



Bridging Completion and Senior High School Education: Exploring Grade 10 Competencies for Senior High School Success

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ABSTRACT

This study looked into the level of science skills and competence of Grade 10 students to bridge completion to senior high school. Mixed method was used to evaluate the level of science skills and competence of Grade 10 students to bridge completion to senior high school. Questionnaire and interview guide were used to gather data regarding the level of science skills and competence of the students. Science exhibited a lower level of MELC. The learning competencies in science were less attained. It was discovered that the MELC level in Science 10 differs significantly according to employment status of their parents, school affiliation and strand. The majority of respondents said that they were having difficulty with science because of the subject matter, the teaching method, and the available resources. In addition, several respondents found the curriculum, teacher and parental involvement, student motivation, and cognitive ability to be challenging. Regarding the effects of these difficulties, they claim that indolence, lack of interest, and a lack of mastery of the material. The results suggest that the government should provide programs and interventions to meet the requirements of students, particularly in education.

Keywords: Socio- demographic profile, MELC, skills, competence, teaching method, learning environment, challenges, impact, intervention and education

INTRODUCTION

Background of the Study

The future of every person is shaped in large part by their education. It is widely believed that education is one of the cornerstones of a better life. It gives one the ability to handle life. As a result, one of the government's primary goals is to benefit society by giving kids access to pertinent education that would enable them to become more prolific and globally competitive learners.

One of the objectives of the K to 12 curricula in the Philippine education system is to ensure that every grade 12 graduate is prepared for tertiary education. Entering senior high school is a crucial part of every learner's journey. A vital a lot of individuals think that obtaining a top-notch education is necessary for success in life. One of the most important things one can accomplish in life is to get higher education (Reyes et al., 2023). It is necessary to determine academic preparation in order to achieve this aim, which raises the question of whether all Grade 10 learners are prepared for the demands of transitioning to senior high school. Since a student's academic walkthrough depends on making the transition from junior high to senior high school, this is a frequently asked question. These kids will be better equipped to tackle their last years of high school if they have a clear understanding of the various capabilities.

The skills that students acquire in grades 7 through 10 are thought to be the cornerstone that will enable them all to succeed in post-secondary education. These include critical thinking and problem-solving, ethics and values, work ethics and readiness, language proficiency, math, science, social studies, and technology and livelihood education; personal and social competencies like self-management, interpersonal skills, and adaptability; career awareness and planning like career exploration and entrepreneurial skills; physical and health education like fitness and health education; and information and communication technology (ICT) competency like digital literacy.

The competencies listed above provide students with the necessary support to thrive in their pursuit of higher education. Nevertheless, unless the student makes an effort to succeed, this does not ensure overall success. Unquestionably, the procedure will close a variety of academic inequalities, including those related to household adult education, racial inequality, and economic inequality (Hung et al., 2019).

The K-12 curriculum of the Philippine Department of Education (DepEd) is split into two sections: basic education and senior high school. Students must fulfill the required competencies for both. Students will move from junior high school to senior high school (Grades 10-SHS) during this phase. In the framework of the K-12 curriculum, which attempts to provide students with the skills they need for further education, employment, or entrepreneurship,

this shift is essential (DepEd, 2013). To ensure a seamless transition from junior high school to senior high school, pupils must enroll in separate academic tracks. This is a crucial issue. As a result, they require a variety of competencies.

Assessing learners' knowledge of the various abilities is a crucial step in determining whether or not they are prepared for senior high school. Learners from lower and medium class backgrounds are served by Tanudan National School, Tanudan Vocational School, and Taloctoc General Comprehensive National High School. Therefore, it is not a given that learner education will be supported by financial stability. This motivated the researcher to carry out this investigation in order to ascertain the present state of academic proficiency and skills among Grade 10 students as they get ready for SHS; to recognize the various obstacles and deficiencies Grade 10 students encounter during the transition to SHS and the ways in which these obstacles affect their success and readiness; and to suggest tactics and actions to improve Grade 10 students' competencies and increase their readiness for SHS.

Education in the province of Kalinga is well ingrained in the customs and culture of the area. Municipalities have varying views on the value of education. Education is a weapon for the people by which they can live a high-quality life. Education makes people easy to govern but at the same time it makes them impossible to be enslaved. Education makes people independent, it increases knowledge, strengthens the mind, and forms character. Moreover, education enables people to put their potentials to optimum use. Education is also a type of reform for the human mind. Without education, the training of the human mind would always remain incomplete.

Education makes a person an efficient decision-maker and a right thinker. Moreover, this is possible only with the help of education. This is because education acquaints an individual with knowledge of the world around him and beyond, besides teaching the individual to be a better judge of the present. A person that receives education shall have more avenues for the life of his choice. Moreover, an educated person will be able to make decisions in the best possible manner. This is why there is such a high demand for educated people over uneducated people for the purpose of employment. Despite this recognition, there are still many obstacles that children must overcome in order to succeed in school, such as poor academic preparation, high dropout rates, and restricted access to resources (Gonzales, 2018). This emphasizes how crucial it is to determine whether pupils in Grade 10 have the skills needed to succeed in senior high school and beyond.

Research Questions

This research aimed determine the level of science skills and competence of Grade 10 students to bridge completion to senior high school. Specifically, this study aims to address the following research questions:

1. What is the profile of the learners as to:
 - a. sex
 - b. work status of parents
 - c. School affiliation
 - d. Strand
2. What is the level of attainment of MELC Science 10 of the students according to their profile?
3. Is there a significant difference on the level of MELC Science 10 of the students according to their profile?
4. What are the challenges on skills, competence, teaching methods and Learning environment that either facilitate or hinder Grade 10 Students in engagement and comprehension of Science and Technology (S & T)?
5. How are these challenges impact their readiness in preparation for their senior high school level?
6. What intervention program that involves innovation in teaching science and technology will be proposed to enhance the science skills of the learners?

METHODS

Research Design

Mixed-method of quantitative research method particularly the descriptive design and the qualitative method which is appropriate for this study to saturate the needed first-hand data from the Grade 10 students on their current level and challenges in absorbing the different competencies necessary to prepare them for senior high school.

Participants of the Study

The study respondents were the grade 10 students from the three Secondary schools at Tanudan, Kalinga Province; Tanudan National School, Tanudan Vocational School, and Taloctoc General Comprehensive National High School.

The respondents were chosen through convenience sampling. It is a non-probability sampling where respondents will be chosen because they are convenient data sources for the researcher. There was a total of 54 students.

Instrumentation

The researcher adapted the challenges in Learning Science Questionnaire (CLSQ) developed by the researchers Sadera, et, al. (2020). The first part consists of the demographic profile of the participants. The profile of the students includes school and sex. The next part is the respondents' problems in

learning science, which include using mixed methods Student Motivation, Student Cognitive Ability, Teacher Characteristic, Subject Matter Content, Medium of Instruction, Learning Environment, Curriculum and Parental Support. The adapted survey questionnaire was subjected to construct and content validity where three experts was chosen to check the consistency of the items in each variable.

The researcher utilized an informal interview guide in collecting the data. The open-ended interview questions the required participants to narrate their challenges and experiences before transitioning to senior high school and how these challenges impact their readiness for success. Further, information validation will be done through a Focus Group Discussion to confirm the veracity of the collected data through interviews with the participants.

Data Gathering Procedure

The researcher sought approval from her adviser and College to proceed with the data collection. Observance of the ethical considerations is paramount to protect human beings as subjects of studies and to maintain the confidentiality of the information to be collected. However, the researcher will not be using any human being as the subject of any experimentation.

The questionnaire was administered to the respondents by the researcher so that she could explain the parts that could not be understood by the respondents.

Ethical Consideration

The researcher submitted the proposal for approval to the office of school principal before permission was granted. The parents of the learners were given an informed consent prior to the conduct of the research. The researcher ensured that all participating learners were not be harmed in any ways like posting their performance of the board for public viewing or announcing the lowest scores. The privacy and confidentiality of the learners was maintained during the intervention period.

Analysis of Data

The collected data were subjected to descriptive statistics particularly the percentage and means to describe the level of challenges of the students. The phenomenological analysis for the impact of the challenges. This analysis is appropriate to find similarities in the statements of participants.

To interpret the weighted mean, the following scale is used. The interval in this scale is computed as: where 4 is the highest and 1 is the lowest number in the Likert Scale used in this study.

Scale	Weighted Means/Equivalent	Corresponding Remarks
4	3.25-4.0	Very Much Attained
3	2.50-3.24	Much Attained
2	1.75-2.49	Less Attained
1	1.0-1.74	Least Attained

Furthermore, to find out for the significant difference, ANOVA and t-Test were used.

RESULT AND DISCUSSION

This study sought to analyze the level of challenges on skills, competence, teaching method and learning environment of the Grade 10 students in learning Science and Technology, describe the impact of the challenges to the students and explore the intervention program that involves innovation in teaching science and technology among grade 10 students.

Table 1. Socio- Demographic Profile of the Respondents

	Frequency	Percentage
Sex		
Male	27	50.00
Female	27	50.00
Employment Status of Parents		
Employed	14	25.93
Unemployed	40	74.07
School Affiliation	26	48.15
Tanudan National High School	17	31.48
Tanudan Vocational School	11	20.37

Talococ General Comprehensive National High School		
Strand		
ABM	3	5.56
HUMSS	37	68.52
STEM	11	20.37
TVL	3	5.56

The males and females are equally distributed. However, the parents of the vast majority of respondents do not have a job. According to the profile, Tanudan National High School is where the majority of the respondents come from. Since grade 10 students will be the ones getting ready for senior high school, they are the respondents. They are in charge of selecting the senior high school track that will best prepare them for their future course of study. These showed that the majority of them favored the social sciences and humanities strand.

The Level of Attainment of MELC Science

Table 2. Level of Attainment of MELC Science among Grade 10 Students

Most Essential Learning Competencies	Mean	Description
1. Describe and relate the distribution of active volcanoes, earthquake epicenters, and major mountain belts to Plate Tectonic Theory	2.44	Less Attained
2. Describe the different types of plate boundaries	2.15	Less Attained
3. Explain the different processes that occur along the plate boundaries	2.06	Less Attained
4. Describe the possible causes of plate movement	2.31	Less Attained
5. Enumerate the lines of evidence that support plate movement	2.30	Less Attained
6. Compare the relative wavelengths of different forms of electromagnetic waves	2.11	Less Attained
7. Cite examples of practical applications of the different regions of EM waves, such as the use of radio waves in telecommunications	2.15	Less Attained
8. Explain the effects of EM radiation on living things and the environment	2.17	Less Attained
9. Predict the qualitative characteristics (orientation, type, and magnification) of images formed by plane and curved mirrors and lenses	2.15	Less Attained
10. Identify ways in which the properties of mirrors and lenses determine their use in optical instruments (e.g., cameras and binoculars)	1.94	Less Attained
11. Explain the operation of a simple electric motor and generator	2.06	Less Attained
12. Explain the role of hormones involved in the female and male reproductive systems	2.09	Less Attained
13. Describe the feedback mechanisms involved in regulating processes in the female reproductive system (e.g., menstrual cycle)	2.07	Less Attained
14. Describe how the nervous system coordinates and regulates these feedback mechanisms to maintain homeostasis	2.30	Less Attained
15. Explain how protein is made using information from DNA	1.96	Less Attained
16. Explain how mutations may cause changes in the structure and function of a protein	2.19	Less Attained
17. Explain how fossil records, comparative anatomy, and genetic information provide evidence for evolution	2.02	Less Attained
18. Explain the occurrence of evolution	1.80	Less Attained
19. Explain how species diversity increases the probability of adaptation and survival of organisms in changing environments	1.85	Less Attained
20. Explain the relationship between population growth and carrying capacity	1.78	Less Attained
21. Investigate the relationship between: 1. volume and pressure at constant temperature of a gas, 2. volume and temperature at constant pressure of a gas, 3. explains these relationships using the kinetic molecular theory	1.69	Least Attained
22. Recognize the major categories of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids	1.81	Less Attained
23. Apply the principles of conservation of mass to chemical reactions	1.70	Least Attained
24. Explain how the factors affecting rates of chemical reactions are applied in food preservation and materials production, control of fire, pollution, and corrosion	2.04	Less Attained
Total Average Weighted Mean	2.05	Less Attained

The most essential learning competencies were less attained.

The next generation of artists, scientists, intellectuals, innovators, and leaders will be students. In addition to conceptualizing and building a new tomorrow, they will have to solve the challenges of the present. In order to give students the information, abilities, and attitudes they will need to successfully navigate their individual learning, living, and working journeys, competencies are essential.

In situations that are new or difficult, students apply and grow their competencies. Competencies enable students to expand on their knowledge, abilities, and ways of thinking. Through learning experiences and subject-area content, children in school acquire and apply competencies.

It was presented on the table above that majority of the most essential learning competencies in Science 10 were less attained. The topic on earthquakes and volcanic eruptions ranked first which was found to be less attained. However, there were two competencies found least attained which is more on chemical reactions and have been ranked 24. Indeed, It has been found out that the learning competencies in science 10 have been very difficult and complicated. All of the respondents was being challenge and found it difficult to study the MELC in Science 10. This findings was supported by the study of Delos Santos, et.al. (2021) states that teaching the students of today's generation has been a perennial challenge for the teachers, particularly in providing these students the core competencies to be more globally competitive and functionality literate in science and in biological disciplines in particular. Another is low content knowledge in science, particularly biology, is a major issue that science students encounter. The Großschedl et al. (2014) study supports this, stating that helping students advance their knowledge of subjects like biology is the most difficult aspect for teachers. They stated that various elements, including pupils' prior knowledge, IQ, and drive, influence these challenges.

There are indications that males have achieved more, while females have achieved less and also with female have achieved more, while males have achieved less. This shows that there are learning competencies in which both men and women perform exceptionally well. It was implied that acquiring competency is still a challenge for both men and women. This findings was supported by the study of Abdelrahman, Rasha M.(2020) found out that according to metacognitive understanding, women scored considerably higher than men on the two measures of metacognitive awareness. Compared to men, women reported higher levels of academic extrinsic motivation. Since some research reveal women have higher metacognitive skills than males, the results also show that there is no gender consensus for metacognitive skills at different levels of schooling (Akin, 2016; AIHilawani, 2001; Ciascai & Lavinia, 2011). However, some studies (Chantharanuwong et al., 2012; Demirel et al., 2015; Hemdan, 2012; Memonun & Akkaya, 2009) conclude that men and women do not differ in metacognitive activity. This conclusion is strengthened by the fact that the one factor analysis of variance (ANOVA), which is used to assess the relationship between metacognitive skills and gender, shows no significant differences between men and women (Duván Ferney Merchán Garzón, et.al.,2020).

Significant Difference on the Level of Attainment of MELC Science among when grouped according to profile

Table 2. Significant Difference on the Level of Attainment of MELC Science among when grouped according to profile

Profile	p-value	Interpretation
Sex	0.16	Not Significant
Employment Status of Parents	0.00	Significant
School Affiliation	0.00	Significant
Strand	0.00	Significant

Significant difference was revealed by the table above that there were significant difference in the level of attainment of the MELC in Science as to employment status of parents, school affiliation and strand. No significant difference was found according to sex. However, Rasha (2020) found out that according to metacognitive understanding, females scored considerably higher than males on the two measures of metacognitive awareness. Compared to men, women reported higher levels of academic extrinsic motivation. Since some research reveal girls have higher metacognitive skills than boys , the results also show that there is no gender consensus for metacognitives kills at different levels of schooling (Akin, 2016; AIHilawani, 2001; Ciascai & Lavinia, 2011). However, some studies (Chantharanuwong et al., 2012; Demirel et al., 2015; Hemdan, 2012; Memonun & Akkaya, 2009) conclude t boys and girls do not differ in metacognitive activity. This conclusion is strengthened by the fact that the one factor analysis of variance (ANOVA), which is used to assess the relationship between metacognitive skills and gender, shows no significant differences between and boysand girls. (Duván Ferney Merchán Garzón, et.al.,2020),

Table 2b. Post- Hoc Analysis on the Significant Difference on the Level of Attainment of MELC Science among Grade 10 Students when grouped according to School Affiliation

		TNHS	TVS	TGCNHS
TNHS	2.61	1		
TVS	2.64	4.5	1	
TGNHS	2.90	0.00*	0.00*	1

Significant difference was revealed between TNHS and TGNHS and between TGNHS and TVS

Table 2b. Post- Hoc Analysis on the Significant Difference on the Level of Attainment of MELC Science among Grade 10 Students when grouped according Strand

	Mean	ABM	HUMSS	STEM	TVL
ABM	3.42	1			
HUMSS	2.44	0.00*	1		
STEM	3.15	0.01	0.00*	1	
TVL	2.74	0.00*	0.00*	0.00*	1

significant difference were found between all the tranches: ABM and HUMSS, STEM and HUMSS, TVL and STEM and HUMSS.

Students' performance was determined by the schools from which they attended. It merely demonstrates that the methods they acquired from their lecturers served as the foundation for their performance. However, as can be seen from the above table, all three schools' students had similar descriptions of their accomplishments; however, Taloctoc General Comprehensive National High School received the highest overall weighted mean (2.91), followed by Tanudan Vocational School (2.64), and Tanudan National High School (2.61). According to certain indications, Tanudan National High School and Tanudan Vocational School received the same rating as less accomplished, however the three schools share the same rating for the majority of the learning skills. This implies that although Science 10's MELC was accomplished, it was not as high as it ought to have been. Focus still needs to be placed on learning competencies. This is inline with the findings of Groves, et.al.(2015) stated that students at universities where the faculty foster an atmosphere that prioritizes good teaching methods are more engaged in their study and feel that their undergraduate experience has yielded more benefits. It was shown that the most significant factor influencing student involvement is the caliber of the relationship between students and their teachers. Additionally, school-related elements, including the availability of learning resources (such as the library, technology support, and Internet services), were the second most important factor. The respondents noted that their active participation has been hampered by the library's small and antiquated collection of books. Additionally, they claimed that the library did not have the reference volumes that their lecturers had recommended. The campus's sluggish and frequently nonexistent Internet connection made matters worse. The respondents emphasized that their poor involvement and disengagement were caused in part by their restricted information sources(Delfino, Armando, 2019).

The strands will advise you on the best course of action for your chosen job. After completing junior high school, every grade 10 student is already considering the strands they wish to pursue. As can be seen from the above table, ABM had the highest weighted mean (3.42), followed by STEM (3.15), TVL (2.74), and ABM (very much accomplished). HUMSS had the lowest weighted mean (2.44), and was defined as less attained. Students find MELC Science 10 more challenging when they wish to pursue the HUMSS strand. However, ABM has been recognized as performing exceptionally well in Science 10. Given that it aligned with the students' strand preferences, this suggests that the learning competencies had been quite challenging. This was supported by the study of Lorenz, George, et al. (2020) found out that students' preferred course was significantly predicted by their academic achievement, peer pressure, parental advice, and job goals. According to their study, students who performed well academically tended to select academic tracks, whereas those who performed poorly favored TVL tracks.

Lorenz et al. (2020) found that academic performance, peer influence, parental guidance, and career aspirations were significant predictors of students' track preference. The study found that students with high academic performance tended to choose academic tracks, while those with lower academic performance preferred TVL tracks. Additionally, Jüttler et al. (2021) discovered that the main determinants of students' track preference were their curiosity, professional aspirations, and perceptions of the track's advantages. According to the survey, students were more likely to select a track if they truly wanted to pursue it.

Challenges on Skills, Competence, Teaching Methods and Learning Environment of the G10 Students in Science and Technology

The challenges encountered by the respondents include student motivation, Student Cognitive Ability, Teacher's Characteristics, Subject Matter Content, Medium of Instruction, Instructional Resources, Curriculum and parental support.

Theme 1: Student Motivation

The issue of student motivation is a common concern for educators, particularly in the field of science. If science is not presented in an engaging and understandable way, students may find it frightening or irrelevant because it is both abstract and practical. Lack of motivation and interest can have a significant impact on students' learning outcomes and subject-matter mastery, even if they may not openly admit it. As a result, the following claims are made:

Student 21. Ipun ganas ko e andongor si itudtudu ni mistala ni. (*I am less interested in our discussion in science*).

Student 7. Amod kimut ni somsomok ko nu dumotong si ulas ni science dallu gay nu dumotong c panggop ni specimen. (*I have psychological fear in science in terms of manipulating specimen in biology that results in problems in learning*).

Student 17. Pattak mappog we angwa si performance task ni si science kan ipun ganas ko e angadar. (*I feel bored while working on our performance tasks in science and I do not enjoy learning science concepts*).

The majority of respondents are not entirely interested in the debate of science, as was shown above. The majority of respondents concurred that they are bored, unmotivated, and afraid when learning science. It has previously been a problem that students cannot grasp learning if they lack enthusiasm in it. The goal and vision of the entire education sector will not be realized because teaching and learning will not be as successful as they should be. These findings were supported by the study of Novianti, Siska, et.al.(2022) found out that the students' dissatisfaction with science was influenced by it is not

an interesting subject to learn, laziness of students due to the teacher's less engaging material delivery, and their lack of enthusiasm for science leading to many students fail to pay attention to what the teacher is teaching during the learning process. It is evident that the students are unable to recap and draw conclusions from the lessons that the teacher has taught them. Moreover, large number of students still lack enthusiasm for learning since they do not want to pursue science-related disciplines and believe that studying science is primarily rote learning. Bedford, Susannah (2017) stated the students were greatly impacted by the motivational aspects, demonstrating the necessity of switching to a growth mindset teaching strategy that makes science relevant to everyday life. Additionally, ignoring the significance of motivation, engagement, and interest in people's involvement and learning can have an impact on whether a project's objectives are reached (Renninger et al., 2018).

Theme 2: Student Cognitive Ability

The fact that students find it difficult to answer science problems, even when they are similar, suggests that many of them are struggling to transfer their knowledge and apply concepts to new situations. This challenge highlights weaknesses in cognitive skills related to understanding and solving problems, which are essential for understanding scientific concepts and methods. Here are a few statements:

Student 13. *Amod kamnut ni angadarak si problem solving uray nu awad sample ak maatod. (I face difficulty in solving problems even when similar examples are given).*

Student 5. *Amod tuntok nu pangop si science. (I have poor conceptual and procedural understanding in science).*

Student 23. *Adiyakpun makaawat si anae e subject adikpun maawatan e dagus isuru ni mistala. (I do not perform well in science and I do not learn things quickly in science).*

According to students' cognitive abilities, the majority of respondents concurred that they had trouble solving difficulties, especially when they are comparable to one another. Some individuals struggle academically, pick things up quickly, and have inadequate conceptual and procedural knowledge of science. The majority acknowledged that other pupils struggle with science in addition to them. Since scientific problem solving requires the use of actual facts or proofs, it has been shown to be challenging. This is inline with the study of Novianti, Siska, et.al.(2022) found out that some students finding science challenging; they believe that the terminologies used in science education make it hard to understand, and they don't receive the most out of their science education. Intelligence is defined as the capacity to learn from experience or adapt to the environment. Additionally, many pupils dislike the content that the teacher teaches them during the learning process. Students' lack of involvement in the learning process and propensity for passive learning are indicators of this. Additionally, Rufaidah, A. (2015) asserts that a student's intellect, or their capacity to accept and solve problems, determines whether they succeed or fail in navigating the learning environment.

Theme 3: Teacher's Characteristic

Students' performance is greatly influenced by their teachers, especially in subjects like science where conceptual understanding and problem-solving skills are crucial. When teachers lack scientific expertise and training, it can significantly impair student engagement and learning outcomes. Bad teaching leads to poor student accomplishment, which feeds a vicious cycle that can further undermine teachers' efficacy and motivation. Here are a few statements:

Student 4. *An kurang ak training mistala ni si science. (My teacher lacks competence and training in science).*

Student 11. *Naipun ganas nae ansuru kan an kulan gak sya si diskarte. (My teacher does not use innovative and engaging teaching strategies).*

Student 16. *Adinapun sya aran an ganasan da uswila na. (My teacher does not stir my interest in my science classes).*

According to the information above, the majority of respondents concurred that their professors are neither qualified or skilled in science. As a result, some people claim that their lecturers don't effectively pique their attention and employ creative and captivating teaching techniques. They also disagreed about their teachers' lack of preparation. These findings was supported by the study of PanoI, Rowena.et.al.(2022) stated that teachers must keep improving professionally as facilitators of students' learning, including in terms of their knowledge and skills. Evaluating teachers' proficiency is crucial to the delivery of education. The development of an efficient academic system and educational performance are significantly influenced by competent teachers. Another issue is the absence of seminar workshops or training programs. They assert that these provisions can give them the background information and understanding they need to feel more confident when discussing controversial evolution-related subjects. Additionally, on the study of Anderman, et.al. (N.D.) presented that science educators lack experience in this area; they must receive training on how to teach scientific writing to their students if they are to be adequately prepared for entry into jobs related to science. In particular, science teachers must integrate particular writing instruction ideas into their science classes.

Theme 4: Subject Matter Content

Given the challenges students have in comprehending science, particularly its complex concepts and procedures, effective teaching strategies and curriculum design are essential. Many of the topics covered by science require intricate connections, abstract concepts, and technical calculations. Teachers need to address these challenges in order to promote higher understanding and mastery. The following are some statements:

Student 9. *Sa gunay nide panangkalkula si pwera kad Komplikadu ya pati de panggop si amin e lubong. (The process of calculating force and motion is complicated and also with the process of energy which is complex in nature).*

Student 17. *Sa anakagwaan amin da anae maila si anwalaw taku ket an kamnut kan amod ligat na. (The symbiotic relationship in the ecosystems is hard to understand as well as the biodiversity and evolution involve complex topics).*

Student 20. Sa talabahu kan parte da amin e kalasin di matatagu c lubong ket adipun maawatan. (*The parts and functions of animal and plant cell are difficult to understand*).

Student. 25. Nu panggop kad c meteorology kad maulawak kan adipun nalawag kan sakon. (*Topics in meteorology are confusing and Topics about heredity are unclear for me*).

Based on the findings, it was decided that the majority of science subjects are intricate and sophisticated, making them challenging for students to comprehend and perplexing. However, there are still some subjects that are easy to understand right away. The majority of scientific concepts, particularly those pertaining to relationships, processes, calculations, functions, and evolutions, require a deep comprehension and mastery of the subject matter from the most fundamental to the most intricate details. It might be challenging to comprehend the existence of something without identifying its underlying cause due to intricate and perplexing procedures. The findings was supported by the study of Jurišević, Mojca, et.al. (2021) explained that Learning science at school is a complex learning task with success depending on several internal (e.g., prior knowledge, ability, personal characteristics) and external factors (e.g., teacher's competences, syllabus, classroom climate). Additionally, the reason science is so hard to learn is because it depends so much on memorization. Students must be able to retain a lot of information in order to comprehend scientific concepts. Those who have trouble remembering things over extended periods of time may find this tough. Moreover, the ability to think abstractly is another necessary talent for learning science. Pupils must comprehend difficult scientific ideas and use them in practical contexts. Those who are more practice-oriented and used to concrete thinking may find this challenging. <https://www.cipcourses.com/blog/why-is-science-so-hard-to-learn/>

Theme 5: Medium of Instruction

Language has a crucial role in the teaching and learning process, particularly in disciplines like physics where precise terminology and conceptual clarity are essential. The challenges associated with scientific terminology and the use of English as a teaching language can have a significant impact on students' understanding and engagement. Thus, the following are some statements:

Student 31. Amod ligat ko e angawat ata udume Scientific terms kan kewaar na. (*I have problems in understanding some scientific terms and processes*).

Student. 44. Nu ansuru mistal ani pasig e English usaronae an ugud. (*My teacher speaks most of the time in English in explaining our science lessons*).

Student 12. Ankamnut angawatak ni utok ko kan adimpun ni utok ko maurmus nu English mausar. (*It is not easy for me to communicate my thoughts in science using English language*).

As previously mentioned, the majority of respondents concurred that scientific phrases are really challenging to comprehend. They also concurred that since the majority of them speak their mother tongue, utilizing English in the teaching and learning process makes it challenging to understand and use for self-expression. Some people stated that learning is ineffective for them because the English language can hinder their comprehension and make it difficult for them to completely articulate what they comprehend. These findings was supported by the study of Vyomakesisri, T, (2017) found out that learning English is not an easy task. The main difficulties in English are related to grammar, pronunciation, vocabulary, slang and colloquialism, sentence structure and alterations, and unfamiliarity with the connotative and denotative meanings of words. Raja, B., & Selvi, K. (2011) assert that the environment is the main cause of learning challenges in English. It is followed by the attitudes and abilities of teachers. Moreover, according to Barnard, D. (2018) stated that pupils' perceptions of words are greatly influenced by the pace at which teachers talk. Understanding the speech rate and modifying it in accordance with the instructions given are so crucial. Additionally, Protacio, Adrian V. (2023) explained that English exposes culturally diverse students (CDSs) in gaining the knowledge and skills required for immediate employment and professional advancement. According to the teachers, English plays a significant role in academia, and speaking English must be ingrained in the culture of any academic institution of higher learning, despite the fact that it is difficult to teach and learn.

Theme 6: Learning Environment

The learning environment has a big impact on students' motivation, engagement, and overall academic success. A supportive and upbeat learning environment can boost students' enthusiasm to participate and try new things, whereas negative elements may make learning more difficult. Here are a few statements:

Student 1. Maapektuwanak si sabali e ugali kanda nakkon da kakagwak ad darom si uswilaan. (*The misbehavior of my classmates in the classroom affects my learning in science*).

Student 36. Nalipilipit ad darom si uswilaan ni isunga ipun ganas ko e an adar si science. (*The large number of students in our class makes it difficult for me to concentrate in learning science*).

Student 26. Adipun gamin usto e naumus ad darom c uswilaan ni sunga adiyakpun an laylayad e angadar si science. (*Our classroom atmosphere does not nurture and inspire my participation in our science class*).

According to the information above, students concurred that their learning is impacted by their peers' misbehavior. The majority of respondents concurred that the classroom environment, especially the vast number of students, disrupts learning, is unsuitable for learning, and does not foster or motivate learning. It was disputed that the teacher's strictness prevented them from engaging in educational activities. These is inline with the findings of Erdem, Cahit, et. Al. (2019) found out that majority of the reported misbehaviors occurred during the instructional period. This is because teachers' interactions with students are primarily restricted to class time; yet, the evidence also suggests that even if misbehaviors take place within class, their impacts persist

outside of the classroom. Additionally, on the study of Shamnadh, M. (2019) found out that misbehavior within the classroom disrupts students' attention and have a negative impact in the teaching learning process.

Theme 7: Instructional Resources

Actually, effective teaching and learning require instructional materials, particularly in science classrooms where understanding complex concepts requires real-world applications and experiments. Inadequate facilities and instructional resources can limit students' learning opportunities and future study preparation while also seriously impeding their engagement with the subject matter. Thus, the following are some statements:

Student 8. Naipun usaron nit e gamit si science isun koma da materyales si laboratory kanda aparatu. (*Our school lacks laboratory apparatuses and tools*).

Student 21. Kulakulang da usaron ni e gamit ad darom si laboratory nu dumotong an experiment kani. (*Our school has inadequate laboratory facilities for our laboratory experiments*).

Student 30. Naipunusaron ni liblu kanda manmanu lang awa materiales wenu aparatu si laboratory. (*Our school has insufficient learner's materials and other reference materials wherein My teacher uses limited instructional aids in teaching science which makes science teaching difficult*).

As previously said, the majority of respondents concurred that schools lack enough educational resources, particularly laboratory equipment and facilities. Additionally, teachers employ fewer teaching resources, which makes science harder to understand. Science requires the direct use of facilities and equipment in order to conduct experiments and determine the results. Having trouble using it could cause them to fall behind when they eventually get their own college course. Some disputed the idea that the school doesn't have adequate funding since they don't support their purchases. These findings was supported by the study of Pareek, Ram Babu (2019) demonstrated that most schools do not undertake science experiments and that laboratory facilities are woefully inadequate, falling well short of expectations. This study also showed that science practical activities are not directly used to measure students' academic ability in the subject because they are not evaluated. It is crucial that funds be made available for the establishment of well-equipped laboratories at educational institutions. Moreover, on the study of Bernardo et al. (2008) explained that science lab apparatus and equipment in the Philippines are insufficient for students to use for practical exercises. The lack of apparatus and equipment in the scientific lab is another issue that science teachers in secondary public schools face, according to Tupas et al. (2020) Furthermore, Orbe, et al. (2018) study showed that the Philippines' K-12 curriculum implementation is hindered by inadequate scientific lab apparatus and equipment, which affects teachers' ability to successfully instruct children. The absence of equipment in the labs prevents the students from conducting the practical experiments.

Theme 8: Curriculum

The curriculum is a crucial component of the educational process because it provides the organization and information needed for effective teaching and learning. A well-designed curriculum should align with the developmental phases of the children to ensure that the information is appropriate and relevant to their requirements. However, if students feel that the curriculum is overly complex or out of line with their grade level, learning can become very challenging. The following are some statements:

Student 45. Sa mistala ni kad an sisiya pyng e an adadjas e aangisuru si k-12 e curriculum. (*My teacher still adjusts in teaching the K-12 spiral curriculum in science*).

Student 27. Sa liknak kad adipun umnu competency si grade level ni. (*I feel that the competencies in the curriculum guide are inappropriate for my grade level*).

Student. 33. Kulakulang osay naitod e oras ni science we subject. (*My science subject has insufficient time allocation*).

The majority of respondents concurred, as previously mentioned, that the existing curriculum guide is out of step with their grade level. The spiral curriculum has an inadequate time allocation, and the teachers are still getting used to it. It is true that the curriculum is still being developed to determine whether or not it is truly successful at raising student achievement. Some respondents, however, disagreed, arguing that the science curriculum is too difficult and complex and does not adequately prepare them for their future careers. It suggests that this presents a significant challenge for the students. These findings was supported by the study of Novianti, Siska (2022) found out that students believe that science is hard to learn and are not motivated to learn because they believe the teacher's material is out of date. This is caused by the teacher giving them material that is not appropriate for their skill level. Teachers play a crucial part in implementing the curriculum, claims Katuuk, D.A. (2014). The primary responsibility of the instructor is to make the curriculum a reality in the learning process's activities. It takes strong and effective management that incorporates professional, pedagogical, personality, and social competency development to build teachers' capacity to implement curricula.

Theme 9: Parental Support

Parental support is one of the most important variables affecting learning. The students may experience psychological effects as a result of this. The Statements below are stated:

Student 9. Adikpun makwa da assignment ko si boroy nit e ipun anurung kan sakon. (*I do not solve science problems at home because nobody guides me*).

Student 46. Nu awad program ani si uswilaan panggop si problema si science adipun umatendar da ama or ak inak. (*My parents/guardians do not attend our science-related programs and school activities*).

Student 23. Naid katurong ko nu kook da project ko si science. (*My parents/ guardians could not assist me in my science projects*).

As said earlier, they all concurred that the indication problems of parental support have an impact on their science education. As previously said, they all contest that their science education is impacted by the indicator issues of parental support. They claim that while their parents are always there to help them with certain aspects of their education, especially money, they are unable to aid them with their projects and other school-related tasks. This is inline with the findings of Fittariet.al. (2020) asserts that students' career planning is strongly correlated with their family's financial status. While pupils in poorer economic circumstances are unable to plan their career path, those in better economic circumstances are able to do so later. Additionally, Novianti (2022) found out that parents who don't give a damn about the learning outcomes that their children achieve and by siblings who don't support their learning when they're having trouble. According to Wiani (2018), a child's personality development is greatly influenced by their family environment since, in contrast to the secondary environment (society), the family environment is the primary environment that has a significant impact on the individual. Therefore, parental support or encouragement is necessary to keep students motivated to learn and attain academic success.

Impact of these Challenges in Preparation for Senior High School

Theme 1. Lack of Interest of Students

Teachers frequently worry about students' lack of motivation in learning. Students may lose interest or enthusiasm in their studies for a variety of reasons, and being aware of these factors can help you deal with the problem more skillfully. Thus, the following are some statements:

Student A. Nu mamingsan ipun ganas ko we c an adar te adikpun maaw-awatan isuru ni mistala. (*Sometimes I don't have interest because I don't like the subject and I cannot really understand the topics that my teacher are teaching*)

Student B. Kada ansuru mistala ipun layad ko kan ganas ko e angadar c process and functions karkarugay panggop c forces. (*Every time my teacher will teach, I am not really interested about processes and functions especially about forces*).

Those children seem to be dealing with some typical learning difficulties, particularly in hard topics like science. Students' motivation and capacity to study might be severely impacted when they are uninterested in the material or find it difficult to understand. According to some students, learning to them is not as effective as it is since their interest is not with the subject. They don't want also some topics discussed in science since they cannot understand especially processes and functions. This was supported by the study of Novianti, Siska, et.al.(2022) found out that the students' dissatisfaction with science was influenced by it is not an interesting subject to learn, laziness of students due to the teacher's less engaging material delivery, and their lack of enthusiasm for science leading to many students fail to pay attention to what the teacher is teaching during the learning process. It is evident that the students are unable to recap and draw conclusions from the lessons that the teacher has taught them. Moreover, large number of students still lack enthusiasm for learning since they do not want to pursue science-related disciplines and believe that studying science is primarily rote learning. Additionally, Naganuma, Shotaro (2021) stated that in the fields of science and mathematics, interest is declining. Science classes tend to cover more material as students move up the grades. Students stated that the requirement for more memorizing was the reason they didn't enjoy science. Additionally, because they stressed memorizing in the limited time available, students tended to memorize knowledge without completely understanding it, which hindered the development of their comprehension.

Theme 2. No Retention/ Mastery of the Subject Matter

More than just teaching knowledge is needed for retention and mastery; students must be engaged, deeper comprehension must be encouraged, and regular practice and application opportunities must be offered. Over time, a move toward more reflective, individualized, and active learning strategies can greatly enhance subject-matter memory and mastery. Here are some statements:

Student A. Adikpun mai-utok de isuru ni mistala ya abus kook isasaud ko basaon kan sisimokon nu dandani quizzes kan exam adipun an ligistru c utok ko. (*The subject matter really not retained since I keep on just memorizing it before quizzes or exam and I don't use critical thinking in analyzing its connection to each other*).

Student B. Ipun ganas ko e angadar c lesan wenu topic ni mistala te dakampun ak sya kalinyaan ni adarok ak osa argaw. (*I am not interested with the subject matter. I don't see its connection or relevance to my career path*).

According to the respondents, they seemed to be under a lot of stress over quizzes and tests, which can make it more difficult for them to learn the content. It is difficult to remember knowledge under pressure when memory is relied upon because it frequently results in superficial comprehension. This is supported by the study of Naganuma, Shotaro (2021) that in scientific lessons, mastering abstract ideas like force, energy, and electricity took precedence over hands-on activities like plant cultivation and craft creation. In contrast to the previously taught material, these ideas are hard to perceive or touch immediately. Additionally, reduced opportunities for hands-on learning, increased memorization, invisibility of information, and mathematical procedures, as well as disengagement from science education and inadequate instruction led to a lack of comprehension of scientific material. The vast majority of the 22 participants said that their distaste for school science was due to a lack of knowledge.

Theme 3. Laziness

Numerous underlying factors can contribute to laziness in learning and studying, and it's critical to recognize that what is sometimes mistaken for "laziness" may actually be a sign of more serious problems including bad study habits, lack of drive, or fear of failing. The following are some statements:

Student A. Nu amingsan adiyakpun lumnok c uswilan te adayu unay c igaw ni kad lamog ko naligsayan ata udum we topic. *(Sometimes I got absent because the school is too far from our home. It is hard for me to enter school everyday so sometimes I don't understand the topics).*

Student B. Patak mappog we angadar c science adipun lumnok c batukag ko sunga naid ganas ko e lumnok ad darom c uswilaan te adipun met miyannatop c piok e aran ak osa argaw. *(I feel tired of learning in science since I don't know its relevance to my future. I Feel bored and not interested so sometimes I don't want to enter and learn the topics that my teacher inculcated to us).*

According to the respondents, their motivation and energy levels may be negatively impacted by the lengthy drive, particularly if they're already feeling overburdened by their coursework. This may lead for them to become lazy sometimes. This is inline with the findings of Audihani, A.L.(2019) explained that one of the requirements that students must meet is being prepared to study. The learning process must take preparedness into account since pupils will find it easier to accept and comprehend the material if that process is coupled with readiness. Students will benefit from the learning conditions of those who are prepared to embrace the lessons that the teacher has taught them; these conditions include motivation, focus, and creation of the preparation. Additionally, on the study of Novianti, Siska, et.al.(2022) found out that the distance between the children' homes and the school, as well as the fact that some students are exhausted following the flag ceremony and lack enthusiasm for the studying process may lead to laziness. Students who are tired will find it difficult to focus and absorb the information in the best possible way. Ilhanda, F. (2021) defines fatigue as a state or condition of the body that is typified by a decreased ability to do an activity, which results in a decreased performance efficiency. Typically, exhaustion and weakness are also present. Students must make an effort to keep their bodies free from weariness in order to learn well.

Theme 4. They do not Value Education

Students' academic performance and general personal growth might be severely hampered when they do not respect education. In order to address this issue, it is necessary to comprehend the underlying causes of students' feelings and identify strategies for assisting them in realizing the value and advantages of education. The are the statements:

Student A. Adu met da adipun nakaadar e tagu ngem namballigi da met c biag dae adipun nanuswila. *(There are successful people who did not enter school. They are not educated but they still made their lives successful. I don't see the connection of the topics I am learning in science for me to become successful someday).*

Student B. Uray nakaadar ka wenu nanggamput ka c uswilaam ket ipun silbi na ta amod rigat ni ansingit ta trabahu sina Pilipinas sunga kaaduwana kan ditaku e nanggamput ata uswila ket magnuwon da umoy da c udume country ankawadi ak katurong wenu babaunon. *(Eventhough you are educated if you don't have job, it is still useless. Some go abroad to be a maid but then they become successful. Some who graduated just be a maid or waiter and etc).*

As stated above, the students frequently find it difficult to relate what they are learning to their future careers. The content may seem less significant if they are unable to relate it to their goals or practical uses particularly if they perceive other routes to success or feel influenced by their surroundings. Indeed, education for the is less important. This findings was supported by Busteed, Stated that beneath the surface, however, is a genuine moral dilemma for our educational system: does it value education and learning, or just the credentials that come with it? Colleges and degrees are at the center of this. It has been an issue in the educational system. Additionally, from the comments on the teachers comments on teachers reddit site (2024), there is a cultural issue in the society's low regard for education and disregard for the knowledge of teachers, there is a resource shortage. The United States has the financial means to reduce class sizes, increase teacher pay, and provide sufficient resources for the classroom. Instead, parents think that they took place litter boxes in classrooms and teach children to be transgender, and they are angry about free school lunches.

Intervention program that involves innovation in teaching science and technology

The following interventions were proposed by the respondents

Intervention Program	Frequency	Percentage	Rank
Remedial Class	54	18.49	1
Role Playing	46	15.75	3
Experimentation	50	17.12	2
Project-Based Learning	33	11.30	6
Use of Technology and Digital Tools	24	8.22	7
Filed Trips	44	15.07	4
Gamified Learning	41	14.04	5
Total	292	100	

Remedial Classes. Students who are lagging behind in their academic achievement, especially in fundamental disciplines like math, science, reading, and writing, are intended to benefit from remedial lessons. In order to help kids catch up to their peers academically, these sessions seek to eliminate learning gaps, improve core abilities, and offer focused support.

The teacher need to do this everyday through one on one session with the use of interactive activities. Giving a lot of examples which can be connected to real-world situations. The utilization of technology, tailored education, small group learning, and multisensory teaching methods give children the resources they need to overcome obstacles and thrive academically. The program creates a constructive and encouraging atmosphere that promotes development, self-assurance, and mastery of fundamental subjects with the help of parents, instructors, and mentors.

Role Playing. A flexible and interesting teaching method that can improve learning in a variety of areas is role-playing. Students are given the chance to gain a deeper understanding of difficult subjects, hone their critical thinking abilities, and apply their knowledge in real-world scenarios by actively participating in them and assuming roles. The teacher gives a role playing on ethical issues in science through debates, weather forecasting and role playing on processes. Students need to be creative in their own way.

Experimentation. An effective teaching strategy that promotes practical experience, critical thinking, and problem-solving in the actual world is experimentation. It gives the students the chance to investigate, ask questions, and test their theories in a safe setting. Experimentation helps students build important skills that they will use throughout their schooling and future occupations while making complex subjects more approachable and interesting by encouraging curiosity and letting them learn by doing.

Project-Based Learning. Engage students in long-term projects where they apply scientific concepts to solve real-world problems. For example, students could work on building models of renewable energy systems or designing experiments to reduce waste in their community.

Use of Technology and Digital Tools. Interactive simulations, virtual labs, and educational apps can bring abstract scientific concepts to life. Using technology can also appeal to students who are more tech-savvy or visual learners.

Field Trips. Taking students to science museums, research centers, or natural environments can spark interest and give them a tangible connection to the subject.

Gamified Learning. Use educational games or incorporate elements of game design (points, levels, rewards) into lessons to make learning more engaging and fun. Games can stimulate interest and motivation by making learning feel like a challenge rather than a chore.

CONCLUSION

The objectives of Science were less attained . The students differed in the attainment of science where the STEM students attain higher than the others. The challenges were along subject matter, instructional medium, and instructional materials students' cognitive and motivational abilities. Due to their lack of interest, they were unable to retain or master the material. Therefore, an intervention was suggested by the .

RECOMMENDATIONS

The Department of Education in collaboration with other stakeholders must institute strict measures to support the needs in every schools. This would go a long way to ensure that the learners would be motivated much in learning science. LGU should see the needs of the students who came from far areas going to school.

The school should provide an opportunity foe the students to be able to cope up with their lacking, moreover stakeholders and partner agencies should give support to the needs of the students not only morally, financially but intellectually.

The School Head, Teachers, Parents and other Stakeholders must be in constant communication and collaboration to obtain the relevance value of formal education, learners security and to ensure that every learners stay in school and study.

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