Determinants of Science Achievement: A Quantitative Study of Grade 10 Learners' Academic Performance and Its Associated Factors

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ABSTRACT

This study examined the factors influencing the academic performance of Grade 10 Science learners at Blancia College Foundation, Inc. (BCFI) in Molave, Zamboanga del Sur. Utilizing a descriptive-correlational research design, the study investigated how personal, learning environment, and external factors relate to students' academic performance in Science. A total of 103 Grade 10 students were selected using stratified random sampling. Data was gathered through a validated and pilot-tested survey instrument. Results revealed that all three factors exhibited a high level of influence based on their average weighted mean scores: Personal Factors (M = 3.70), Learning Environment Factors (M = 3.90), and External Factors (M = 3.60). Also, Personal Factors, including motivation and study habits, showed a weak positive correlation (r = .228) with statistical significance (p = .020). Similarly, Learning Environment Factors, comprising teaching quality, school facilities, and resource availability, demonstrated a weak positive correlation (r = .213) and was statistically significant (p = .030). In contrast, External Factors, such as family support and socioeconomic status, displayed a very weak positive correlation (r = .126) but no statistical significance (p = .206). Based on the findings, an intervention program was proposed to address key barriers to learning, including test anxiety, limited study time, and inequitable access to resources. The study emphasized the multidimensional nature of academic performance and the importance of learner-centered, environmentally supportive, and contextually responsive strategies in improving Science education.

Keywords: academic performance, Science education in the Philippines, personal factors, learning environment factors, external factors, intervention

THE PROBLEM AND A REVIEW OF RELATED LITERATURE

Science education is largely acknowledged as a crucial catalyst for innovation, economic progress, and society growth. In the Philippines, similar to numerous other countries, educational reforms have progressively emphasized Science education for its capacity to foster critical thinking, problem-solving abilities, and creativity in students (Department of Education, 2013). The implementation of the K-12 curriculum in the Philippines underscores the country's dedication to provide students with essential information and abilities to thrive in a modern world increasingly influenced by technological progress and scientific innovation.

The core of the K-12 reforms is an increasing recognition that national advancement relies on equipping students for professions in science, technology, engineering, and mathematics (STEM) disciplines. The Philippine educational system prioritizes the cultivation of scientific literacy in secondary school students, seeking to establish a solid comprehension of scientific principles as a basis for further study. Barredo (2020) asserts that science education is essential for academic advancement and is pivotal in cultivating the creativity and analytical skills necessary for addressing real-world problems. This signifies a worldwide trend of emphasizing STEM education to meet the requirements of a swiftly changing work market, where proficiency in these fields is becoming progressively vital.

Nonetheless, despite these national initiatives, the academic performance of Filipino students in Science continues to be a controversial issue. The 2019 Trends in International Mathematics and Science Study

(TIMSS) has exposed that the Philippines ranked among the lowest-performing nations in both Science and Mathematics (Mullis et al., 2020). The concerning reports have been ascribed to many variables, such as inadequate educational resources, limited exposure to practical scientific activities, and a discordance between instructional approaches and student learning preferences. The record from TIMSS illuminates the necessity of determining effective strategies and interventions to enhance Science education in the Philippine education system.

Several studies have examined the factors contributing to low academic performance in science, particularly in the Philippine context. Bernardo (2014) explored how educational resources affect student outcomes, noting that schools with limited access to laboratory equipment, textbooks, and digital tools often see lower achievement in science. The lack of practical, hands-on activities hinders students' ability to grasp essential concepts, leading to underdeveloped critical thinking and problem-solving skills. This issue is particularly prevalent in resources-deprived institutions, where students struggle to perform on par with their peers from better-equipped academies.

Similarly, Ganal and Guiab (2014) investigated the notion of educators' credentials and pedagogical strategies on science performance. Their research gives prominence to teachers with insufficient subject-matter expertise struggling to effectively teach complex scientific concepts, which directly degrade student comprehension and engagement. Malaya and Panganiban (2021) further elaborated this controversy by centralizing on how school infrastructure and the learning environment unanimously affect academic performance. Their study uncovered that overcrowded classrooms, inadequate laboratory facilities, and poorly maintained school environments detract students' ability to focus and engage in active learning. They stressed the essence of creating a conducive environment for science education, where students have access to the necessary supplies and learning space to explore scientific concepts through experimentation and discussion.

While the desire for enhanced Science education is widely acknowledged, a significant gap persists in comprehending particular factors that affect students' academic success in this field, especially within the Philippine context. This study aims to identify the factors influencing the academic performance of Grade 10 Science students. Specifically, it seeks to determine the students' level of academic performance in Science and to evaluate the extent to which various factors contribute to this performance. These factors include personal aspects such as motivation and study habits, the learning environment encompassing teacher quality and school facilities, and external influences like family support and socioeconomic status. The study also investigates whether there is a significant relationship between these identified factors and the students' performance in Science. Finally, in accordance with the findings, the study aims to design an intervention program that will resolve the key issues modifying academic success among Science learners, ultimately improving educational outcomes for Grade 10 students.

Review of Related Literature

This chapter overlays a review on the specified factors affecting the academic performance of Grade 10 Science learners. It examines relevant theories, studies, and research findings that explore how personal factors like motivation and study habits; learning environment factors such as teaching strategies and classroom conditions; and external influences like parental support and socioeconomic status contribute to student performance in Science.

Personal Factors

Personal factors have a considerable impact on students' academic achievement, particularly in the sciences. These aspects include study habits, motivation, and attitudes towards the subject, all of which influence how students interact with and retain knowledge. Study habits play a crucial role in determining students' academic success, particularly in Science. Aguado (2015) highlighted that secondary students in Laguna who practiced effective time management, by planning their study schedules and incorporating active learning strategies like self-testing and summarization, achieved significantly higher grades in Science. The study underscores the importance of structured and personalized learning approaches that enhance knowledge retention and application. Similarly, Torio and Cardenas (2016) found that disorganized study habits among students in

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Cavite City led to a marked decline in their Science performance, emphasizing the critical need for organization in academic routines.

In a study conducted by Catubag and Barba (2019) in Batangas, it was revealed that students who adopted a harmonized study routine, including spaced repetition, performed better academically. Spaced repetition, which involves reviewing material at progressively increasing intervals, was particularly effective for mastering complex scientific concepts. Talosa, Bahala, and De Los Reyes (2021) further demonstrated that students who leveraged technology in their study habits, such as using educational apps, watching instructional videos, or engaging in online Science forums, showed improved engagement and comprehension. These findings underscore the transformative potential of digital tools in creating interactive and student-centered learning environments.

Additionally, motivation is a pivotal factor in academic achievement in Science. Pantoja (2018) conducted a study in Quezon City, revealing that students driven by intrinsic motivation, rooted in curiosity, personal interest, and a genuine passion for learning, outperformed those motivated by external rewards like grades or recognition. This intrinsic drive led to deeper engagement with the material and more active class participation. Supporting this, Limjap and Reyes (2019) observed that intrinsically motivated students in Science classes demonstrated higher levels of curiosity and performed better in assessments due to their proactive learning approach.

Dela Cruz (2020) also reported that motivated students in Pampanga not only achieved higher grades but were more active in classroom discussions, displaying enthusiasm and inquisitiveness. External factors, such as family support, further bolster motivation. Ramirez (2020) found that students in Cebu City who received encouragement from their families to pursue Science-related careers showed greater academic success. Similarly, San Juan and Villanueva (2021) emphasized the role of parental involvement in boosting students' motivation, with activities such as attending school meetings or participating in Science fairs significantly enhancing their academic performance.

Moreover, a positive attitude toward Science is a key determinant of student success. Bantayan and Alejandrino (2017) examined high school students in Iloilo and found that those who recognized the subject's relevance to their future careers performed better academically. Students with a favorable perception of Science were more likely to engage actively in learning and invest effort in mastering complex concepts. This aligns with international research by Osborne, Simon, and Collins (2003), which showed that students who found Science engaging and valuable tended to achieve higher academic milestones.

De Leon and Rodriguez (2018) demonstrated that participation in Science-related extracurricular activities, such as Science clubs or environmental advocacy groups, fostered greater interest and improved academic outcomes in Science. Similarly, Tuga (2020) observed that students in the National Capital Region who joined Science competitions exhibited more positive attitudes and better academic performance. Eilam and Shafran (2016) highlighted the importance of hands-on learning experiences, such as laboratory experiments and field studies, in enhancing students' interest and achievement in Science. Lastly, Salcedo and Magsino (2019) noted that a supportive classroom environment, where teachers encouraged inquiry and provided constructive feedback, played a crucial role in fostering positive attitudes toward Science, leading to improved academic outcomes.

Learning Environment Factors

The classroom environment significantly influences students' academic performance in Science. Study findings from Jablonski and Fisher (2019) revealed that a positive classroom environment, marked by supportive teacher-student relationships and collaborative learning opportunities, greatly improves student engagement and academic achievement. In the context of the Philippines, a study conducted by Dela Torre (2020) across several public high schools revealed that classrooms promoting a sense of community and mutual respect among students had a beneficial impact on their attitudes toward learning Science. This finding is supported by Kuhl's (2016) work, which highlighted the influence of a nurturing classroom environment on student motivation and performance.

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Additionally, the layout of the classroom can influence the learning outcomes of students. A study conducted by De Vera and Robles (2021) explored the connection between classroom design and student engagement in Science classes. It was discovered that adaptable seating configurations, which facilitate collaboration and mobility, resulted in heightened engagement and enhanced academic performance among learners. This is consistent with global studies conducted by Bartholomew et al. (2019), which observed that classrooms structured to promote student interaction enhance the overall learning experience. Furthermore, the presence of educational resources in the classroom can greatly influence student outcomes in Science. A study conducted by Solis (2018) in public schools in Bulacan revealed that students who had access to a range of learning materials—including laboratory equipment, textbooks, and multimedia resources—generally achieved higher scores in Science assessments. This observation is supported by findings from the Department of Education (2016), which indicated that well-resourced classrooms correlate with enhanced student performance across multiple subjects.

The quality and accessibility of school facilities significantly impact students' academic performance in Science. A study conducted by Malaya and Panganiban (2021) examined how school infrastructure influences students' engagement in Science education. The results showed that educational institutions with contemporary laboratories and current learning resources led to increased student engagement and enhanced achievement in Science disciplines. The findings of Romero et al. (2017) align with this observation, highlighting that students in schools equipped with superior facilities exhibited increased enthusiasm for learning and enhanced academic performance. Additionally, a study by Valdez (2019) in a rural area of the Philippines found that insufficient school facilities had a detrimental impact on students' motivation and engagement in Science classes. The absence of adequate laboratories and educational materials obstructed practical experiences, which are essential for grasping scientific principles. This observation is consistent with the findings of Black and Wiliam (1998), who emphasized the significance of formative assessments and hands-on experiences in improving student learning outcomes. A survey carried out by Bautista (2020) in various regions of the Philippines revealed that students who viewed their school facilities as sufficient were more inclined to demonstrate a favorable attitude toward Science. This discovery highlights the critical need to sustain and enhance educational facilities to promote an effective learning atmosphere.

The impact of educators is a significant element influencing students' outcomes in Science. A study by San Jose and delos Santos (2020) emphasized that educators utilizing a variety of teaching methods, like inquiry-based learning and collaborative projects, were more successful in engaging students, resulting in better academic performance. A study conducted by Cruz (2018) in the Philippines highlighted the significance of ongoing professional development for Science educators. The findings indicated that educators engaged in workshops and training initiatives exhibited enhanced skills in presenting Science material, which had a beneficial impact on their students' educational experiences.

Furthermore, the significance of interactions between teachers and students must not be underestimated. A study conducted by Bañez (2021) in Metro Manila revealed that educators who cultivated a supportive and inclusive classroom atmosphere saw their students exhibiting higher motivation and improved performance in Science subjects. This is consistent with global studies conducted by Pianta et al. (2008), which highlighted the significance of positive relationships between teachers and students on engagement and learning results. A study conducted by Andaya and Ramos (2019) examined the significance of teacher feedback in the educational process. Timely and constructive feedback from educators was shown to play a significant role in enhancing students' comprehension of Science concepts and improving their overall academic performance. This aligns with the findings from Hattie and Timperley (2007), emphasizing that feedback plays a vital role in enhancing student learning.

The educational setting, including classroom interactions, school resources, and the proficiency of educators, significantly influences the academic outcomes of Grade 10 Science students. Enhancing these factors is crucial for cultivating a positive and engaging learning environment that boosts student outcomes in Science education.

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External Factors

The performance in Science is a complex matter shaped by numerous external influences. Grasping these elements—like parental engagement, economic background, and peer dynamics—offers significant perspectives on student achievement. This review explores various interventions and strategies designed to enhance performance, such as remediation programs, innovative teaching approaches, and the integration of technology. The synthesis incorporates local studies, focusing on the Filipino context, in conjunction with pertinent international research.

Parental involvement plays a vital role in influencing students' academic achievements, especially in areas such as Science. According to a study conducted by Dominguez and Rojas (2021), students whose parents are actively involved—by overseeing academic progress and offering support—generally achieve higher academic performance. A study conducted by Santos et al. (2022) revealed that parental support had a significant impact on the attitudes of Filipino Grade 10 students toward Science, as well as their overall academic performance. Students who engaged in constant conversations about academic and scientific subjects at home demonstrated increased enthusiasm and improved academic performance. Additionally, Garcia (2022) highlighted how the educational backgrounds of parents influence the academic achievements of their children. The findings revealed that parents possessing advanced educational backgrounds tended to participate more actively in significant educational activities with their children, thereby promoting a supportive learning atmosphere. This is consistent with findings from global studies, including those by Hill and Tyson (2009), which demonstrated that parental involvement consistently enhances academic performance across various cultures.

The influence of socioeconomic status on academic performance is also significant. Ainsworth (2020) observes that students from elevated socioeconomic backgrounds typically enjoy enhanced access to educational resources, which has a direct impact on their performance in Science. Cruz (2022) conducted a local study examining how family income influences the academic performance of Grade 10 students in Science within Metro Manila. The findings revealed that students hailing from families with greater financial resources were more inclined to access additional educational resources, including private tutoring and educational workshops, thereby enhancing their comprehension of intricate Science concepts. On the other hand, individuals from lower socioeconomic backgrounds frequently encounter obstacles that impede their educational success. Lim (2020) observed that numerous students from economically disadvantaged backgrounds were without crucial study resources and faced stress stemming from financial uncertainty, which resulted in diminished concentration on their academic pursuits. This is consistent with global studies, including those by Sirin (2005), indicating that lower socioeconomic status is regularly associated with diminished academic performance.

The impact of peer influence is a notable external factor that plays a role in academic performance in Science. A study conducted by Reyes (2021) reveals that the dynamics of peer relationships can significantly influence students' engagement with Science subjects, either positively or negatively. The investigation revealed that students engaging with driven peers in collaborative group work exhibited increased interest and success in Science. This indicates that constructive peer interactions can cultivate a cooperative learning atmosphere, improving academic outcomes. Nonetheless, social influence can also result in adverse consequences. A study conducted by Dela Cruz and Santos (2022) emphasized situations in which students felt pressured to prioritize social engagements over their academic duties, leading to a reduced concentration on their Science coursework. Research conducted by Ryan and Deci (2000) on an international scale supports these findings, indicating that peer dynamics play a crucial role in shaping student motivation and engagement in the learning process.

Academic Performance in Science Education

Academic performance refers to the outcome of education, manifesting how well endowed a student, teacher, or institution in meeting their educational goals. Academic performance in Science is frequently measured by students' grades, test scores, and proficiency in scientific inquiry (Mayer, 2020). This encompasses the capacity to integrate scientific methods, solve problems, and discern complicated theoretical concepts across disciplines such as physics, biology, and chemistry. The study of academic performance in Science is a

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formula for judging discrepancies among learners, addressing challenges towards successful Science instruction, implementing essential reforms, and supervising students in achieving better results. The data from Science performance assessments are frequently used in educational reforms to change curricula and teaching practices to fortify student engagement and comprehension of the subject (OECD, 2019).

The performance of students in Science has attracted attention because of its timely influence on developing future scientific knowledge and abilities. Several studies have endorsed the significance of Science education in secondary schools, especially for students at the foundational Grade 10 level. Bybee (2018) emphasizes that a solid grasp of scientific principles at this phase is a must for students' future attainments in STEM-related areas. The evaluation of students' performance in Science typically involves standardized tests, classroom examinations, and practical applications, each serving as an emphasis of a student's unraveling of scientific concepts (Mujtaba & Reiss, 2013). Nonetheless, academic performance in Science often fluctuates because of the range of influencing factors, comprising personal traits as well as environmental and external variables (Tobin & Tippins, 2014).

In the Philippines, Science education has been an epicenter of countless educational reformations, especially following the implementation of the K-12 curriculum under the supervision of the Department of Education (DepEd), in which learners' academic performance are measured based on a grading system. In purpose, the Department of Education (DepEd) has designated the vivid casting of Science in fostering students' critical thinking and problem-solving skills (DepEd, 2013). Despite unwavering efforts, concerns persist regarding student outcomes in Science, as reflected in international assessments such as the Trends in International Mathematics and Science Study (TIMSS). The 2019 TIMSS results indicate that Filipino students ranked among the lowest, indicating the challenging contender in Science education across both primary and secondary levels (Mullis et al., 2020).

Science Academic Performance

Academic performance in Science among Grade 10 students has been a critical focus in educational research, with studies emphasizing the interplay of personal, school-related, and external factors. For instance, a study conducted by Casiño et al. (2020) in the Philippines found that students with strong study habits and positive attitudes toward Science achieved higher grades. Similarly, the research of Lopez and Ramirez (2021) highlighted the importance of teacher quality and classroom environment in fostering better academic outcomes among Filipino high school students. Additionally, parental involvement and socioeconomic status were identified as key determinants of academic performance in a study by Cruz and Santos (2019), which revealed that students from supportive families and stable economic backgrounds performed better in Science. These findings underscore the significance of targeted interventions, such as improving instructional materials and training teachers, to address the unique needs of Grade 10 Science learners in the Philippine context.

Intervention Programs to Improve Science Academic Performance

One common type of intervention is the use of remedial and enrichment programs, which cater to students who either struggle with or excel in Science subjects. A study by Gonzales and Alviar (2021) in public high schools in Metro Manila demonstrated the positive impact of tailored Science remedial classes on students' academic performance. These classes focused on reviewing difficult topics and reinforcing foundational skills, which led to significant improvements in exam scores. Additionally, the study found that students participating in these remedial sessions developed a more positive attitude toward the subject, showing increased confidence in their ability to tackle scientific concepts. Similarly, a study conducted by De Guzman (2020) in Laguna emphasized the effectiveness of enrichment programs for high-achieving students. The intervention, which involved advanced topics and hands-on projects, provided opportunities for deeper exploration of Science content. The findings stated that students who joined in these enrichment activities exhibited higher levels of motivation and a greater sense of accomplishment, contributing to their sustained academic success.

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Conceptual Framework

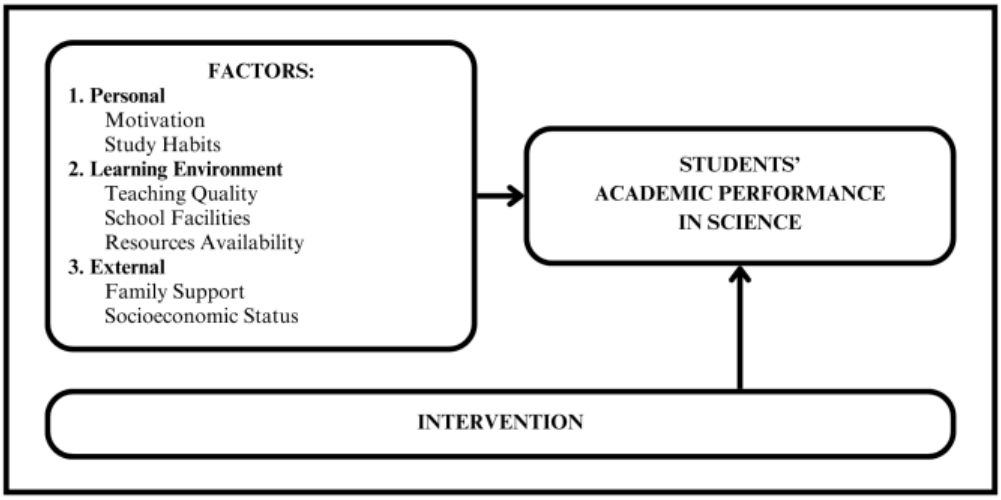

Figure 1 Schematic Diagram of the Study

Figure 1 illustrates the conceptual framework of this study, which illustrates the relationship between various factors influencing academic performance in Science and the development of intervention programs. Personal factors, such as study habits, motivation, and attitude toward Science, along with learning environment factors, including teaching quality, classroom setup, and resource availability, interact with external factors like parental involvement and socioeconomic status. These factors collectively impact students' academic performance in Science, which serves as the basis for designing targeted intervention programs. The framework emphasizes a systematic approach, where understanding these influencing elements informs the creation of effective strategies to enhance student outcomes and foster a positive learning experience in Science.

Statement of the Problem

This study aims to identify the factors affecting the academic performance of Grade 10 Science students. Specifically, this seeks to answer the following questions:

1. What is the profile of Grade 10 Science learners in terms of:

1.1 Age

1.2 Gender

1.3 Parents' Monthly Income

2. What is the level of influence of the following factors on the academic performance of the students:

2.1 Personal Factors

2.2 Learning Environment Factors

2.3 External Factors

3. What is the students' academic performance in terms of First Quarter Grades?

4. Is there a significant relationship between the identified factors and the academic performance of Grade 10 students in Science?

5. Based on the study's results, what intervention program can be designed?

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Scope and Delimitation

This study seeks to identify and analyze the factors that influence the academic performance of Grade 10 science learners at Blancia College Foundation, Inc. (BCFI). A stratified random sampling technique, operating on Raosoft, will be employed to nominate a representative sample of 137 Grade 10 learners. The research will investigate three primary categories of factors: personal, learning environment, and external. Data will be collected via structured questionnaires designed to assess students' personal, academic environment, as well as the external factors. Academic performance will be measured using the learners' first quarter average grades in Science, as recorded in their official school records. Based on the findings, evidence-based interventions will be proposed to address the most serious grounds modifying student performance. The study is delimited to Grade 10 students at BCFI, excluding other unspecified grade levels or schools.

Significance of the Study

This study explores the factors affecting the academic performance of Grade 10 Science students at Blancia College Foundation, Inc. (BCFI). By investigating personal, learning environment, and external factors, it seeks to provide a comprehensive understanding of what influences student success in Science.

Administrators. The findings of this study will help school administrators to implement targeted interventions and allocate resources more effectively. It will provide valuable insights for improving the overall educational environment, potentially leading to enhanced student performance. Administrators may use the study's findings to design professional development programs that better equip teachers with strategies to meet students' needs.

Teachers. This study will assist teachers in identifying key factors affecting their students' learning, allowing them to adjust their instructional methods accordingly. By tailoring lessons to address personal and environmental challenges, teachers can foster greater engagement and boost academic outcomes in Science.

Parents. This study will offer parents a deeper understanding of how external and personal factors influence their children's learning process. This will enable parents to provide better support at home, ensuring their children's learning environment remains conducive to academic success.

Students. Grade 10 Science students will benefit directly from the insights gained in this study, as they will be able to engage with interventions tailored to their individual needs. These interventions may help improve their motivation, enhance their engagement with the subject, and ultimately lead to better academic performance.

Future Researchers. This study will serve as a foundation for future research aimed at understanding the factors affecting academic performance in different subjects or grade levels. The findings will contribute to the broader field of educational research and inform evidence-based practices, especially in Science education.

METHOD

This chapter comprises research design, research locale, research respondents, research instrument, scoring procedure, the instruments, data gathering procedure, treatment of the data and the ethical considerations.

Research Design

This study uses a descriptive-correlational design to examine the factors influencing the academic performance of Grade 10 Science students. This method is typically employed when a researcher desires to explore features of certain groups of people or discover relations between variables. A descriptive correlational design is a study in which the researcher selects a single group and attempts to discover a connection between two variables. The objective of the descriptive-correlational design in research is discussed, emphasizing its significance in analyzing correlations between variables (Brodowicz, 2024).

In this study, variables such as personal factors, school-related factors, external factors, and academic performance of Grade 10 Science students, are examined to determine the strength of relationship between these variables.

Research Locale

The study will be performed at Blancia College Foundation, Incorporated (BCFI), located in Molave, Zamboanga del Sur. The Blancia College Foundation, Incorporated (BCFI), situated in the heart of Molave, began in 1968 as Molave Institute, founded by Engr. Elcesor Bonecillo, initially offering high school and basic college courses. After financial challenges led to foreclosure, the Blancia family acquired the institution in 1991, reestablishing it as Blancia Carreon College Foundation, Inc. under Dr. Ramon V. Blancia, Sr. With a mission to serve middle-class and economically disadvantaged families, the Blancia family expanded the college's programs, notably introducing midwifery, nursing, and other allied health courses, which gained prominence for high board examination pass rates. In 2010, the school was restructured as Blancia College Foundation, Inc., led by Dr. Ramon O. Blancia, Jr., focusing on developing globally competitive, service-oriented professionals. Continuing its founder's mission, Blancia College remains committed to academic excellence, Christian values, and community service, particularly for the underserved, in Salug Valley and surrounding areas. Blancia College Foundation, Inc. (BCFI) has established itself as a respected educational institution, driven by a mission to make quality education accessible and affordable.

Figure 2 Map of Blancia College Foundation, Incorporated (BCFI), Located in Molave, Zamboanga del Sur

Source: Google Search and Google Map

Respondents of the Study

The respondents of the study were the Grade 10 learners of Blancia College Foundation, Incorporated (BCFI), with a total population of 140 students aged 14 to 17 and above. This grade level was chosen as respondents through purposive sampling because Grade 10 served as the culminating stage of junior high school under the K to 12 Basic Education Program. It synthesized foundational knowledge in Biology, Chemistry, Earth Science, and Physics taught progressively from Grades 7 to 9 through a spiral curriculum approach (Department of Education, 2016). Therefore, academic performance in science at this stage provided an integrative reflection of learners' scientific understanding.

Using Raosoft Sample Size Calculator and a stratified random sampling technique, 103 students from BCFI's Grade 10 population will be selected as respondents. Inclusion criteria include: (1) must be a bona fide Grade 10 student of the institution, (2) currently enrolled during the conduct of the study, and (3) under the direct instruction of the science teacher who is also the researcher. This ensures that observed academic performance is reliably aligned with firsthand instructional context. This targeted sampling supports the study's goal to

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investigate the influence of personal, environmental, and external factors on Science performance at a significant point in secondary education.

Research Instruments

This study utilized a structured survey questionnaire to gather data on the personal, learning environment, and external factors that may influence the academic performance of Grade 10 Science students at Blancia College Foundation, Inc. The instruments have been adapted and modified from the works of Garzon and Gil (2017), as well as Navarro, De Guzman, and Uy (2021), to align with the specific objectives of the study while maintaining content validity. The questionnaire was composed of four major sections. The first section collects the learners' profile information, including age, gender, First Quarter Science Grade, parents' monthly income, weekly study time and availability of study resources. The second section comprised ten items focusing on personal factors such as motivation, time management, self-discipline, study habits, and interest in Science. The third section includes ten items that will assess the learning environment, particularly teaching strategies, classroom management, peer relationships, and the use of instructional materials. The fourth section will comprise ten items that will explore external factors like parental support, home responsibilities, access to technology, and socioeconomic conditions. Items in Parts II to IV will be measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Prior to full deployment, the instrument will undergo pilot testing to ensure reliability and clarity. Necessary revisions will be made based on the feedback gathered. This questionnaire will serve as the primary research tool for identifying and analyzing the factors that could affect student performance in Science.

Data Gathering Procedure

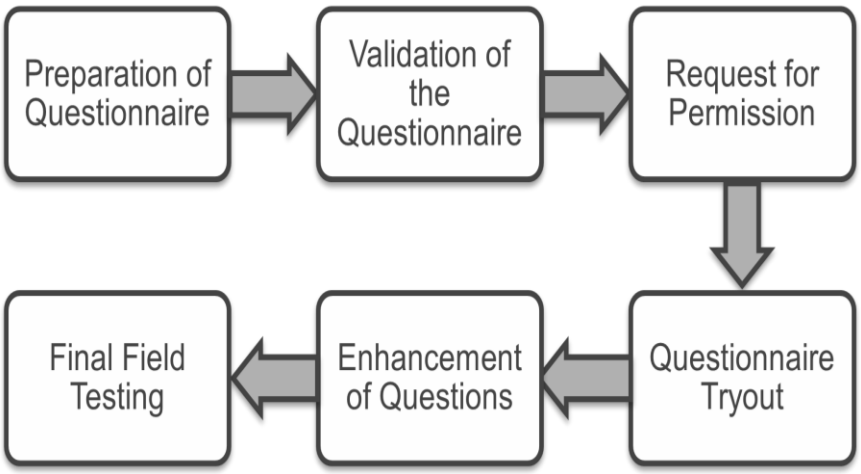

Figure 3 Flow of Data Gathering

Preliminary Procedure. The data gathering process will commence with the preparation of the questionnaire, developed carefully to align with the study's objectives. Once the draft is ready, the instrument will be subjected to validation by selected experts in education and research methodology to ensure its content accuracy and appropriateness. Upon securing expert approval, a formal request for permission will be submitted to the administration of Blancia College Foundation, Inc. to obtain clearance for the study's conduct.

Following this, a pilot testing phase will be implemented, where the questionnaire will be administered to a small sample of Grade 10 Science students outside the main study population. This tryout aims to evaluate the clarity, reliability, and overall effectiveness of the instrument. Based on feedback and analysis of the pilot test results, necessary improvements will be made to refine the questionnaire further. During the pilot testing phase of the research instrument, a sample of 30 Grade 10 Science students from Blancia College Foundation, Inc. was selected. To assess the reliability of the questionnaire, internal consistency was evaluated using Cronbach's alpha (α), computed through the Jamovi statistical software to ensure precise and objective analysis. The resulting data are presented as follows:

Table 1 Reliability Analysis Using Cronbach's Alpha

	Cronbach's alpha (α)
Scale	0.962

The table presented above demonstrates that the overall internal consistency of the instrument, as measured by Cronbach's alpha, is 0.962—an index interpreted as *Excellent*. Meanwhile, none of the individual question items fell below the acceptable threshold of 0.70 (*Acceptable*), indicating that no item warranted removal or revision based on reliability concerns. This suggests a high degree of internal consistency across all questionnaire items, affirming the instrument's reliability. In terms of content validity, the questionnaire underwent expert review by an educational specialist, who affirmed its relevance and appropriateness. Hence, the research instrument was duly evaluated and confirmed to possess both reliability and content validity.

Gathering of Data. The revised instrument underwent final field testing with the actual sample of Grade 10 Science learners. The administration of the questionnaire was carefully supervised online via google forms to ensure completeness and accuracy. All collected data was securely compiled for subsequent analysis, maintaining strict adherence to ethical standards and confidentiality protocols.

Scoring Procedure

The survey questionnaire will be scored using a five-point Likert scale to assess the level of influence of three main categories: Personal Factors, Learning Environment Factors, and External Factors. Each category consists of ten (10) items, with each item rated on a scale from 1 to 5. The response options are interpreted as follows: *Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1).*

To interpret the scores, the following mean score ranges and corresponding descriptions will be applied:

Table 2 Scale Interpretation for Survey Responses on Factors Affecting Academic Performance

Scale	**Mean Score Range**	**Description**	**Interpretation**
5	4.20 - 5.00	Strongly Agree	Very High Influence
4	3.40 - 4.19	Agree	High Influence
3	2.60 - 3.39	Neutral	Moderate Influence
2	1.80 - 2.59	Disagree	Low Influence
1	1.00 - 1.75	Strongly Disagree	Very Low Influence

Each category will therefore have a maximum possible score of 50 points (10 items x 5) and a minimum possible score of 10 points (10 items x 1). To analyze the results, the total score of each respondent for every category will be calculated and then divided by the number of items to obtain the mean score per factor:

$$Mean\ Score\ = \frac{Total\ score\ per\ Category}{10}$$

The computed mean scores will be used in conjunction with descriptive statistics such as the mean and standard deviation to describe the level of influence of each factor on academic performance.

In accordance with the Department of Education's (DepEd) K–12 grading system, the academic performance of Science students, as measured by their First Quarter Grades, will follow a standardized scale: 90–100 =

Outstanding, 85–89 = *Very Satisfactory*, 80–84 = *Satisfactory*, 75–79 = *Fairly Satisfactory*, and below 75 = *Did Not Meet Expectations*. Grades ranging from 75 to 100 are classified as "Passed," while those below 75 are designated as "Failed" (DepEd Order No. 8, s. 2015; Department of Education [DepEd], 2015).

Treatment of Data

Frequency Distributions. This quantitative study analyzed the data using descriptive and inferential statistical tools. The survey questionnaires were administered to Grade 10 Science students of Blancia College Foundation, Inc. to categorize and tabulate their responses. The demographic and background profile of the respondents, in terms of personal, learning environment, and external factors, was assessed using frequency distributions. This will help in describing the number and percentage of students under each classification per factor.

Mean. The mean was utilized to determine the level of influence of the identified factors on the academic performance of Grade 10 students. The mean, or average, represents the most common measure of central tendency and will be computed for each of the three categories: personal factors, learning environment factors, and external factors. The scores from each item on the 5-point Likert scale was totaled and divided by the number of responses to establish how much influence each factor exerts as perceived by the students.

Pearson Correlation Coefficient. This quantifies the strength and direction of a linear relationship between two variables in a sample, though it may not accurately reflect the association if the relationship is non-linear. By symbol, Pearson's correlation is denoted by "ρ" when referring to a population and by "r" when derived from a sample (Lane, 2022). To test the significant relationship between the identified factors and the academic performance of Grade 10 Science students, the Pearson Product-Moment Correlation Coefficient was applied with its corresponding values and its interpretation are from (Napitupulu et al., 2018). The scale of its coefficient interval and its corresponding interpretation are stated as follows: 0.00 - 0.199 (Very Weak), 0.20 - 0.399 (Weak), 0.40 - 0.599 (Moderate), 0.60 - 0.799 (Strong), and 0.80 - 1.000 (Very Strong). The test measures the strength and direction of the linear relationship between two variables, in this case, between each factor (personal, learning environment, external) and the students' academic performance. In addition, a significance level of 0.05 will be used to determine whether the relationships are statistically meaningful.

Ethical Considerations

Observing ethical principles is critical to ensuring participant safety and security throughout the study. Researchers prioritize participant safety by minimizing risks, taking precautions to avoid harm, discomfort, or invasion of privacy, and avoiding intimidation. Participants are treated with respect, and their privacy and anonymity are highly respected. Furthermore, participants have the right to withdraw from the study at any time, without explanation, and without affecting future participation or services. Consent is fully informed and voluntary, demonstrating the participants' willingness to provide genuine data. Confidentiality is also prioritized, with personal information not included in any reports and data collected solely for research purposes. Also, the researchers agree to not mislead or alter data, and both researchers and participants follow the Data Privacy Act of 2012, which protects all personal information.

RESULTS AND DISCUSSION

This chapter discusses the presentation, analysis, and interpretation of data collected from the respondents. The sequence of presentation is in accordance with the questions stipulated in the statement of the problem.

Demographic Profile of the Respondents

This section of the paper illustrates the frequency count and percentage distribution of the respondents' profile in terms of age, gender, and parents' monthly income.

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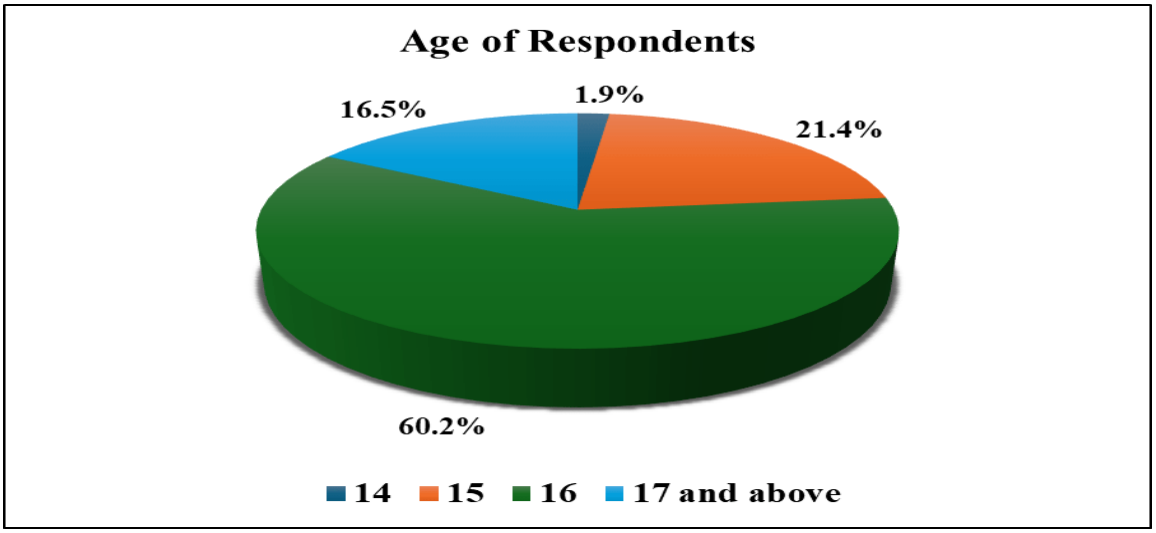

Figure 4 Age of the Respondents

Figure 4 reveals that the majority of the respondents (60.2%) were 16 years old. This was followed by those who were 15 years old (21.4%) and 17 years old and above (16.5%). Only 1.9% of the respondents were 14 years old. These findings suggested that most students were within the typical age range for Grade 10, consistent with the standard educational system in the Philippines.

The age range of respondents reflects a typical Grade 10 cohort. The concentration of students at age 16 indicates standard progression through the grade levels. The presence of a few students outside this age range may result from early or late school entry, acceleration, or grade repetition. Understanding age distribution is relevant in assessing developmental readiness for complex subjects such as Science.

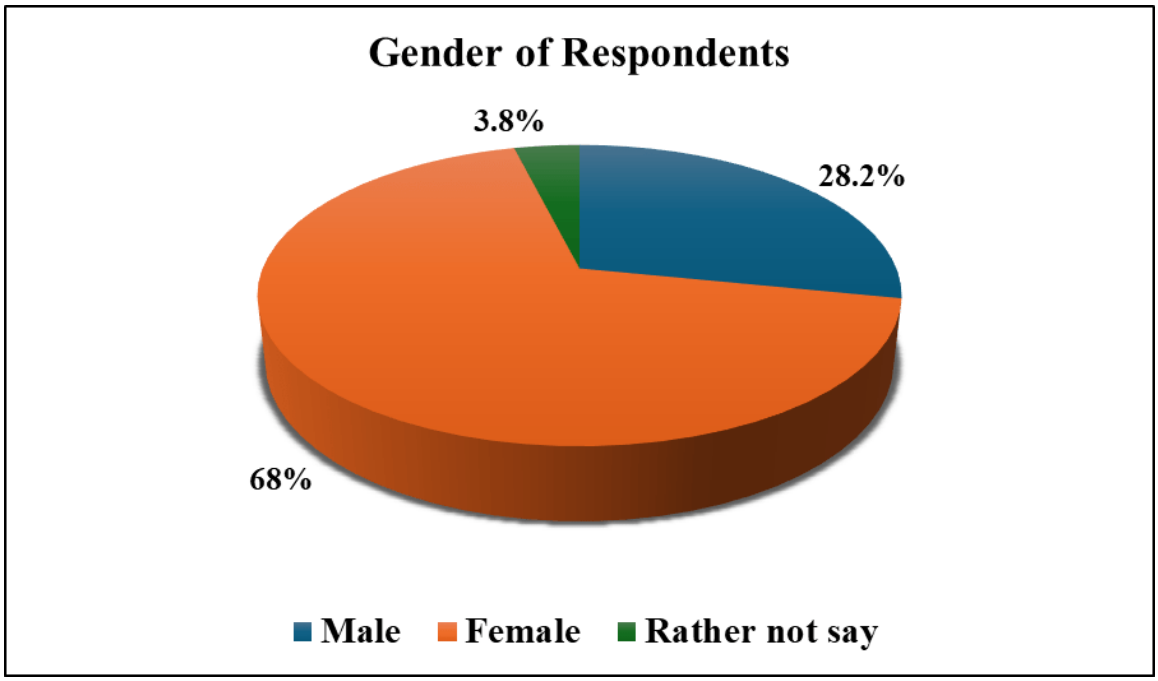

Figure 5 Gender of the Respondents

The Figure 5 above shows that 68.9% of the respondents identified as female, 28.2% as male, and 2.9% preferred not to disclose their gender. The distribution revealed that the sample was predominantly composed of female students. The greater number of female respondents may influence the data regarding academic behaviors and learning preferences. Some studies indicate that female students tend to have higher levels of motivation and academic discipline (Duckworth & Seligman, 2006). However, gender-related factors in science performance remain complex and are influenced by cultural, pedagogical, and social contexts.

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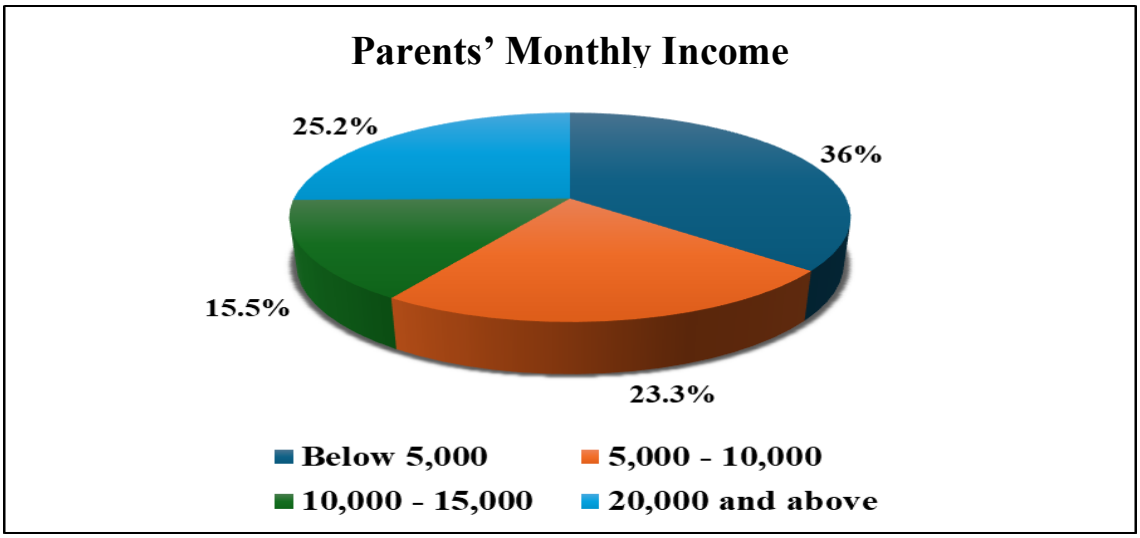

Figure 6 Parents' Monthly Income

Figure 6 shows the socioeconomic background of the students, as reflected in parents' monthly income. A total of 35.9% of the respondents reported an income below ₱5,000. About 23.3% had a monthly household income between ₱5,000–₱10,000, while 15.5% reported ₱10,000–₱15,000. Only 25.2% of respondents belonged to households earning ₱20,000 and above per month.

The data suggest that a majority of students come from economically disadvantaged backgrounds. Socioeconomic status is widely linked to access to learning materials, availability of private tutoring, internet connectivity, and parental support—all of which are relevant to science performance. Students from lower-income families may experience difficulty accessing supplementary learning resources or may bear additional responsibilities at home, limiting study time (OECD, 2016).

Table 3 Frequency Count and Percentage Distribution of Respondents' Profile in terms of Weekly Study Time in Science, Internet Access at Home, and Quiet Place to Study at Home

Category	**Response**	**Frequency (*f*)**	**Percentage (%)**
Weekly Study Time in Science	1–3 hrs	73	70.9%
	3–5 hrs	14	13.6%
	5–7 hrs	12	11.7%
	7 hrs and above	4	3.9%
Internet Access at Home	Yes	85	82.5%
	No	18	17.5%
Quiet Place to Study at Home	Yes	71	68.9%
	No	32	31.1%

The data in Table 3 shows that a significant portion of the respondents (70.9%) studied Science for only 1 to 3 hours per week. A much smaller percentage of students (15.6%) reported studying for more than 5 hours weekly. These results suggested that most students allocated minimal time to Science outside of the classroom, which may be insufficient for understanding complex scientific concepts. It indicates that most students devote limited time to studying Science independently. This low study duration raises concern, as Science requires consistent review and application of concepts. Research by Zimmerman (2002) emphasizes that regular study habits and self-regulated learning are critical for academic success in subjects like Science.

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In terms of internet access, the majority of the students (82.5%) reported having internet at home, suggesting that most had the potential to access online educational resources. However, 17.5% lacked internet access, which could significantly hinder their ability to research or complete online assignments. This finding shows that while a large number of students have access to the internet, there remains a substantial minority at a disadvantage. The availability of internet access does not automatically translate into effective usage. Factors such as digital literacy, motivation, and self-discipline play a crucial role in how students engage with online resources (UNESCO, 2021).

Regarding the learning environment, 68.9% of the respondents reported having a quiet place to study at home, while 31.1% did not. The absence of a quiet study space for nearly one-third of the students might have contributed to reduced concentration and learning efficiency. A conducive study environment is widely regarded as essential for academic achievement. Students without a quiet space may struggle to maintain focus or complete assignments effectively. This factor can impact their performance, especially in Science, which often requires uninterrupted concentration and logical reasoning (Leone & Richards, 1989).

Level of Influence of the Factors to the Academic Performance

Table 4 Weighted Mean Scores and Interpretation for Personal Factors

Question	**Weighted Mean**	**Interpretation**
1. I study Science even when I am not required to.	3.65	High Influence
2. I feel confident when answering questions in Science class.	3.80	High Influence
3. I manage my time well to study Science.	3.45	High Influence
4. I understand Science concepts easily.	3.70	High Influence
5. I am motivated to excel in Science.	3.90	High Influence
6. I feel anxious when taking Science tests.	3.20	Moderate Influence
7. I review my notes regularly after Science class.	3.85	High Influence
8. I find Science interesting and enjoyable.	4.00	High Influence
9. I take the initiative to ask for help when I struggle in Science.	3.95	High Influence
10. I stay focused during Science lessons.	3.75	High Influence
Average Weighted Mean	**3.70**	**High Influence**

Table 4 portrays the weighted mean scores and interpretation for Personal Factors domain ranging from 3.20 (moderate influence) to 4.00 (high influence) , with an average of 3.70, indicating a high level of influence on students' learning experiences in Science. Statements such as "I find Science interesting and enjoyable" (*M* = 4.00) and "I am motivated to excel in Science" (*M* = 3.90) received the highest scores, suggesting that students generally have a positive attitude toward Science and are self-driven learners.

However, the statement "I feel anxious when taking Science tests" had the lowest score (*M* = 3.20), indicating a moderate influence. The findings suggest that students possess strong personal characteristics that support their engagement and success in Science. A high proportion of students reported feeling confident (*M* = 3.80), motivated (*M* = 3.90), and interested in Science (*M* = 4.00). These results align with the study of Zimmerman

(2000) who emphasized the role of intrinsic motivation and self-efficacy in academic achievement.[1] Students who perceive themselves as capable and interested in a subject are more likely to engage deeply with the material and persist through challenges (Pintrich, 2004).

Meanwhile, the presence of test anxiety (*M* = 3.20) is a concern, as it can negatively impact performance despite overall positive attitudes. Test anxiety has been shown to reduce cognitive functioning and increase stress, which may hinder students' ability to demonstrate their true knowledge (Ashcraft, 2009). Interventions such as mindfulness training, test preparation workshops, and emotional support systems could be beneficial in addressing this issue.

Table 5 Weighted Mean Scores and Interpretation for Learning Environment Factors

Question	**Weighted Mean**	**Interpretation**
1. My Science teacher explains lessons clearly.	4.10	High Influence
2. The classroom is conducive for learning Science.	3.95	High Influence
3. I am encouraged to ask questions in Science class.	3.85	High Influence
4. We have enough learning materials for Science (books, modules, etc.).	3.75	High Influence
5. My teacher uses activities that help me understand Science better.	4.05	High Influence
6. We are allowed to do hands-on experiments.	3.90	High Influence
7. Our Science classes are interactive.	3.80	High Influence
8. The seating arrangement helps me concentrate.	3.65	High Influence
9. I feel safe and respected in our classroom.	3.95	High Influence
10. I am given enough time to finish Science tasks.	3.80	High Influence
Average Weighted Mean	**3.90**	**High Influence**

Table 5 presents the weighted mean scores and interpretation for the Learning Environment Factors domain ranging from 3.65 (high influence) to 4.10 (high influence), with an average of 3.90, indicating a high level of influence on students' learning experiences in Science. The highest score was recorded for "My Science teacher explains lessons clearly" (*M* = 4.10), followed by "My teacher uses activities that help me understand Science better" (*M* = 4.05). The lowest score was for "The seating arrangement helps me concentrate" (*M* = 3.65), still within the high influence range.

Students perceive their learning environment as highly supportive, with teachers being effective communicators and using interactive methods to enhance understanding. This finding is consistent with research highlighting the importance of teacher clarity and active learning strategies in promoting student engagement and achievement (Vogt et al., 2012). When students are encouraged to ask questions (*M* = 3.85) and participate in hands-on experiments (*M* = 3.90), they are more likely to develop a deeper understanding of scientific concepts (Krajcik & Blumenfeld, 2006).

[1] See Zimmerman, B. J. (2000). *Self-efficacy: An essential motive to learn*. Contemporary Educational Psychology, 25 (1), 82–91. https://doi.org/10.1006/ceps.1999.1016

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Despite the overall positive perception, the lower score for seating arrangement (M = 3.65) suggests that some students have trouble concentrating due to physical layout. This implies that schools may need to consider ergonomic and spatial design improvements to optimize student focus and participation. Overall, the learning environment appears to be a strong facilitator of Science learning, but small adjustments in classroom setup could further improve student outcomes.

Table 6 Weighted Mean Scores and Interpretation for External Factors

Question	**Weighted Mean**	**Interpretation**
1. I have internet access to help me study Science.	4.05	High Influence
2. My parents support my studies.	3.90	High Influence
3. I receive help with homework when needed.	3.75	High Influence
4. My home is quiet enough for studying.	3.60	High Influence
5. I have responsibilities at home that take time away from studying.	3.20	Moderate Influence
6. There are distractions at home when I try to study.	3.30	Moderate Influence
7. I am allowed to attend Science reviews or tutorials.	3.80	High Influence
8. I feel pressure from my family to perform well in Science.	3.40	Moderate Influence
9. I have access to digital resources for Science (videos, apps, websites).	4.10	High Influence
10. My financial situation affects my ability to study Science.	3.10	Moderate Influence
Average Weighted Mean	**3.60**	**High Influence**

Table 6 shows the weighted mean scores and interpretation for the External Factors domain ranged from 3.10 (moderate influence) to 4.10 (high influence), with an average of 3.60, indicating a high level of influence on students' learning experiences in Science. Statements related to internet access (M = 4.10) and parental support (M = 3.90) received the highest scores, while statements about home responsibilities (M = 3.20), financial constraints (M = 3.10), and family pressure (M = 3.40) showed moderate influence.

External factors such as access to technology (e.g., internet and digital resources) and parental involvement play a significant role in supporting students' Science learning. These findings are consistent with research showing that external support systems, including parental encouragement and technological access, enhance academic performance (Dearing et al., 2008). Students who have access to online tools and resources (M = 4.10) are better equipped to engage with Science outside of school hours. However, some students face challenges due to home responsibilities (M = 3.20), distractions (M = 3.30), and financial limitations (M = 3.10). These factors can interfere with consistent study habits and academic progress. Additionally, family pressure (M = 3.40) may create additional stress, potentially affecting students' motivation and mental health.

To address these challenges, educational institutions and policymakers should consider providing equitable access to digital resources and support services for students from diverse socioeconomic backgrounds. Furthermore, fostering open communication between students and families could help mitigate the negative effects of pressure and distraction.

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Students' Academic Performance Based on First Quarter Grades in Science

Table 7 First Quarter Grades of Students in Science

Academic Performance	***N***	**Mean**	**Descriptor**
First Quarter Grades	103	89.29	Very Satisfactory

Table 7 presents the students' academic performance in Science based on their First Quarter Grades. The results indicate that out of 103 students, the mean grade was *89.29*, indicating a "Very Satisfactory" level.

According to the Department of Education's grading system (DepEd Order No. 8, s. 2015), a passing grade is 75, and grades are interpreted through qualitative descriptors. A grade ranging from 90 to 100 is classified as "Outstanding," 85 to 89 as "Very Satisfactory," 80 to 84 as "Satisfactory," and 75 to 79 as "Fairly Satisfactory." Grades below 75 are considered as "Did Not Meet Expectations."

Given that the mean grade falls within the "Very Satisfactory" descriptor, it indicates that students, on average, demonstrated a high level of performance in Science during the first quarter. The overall range of grades suggests that most learners are meeting or exceeding the expectations of the curriculum. However, the presence of a minimum grade of 73 implies that a small portion of the cohort did not meet the required standard. This highlights the importance of early intervention and differentiated instruction to support these learners. The high average performance may reflect effective teaching practices, strong learner engagement, and supportive learning environments. Still, continuous monitoring is essential to ensure that all students, especially those at risk of falling behind, are provided with the necessary academic support.

Correlations of the Factors and the Academic Performance

Table 8 Correlation between Grades and Personal Factors

	Pearson's *r*		***p-value***	
	Values	Interpretation	Values	Interpretation
Grades - Personal Factors	.228	Weak positive correlation	.020	Statistically significant

Scale. Pearson's Correlation (r): 0.00 - 0.199 = Very Weak; 0.20 - 0.399 = Weak; 0.40 - 0.599 = Moderate; 0.60 - 0.799 = Strong; 0.80 - 1.000 = Very Strong Relationship

Table 8 shows correlation between academic grades and personal factors yielding a weak positive correlation but statistically significant at the 0.05 level (r = .228, p = .020). This suggests that personal factors such as study habits, motivation, and attitudes toward Science indicate a weak positive correlation but with significance on students' academic performance. Although the effect size is not strong, the significance indicates that enhancing students' personal factors could potentially lead to improvements in their academic outcomes. This finding aligns with prior research highlighting the role of intrinsic motivation and consistent study practices in academic success (Ormrod, 2016).

Table 9 Correlation between Grades and Learning Environment Factors

	Pearson's *r*		***p-value***	
	Values	Interpretation	Values	Interpretation
Grades - Learning Environment Factors	.213	Weak positive correlation	.030	Statistically significant

Scale. Pearson's Correlation (r): 0.00 - 0.199 = Very Weak; 0.20 - 0.399 = Weak; 0.40 - 0.599 = Moderate; 0.60 - 0.799 = Strong; 0.80 - 1.000 = Very Strong Relationship

Table 9 shows a weak positive correlation but with statistical significance was also found between grades and learning environment factors (r = .213, p = .030). This implies that features of the learning environment, such as classroom setup, teacher effectiveness, and availability of instructional resources, are modestly associated with students' academic performance. Even though the strength of the relationship is low, its significance underlines the importance of fostering a supportive and engaging learning atmosphere. As per Vygotsky's sociocultural theory, the learning environment can serve as a scaffold for cognitive development, thereby improving academic outcomes (Daniels, 2001).

Table 10 Correlation between Grades and External Factors

	Pearson's *r*		***p-value***	
	Values	Interpretation	Values	Interpretation
Grades - External Factors	.126	Very weak positive correlation	.206	Not statistically significant

Scale. Pearson's Correlation (r): 0.00 - 0.199 = Very Weak; 0.20 - 0.399 = Weak; 0.40 - 0.599 = Moderate; 0.60 - 0.799 = Strong; 0.80 - 1.000 = Very Strong Relationship

Table 10 declares the relationship between grades and external factors has a very weak positive correlation but not statistically significant (r = .126, p = .206). This suggests that factors external to the school and individual, such as socioeconomic status, parental involvement, and peer influence, indicates a very weak correlation yet did not have any statistically significant impact on academic performance in this context. While previous foundational studies have emphasized the role of external factors in shaping educational outcomes, more recent research also supports that their influence may vary across settings. For instance, Sirin (2005) conducted a meta-analytic review and found that the relationship between socioeconomic status and academic achievement is moderate overall, but significantly influenced by contextual variables such as school-level characteristics and cultural factors. Thus, the non-significant findings in this study may reflect unique demographic, cultural, or institutional characteristics of the sample, or the presence of intervening variables such as individual resilience or school support systems.

SUMMARY, FINDINGS, CONCLUSION, & RECOMMENDATIONS

This chapter provides a detailed summary of the study, presents the key findings, draws informed conclusions, and offers evidence-based recommendations grounded in the results.

Summary

This study aimed to identify the factors affecting the academic performance of Grade 10 Science students at Blancia College Foundation, Incorporated (BCFI). A descriptive-correlational design was used to examine the relationships between personal, learning environment, and external factors and their influence on academic performance. Data was collected from 103 Grade 10 students using a structured questionnaire adapted from existing studies. The findings revealed that personal factors, such as motivation, study habits, and self-efficacy, had a statistically significant but weak positive correlation on academic performance. Similarly, the quality of the learning environment factors, including teacher effectiveness and classroom conditions, was also found to be statistically significant but weak positive correlation on their academic performance. While external factors, like socioeconomic status and family support, showed no statistical significance yet their relationship on academic performance has a very weak positive correlation compared to personal and environmental factors. The study also highlighted the strong positive correlations and statistical significance among all three domains, suggesting that academic performance in Science is not determined by a single factor but rather by a combination of personal, environmental, and external factors. These findings provide a valuable blueprint into the complex nature of academic performance in Science and emphasize the importance of addressing multiple dimensions when designing interventions to improve student achievement.

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Findings

The findings of this study provide a detailed understanding of the factors influencing the academic performance of Grade 10 Science students at Blancia College Foundation, Incorporated (BCFI), located in Molave, Zamboanga del Sur. The study examined three main categories of factors: personal factors, learning environment factors, and external factors, and their relationship with academic performance as measured by first-quarter Science grades.

The following statements below are the findings of the study, such as:

1. The age distribution of Grade 10 Science learners primarily falls within 16 years old (60.2%), followed by 15 years (21.4%), 14 years (16.5%), and 17 years and above (1.9%).

2. In terms of gender, the sample comprised predominantly females (68%), with males constituting 28.2% and 3.8% preferring not to disclose their gender.

3. Regarding socioeconomic status, 36% of the learners' parents reported a monthly income below PHP 5,000, while 23.3% earned between PHP 5,000–10,000, 15.5% between PHP 10,000–15,000, and 25.2% reported earning PHP 20,000 or more.

4. As for study habits, most learners reported studying Science for 1–3 hours weekly (70.9%), followed by 3–5 hours (13.6%), 5–7 hours (11.7%), and 7 hours or more (3.9%).

5. Concerning study resources, 82.5% of learners indicated having internet access at home, while 17.5% did not.

6. Regarding the students' own study room, 68.9% had a quiet place to study, whereas 31.1% reported the absence of such an environment.

7. Learners reported a high level of influence for all three categories of factors. Personal factors recorded a weighted mean of $M = 3.70$ (High Influence). Among these, the item "I find Science interesting and enjoyable" garnered the highest rating ($M = 4.00$), while "I feel anxious when taking Science tests" had the lowest ($M = 3.20$), still within the moderate influence range.

8. Learning environment factors exhibited the highest weighted mean ($M = 3.90$), indicating a High Influence. The highest-rated item was "My Science teacher explains lessons clearly" ($M = 4.10$), while "The seating arrangement helps me concentrate" received the lowest (M = 3.65), both rated as High Influence.

9. External factors yielded a mean score of $M = 3.60$ (High Influence), with "I have access to digital resources for Science (videos, apps, websites)" receiving the highest influence rating ($M = 4.10$), and "My financial situation affects my ability to study Science" the lowest ($M = 3.10$), which still falls under moderate influence.

10. Using Pearson's correlation analysis, results revealed a statistically significant but weak positive correlation between academic performance and the personal factors ($r = .228$, $p = .020$), specifically study habits and motivation.

11. Meanwhile, the learning environment factors revealed weak positive correlations but with statistical significance to the students' academic performance ($r = .213$, $p = .030$), particularly teaching quality, school facilities and resources availability.

12. Nevertheless, the relationship between academic performance and external factors has a very weak positive correlation but was not statistically significant ($r = .126$, $p = .206$), such as family support and socioeconomic status.

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CONCLUSION

The findings of this study affirm that academic performance in Science among Grade 10 learners at Blancia College Foundation, Incorporated (BCFI) is influenced by a constellation of personal, learning environment, and external factors. The statistically significant relationships between academic performance and both personal and environmental domains underscore the importance of addressing student-centered motivations, study habits, and quality of instruction. Notably, while external influences such as socioeconomic status and parental involvement were acknowledged as contributing elements, their direct correlation to academic performance was found to be weaker.

This study supports the assertion of Zimmerman (2002) that self-regulated learning behaviors and motivation are critical components in student success. Likewise, the observed impact of teacher effectiveness and classroom conditions echoes Krajcik and Blumenfeld's (2006) emphasis on interactive and inquiry-based pedagogy as drivers of academic achievement. Although test anxiety and financial constraints emerged as moderate barriers, the overall positive perceptions of learners toward their Science subject and their educational environment suggest a readiness for further academic advancement, provided that tailored support mechanisms are in place.

In conclusion, academic performance is not shaped by isolated variables but rather by the dynamic interaction of internal dispositions, instructional quality, and contextual realities. For educational programs to be truly effective, they must take all of these aspects into account. Schools are therefore encouraged to develop initiatives that strengthen student motivation, enhance classroom conditions, and address challenges that may arise outside the school setting. These efforts should be guided by inclusive and responsive policies that support all learners holistically.

Recommendations

Based on the findings of this study, it is recommended that Blancia College Foundation, Inc. (BCFI) consider the following multidimensional interventions and strategies to enhance the academic performance of Grade 10 Science learners:

Strengthen Learner Motivation and Address Test Anxiety. Given the high levels of motivation and interest in science reported by students, the school should reinforce student-centered strategies that maintain and deepen intrinsic motivation. This may include inquiry-based projects, peer mentoring programs, and student-led science activities that build confidence and engagement (Zimmerman, 2002). At the same time, moderate levels of test anxiety identified in the findings warrant targeted interventions, such as stress-reduction workshops, test-taking skills training, and mindfulness programs (Ashcraft, 2009).

Enhance Study Habits Through Structured Support. As most students only allocate 1–3 hours per week for studying Science, BCFI should establish a study enrichment program or guided study halls where students can develop self-regulated learning strategies (Zimmerman, 2000). Teachers and class advisers may also guide students in designing personalized study schedules and provide accountability mechanisms to promote consistency.

Improve Classroom Ergonomics and Teaching Approaches. Although students acknowledged the effectiveness of their teachers and the conduciveness of their classrooms, lower ratings for seating arrangements suggest the need for a more learner-centered and flexible classroom design. The institution may explore seating innovations that support collaboration, visibility, and comfort to reduce distractions and increase attentiveness (Krajcik & Blumenfeld, 2006).

Address Inequities in Learning Resources and Environment. With 17.5% of respondents lacking internet access and 31.1% without a quiet study space, BCFI should consider opening its library or designated learning centers during after-school hours and weekends. This can serve as a quiet and resource-equipped venue for independent or group study. Additionally, the school may collaborate with local government units or NGOs to secure internet access assistance for low-income students (UNESCO, 2021).

Expand Teacher Development and Reflective Practice. Given the positive feedback on teacher effectiveness, continuous professional development programs focusing on differentiated instruction, digital pedagogy, and inquiry-based learning should be sustained. Regular peer-observation cycles and feedback sessions may be institutionalized to ensure instructional quality remains aligned with best practices (Vogt et al., 2012).

Promote Parent Engagement and Community Involvement. Recognizing the significant influence of parental involvement, the school should conduct regular parent-teacher dialogues, workshops on supporting students at home, and establish a "Parent Champions of Science" initiative to promote home-based science learning activities (Dominguez & Rojas, 2021).

These recommendations, consistent with Zimmerman's (2002) and Krajcik and Blumenfelds (2006) models of learning, emphasize the need for an integrated, learner-centered, and equity-oriented response. Institutional efforts that address personal, environmental, and contextual barriers simultaneously are more likely to sustain and improve students' Science achievement at Blancia College Foundation, Inc. (BCFI).

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Researchers

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APPENDIX A

Research Questionnaire

Factors Affecting Academic Performance of Grade 10 Students in Science

Instructions:

This questionnaire aims to gather data on the factors that may influence your academic performance in Science. Please read each item carefully and answer honestly. Your answers will be kept confidential and used solely for research purposes.

Kindly answer the profile section first, then proceed to rate each item in Parts II, III, and IV based on how true it is for you using the scale below:

1 - Strongly Disagree 2 - Disagree 3 - Neutral 4 - Agree 5 - Strongly Disagree

Part I – Learner Profile

Instructions: Please provide the following personal details.

- Name (Optional): _____
- Age: _____
- Gender: ☐ Male ☐ Female
- First Quarter Science Grade: _____
- Parents' Monthly Income: _____
- Weekly Study Time for Science: _____ hours
- Access to Internet: ☐ Yes ☐ No
- Has a quiet study space at home: ☐ Yes ☐ No

Part II – Personal Factors	**1**	**2**	**3**	**4**	**5**
1. I study Science even when I am not required to.					
2. I feel confident when answering questions in Science class.					
3. I manage my time well to study Science.					
4. I understand Science concepts easily.					
5. I am motivated to excel in Science.					
6. I feel anxious when taking Science tests.					
7. I review my notes regularly after Science class.					
8. I find Science interesting and enjoyable.					
9. I take the initiative to ask for help when I struggle in Science.					
10. I stay focused during Science lessons.					

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Part III – Learning Environment Factors	1	2	3	4	5
1. My Science teacher explains lessons clearly.					
2. The classroom is conducive for learning Science.					
3. I am encouraged to ask questions in Science class.					
4. We have enough learning materials for Science (books, modules, etc.).					
5. My teacher uses activities that help me understand Science better.					
6. We are allowed to do hands-on experiments.					
7. Our Science classes are interactive.					
8. The seating arrangement helps me concentrate.					
9. I feel safe and respected in our classroom.					
10. I am given enough time to finish Science tasks.					
Part IV – External Factors	1	2	3	4	5
1. I have internet access to help me study Science.					
2. My parents support my studies.					
3. I receive help with homework when needed.					
4. My home is quiet enough for studying.					
5. I have responsibilities at home that take time away from studying.					
6. There are distractions at home when I try to study.					
7. I am allowed to attend Science reviews or tutorials.					
8. I feel pressure from my family to perform well in Science.					
9. I have access to digital resources for Science (videos, apps, websites).					
10. My financial situation affects my ability to study Science.					

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