related Factors (SCRF) include teacher quality, facilities, leadership, class size, and instructional strategies. Their substantial predictive value emphasizes the crucial role that schools play in shaping learning experiences. Student-Related Factors (SRF) consist of motivation, attendance, attitude, and study habits, underscoring the significance of personal engagement and behavior in achieving academic success. Collectively, these domains create a dynamic system that can either facilitate or hinder student achievement. The model promotes a comprehensive approach to educational enhancement, stressing that effective interventions must concurrently tackle factors at the home, school, and student levels. Notably, increasing parental involvement is vital at the home level.

Table 2*: Analysis of variance (ANOVAa)*

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4232.243	3	1410.748	552.300	.000[b]
	Residual	750.968	294	2.554		
	Total	4983.211	297			

a. Dependent Variable: Students' test scores (STS)
b. Predictors: (Constant), Home socio-economic factors (HSEF), School-related factors (SCRF), Student-related factors (SRF)

The ANOVA table provides a summary of a regression analysis that evaluates whether Home Socio-Economic Factors (HSEF), School-Related Factors (SCRF), and Student-Related Factors (SRF) significantly influence Students' Test Scores (STS). The Regression Sum of Squares (SSR) is recorded at 4232.243, while the Residual Sum of Squares (SSE) stands at 750.968, and the Total Sum of Squares (SST) is 4983.211. These figures suggest that the model accounts for a considerable amount of the variance in test scores, with SSR representing the largest portion. The regression model possesses 3 degrees of freedom, which correspond to the three predictors, and has 294 residual degrees of freedom ($N – k – 1$). The Mean Square for Regression is calculated as 1410.748 (SSR ÷ 3), and for Residual it is 2.554 (SSE ÷ 294), resulting in an F-statistic of 552.300. This elevated F-value, accompanied by a significance level of .000 ($p < .001$), substantiates the model's robust fit and statistical significance. Consequently, we reject the null hypothesis and deduce that HSEF, SCRF, and SRF collectively exert a significant influence on students' academic performance. This conclusion is consistent with the Model Summary ($R = .922$, $R^2 = .849$), which indicates that 84.9% of the variance in test scores is accounted for by the model

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Table 3: *Coefficients of multiple linear regression*

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.705	.636		1.108	.269	-.547	1.957
	Student-related factors (SRF)	.648	.027	.801	24.291	.000	.595	.700
	School-related factors(SCRF)	-.068	.018	-.099	-3.768	.000	-.103	-.032
	Home socio-economic factors (HSEF)	.223	.031	.222	7.108	.000	.161	.285

a. Dependent Variable: Students' test scores (STS)

The table of regression coefficients illustrates the correlation between Students' Test Scores (STS) and three predictors: Student-Related Factors (SRF), School-Related Factors (SCRF), and Home Socio-Economic Factors (HSEF). The intercept value of 0.705, while not statistically significant (t = 1.108, p = .269), acts as a baseline rather than a substantial contributor. SRF demonstrates the most considerable effect, with an unstandardized coefficient of 0.648 (SE = 0.027), a highly significant t-value of 24.291 (p = .000), and a standardized Beta of .801, indicating that SRF is responsible for approximately 80.1% of the variation in STS. The 95% confidence interval (0.595–0.700) further validates the reliability of this effect. Conversely, SCRF exhibits a negative effect, with a coefficient of –0.068 (SE = 0.018) and a significant t-value of –3.768 (p = .000), implying that increased school-related factors slightly diminish test scores when other variables are controlled.

Higher scores on school-related factors correlate with slightly lower student test scores in this sample, while controlling for SRF and HSEF. This is evidenced by a small yet statistically significant negative coefficient (CI: –0.103 to –0.032), indicating a possible inverse or suppressor effect. Such a phenomenon may be indicative of unfavorable school conditions—like overcrowding, excessive teacher workload, stringent assessments, or administrative limitations—that can impede performance if not managed effectively. Conversely, Home Socio-Economic Factors (HSEF) demonstrate a positive influence: an increase of one unit in HSEF (for instance, parental education, income, home support) is associated with a 0.223-point increase in test scores (B = 0.223, SE = 0.031, t = 7.108, p = .000). This is supported by a standardized coefficient (Beta = .222) and a confidence interval (0.161–0.285), which affirm a consistent and significant contribution to academic success.

The research indicates that factors related to students, schools, and home socio-economic conditions all have a significant impact on test scores, albeit with differing effects and directions. Student-Related Factors (SRF)—which encompass motivation, study habits, attendance, discipline, and learning attitudes—are the most powerful indicators of academic achievement, implying that initiatives aimed at enhancing student engagement can greatly improve performance. Home Socio-Economic Factors (HSEF), including parental involvement, financial stability, educational resources, and emotional support, also

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contribute positively to outcomes by creating favorable learning environments. Conversely, School-Related Factors (SCRF) exhibit a notable yet negative influence, potentially due to institutional challenges such as overcrowded classrooms, insufficient resources, or a rigid focus on examinations, and may provide limited advantages when robust student and home support systems are already in place.

The regression model indicates that student achievement is the result of a dynamic interplay between individual characteristics, home environment, and school conditions. SRF has the most significant positive effect, suggesting that schools should promote intrinsic motivation, confidence, and study habits through mentorship, goal-setting, and learner-centered teaching. The positive influence of HSEF underscores the importance of active parental engagement, facilitated by regular communication, parent workshops, and community outreach. In contrast, the negative coefficient for SCRF implies that certain school-related factors may hinder learning, necessitating enhancements in classroom climate, teacher workload, discipline practices, and assessment strategies. Improving teacher training in empathy, creativity, and differentiated instruction could help alleviate these challenges. In summary, the findings emphasize the necessity of supporting students in a holistic manner—academically, emotionally, and socially through integrated counseling, peer support, and extracurricular activities.

At the policy level, the findings underscore the necessity for multi-faceted, evidence-driven educational reforms that incorporate home, school, and learner-centered interventions. Governments ought to prioritize initiatives that promote student autonomy, resilience, and responsibility—such as life skills education, mentorship, and leadership programs—while simultaneously addressing socio-economic inequalities through targeted social welfare strategies like school feeding, scholarships, and conditional cash transfers. The detrimental effects of School-Related Factors (SCRF) on test scores necessitate enhancements in school management, instructional methodologies, teacher training, and accountability measures. Student-Related Factors (SRF) have emerged as the most significant positive predictor of academic achievement, followed by Home Socio-Economic Factors (HSEF), highlighting the critical role of student motivation, self-regulation, and engagement, which are bolstered by supportive home environments but obstructed by systemic challenges within schools. Collaborative efforts among the education, social welfare, and community development sectors are vital for comprehensively improving student outcomes. These findings emphasize the pressing need for educational reforms that focus on students, involve families, and enhance school environments. Essential strategies include promoting student agency, empowering parents, and fostering supportive school atmospheres. Policy initiatives should advocate for integrated approaches that link home, school, and individual learning to guarantee equitable academic success for all children.

DISCUSSION AND CONCLUSION

The study investigated the crucial relationship between factors related to students and their test scores in secondary and high schools. The results indicated a positive and significant correlation between these student-related factors and test scores. This suggests that elements such as motivation, prior knowledge,

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learning styles, subject knowledge, test-related anxiety or stress, lack of confidence, study habits, time management skills, and emotional states (such as stress and anxiety) influence students' comprehension of the subject matter, their ability to achieve high scores, and their overall satisfaction with test results in secondary and high schools. This implies that teachers may require training to address diverse needs of students and develop strategies to mitigate potential barriers, personalized learning approaches tailoring instructions to individual students' needs and characteristics. Previous academic performance serves as a highly dependable indicator of current performance; students who have achieved higher scores in the past generally exhibit significantly elevated performance indexes (Suleiman et al., 2024). Students' negative attitudes towards the subject can adversely impact their academic performance. The caliber of instruction delivered by teachers plays a crucial role in shaping students' interest in their subjects. In particular, a well-organized lesson is likely to yield positive results for the students (Mazlili, et al., 2020). Cognitive abilities and students' previous academic experiences are recognized as significant factors influencing academic success, profoundly affecting grades, performance, and learning outcomes throughout various educational stages (Costal, et al., 2024).

The research investigates the important connection between factors related to schools and the test scores of students in secondary and high schools. The findings revealed a positive and significant correlation between school-related factors and the test scores of students. This suggests that the quality of teachers, the availability of school resources (such as textbooks, technology, and facilities), a supportive school climate, teachers' expertise in their subjects, and a relevant and engaging curriculum that prepares students for the future are all influential. Additionally, the diverse teaching methods employed by educators, the assessment techniques utilized by teachers, and the leadership of school principals and administrators have an impact on students' test scores. This validates the findings of Suleiman et al. (2024), indicating that study habits such as the allocation of study time, selection of study locations, and particularly the number of study hours significantly influence academic performance. Students who study in conducive environments tend to achieve superior grades. Conversely, a school environment lacking a supportive space for the learning process can negatively affect students' academic success (Mazlili et al., 2020). Factors like motivation levels and access to resources also demonstrated a strong correlation with exam scores. For example, students exhibiting high motivation and better access to academic resources generally achieved higher scores (Islam et al., 2025). Furthermore, effective communication, adequate learning facilities, and proper guidance positively influence student performance (Irfan & Shabana, 2012).

The study explores the crucial relationship between socio-economic factors at home and the academic performance of students in secondary and high schools. The results indicated a strong and positive correlation between these home socio-economic factors and students' test scores. This suggests that the educational attainment of parents or guardians, the family's income level, their involvement in their children's education, regular communication with teachers, access to technology (such as computers and the internet) at home, and the overall financial situation of the family significantly influence students' confidence in achieving high scores on future assessments, utilizing test scores to establish goals, effectively planning their studies, and consistently attaining high scores in classroom tests. This research supports the conclusions drawn by Oluwakemi et al. (2024) that academic performance is significantly affected by several key factors, such as financial stability, community resources, parental education, socioeconomic diversity, and innovative teaching methods. According to Papalia and Martorell (2013)

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and Mutyahara and Prasetyawati (2018), although socio-economic conditions can influence specific life experiences, it is psychological resilience, interpersonal support, and the school environment that more frequently affect emotional and social adjustments during adolescence, rather than solely economic factors.

In order to tackle the factors related to students, schools, and home environments that influence students' test scores, educators ought to cultivate a positive mindset, encourage self-directed learning, and create opportunities for success by teaching effective time management, organizational skills, and study habits. Targeted professional development for teachers, improved resource allocation (including textbooks and technology), and the utilization of digital resources and open educational resources can effectively complement traditional textbooks. Furthermore, establishing an inclusive and supportive school environment is essential for fostering strong teacher-student relationships and enhancing engagement. The introduction of bullying prevention and intervention programs can also play a significant role in promoting a supportive school climate. Additionally, there should be a focus on implementing mentoring and coaching programs that assist teachers in delivering high-quality instruction.

To enhance student success, educational institutions should emphasize the importance of teacher expertise, a relevant and engaging curriculum, varied teaching methods, and effective assessment strategies. It is vital to provide teachers with opportunities to deepen their subject knowledge and improve their effectiveness in the classroom. Additionally, developing and implementing a curriculum that is both relevant and engaging, while preparing students for future success, is of utmost importance. Integrating real-world applications and project-based learning can render the educational experience more meaningful and engaging for students. Furthermore, encouraging educators to adopt diverse teaching methods, such as project-based learning and the flipped classroom model, can significantly boost student engagement and motivation. Strong leadership from school principals is also critical in nurturing a positive school culture and facilitating teacher development alongside student learning.

To tackle the socio-economic factors influencing students' test performance, educational institutions can adopt a range of strategies, such as offering adult education programs aimed at enhancing parental educational levels. Encouraging parental involvement in school activities and decision-making processes can also contribute to creating a supportive learning atmosphere. Providing low-income families with affordable access to technology and the internet is essential for bridging the digital divide. Furthermore, schools can offer financial aid and resources to meet students' academic necessities, including food and clothing. It is crucial for teachers to receive training that equips them to assist students from various socio-economic backgrounds and to maintain regular communication with parents. Collaborations with community partners can yield additional resources and opportunities for students. By uniting efforts, schools, families, and communities can work together to ensure that every student has the chance to achieve academic success. This cooperative strategy can help alleviate the impact of home socio-economic factors on students' test scores and overall academic performance, ultimately fostering a more equitable education system.

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