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The Underlying Factors Of Learning And Their Impact On The Academic Performance Of The Chemistry Students Of Bohol Island State University

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Abstract — The main thrust of the study was to assess the impact of the underlying factors of learning, such as student-related, home-related, and school-related factors, on students' academic performance in Chemistry. The study used the descriptive-correlational and comparative survey method, utilizing a modified questionnaire for the data collection. The weighted mean of the responses was used for analysis and interpretation. Pearson Product Moment Correlation Coefficient was used to determine the correlation between the underlying factors of learning and students' academic performance in Chemistry. Based on the findings, student-related factors posited the highest impact, while school-related factors had the lowest impact on the respondents' academic performance in Chemistry. The study revealed that the availability of school facilities and instructional materials was insufficient. The respondents obtained an overall academic rating within the average mark for academic performance. However, the theoretical implications of Social Constructivism Theory were evident based on the findings. Thus, the study concluded that the three dimensions of learning are the underlying factors of the respondents' academic performance in Chemistry. As to recommendations, improving the respondents' academic performance level can be realized by practicing and integrating good study habits, proper time management, strong parental involvement, a positive attitude, and interest in Chemistry.

Keywords — Academic Performance, Chemistry, Underlying Factors Of Learning, Student-Related Factors, Home-Related Factors, School-Related Factors, School Facilities, Instructional Materials

I. Introduction

Chemistry is one of the cornerstones of science, technology, and industry. It forms the foundation of the life sciences and the core of every technology people enjoy today. Chemistry plays a pivotal role in engineering feasible economic and community progress. It features agriculture, health, environment, infrastructure, industry, crime detection, and waste management (Abulude, 2016). Thus, Chemistry is a catalyst for a nation's sustainable growth and development. Recently, Section 11 of the Commission on Higher Education (CHED) Memorandum No. 94, s. of 2017 mandates the inclusion of Chemistry in the curriculum for a Bachelor of Science in Agricultural and Biosystems Engineering. However, most first-year students taking up Bachelor of Science in Agricultural and Biosystems Engineering (BSABE) at Bohol Island State University-

Bilar Campus got low test scores. They performed poorly during quarterly examinations in the Chemistry subject. This predicament affirms the result of the 2019 Trends in International Mathematics and Science Study (TIMSS), in which the Philippines fared worst among the 58 participating countries (Bernardo, 2020). This scenario has prompted the researcher to understand the underlying factors of academic performance in science, specifically among university students taking Chemistry.

Anent to this, the researcher believed that the construct of knowledge is mainly influenced by the learner's ability to absorb instruction and their study habits. However, there is a notion that students' academic performance is not only associated with a single factor. As cited by Singh et al. (2016), proper guidance from parents and teachers, communication skills, and learning facilities have been found as critical determinants of students' performance at school. In addition, the socio-economic status of the parents, family involvement, and school climate have also been found to affect academic performance. Thus, the study is conducted to determine if these variables can significantly affect the grades of the first-year Bachelor of Science in Agricultural and Biosystems Engineering (BSABE) students in the Chemistry subject. Based on the points mentioned above, this study assessed the impact of student-related, home-related, and school-related factors on students' academic performance in Chemistry at Bohol Island State University-Bilar Campus, Bilar, Bohol. This study also intended to assess the adequacy of school facilities and instructional materials available for Chemistry students. Moreover, this study was designed to assess the respondents' academic performance in Chemistry during the first semester of the academic year 2018-2019.

Literature Review

Age. Relating to a learner's individuality, age is believed to impact academic performance significantly. Several studies are included in the literature to validate whether the results affirmed or argued such a claim. A Nigerian researcher investigated the influence of age and content area on students' achievement in Chemistry. The data gathering used a validated instrument. Based on the Chemistry Achievement Test (CAT) result, statistical analysis showed that age has no significant correlation with achievement. At the same time, the content area does affect the students' test scores in Chemistry. The study concluded that age is not a determinant of students' performance in Chemistry. On the other hand, to improve students' achievement levels in the subject, providing necessary pedagogical resources was recommended to all students regardless of gender (Onuekwusi, 2015).

Sex. To many, it is an accepted truism that female students are more academically inclined than males. This idea has created tons of speculations that sex can also affect students' academic performance. Concerning this, students' academic performance in secondary schools of the Local Government of Borgu, Nigeria, was a different scenario. Joseph et al. (2015) found that male students performed better than females in chemistry. Although there was a difference in students'

achievement when grouped according to sex, it did not influence academic performance in Chemistry among students who took up Computer Studies in Nigerian schools.

On the other hand, Hdii and Fagroud (2018) investigated the impact of gender on university students' performance at the National School of Agriculture in Meknes, Morocco. The study explored gender differences based on academic achievement between males and females. Students' test scores from 2008 to 2015 were used as the data for comparison. Based on the results, gender significantly impacts students' academic performance, by which female students performed better than males. Consequently, the outcome argued to the result of the previous related study conducted by Joseph et al.

Academic Track. In a study by Palafox et al. (2018), Accountancy and Business Management (ABM) students perceived that they were the most competent learners in the Senior High School Department of Malacampa National High School, Camiling, Tarlac, Philippines. This notion has led to speculations that the chosen academic track of the students may also affect their academic performance.

Recently, Alipio (2020) conducted a study titled, "Academic Adjustment and Performance among Filipino Freshmen College Students in the Health Sciences: Does Senior High School Strand Matter? Findings revealed that senior high school students from Science, Technology, Engineering, and Mathematics (STEM) strand obtained the highest academic adjustment and performance level. By employing a One-Way Analysis of Variance (ANOVA), it was proven that there was a significant difference in academic adjustment and performance when students are stratified according to their academic strand. Moreover, moderation analysis showed that the academic strand significantly moderates the relationship between academic adjustment, motivation, and performance. The findings have several implications for theory and other strategic educational practices used to improve students' performance.

Chemistry

Hoffman defined *Chemistry* as the science of molecules and their transformations as one of the branches of science. It is the science, not so much of one hundred elements but the infinite variety of molecules that may be built from them. Magdara (2015) considered chemistry one of the cornerstones of science, technology, and industry. It forms the foundation of the life sciences and the core of every technology people enjoy today. The chemical sciences provide enabling infrastructures that deliver foods, fuels, medicine, and materials that are part of everyday life. Moreover, the contribution of chemists and chemical engineers is central to the technological progress of many areas, including the chemical, pharmaceutical, electronics, agriculture, automobile, and aerospace industries.

The importance of Chemistry as part of a bigger picture in science is one of the concerns in Philippine education. It is evident in the 1987 Philippine Constitution Article 14, Section 10, which states that Science and Technology are essential for national development and progress. The State shall prioritize research and development, invention, innovation, and utilization, and science and technology education, training, and services. It shall support indigenous, appropriate, and self-reliant scientific and technological capabilities and their application to the country's productive systems and national life.

Adesoji and Olantubosun (2008) observed that within the context of science education, Chemistry had been identified as an essential school subject, and its importance in any nation's scientific and technological development has been widely reported. They argued that effective teaching of science could further lead to scientific and technological greatness. It also posits many advantages when developing a learner's higher-order thinking skills (HOTS). Hence, the inclusion of the subject into the curriculum in most higher education courses is timely and relevant.

The Underlying Factors of Learning

Stark and Gray (1999) stated that attitude and academic achievement are essential outcomes of science education. Developing students' positive attitudes toward science as a school subject is one of the primary responsibilities of every science teacher. Unfortunately, research has revealed that much of what goes on in science classrooms is not particularly attractive to students of all ages. Farooq et al. (2011) hypothesized that students' academic performance largely depends on the different circumstances that involve socio-economic, psychological, and environmental factors. Anent to this, the researcher believed that there are three (3) major factors that can affect a student's performance at school, as follow:

Student-Related Factors. Along with the complexity and difficulty in dealing with the subject, the student-related factor is considered one of the interventions in achieving good academic performance. Attitude toward Chemistry, which denotes student interests or feelings in studying the subject, is counted as one. The students' disposition of being engaged or disengaged in the subject counted the most. Yara (2009) stated that a student's beliefs and attitudes have the potential to either facilitate or inhibit learning. Many factors could contribute to a student's attitude toward studying science, specifically, Chemistry. Consequently, Magwilang (2016) concluded that most students taking Chemistry perceived the subject as challenging. The students' perception is contrary to the most industrially relevant science that features every aspect of human endeavor and natural phenomena. Moreover, these perceptions may be attributed to the abstract conceptions of Chemistry, by which many students think that the subject is irrelevant to the world they live. Some students disclosed that Chemistry is too confusing and mathematical.

Relatively, some factors can affect students' learning at school. Consequently, a student's innate ability to learn involves the following aspects:

Study Habit. A habit is just a behavior until it becomes automatic when repeated from time to time. Students with a consistent passion when studying are more likely to obtain better grades in the academe. Students with good study habits are more engaged, learn the subject matter faster, and can convey his/her learning into the real world. Good study habits include being organized, persistence in note-taking and reading, attentive listening in class, and regular studying at home. On the contrary, bad study habits include skipping classes, absenteeism, and studying only when there is a quiz or an examination (Illahi and Khandai, 2015).

Attitude. Cheung (2011) cites that students' attitude is essential in evaluating science curricula. It is a hypothetical construct and lays the foundation for understanding and predicting human behavior. In line with Chemistry, educators worldwide have long been asking about how to improve the curriculum and classroom teaching. One of the factors to consider is the student's attitude toward learning. Although most students dislike Chemistry, motivating them to persevere with the subject is the fundamental responsibility of both teachers and parents.

Interest. Students' interest energizes learning, guides academic and career trajectories, and is essential to academic success. Interest is a psychological state of attention and affection toward a particular object or topic. Integrating these two definitions may guide and promotes more determination to learn any subject. Thus, promoting interest can contribute to a more engaging learning experience for students (Harackiewicz **et al.**, 2018).

Home-Related Factors. According to Cole (2017), education begins at home. The responsibility to nurture and educate children is a shared obligation between parents and schools. Parents must be involved and participate in the educational process for a child to achieve academic achievement. The more parents are involved in their children's education; the more students are likely to become productive members of society and achieve academic excellence.

Environmental factors, such as parental support, family structure, socio-economic status, parents' education, and family culture, significantly contribute to a learner's performance at school. Recent studies have found that parental involvement positively impacts children's academic performance (Abaidoo, 2018). However, McNeal (2014) stressed that parent involvement directly affects the students' attitudes but indirectly influences their academic performance.

In Ghana, Chowa et al. (2013) concluded that parental involvement is categorized into home-based and school-based. By then, it was conceptualized that there was a negative relationship between school-based parental involvement and academic performance. However, Mante (2015) argued the findings by postulating that parental involvement directly affected students' academic performance. The findings from the study of Marshall and Jackman (2015) affirmed the idea of Cole that there is a positive relationship between parental involvement and students' engagement at school, resulting in higher academic performance. The result is similar to the study conducted in Pakistan by Rafiq et al. (2013), which concluded that parental involvement significantly affects students' academic performance.

Meanwhile, Jafarov (2015) stated that parental involvement also denotes the amount of school participation invested in obtaining children's academic growth and engagement. However, some factors lead to poor parental school involvement, as follows: parental educational background, lack of knowledge about the curriculum, lack of time, children's desire for independence, family structure, and parenting style.

For further discussion about home-related factors affecting students' academic performance, the researcher believed that the following are strong indicators of students' learning in the Chemistry subject:

Parents' Education. One of the characteristics that may affect the value of parental involvement in students' academic performance is the level of education attained by their parents. Various studies describe that the parents' education level plays a significant role in the amount of parent involvement. More findings described that students raised by highly-educated parents would have better grades in school (Asad Khan et al., 2015).

Family Income. A group of Japanese researchers has postulated that family income level affects a child's academic achievement. There were claims that children in middle- and lower-class families tend to receive limited time to deal with the different academic issues due to time constraints and other priorities in the family. Parents with heavy work schedules and domestic obligations are more likely to be less efficient in providing learning support. In this connection, the study of Machebe et al. (2017) revealed that most students raised by financially buoyant families achieved higher grades and were more engaged in school.

Home Location. In a study conducted by Mhiliwa (2015) in Eastern Africa, it was found that the longer distance traveled by the students to school made them reach school late with an empty stomach and exhausted. It was speculated that the long travel has led to the mass failure of most students due to tardiness. This predicament has worsened, resulting in a high drop-out rate in secondary schools in Makambako Town Council, Njombe, Tanzania. Drawn from the findings, improvement in education provision (e.g., providing school buses) was highly suggested to local school council members. Educational institutions are directly linked with society at large. They are the temples of knowledge, where social change and transformation usually occur. The school is highly responsible for value formation and developing the learners' capabilities to understand instruction. Hence, students spend most of their lives at school (Lawrence and Vimala, 2012). Thus, the school community is also considered one of the significant factors in student learning through social influences.

School-Related Factors. As viewed by Nuqui et al. (2015), school-related factors could significantly influence the learning of the students, including the schools' facilities and instructional materials. In addition, the school setting and improvement plan also addressed that 21st-century schools need to focus on dual missions continuously. This plan includes providing a classroom and school environment that addresses all students' developmental needs and providing

a "hub" for additional support services to ensure that high-risk students get on track academically toward a successful future. Hence, public schools often experience a lack of books, classrooms, other instructional materials, and essential school facilities.

Aside from the students' individuality and parental involvement, the school climate is one of the factors in how a learner performs at school. Maxwell et al. (2017) view the school climate construct as complex and multi-dimensional. It has been described as a school's unwritten characteristics and atmosphere, including its norms, values, and expectations. In the same view, Harinayaranan and Pazhanivelu (2018), the school creates a variety of influences on students' learning through the curriculum, teaching techniques, relationships, and the availability of school facilities and learning resources.

Academic Complexity. As schools and the overall educational system are complex entities, teaching and learning contexts must be accountable and appropriate to cater to the needs of the ever-changing, modernized society (Trombly, 2014). By how the subjects are organized, students can be more engaged when educators recognize the learners' individuality. Regarding retention, students vary in terms of their abilities to absorb and respond to instruction, particularly in Chemistry. However, class programs that are scheduled and patterned for the convenience of the teachers and learners can still motivate a learner. Hence, a conducive school environment is intended for all stakeholders.

School Safety. Educational institutions are the cradles of formal education. These are the avenues for learning, career development, and training, where safety for all entities is one of the prime concerns. Anent to this, researchers from the University of Southern California (USC) and Bar Ilan University in Israel found that schools with a lesser occurrence of violence were able to increase their students' literacy level (McIntyre, 2016).

Relationship. According to Sparks (2019), students spend more than 1,000 hours with their teachers in a typical school year. The time spent is one of the reasons why a teacher-student relationship is essential in education. Moreover, educators should display a sense of belongingness with their students (and vice-versa) to emulate a harmonious school climate where the entities can openly communicate in a more extensive forum.

Aside from the aspects mentioned above for school-related factors, the adequacy of school facilities and the sufficiency of instructional materials may also contribute to students' learning in all subjects. This notion is derived from the conceptual foundation of Likoko et al. (2013), which postulated that school facilities and instructional materials are vital components of effective teaching and productive learning.

School Facilities. From the article published by Phoenix International School (2018), school facilities can significantly impact teaching performance and student learning results. Being teacher-related, school facilities influence teacher recruitment, retention, commitment, and effort to teach. Concerning students, school facilities may influence health, behavior, engagement,

learning, and an increase in academic achievement. Thus, researchers concluded that without adequate resources and facilities, it is challenging to serve a large number of teachers and learners in a school organization.

Instructional Materials. In delivering instructions between the teachers and students, instructional materials serve as a channel for competency and evaluation. They also serve as a motivating agent in the teaching and learning processes. Instructional materials are vital for teachers, especially inexperienced and new to the teaching profession. In the same view, instructional materials are also significant for students. In relevance to this, Adalikwu and Iorkpilgh (2012) agreed that Chemistry students in Secondary Senior High Schools in Nigeria performed significantly better in the subject than those taught with fewer instructional materials. As to conclusions, it was stipulated that the use of instructional materials generally improved students' understanding of scientific concepts and led to higher learning outcomes among the students in the Cross River State of Nigeria.

Academic Performance

According to Lamas (2015), academic performance is the learning outcome prompted by the teaching activity by the teacher and produced by the student. The Peruvian researcher also cited that academic performance involved meeting goals set in the program or course that a student needs. Schools, colleges, and universities are worthless without students. It is a prevalent concept that students are essential assets for any educational institution. The socio-economic development of any nation is directly linked to the student's academic performance (Mushtaq and Khan, 2012). Hence, education replicates the future and progress of any society. Assessment of student's academic performance is a crucial responsibility among educators. Asking the students to demonstrate their understanding of the subject matter is crucial to the learning process. Also, the evaluation of learning goals and lesson standards is critically linked to the teaching and learning outcomes of the students (Edutopia, 2008). Inevitably, academic performance matters as it indicates a student's academic success. Academically successful individuals who usually earn high levels of education are more likely to be employed. It would be much easier for them to have a stable job, have more employment opportunities and earn higher salaries (Regier, 2011).

II. Methodology

T **Research Design**

This quantitative study employed the descriptive-correlational and descriptive-comparative research design using an adapted questionnaire for the data gathering. This method was employed to ascertain the relationships between the underlying factors and academic performance in Chemistry and the difference in the academic performance between male and female students. Descriptive and inferential statistics were used for the data analysis and

interpretation. The data were presented in tables using frequency distribution, percentile ranking, and the weighted mean as the basis for discussion.

Research Respondents

The respondents included the 60 First Year students of Bohol Island State University-Bilar Campus taking up Bachelor of Science in Agricultural and Biosystems Engineering (BSABE) during the first semester of the academic year 2018-2019. Notably, the researcher is the instructor of the Chemistry subject taken by the respondents. The study used the total enumeration of population sampling technique for the sample size. However, only 60 out of 63 students participated in the survey since the other three were absent during the data collection.

Research Instrument

The study used a three-part questionnaire. The first part focused on the respondents' profile (age, sex, and academic track taken in SHS). The second part focused on the student, home, and school-related academic performance factors. The questionnaire was adapted from the study of Alos, S. B. et al. (2015) entitled Factors Affecting the Academic Performance of the Student Nurses of BSU. The adapted questionnaire has 15 items, with five items per category. In assessing the responses, the study used a 4-point Likert Scale. The adapted questionnaire was pilot tested on 15 first-year students of the same school taking up Bachelor of Science in Environmental Science to ensure its reliability. All the participants during the dry-run process were native residents of Bilar, Bohol. Using Cronbach's Alpha, the pilot tested a reliability test score of 0.88. For the third part, the study used the inventory type of data gathering instrument to assess the adequacy level of school facilities and the sufficiency level of instructional materials. For the adequacy of school facilities, a 5-point Likert Scale was used with the following descriptive values: Not Available (NA), Inadequate (IA), Fairly Adequate (FA), Adequate (A), and Very Adequate (VA). For the sufficiency of instructional materials, the following descriptive values were used: Not Available (NA), Insufficient (IS), Fairly Sufficient (FS), Sufficient (S), and Very Sufficient (VS).

Data Gathering Procedure

A. Pre-implementation Phase. A permission letter was formally forwarded to the Office of the Dean of the Graduate School of Education, University of San Jose-Recoletos, Cebu City. Another letter with the same purpose was formally forwarded to the Office of the Campus Director of Bohol Island State University–Bilar Campus. Another letter bearing the same purpose was formally forwarded to the Office of the Dean of the College of Agriculture and Natural Resources (CANR), Bohol Island State University – Bilar Campus, through the Chairperson of the Department of Agricultural and Biosystems Engineering.

In adherence to the standard protocol prior to the data gathering, ethical considerations were not excluded in the process. The researcher sent a Letter of Request, asking for the student's voluntary participation in the study. In addition, the confidentiality of the collected data was also discussed with the respondents. Hence, the survey was intended for research purposes only.

B. Implementation Phase. The researcher read and explained the mechanics of the survey to the respondents. The research participants were given a maximum of 90 minutes to answer the questionnaire.

C. Post-implementation Phase. The researcher made sure that all questionnaires were completely submitted. All the items were carefully checked to ensure no item was left unanswered. After the retrieval of the answered survey questionnaires, all collected data were coded and tabulated.

Statistical Treatment

After the data gathering, the researcher tabulated all the responses using various statistical methods to generate the research findings and arrive at a definite conclusion. For the statistical treatment, the study used the following:

Percentage. The researcher computed the percentage to determine the quantitative relation to the overall response for the respondents' profiles. Computing the percentage rate is the process of dividing the frequency (sum of responses) by the total population and then multiplying by 100.

Weighted Mean. This statistical computation measures the average response of a given data. The researcher computed the weighted mean to determine the extent of student’s assessment of the underlying factors of academic performance, the assessment of the adequacy of school facilities, and the sufficiency of instructional materials in Chemistry.

Chi-square Test (Two-Way). The researcher used the Two-way Chi-square Test to determine the significant degree of relationship between the respondents’ profile and the level of the respondents’ academic performance.

Pearson Product Moment Correlation Coefficient. The researcher computed the value of r to determine the significant degree of correlation in the following: extent of the respondent's assessment of the factors of academic performance and academic performance in Chemistry, adequacy of school facilities and academic performance, and sufficiency of instructional materials and academic performance in Chemistry.

T-test (Independent Samples). The researcher computed the t-value to determine the significant degree of difference in the respondents' academic performance in Chemistry when grouped according to sex.

III. Results and Discussion

Profile of the Respondents

Table 1 presents the profile of the respondents regarding their age, sex, and chosen academic track during Senior High School. The study used the frequency count in determining the percentile distribution of respondents.

Table 1
Profile of the Respondents
n=60

Age	Frequency (f)	Percentage (%)	Rank
18 years old	20	33.33	2
19 years old	34	56.67	1
20 years old and above	6	10.00	3
Total:	60	100.00	
Sex	Frequency (f)	Percentage (%)	Rank
Male	26	43.33	2
Female	34	56.67	1
Total:	60	100.00	
Academic Track	Frequency (f)	Percentage (%)	Rank
GAS	20	33.33	2
HUMSS	2	3.33	4
Old Curriculum	2	3.33	4
STEM	2	3.33	4
TVL	34	56.67	1
Total:	60	100.00	

For **Age,** there were 20 out of 60, aged 18 years old, which comprised 33.33% of the respondents' total population. There were 34 out of 60, aged 19 years old, which comprised 56.67% of the respondents' total population and there were only 6 out of 60, with an age of 20 years old and above. The result means that the majority of the research respondents were under 20 years old. Moreover, the result also implies that most of the First Year Bachelor of Science in Agricultural and Biosystems Engineering (BSABE) students of Bohol Island State University-Bilar Campus had completed their secondary education approximately at the age of 18.

For **Sex,** there were 26 males, which comprised 43.33% of the respondents' total population and there were 34 females, which comprised 56.67% of the respondents' total population. The result means that the majority of the first-year students taking the course during the first semester of the academic year 2018-2019 were women.

For **Academic Track,** 20 out of 60, which comprised 33.33% of the respondents' total population had chosen the General Academic Strand (GAS). There were 34 out of 60, which comprised 56.67% of the respondents' population who had chosen the Technical Vocational Livelihood (TVL) Track. There were 2 out of 60, which comprised 3.33% of the respondents' total population who had chosen Humanities and Social Sciences (HUMSS), Science, Technology, Engineering, and Mathematics (STEM) and similarly, there were 2 out of 60, who finished their secondary course by the time the Old Curriculum was used. The result means that the majority of the first-year students taking the course were inclined to technical-vocational education. In summary, results revealed that the study has a cohort of respondents aged below 20 years old. Moreover, the majority of the respondents were females. Furthermore, the majority of the respondents took Technical-Vocational Livelihood (TVL) courses during senior high school.

The Underlying Factors of Learning in the Three (3) Dimensions

Table 2 presents the responses of the students for student-related factors, home-related factors, and school-related factors. The study used the weighted mean to determine the average response in every dimension of the underlying factors of learning.

Table 2
The Underlying Factors of Learning in the Three (3) Dimensions
n=60

STUDENT-RELATED FACTORS	WM	DV	Interpretation	Rank
1. I study only when there is a quiz	3.28	STA	High Impact	1
2. I feel bored during discussions in Chemistry subject.	2.13	SLA	Low Impact	5
3. I prefer listening to the radio, watching television, and using gadgets than studying my lessons in Chemistry.	3.25	STA	High Impact	3
4. I study only whenever I feel comfortable about a specific topic in Chemistry.	3.27	STA	High Impact	2
5. I study only when I like because Chemistry is a difficult subject.	3.15	MA	Moderate Impact	4
Composite Mean	3.02	MA	Moderate Impact	
HOME-RELATED FACTORS				
1. Although I live near/far from school, I tend not to care about punctuality in class.	2.15	SLA	Low Impact	5
2. I cannot rely on my parents for my lessons in Chemistry.	3.32	STA	High Impact	2
3. My parents are busy with their job.	2.67	MA	Moderate Impact	3
4. At home, I have many tasks to attend to.	3.45	STA	High Impact	1
5. I am distracted when studying at home.	2.57	MA	Moderate Impact	4
Composite Mean	2.82	MA	Moderate Impact	
SCHOOL-RELATED FACTORS	WM	DV	Interpretation	Rank

1. Academic complexity distracts my attention in learning Chemistry.	3.27	STA	High Impact	1
2. The available learning resources in Chemistry in the school library are insufficient.	2.43	SLA	Low Impact	2
3. The physical arrangement of the classroom is not well-organized.	2.02	SLA	Low Impact	4
4. The school premises are not completely free from any violence.	2.17	SLA	Low Impact	3
5.The instructor in Chemistry is not approachable.	1.68	D	No Impact	5
Composite Mean	2.31	SLA	Low Impact	
Grand Mean	2.72	MA	Moderate Impact	

Parameter:

1.00 – 1.74 No Impact
1.75 – 2.49 Low Impact
2.50 – 3.24 Moderate Impact
3.25 – 4.00 High Impact

For **Student-Related Factors,** a composite mean of 3.02 was obtained with a descriptive value of "Moderately Agree." The result implies that student-related factors had a moderate impact on the academic performance of the respondents in the Chemistry subject. Based on the findings, it can also be implied that although the students were enthusiastic about listening to their instructor during lectures/discussions, there is a need to improve their study habits. Thus, being diligent in studying every topic in Chemistry is essential for literacy and skills acquisition in the subject.

Apparently, this idea affirms the statements of Illahi and Khandai (2015), which postulated that students with good study habits are more engaged and can learn the subject matter faster, and are able to convey his/her learning into the real world. These habits include being organized, persistence in note-taking and reading, attentive listening in class, and regular studying at home. Moreover, the preceding ideas correlate to the notions of Harackiewicz **et al.** (2018), which disclosed that students' interest energizes learning, guides academic and career trajectories, and is essential to academic success. Cheung (2011) also noted that a student's passion for learning is an important variable in evaluating the science curricula. Relating to this, the researcher himself,

strongly agreed with developing a student's positive attitude toward the subject. This suggestion is congruent with the perceptions of many students that Chemistry is one of the most difficult subjects to deal with. However, mitigating the different learning difficulties in the subject cannot be fulfilled in an instant. With this, a collaborative effort of the school community is highly recommended.

For **Home-Related Factors,** a composite mean of 2.82 was obtained with a descriptive value of "Moderately Agree." The result implies that home-related factors had a significant impact on the academic performance of the respondents in the Chemistry subject at a moderate level. Based on the findings, it can also be implied that being overloaded with household chores limited the duration of study hours of the respondents. Thus, it leads to more disruptions in students' time management and focuses to study diligently. Moreover, the result implies that most of the respondents were not able to receive academic assistance from their parents, particularly in Chemistry subject. Anent to this, parents' education and household obligations may be among the hindrances of insufficient parental involvement at school. Similarly, the livelihood and professional commitment of the parents of the respondents also contributed to the insufficient support they provided to their children.

The above-stated speculations correlate to the statements of Cole (2017), which postulated that education begins at home. She insisted that molding a child's education is a shared responsibility between parents and schools. She also suggested that parents must be involved and participate in the educational process in motivating their children to be academically competent. In the same view, the key findings from the study of Asad Khan et al. (2015) showed that the level of parents' education may affect the value of parental involvement in students' academic performance. On the other hand, Japanese researchers claimed that children in middle- and lower-class families tend to receive limited parental support at school due to some other priorities.

For **School-Related Factors,** a composite mean of 2.31 was obtained with a descriptive value of "Slightly Agree." The result implies that school-related factors had a slight impact on the academic performance of the respondents in the Chemistry subject. Based on the findings, it can also be implied that among the factors being cited, academic complexity has contributed a strong influence on student's academic performance in Chemistry. On the contrary, it can also be implied that regardless of how they felt being heavily loaded with academic obligations, the respondents did not experience any problems in communicating with their Chemistry instructor. Thus, it posited no impact on their learning problems in Chemistry. Concerning academic complexity, the result affirms the statements of Trombly (2014), by stressing that the teaching and learning contexts must be accountable and appropriate to cater to the needs of the ever-changing, modernized society. This aspect includes the nature of how the subjects are organized and instructed to the students. Hence, students can be more engaged when educators can recognize the individuality of the learners in coping with the standard of any academic discipline. Getting further, a positive teacher-student relationship bridges the mutual distribution of responsibilities

in any educational setting. As cited by Sparks (2019), students spend more than 1,000 hours with their instructors in a typical school year. Thus, educators should display a sense of belongingness with their students (and vice-versa) to emulate a harmonious school climate, where the entities can openly communicate and relate with one another in wider forums.

The Adequacy of School Facilities

Table 3 presents the data on the adequacy of school facilities and sufficiency of instructional materials in Chemistry that are available at Bohol Island State University-Bilar Campus.

Table 3
Adequacy of School Facilities and Sufficiency of Instructional Materials
n=60

School Facilities	WM	DV	Rank	Instructional Materials	WM	DV	Rank
1. Staff Room / Office	3.42	A	5	1. Text Books	3.28	FS	6
2. Classroom	3.25	FA	8.5	2. Reference Books	3.17	FS	7
3. Stock Room / Supply	2.78	FA	13	3. Laboratory Guides	2.95	FS	8
4. Toilets	3.12	FA	12	4. Graphic Organizers	2.93	FS	9.5
5. Library	3.77	A	2	5.Syllabus / Outline	3.38	FS	5
6. School Grounds	4.10	A	1	6. Handouts	3.52	S	4
7. Gymnasium	3.22	FA	10.5	7. Worksheets	3.58	S	3
8. Clinic / First Aid	3.65	A	4	8. Chalkboards / Chalk	4.00	S	1
9.Laboratory / Equipment	2.50	IA	14	9. Writing Pens	3.82	S	2
10. Working Tables	3.22	FA	10.5	10. Science Kits	2.93	FS	9.5
11. Chairs	3.67	A	3	11. Projector	2.72	FS	11
12. Water Supply	3.35	FA	6.5	12.Transparencies / Films	2.55	IS	14
13. Electrical System	3.35	FA	6.5	13. Audio-Visual Aids	2.70	FS	12.5
14. Ventilation	3.25	FA	8.5	14. Instructional Models	2.70	FS	12.5
Composite Mean	3.10	FA		Composite Mean	3.16	FS	

Parameter:

1.00 – 1.79	**Not Available**	**Not Available**
1.80 – 2.59	**Inadequate**	**Insufficient**
2.60 – 3.39	**Fairly Adequate**	**Fairly Sufficient**
3.40 – 4.19	**Adequate**	**Sufficient**
4.20 – 5.00	**Very Adequate**	**Very Sufficient**

For the **Adequacy of School Facilities,** item no. 6, "School Grounds," obtained the highest rating, with a weighted mean of 4.10. The result means that Bohol Island State University-Bilar

Campus provides an adequate space to host educational events and other academic and co-curricular activities. On the contrary, item no.9 "Laboratory/Equipment," obtained the lowest rating, with a weighted mean of 2.50. The result means that more provisions on laboratory facilities and equipment are highly needed to cater to the needs of university students, specifically in the Chemistry subject. Thus, the composite mean of 3.10 denotes a fair adequacy level of school facilities used in the Chemistry subject. The preceding statements connect with the main idea asserted by Phoenix International School (2018). The article emphasized that school facilities can have a significant impact on teaching performance and student learning results. Concerning this, it is difficult to serve a large number of teachers and learners in a school organization, when school facilities that are available are limited and inadequate to the users.

For the **Sufficiency of Instructional Materials,** item no. 8, "Chalkboards/Chalk," obtained the highest rating, with a weighted mean of 4.00. The result means that Bohol Island State University-Bilar Campus has provided sufficient quantities of chalkboards/chalk that were used during instructional delivery. On the contrary, item no.12 "Transparencies/Films," obtained the lowest rating, with a weighted mean of 2.55. The result means that the utilization of these instructional materials was no longer prevalent on the campus since there are other options like PowerPoint and audio-visual presentations during instructional delivery. Thus, the composite mean of 3.16 denotes fairly sufficient instructional materials in Chemistry that are available at the university. This notion affirms Adalikwu and Iorkpilgh (2012) who concluded that the utilization of sufficient instructional materials in Chemistry generally improved students' understanding of scientific concepts.

The Academic Performance of the Students in Chemistry

Table 4 presents the data on the academic performance in Chemistry among the First Year BSABE students of Bohol Island State University-Bilar Campus, using frequency and percentile ranking as the basis for discussion.

Table 4
Students' Academic Performance in Chemistry
n=60

Scale	Range	Descriptive Value	Interpretation	Frequency (f)	Percentage (%)	Rank
5	1.3 – 1.0	Outstanding	Very High AP	5	8.33	4
4	1.7 – 1.4	Very Satisfactory	High AP	17	28.33	2
3	2.1 – 1.8	Satisfactory	Average AP	29	48.33	1
2	2.5 – 2.2	Fairly Satisfactory	Low AP	7	11.67	3
1	3.0 – 2.6	Poor	Very Low AP	2	3.34	5
		Total		60	100.00	
Mean:		1.81	Satisfactory			

Parameter:
3.0 – 2.6 Poor
2.5 – 2.2 Fair
2.1 – 1.8 Satisfactory
1.7 – 1.4 Very Satisfactory
1.3 – 1.0 Outstanding

As revealed, there were 29 out of 60, which comprised 48.33% of the total population, with a grade ranging from 2.1 to 1.8. The result means that the majority of the respondents garnered a rating not lower than 2.1. Overall, the mean academic performance of 1.81 implies that the respondents performed in the Chemistry subject at an average level only. Therefore, most of the respondents had to study harder to obtain higher grades, particularly in other science-related subjects. Thus, academic performance really matters as it indicates the academic success of a student (Regier, 2011).

The Relationship between the Profile of the Respondents and Their Academic Performance in Chemistry

Table 5 presents the relationships between the profile of the respondents and their academic performance.

Table 5
Relationship between Students' Profile and Academic Performance in Chemistry

Variables	p-value	Alpha level	Result	Ho
Age and Academic Performance	.887	≥0.05	Insignificant	Accepted
Sex and Academic Performance	.079	≥0.05	Insignificant	Accepted
Academic Track and Academic Performance	.000	≤0.05	Significant	Rejected

As revealed, it is clearly understood that age and sex had no significant influence on the academic performance of the respondents. However, the result revealed that the chosen academic track during Senior High School is a key determinant of the level of academic performance of the students in Chemistry. For **Age,** the result affirms the study of Onuekwusi (2015), which revealed that age is not a key determinant of students' academic performance in Nigerian schools. For **Sex,** the result affirms the study of Joseph et al. (2015), which postulated that sex has not influenced the academic performance among the students in Chemistry who were taking up Computer Studies in Nigerian schools. For the **academic track,** the result affirms the study of Palafox et al. (2018), which showed that Accountancy and Business Management (ABM) Senior High School students of Malacampa National High School, Camiling, Tarlac, Philippines, perceived that they were the most competent learners in their school because of the track they have chosen.

The Correlations between the Underlying Factors of Learning, Adequacy of School Facilities, Sufficiency of Instructional Materials, and Academic Performance in Chemistry

Table 6 presents the statistical results of the correlations between the main variables of the study

Table 6
Correlation between the Underlying Factors of Learning, Adequacy of School Facilities, Sufficiency of Instructional Materials, and Academic Performance in Chemistry

Variables	p-value	Alpha level	Result	Ho
Student-Related Factors and Academic Performance	.00001	≤0.05	Significant	Rejected
Home-Related Factors and Academic Performance	.00035	≤0.05	Significant	Rejected
School-Related Factors and Academic Performance	.00039	≤0.05	Significant	Rejected
Adequacy of School Facilities and Academic Performance	.78555	≥0.05	Insignificant	Accepted
Sufficiency of Instructional Materials and Academic Performance	.44777	≥0.05	Insignificant	Accepted

As revealed, it is clearly understood that all of the three (3) underlying factors of learning had a significant impact on the respondents' academic performance in Chemistry, since the p-values (0.00001, 0.00035, and 0.00039) are below the alpha level of 0.05. Thus, the null hypotheses were rejected. The results imply that the respondents' capacity to perform in the subject can be multi-dimensional or can be influenced by student-related, home-related, and school-related factors at the same time. On the contrary, the p-values of .785 and .447 are beyond the alpha level of 0.05. Thus, the null hypotheses are accepted. The results mean that the adequacy of school facilities and academic performance and the sufficiency of instructional materials and academic performance were insignificantly correlated with each other. Moreover, the present study reveals that the adequacy level of school facilities and sufficiency of instructional materials did not influence the level of the respondents' academic performance in Chemistry. Similarly, the result opposes the conceptual foundation of Likoko et al. (2013), which postulated that the adequacy of school facilities and instructional materials may also contribute to the level of students' academic performance in all subjects.

The Difference in Students' Academic Performance in Chemistry When Grouped According to Sex

Table 7 presents the statistical result on the difference between the academic performance of male and female students in Chemistry.

Table 7
The Difference in the Academic Performance Between Male and Female Students

Variables		n	Mean Rating	p-value	Alpha Level	Result	Ho
Academic Performance	Males	26	1.88	.218	≥0.05	Insignificant	Accepted
	Females	34	1.77				

Findings revealed no significant difference in the academic performance in Chemistry between the male and female students since the p-value of .218 is beyond the alpha level of 0.05. The result means that the students manifested equal performance in the subject regardless of their gender Thus, the null hypothesis is accepted.

IV. Conclusion

Based on the study's major findings, the theoretical implications of Social Constructivism Theory were very evident. Notably, students' attitudes and interest in learning, parental support and domestic obligations, academic complexity, the availability of learning references, and the chosen academic track during Senior High School significantly affected the academic performance of the first year Chemistry students taking up Bachelor of Science in Agricultural and Biosystems Engineering at Bohol Island State University-Bilar Campus, during the first semester of the academic year 2018-2019. However, the profile on age and sex, the adequacy of school facilities, and the sufficiency of instructional materials did not affect the academic performance of the respondents in the Chemistry subject. Further, there is a need to conduct another investigation using a wider array of variables to determine how academic performance is affected by these factors.

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