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Science performance predictors of the first batch of the K-12 curriculum in Valencia District, Negros Oriental, Philippines

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Abstract

The authors designed and conducted this study using the predictive analytics to determine the different science performance predictors of the first batch of K to 12 curriculum in Valencia District, Valencia, Negros Oriental. The authors had chosen three kinds of predictors namely; student-related predictors, teacher-related predictors, and school-related predictors. For the student-related predictors, parents' educational attainment, parents' occupation, family income, IQ level, learning styles and previous grade level science performance. The teacher-related predictors include teachers' educational qualifications, length of science teaching experience, relevant science trainings and seminars attended, and exposure to access internet connection. On the other hand, the school-related predictors include the type of school, class size, ratio of science books to number of students and conformity of science laboratory equipment and apparatus to K to 12 standards. The authors had randomly chosen 311 student-respondents and 8 teacher-respondents coming from four public and two private secondary schools of Valencia District. Questionnaires that were tested on its reliability and validity were used in this study. The collected data were then interpreted and analysed using appropriate statistical tools. Students' previous science performance, parents' educational attainment, parents' occupation, intelligence quotient (IQ), teachers' educational qualification, number of years in science teaching experience, levels and numbers of seminars and trainings attended and teachers' internet access significantly predict the level of students' performance in science; thus, they are considered as predictors. However, learning styles, class size, parents' occupation, type of school, student-book ratio, and conformity of science equipment and apparatus cannot predict students' level of performance.

Keywords: Science performance; predictors; k-12 curriculum

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1. Introduction

Science greatly influences our lives today. Wherever we may go or whatever we do, it is always part on it. It has really brought many changes to our lifestyle. The food that we eat, the clothes we wear, the gadgets we have, or we may say, the simple and complex things that we have are the products of science and technology. These are the products of the hard works of our diligent scientists who continuously conduct researches, proving that science has become highly important to our lives and the key that will lead us towards progress. With these great contributions of science and technology, it should be noted that our schools or educational institutions should also be given credits because almost everybody including the scientists had first learned their science in school. Our schools had been the avenue in promoting science and technology since the time of its existence. They provide the holistic development of the child including their scientific aspects such as scientific knowledge and skills. Due to these facts, science curriculum in high schools has been modified in quantity and quality to adapt to the changes in time.

Science curricula have been improved to keep pace with the challenging world – the fast changing technology and even behaviour and cultures of people all over the world. Advances in science education are seen not only in the so-called First World Countries but even throughout the Asia-Pacific region. While it is true that Asian countries are spending heavily in upgrading the quality education in all levels, it is sad thing to note however that in the Philippines, the quality of education has continuously deteriorated (Fajardosa, 2011). Moreover, according to Cayetano (2012), despite our country allotted themost time to science education in the Southeast Asia, it continues to rank poorly in comparison to other countries in the region. Also, the Philippines ranks seventh among nine Southeast Asian nations in the area of education, science and technology and innovation (Williams, 2013).

The national scenario is a reflection of what is going on in smaller unit of educational system like in the division level or even district level. Teachers, school administrations and supervisors lament over the deteriorating performance of high school students particularly in science. The same situation holds true in the Division of Negros Oriental, particularly the district of Valencia. However, educational experts in our country have continuously exerted efforts towards the revision and enrichment in order to attain the objectives of Philippine education. And thus, K to 12 Basic Education Curriculum is being implemented. With its implementation, science Curriculum practices the spiral progression starting from Grades 7 up to 10.

Due to the problems on students' science performance and the new implementation of K to 12 BEC, the authors believe that there is a need to look into the different predictors surrounding the learners that might affect their performances in science – the teacher, the school and themselves. It is for this reason that the present study has been conceptualized to determine the predictors of the Grade 8 students' science performance in Valencia District, Negros Oriental, Philippines.

1.1 Purpose of the research

This study sought to determine the predictors of the Grades 8 students' science performance in DepEd Valencia District, Negros Oriental with an end view of making the results as the basis for an action plan. Specifically, this study determined answers of the following questions:

1. What is the profile of the respondents in terms of:
    1.1. parents' educational attainment;
    1.2. parents' occupation;
    1.3. family income; and
    1.4. IQ levels based on Catell's Culture Fair Test?
2. What is the science performance level of the student respondents in:
    2.1 Grade 8 Science SY 2013-2104; and
    2.2 Grade 7 Science SY 2012-2013?
3. What are the learning styles of the student respondents based on Carl Jung's Learning Styles?
4. What are the teachers' characteristics in terms of:
    4.1 educational qualifications;
    4.2 length of science teaching experience;
    4.3 relevant science trainings and seminars attended; and
    4.4 exposure to access internet connection for science-related readings?
5. What are the schools' characteristics in terms of:
    5.1 type of school;
    5.2 class size;
    5.3 ratio of science books to number of students; and
    5.4 conformity of science laboratory equipment and apparatus to standard

6. To what extent do each of the students' previous science performance level, parental education, parental occupation, family monthly income, IQ, learning styles, teacher-related, and school-related predictors significantly predict students' performance in science?

1.1. Theoretical Framework

The theoretical framework of this study is essentially based on Functionalist Theory, Social Learning Theory and Predictive Analytics.

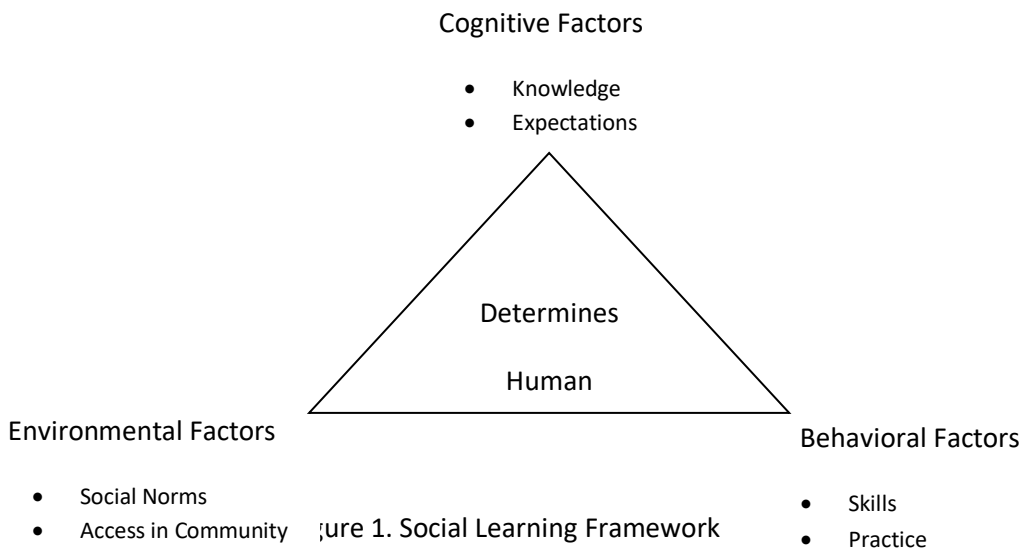
Functionalist Theory

Functionalist theory is based largely on the works of Herbert Spencer, Emile Durkheim, Talcott Parsons, and Robert Merton. According to functionalism, society is a system of interconnected parts that work together in harmony to maintain a state of balance and social equilibrium for the whole. For example, each of the social institutions contributes important functions for society: family provides a context for reproducing, nurturing, and socializing children; education offers a way to transmit society's skills, knowledge, and culture to its youth; politics provides a means of governing members of society; economics provides for the production, distribution, and consumption of goods and services; and religion provides moral guidance and an outlet for worship to a higher power (Mooney, et. al.,

2007). Functionalist theory is compatible to the theory of human capital and maintains that education is a resource opened equally to everyone but family and other factors influence it together with personal characteristics and the level of education people attain (Ogunsola, 2014). From this perspective, individuals attain as much as they inherently capable of attaining in an educational system. The functionalist argue that children though, patterns and exploration are stimulated by different factors and some of which are knowledge enhancing and others are knowledge inhabitancy (Mooney, et. al., 2007). For example, better-off families or parents tend to favour knowledge enhancing socialization of their children while children from the lower category of parents face severe problems at school such as limited vocabulary and poor learning environment at home which are responsible for producing different level of cognitive ability and commitment to education.

Social Learning Theory

In the early 1960's, Albert Bandura began contributing to the development of social learning theory by showing that children naturally imitate the behaviour of other children – without needing or receiving a direct reward for the new behaviour. Social Learning Theory is a category of learning theory which is grounded in the belief that human behaviour is determined by a three-way relationship between cognitive factors, environment influences, and behaviour. This three-way reciprocal relationship is presented in the graphic below (ReCAPP, 2007):



ure 1. Social Learning Framework

Social Learning Theory emphasizes the reciprocal relationship between social characteristics of the environment, how they are perceived by individuals, and how motivated and able a person is to reproduce behaviours they see happening around them. People both influence and are influenced by the world around them (Smith and Berge, 2009).

Predictive Analytics

Predictive analytics is an area of data mining that deals with extracting information from data and using it to predict trends and behaviour patterns. Often the unknown event of interest is in the future, but predictive analytics can be applied to any type of unknown whether it be in the past, present or future. The core of predictive analytics relies on capturing relationships

between explanatory variables and the predicted variables from past occurrences, and exploiting them to predict the unknown outcome. It is important to note, however, that the accuracy and usability of results will depend greatly on the level of data analysis and the quality of assumptions (Buytendijk and Trepanier, 2010). Generally, the term predictive analytics is used to mean predictive modeling, "scoring" data with predictive models, and forecasting. However, people are increasingly using the term to refer to related analytical disciplines, such as descriptive modelling and decision modelling or optimization. These disciplines also involve rigorous data analysis, and are widely used in business for segmentation and decision making but have different purposes and the statistical techniques underlying them vary (McCue, 2012). The approaches and techniques used to conduct predictive analytics can broadly be grouped into regression techniques and machine learning techniques (Buytendijk and Trepanier, 2010). In this present study, data were analysed through regression techniques. Regression models are the mainstay of predictive analytics. The focus lies on establishing a mathematical equation as a model to represent the interactions between the different variables in consideration (Buytendijk and Trepanier, 2010). Depending on the situation, there are variety of models that can be applied while performing predictive analytics (McCue, 2012).

In this study, multiple regression model was used to analyse the relationship between the response or dependent variable and a set of independent or predictor variables. This relationship is expressed as an equation that predicts the response variable as a linear function of the parameters. These parameters are adjusted so that a measure of fit is optimized. Much of the effort in model fitting is focused on minimizing the size of the residual, as well as ensuring that it is randomly distributed with respect to the model predictions through conducting multiple correlation analysis before having the regression analysis.

2. Methods

2.1 Research Design

This study used the descriptive – correlational method and predictive analytics to determine the relationship between the dependent and independent variables. The predictors (independent variables) included (1) student-related predictors (2) teacher-related predictors and (3) school-related predictors were correlated to students' science performance level (dependent variable) using the descriptive rating of the calculated average of the first, second and third quarter grades.

2.2 Research Respondents

The respondents of this study were the Grade 8 students who took science subjects and who were enrolled during the school year 2013 – 2014. All the science teachers from the selected schools were included as teacher-respondents. The respondents were taken from the four public and two private secondary schools in Valencia District. Half of the class were taken from the science classes of the teacher-respondents involved in the study. The students were selected through random sampling. Their names were written in a small sheet of paper and randomly drawn using fish bowl technique. This is to give everybody in the class a fair chance of being included in the sample. The table below shows the number of student respondents per secondary schools.

Table 2. Number of Student Respondents

Name of Schools	Grade Level	Number of Student Respondents
Public Secondary Schools:		
Balugo National High School	8	52
Pulangbato National High School	8	44
Valencia National High School	8	125
Valencia National High School – Dobdob Extension	8	15
Private Secondary Schools:		
San Pedro Academy	8	37
San Pedro Academy – Recoletos	8	38
TOTAL		**311**

2.3 Research Environment

The study was conducted in Valencia, Negros Oriental. Valencia is composed of twenty-four barangays wherein the student respondents came from. It is comprised of four public secondary schools (Balugo National High School, Pulangbato National High School, Valencia National High School, and Valencia National High School – Dobdob Extension) and two private schools (San Pedro Academy and San Pedro Academy – Recoletos).

2.4 Research Instrument

Questionnaires, unstructured interview and documentary analysis were used in collecting data. The questionnaire was the main instrument in gathering information needed for this study. There were two sets of questionnaires: one for the student-respondents and another for the teacher-respondents. The student-respondent questionnaire is divided into two parts: part I consisted of questions on personal profile of the student respondents; part II consisted the Intelligent Quotient (IQ) test and part III the Learning Styles Inventory. The second set is for teacher-respondents. This questionnaire consisted of four parts: part I elicits personal information about the respondent which includes educational qualification, teaching experience, trainings & seminars attended, and number of hours on internet access, and part II deals with class size and student-book ratio. Unstructured interview and documentary analysis were conducted to determine the student-book ratio and the conformity of science laboratory equipment to National Science Teaching and Instrumentation Center (NSTIC).

It is a reality that the results of a research study depend upon the authentication and validation of a research instrument. Thus, content validity of the test items was done by three experts in the field of education to ascertain the validity of the questionnaire. A pilot testing was conducted in Ong-Chetee National High School, Bacong, Negros Oriental in order to determine the weakness and ambiguities of the questionnaire. Furthermore, pilot testing was done to test the reliability, readability and understandability of the items and directions. For the Intelligent Quotient (IQ) test and Learning Styles Inventory, questionnaires were taken from a licensed psychologist to ensure its reliability and validity.

2.5 Data Gathering Procedures

The authors requested permission from the Schools Division Superintendent as well as to the District Supervisor and school principals to allow them to distribute questionnaires regarding the science performance predictors of the first batch of the K to12 curriculum in Valencia District for the school year 2013 - 2014. The student respondents' first, second and third quarter grades were obtained from the teacher respondents.

2.6 Statistical Treatment of the Data

The various data gathered were subjected to statistical treatment to answer the questions proposed in the study. Frequency counting, ranking, mean and standard deviation were used to answer problems one to seven. Simple and multiple correlations as well as regression analysis were used to answer problem eight. To determine the level of students' science performance, the average of their first, second and third quarter grades were computed and its descriptive rating were used. The descriptive rating are as follows based on the Guidelines on the Assessment and Rating of Learning Outcomes under the K to 12 Basic Education Curriculum pursuant to DepEd Order No. 73, s. 2012: Beginning (B) 74% - below; Developing (D) 75% - 79%; Approaching Proficiency (AP) 80% - 84%; Proficient (P) 85% - 89%; Advance (A) 90% - above

Beginning (B) – The student at this level struggles with his/her understanding; prerequisite and fundamental knowledge and/or skills not been acquired or developed adequately to aid understanding. Developing (D) – The student at this level possesses the minimum knowledge and skills and core understandings, but needs help throughout the performance of authentic tasks. Approaching Proficiency (AP) – The student at this level has developed the fundamental knowledge and skills and core understandings and, with little guidance from the teacher and/or with some assistance from peers. He/she can transfer these understanding through authentic performance tasks. Proficient (P) – The student at this level has developed the fundamental knowledge and skills and core understandings, and can transfer them independently through authentic performance tasks. Advance (A) – the student at this level exceeds the core requirements in terms of knowledge, skills and understandings, and can transfer them automatically and flexibly through authentic performance tasks.

For the verbal description of the weighted mean of the family monthly income, the researcher considered the monthly average income classification of the Income Classes in the Income Distribution, Income Thresholds and Sizes of Income in 2015 (Albert, et. al., 2015) which are as follows: Rich = average of at least P 157,800; Upper Income (but not rich) = average of between P

118,350 to P 157,800; Upper Middle Income = average of between P 78,900 to P 118,350; Middle Class = average of between P 31,560 to P 78,900; Lower Middle Income = average of between P 15,780 to P31,560; Low Income (but not poor) = average of between P 7,890 to P 15,780; and Poor = average of less than P 7,890.

Pearson-r Moment Correlation was used to determine the relationship between the dependent and independent variables. The strength of the correlation value was interpreted using the following scale as suggested by Refugio (as cited by Alfaras, 2013):

Correlation Coefficient	**Interpretation (Size of Correlation)**
± 0.00 - ± 0.09	Negligible
± 0.10 - ± 0.29	Small
± 0.30 - ± 0.49	Medium
± 0.50 - ± 1.00	Large

Quantification of Some Variables

With the approval of the adviser, quantification of some variables was done for the nonnumeric data in correlation and regression analysis. The following quantifications were utilized by the researcher:

Fathers and Mothers' Educational Attainment	**Points**
College graduate	35
College level	30
Vocational	25
High school graduate	20
High school level	15
Elementary graduate	10
Elementary level	5
Fathers' Occupation	**Points**
OFW	35
Professional	30
Government office employee	25
Private employee	20
Service/sales worker	15
Manual labor	10
Farmer	5

Mothers' Occupation	Points
OFW	35
Professional	30
Government office employee	25
Private employee	20
Service/sales worker	15
Farmer	10
Housewife	5

2. Results and Discussions

3.1 Parents Educational Attainment

Education is the lifeline for efficient and stable working of human society (Memon, et. al., 2010). Education help develop individual's personality making the person knowledgeable, competent, capable and skillful.

3.1.A. Fathers' Educational Attainment

Table 1.1.A. Fathers' educational attainment

Educational Attainment	Frequency	Percentage	Rank
Elementary level	36	11.58	4
Elementary graduate	46	14.79	3
High school level	90	28.94	1
High school graduate	80	25.72	2
College level	28	9.00	5
College graduate	18	5.79	6
Vocational	13	4.18	7

Table 3.1.A shows that high school level ranked number one with 28.94% among the educational attainment of the fathers of the student respondents of both the public and private secondary schools of Valencia District, Valencia, Negros Oriental followed by high school and elementary graduate ranked as numbers 2 and 3 with 26% and 15% respectively. It also shows that there are only few fathers who graduated in college (5.79%) and a few who had taken vocational courses (4.18%). Based on the review of related literature, the researcher found out that parental education is an important aspect of the socioeconomic status of students. According to the study of

Duncan and Magnuson (2005), the higher the parental education, the better is the student's socioeconomic status. Likewise, the result of Memon, et. al. (2010) stressed that parents with high socio-economic status often have more success in preparing their young children for school because they typically have access to a wide range of resources to promote and support status often lack the financial, social and educational supports that characterize families with high socio-economic status.

Moreover, on the findings of Organization for Economic Co-Operation and Development (as cited in Tomul and Polat, 2013), the education of parents has an impact on children's school achievement. Studies emphasize that education level of parents of successful students is higher than educational level of parents of unsuccessful students (Duncan and Magnuson, 2005) (Eamon, 2005). De Broueker and Underwood (2008) pointed out that those parents with high education provide the most conducive environment for their children to study, thus providing the necessary motivation for them to excel in their studies. The findings of the studies mentioned above support that the choice of including fathers' educational attainment as one of the predictors in this study is empirically justified.

3.1.B. Mothers' Educational Attainment

Table 3.1.B. Mothers' educational attainment

Educational Attainment	Frequency	Percentage	Rank
Elementary level	25	8.04	4
Elementary graduate	13	4.18	6
High school level	94	30.23	2
High school graduate	121	38.91	1
College level	38	12.22	3
College graduate	14	4.50	5
Vocational	6	1.93	7

Table 3.1.B shows that high school graduate ranked number one with 39.91% among the educational attainment of the mothers of the student respondents of both public and private secondary schools of Valencia District, Valencia, Negros Oriental followed by high school level and college level ranked as numbers 2 and 3 with 30.23% and 12.22% respectively. The table further shows that most mothers of the student respondents have higher education level compared to their fathers (refer Table 2). Literature review shows that mother education affects the academic achievement of the students (Eamon, 2005). The children of highly educated mothers obtain higher test scores thus, obtain better grades (Muola, 2010). Shute, et. al. (2011) stressed that relation of parents' education to their children's academic performance rests upon quite specific beliefs and behaviors. Parents' educational qualifications are linked with their language competence, which has a significant influence in manner in which parents communicate with their children. Ali (2007) also highlighted educational qualifications of parents as a significant factor that affects academic performance of students. His study showed that children of parents with high educational qualifications have better academic achievements as compared to those parents with low educational qualifications. The findings of the studies mentioned above are the basis of the present researcher in choosing mothers' educational

attainment as one of the predictors of this present study. Moreover, the aforementioned studies support the choice of including mothers' educational attainment as one of the predictors in this study is empirically justified.

1.1 Parents' Occupation

Parents' occupation is also one of the important aspects that comprise the socio-economic status of students. The proceeding tables 4 and 5 shows the student respondents' fathers' and mothers' occupation.

1.2.A. Fathers' Occupation

Table 1.2.A. Fathers' occupation

Occupation	Frequency	Percentage	Rank
Architect	1	0.32	14
Businessman (small business)	7	2.25	11
Call center agent	1	0.32	14
Caretaker/Janitor	4	1.29	12
Carpenter/Mason	43	13.83	2
Construction worker	21	6.75	5
Driver	33	10.61	3
Farmer	88	28.30	1
Fireman	1	0.32	14
Fisherman	1	0.32	14
Government employee	14	4.50	7
Mechanic/Technician	13	4.18	8
Medical representative	1	0.32	14
Pastor	1	0.32	14
Policeman/Army	3	0.96	13
Private employee	10	3.22	10
Security guard	11	3.54	9
Vendor	4	1.29	12
Veterinarian	1	0.32	14
None/Deceased	18	5.79	6

Table 1.2.A shows that the fathers' occupation of the student respondents that ranked first is farmer followed by carpenter/mason and no occupation with 28.30%, 13.83% and 5.79% respectively. Since most of them have low educational attainment (refer table 2), they cannot apply to high income jobs. The literature review of the researcher revealed that parents with low income occupation contribute to the low socioeconomic status of most of the student respondents (Castillo, et. al., 2011). Moreover, Memon, et. al. (2010) pointed out that children from families with low socio-economic status are less prepared than their peers from families with medium or high socio-economic status due to inadequate resources and limited access to available resources. According to the studies of Croll (2004), Chiu (2007) and Usani and Abubakar (2015), students from high socioeconomic conditioned families have positive results on their academic achievement at school compared to those from low socioeconomic conditioned families. The aforementioned findings proved that choosing fathers' and mothers' occupation as one of the predictors is empirically justified. Thus, this variable is included by the researcher to find out the truthfulness of the aforementioned claims in this study.

1.2.B. Mothers' Occupation

Table 1.2.B. Mothers' occupation

Occupation	Frequency	Percentage	Rank
Baby sitter	4	1.27	8
Beautician	2	0.64	10
BHW/Day care worker	4	1.27	8
Businesswoman (small business	6	1.93	7
Call center agent	3	0.96	9
Caregiver	3	0.96	9
Caretaker/Housemaid	8	2.57	6
Dressmaker	3	0.96	9
Farmer	34	10.93	2
Government employee	6	1.93	7
Housewife/Housekeeper	160	51.45	1
Laundrywoman	4	1.29	8
OFW	12	3.86	4
Private employee	3	0.96	9
Real state	1	0.32	11
Sales Lady/ Sales clerk	6	1.93	7
Teacher	10	3.22	5

Vendor	28	9.00	3

Table 1.2.B shows that housewife/housekeeper ranked first with 51.45% among the mothers' occupation followed by farmer and vendor with 10.93% and 9.00% respectively. This further shows that more than half of the mothers are plain housewife/housekeeper. Based on the literature review, it was found out that just like with the fathers' occupation, mothers' occupation could also greatly influence the socioeconomic status of the students (Castillo, et. al., 2011). According to the study of Castillo, et. al. (2011), parents with low income occupation contribute to the low socioeconomic status of most of the student respondents. Moreover, Memon, et. al. (2010) pointed out that children from families with low socio-economic status are less prepared than their peers from families with medium or high socio-economic status due to inadequate resources and limited access to available resources. Thus, mothers' occupation as a variable is chosen to find out the applicability of the aforementioned studies to this present study.

1.3 Family Monthly Income

Table 1.3. Family monthly income

Family Monthly Income	Frequency	%	Rank	Mean	Verbal Description	Standard Deviation	Verbal Description
1,000 – 5,000	184	59.16	1	P 6,139.87	*Poor	4,886.57	Heterogeneous
5,001 – 10,000	79	25.40	2				
10,001 – 15,000	25	8.04	3				
15,001 – 20,000	15	4.82	4				
20,001 – 25,000	6	1.93	5				
25,001 – 30,000	2	0.64	6				

*Based on Income Classes in the Income Distribution, Income Thresholds and Sizes of Income in 2015 (Albert, et. al., 2015)

Table 1.3 shows the family monthly income of the student respondents of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows that 1,000 – 5,000 family monthly income ranks first with 59% and 25,001 – 30,000 FMI ranks last with 0.6%. Likewise, the standard deviation shows that the distribution of variance is heterogeneous from the weighted mean which further means that there is a big gap between the family monthly incomes of the respondents. The table further shows that the student respondents' family monthly mean income is P 6,139.87. According to the Income Classes in the Income Distribution, Income Thresholds and Sizes of Income in 2015 (Albert, et. al., 2015), families which earn an average of less than P 7, 890 per

month will be classified as Poor. Since the mean income of our students' family monthly is below the given average, it is then classified as Poor Income Class. The survey of related literature conducted by the researcher tells that low income means low socioeconomic status (Caro, et. al., 2009). According to Duncan and Magnuson (2005), socioeconomic status is the most important and fundamental factor which is responsible for the academic success. Low socioeconomic status further means low academic performance (Akinsanya, et. al., 2011).

Likewise, Ahmad and Khan (2012) and Ahmar and Anwar (2013) found a significant relationship between parental socio-economic conditions and academic achievements of the children in secondary examination and it was concluded that the majority of children whose parents have better socio-economic conditions perfrom better compared to those children whose parents had low socio-economic conditions. Ogunsola, et. al. (2014) also found out that in modern society, parents' influence plays a very important role in the academic life of a student. The findings of studies mentioned above justified the researcher's choice to consider family monthly income as one of the predictors in this study to find out the applicability of those aforementioned findings in this study.

1.4. IQ Levels IQ Levels of the Student Respondents

Table 1.4. Intelligent quotient of student respondents

IQ LEVEL	Frequency	Percentage	RANK	Mean	Verbal Description	Standard Deviation	Verbal Description
Very Superior (VS) 130+	5	1.61	7				
Superior (S) 120-129	13	4.18	6				
High Average (HA) 110-119	41	13.18	3	93.74	Average (A)	16.01	Heterogeneous
Average (A) 90-109	129	41.48	1				
Low Average (LA) 80-89	53	17.04	2				
Borderline (B) 70-79	36	11.58	4				
Extremely Low (EL) 69 and below	34	10.93	5				

Based on Cattell's Culture Fair Intelligence Test Scale (Apostol, 2013)

Table 1.4 shows the intelligent quotient (IQ) level of the student respondents of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows that the mean of the IQ levels of the students is equivalent to 93.74 and has a verbal description of Average (A) which means that most of the student respondents have an average intelligent quotient (IQ). According to Apostol (2013) students at average IQ are proficient in executing job related tasks that involve cognitive ability. They are also able to learn a trade in a hands-on manner and perform tasks involving decisions and able to learn from written materials.

Moreover, the standard deviation shows that there is a wide distribution of variance from the weighted mean between the intelligence quotients of the of the student respondents. This means that the numbers of student respondents are well distributed among the levels of intelligence quotient. Literature review revealed that intelligence is a concept which has affected the life of every individual in all spheres of life. It is responsible for the academic outcome and finally the success in life (Chandra and Azimmudin, 2013). Chandra and Azimmudin (2013) further stressed that the intelligence quotient has significant influence on academic achievement. Likewise, the findings of Deary, et. al. (2006) support that IQ significantly contributes to the success of students' educational achievement. Other authors assert that intelligence is causally related to achievement. Laidra, Pullmann, and Allik (2007) reported that students' achievement relies most strongly on their cognitive abilities through all grade levels. The researcher of this study based his choice of making IQ as one of the predictors on the mentioned findings to find out the truthfulness of those aforementioned findings to this present study.

2. **Science Performance Levels of the Student Respondents**

2.1. Present Science Performance Levels of the Student Respondents

Table 2.1. Grade 8 science level of performance of student respondents

LEVEL OF PERFORMANCE	Frequency	Percentage	RANK	Mean	Verbal Description	Standard Deviation	Verbal Description
Advance (90 – 94)	17	5.47	4	81.63	Approaching Proficiency	4.83	Homogeneous
Proficient (85 – 89)	71	22.83	3				
Approaching Proficiency (80 – 84)	107	34.41	1				
Developing (75 – 79)	104	33.44	2				
Beginning (70 – 74)	12	3.86	5				

Table 2.1 shows the Grade 8 science level performance of the student respondents of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows that Approaching Proficiency ranks first with 34.4% followed by Developing (33.4%), Proficient (22.8%), Advance (5.5%) and Beginning (3.9%). Likewise, the standard deviation shows that the distribution of variance is homogeneous from the mean which further means that there is just a small difference between the science level performances of the respondents. The table further shows that the student respondents' grades mean is 81.63 and has a verbal description of Approaching Proficiency. Based on Enclosure No. 1 to DepEd Order No. 73, s. 2012, students at approaching proficiency level have developed the fundamental knowledge and skills and core understandings and, with little guidance from the teacher and/or with some assistance from peers, can transfer these understanding performance tasks.

2.2. Previous Science Performance Levels of the Student Respondents

Table 2.2 Grade 7 science level of performance of student respondents

LEVEL OF PERFORMANCE	Frequency	Percentage	RANK	Mean	Verbal Description	Standard Deviation	Verbal Description
Advance (90 – 94)	25	8.04	4				
Proficient (85 – 89)	78	25.08	3	82.48		4.72	Homogeneous
Approaching Proficiency (80 – 84)	110	35.37	1		Approaching Proficiency		
Developing (75 – 79)	96	30.87	2				
Beginning (70 – 74)	1	0.32	5		Approaching Proficiency	4.72	Homogeneous

Table 2.2 shows the Grade 7 science level performance of the student respondents of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows that majority of the student respondents belong to the Approaching Proficiency level and minimal are in the level of Advance and Beginning. Likewise, the standard deviation shows that the distribution of variance is homogeneous from the mean which implies that there is just a variance between the science level performances of the respondents. The table further shows that the student respondents'

grades mean is 82.22 and has a verbal description of Approaching Proficiency. This means that the level of performance of the student respondents in grade 7 science is just the same with their level of performance in grade 8 science which based on Enclosure No. 1 to DepEd Order No. 73, s. 2012, students at approaching proficiency level have developed the fundamental knowledge and skills and core understandings and, with little guidance from the teacher and/or with some assistance from peers, can transfer these understanding performance tasks. Based on the findings of Seery (2009), prior performance and knowledge could significantly affect the current performance of the students. Likewise, the findings of Awah, et. al. (2015) support that previous performance of the students significantly predicts their current performance level. The aforementioned studies and findings are the basis of the researcher to select previous science performance as one of the predictors in this present study.

3. **Learning Styles of The Student Respondents**

Learning style refers to the ability of learners to perceive and process information in learning situations. One of the most important uses of learning styles is that it makes it easy for teachers to incorporate them into their teaching (Vaishnav, 2013). There are different learning styles. In this study, the researcher considered Carl Jung's learning styles (Sternberg, 2016) (Cherry, 2016).

Table 3. Learning Styles of Student Respondents

LEARNING STYLES	Frequency	Percentage	RANK
Intuiting	137	44.05	1
Sensing	62	19.94	2
Thinking	35	11.25	4
Feeling	42	13.50	3
Sensing-Thinking	4	1.29	7
Intuiting-Thinking	1	0.32	9
Sensing-Feeling	7	2.25	6
Intuiting-Feeling	8	2.57	5
Thinking-Feeling	8	2.57	5
Intuiting-Feeling-Sensing	2	0.64	8
Intuiting-Thinking-Sensing	2	0.64	8
Thinking-Feeling-Sensing	2	0.64	8
Intuiting-Feeling-Thinking	1	0.32	9

Table 3 shows the learning styles of the student respondents of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows the frequency and rank of the learning styles and in which intuiting ranks first with 44% while intuiting-thinking and intuiting-feeling-thinking ranks last with 0.32%.This further shows that majority of the student respondents are intuitive learners. According to Sternberg (2006), intuitive learners perceive inner meaning and relationships of what is occurring. They don't always believe what they sees, instead looks to what the potential significance might be. They believe first then verifies (Cherry, 2016). The findings of the

studies of Abidin, et. al. (2011) and Abdul Kadir (2013) showed that learning styles have a significant relationship with the educational achievement of students. Abidin, et. al. (2011) further pointed out that learners having different learning style preferences would behave differently in the way they perceive, interact, and respond to the learning environment. Thus, considering learning style as one of the predictors in this study is empirically justified to find out the veracity of those aforementioned studies to this present study.

4. **Teachers' Characteristics**

4.1. Teachers' educational qualifications

Teacher quality is a key element of students' academic success, but few specific teacher characteristics influence classroom outcomes (Buddin and Zamarro, 2009). This research examined whether teacher educational qualification could predict the science performance level of the first batch of K to 12 curriculum students in Valencia District, Negros Oriental.

Table 4.1. Undergraduate courses of teacher respondents

TEACHERS' COURSE	Frequency	Percentage	RANK
BSED/General Science	5	62.50	1
BS Biology	1	12.50	2
BSED/Mathematics	1	12.50	2
BSE-Electronics	1	12.50	2

Table 4.1 shows the undergraduate courses of the teacher respondents of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows the frequency, percentage and rank of the courses and in which BSED/ General Science ranks first with 62.50%. The table further shows that there are six teachers having science related-courses and two teachers with no science-related courses. This means that there are two teachers that are teaching science but not a science major. According to Kara and Njagi (2003) teachers have an important influence on students' academic achievement and play a crucial role in their educational attainment because they are ultimately responsible for the transmission of knowledge, values and skills in learning process, thus, their educational qualifications really matters. Based on the findings of the studies of Buddin and Zamarro (2009) and Unanma, et. al. (2013), teachers' educational qualifications have significant effects to academic performance of students. Likewise, in the study of Abe (2014) and Musau and

Abere (2015), students who are under the teachers whose educational qualification is aligned with the subject taught have high academic performance. The aforementioned studies and findings served as the basis in choosing teachers' educational qualification as one of the predictors.

4.2 Length of Science Teaching Experience

Table 4.2. Number of years in science teaching of teacher respondents

Number of Years in Science Teaching	Frequency	Percentage	Mean Year of Science Teaching Experience	Longest Year of Science Teaching Experience	Shortest Year of Science Teaching Experience	Standard Deviation	Verbal Description
41	1	12.50					
19	1	12.50					Heterogeneous
12	1	12.50	14.57	41	1	12.66	
11	1	12.50					
8	1	12.50					
5	2	25.00					
1	1	12.50					

Table 4.2 shows the number of years in science teaching of the teacher respondents of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows the maximum and minimum number of years acquired by the teacher respondent which is forty-one (41) and one (1) year respectively. The table further shows that the mean and standard deviation of the number of years in science teaching of teacher respondents are equivalent to 14.57 and 12.66 respectively. This shows that there is a great variance of the years of experience among the teacher respondents. According to the study of Dial (2008), teacher experience had an effect on student achievement and in the findings of Ladd and Sorensen (2014), it was positively associated with students' test scores and students' behavior. Likewise, the study of Ewetan and Ewetan (2015) found out that schools having more teachers with above 10 years teaching experience achieved better results than schools having more teachers with 10 years and below teaching experience. The aforementioned studies and findings served as the basis of choosing the teachers' experience as one of the predictors in this study.

4.3. Relevant Trainings and Seminars Attended

Table 4.3. Seminars attended of teacher respondents

SEMINARS ATTENDED	Frequency	Percentage	RANK
National	10	25.64	3
Regional	13	33.33	2

Division	16	41.03	1

Table 4.3 shows the seminars and trainings attended by the teacher respondents of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows that teachers are more frequent to attend division level seminars and trainings which is 41% followed by regional (33.3%) and national levels (25.6%). According to the findings of Angrist and Lavy (2006) and Bushra, et. al. (2011), teachers' training substantially improves students' test scores. Likewise, the study of Rahman, et. al. (2011) concluded that teacher training was positively related to effective teaching. Their results also indicated that there is a significant correlation between teachers training and students' test result. Bushra, et. al (2011) also concluded their study that students' test result under trained teachers are significantly better than those under the untrained teachers. The aforementioned studies and findings of the studies prompted the researcher to include teachers' trainings and seminars as one of the predictors in this present study.

4.4. Exposure to Access Internet Connection

Table 4.4. Number of hours/week on internet access of teacher respondents

Number of Hour/Week on Internet Access	Frequency	Percentage	Mean Number of Hours	Maximum Number of Hours	Minimum Number of Hours	Standard Deviation	Verbal Description
10	1	12.50					
8	1	12.50					
			3.75	10	0	3.58	Heterogeneous
5	1	12.50					
2	3	37.50					
1	1	12.50					
0	1	12.50					

Table 4.4 shows the number of hours per week on internet access of the teacher respondents of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows the maximum and minimum number of hours on internet access of the teacher respondent which is ten (10) and zero (0) respectively. The table further shows that the mean and standard deviation of the number of hours per week on internet access of the teacher respondents are 3.25 and

3.58 respectively. This means that there is a small variance of the number of hours of internet access among the teacher respondents. Review of related literature says that the internet has become an integral part of people's lives today. As more people gain internet access and as students become more proficient with computers, teachers must have the opportunity to use the internet to increase the students' learning outcomes. In the study of Kaya, et. al. (2012), internet-based teaching promotes higher test results than conventional teaching method. Moreover, the findings of Mohamed and Ayeche (2010) proved that the use of internet can contribute in improving student performance. These studies provided basis to the researcher of including exposure to access internet connection as one of the predictor variables.

5. **Schools' Characteristics**

5.1.Type of School

Table 5.1. Type of secondary schools in Valencia District, Valencia, Negros Oriental

Type of School	Frequency	Percentage
Public	4	66.67
Private	2	33.33

Table 5.1 shows that there are four public and two private secondary schools in Valencia District, Valencia, Negros Oriental. These secondary schools were the research environment of this study. According to Newhouse and Beagle (2005), type of schools whether they are publicly and privately administered, affect students' acquisition of cognitive skills. Moreover, both findings of Newhouse and Beagle (2005) and Lubienski and Lubienski (2006) showed that students enrolled in public schools have performed well as compared to those in private schools. The researcher of this study considered the aforementioned studies and findings in choosing type of school as one of the predictors.

5.2 Class size

Class size is one of the few variables which can influence students' learning. Jepsen (2015) defined class size as the actual number of students taught by a particular teacher at a particular time.

Table 5.2. Class size

Class Size	Frequency	Percentage	Mean Class Size	Maximum Class Size	Minimum Class Size	Standard Deviation	Verbal Description
62	1	7.69					
60	1	7.69					
56	1	7.69					
51	1	7.69					
50	2	15.38	47.3	62	33	11.90	Heterogeneous
49	1	7.69					
48	1	7.69					

41	1	7.69
40	2	15.38
35	1	7.69
33	1	7.69

Table 5.2 shows the number class size of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows the maximum and minimum class size which is sixty-two (62) and thirty-three (33) respectively. The table further shows that the mean and standard deviation of the class size are 47.3 and 11.90 respectively. According to the findings of Dillon, et. al. (2006), class size has a negative influence to students' grades. They further stressed that the average grades of the students declines as class size increases. Moreover, the findings of Bascia (2010) showed that in small class size the students performed better compared to those in bigger class size. She further found out that in small class size, students learn more not only academically but socially because they interact individually more frequently. The findings of Dillon, et. al (2006) and Bascia (2010) served as the basis of the researcher in choosing class size as one of the predictors in this study.

5.3. Ratio of Science Books to Number of Students

Table 5.3. Student – book ratio

No. of Students	Number of Books	Student-Book Ratio
311	311	1:1

Table 5.3 shows the student-book ratio of the four (4) public schools and two (2) private schools of Valencia District, Negros Oriental. It also shows that there is a 1:1 student-book ratio. This further means that each student has its own textbook. Based on the given data, the student-book ratio could not be used as predictor in science performance of the student respondents in Valencia District in the sense that all secondary schools have a 1:1 ratio.

5.4. Conformity of science laboratory equipment and apparatus to K to 12 standard

Table 5.4. Conformity of Science Laboaratory Equipment and Apparatus to K-12 Standard

Science Equipment Standards	Number of Schools	Percentage
Conform to the standards	0	0
Not conform to the standards	6	100

Currently, science equipment standard in all schools in the Philippines is based on the listing of DepEd – National Science Teaching and Instrumentation Center (NSTIC) (DepEd Order No. 118, s. 2009). Based on the actual survey conducted by the researcher to the teacher respondents and school heads of the six secondary schools, 100% of the school respondents are not fully followed the given standards in the sense that the schools do not have some of the equipment and some do not have the suggested number of units. Based on the given data, the conformity of science equipment to standards could not be used as predictor in science performance of the student respondents in Valencia District in the sense that all secondary schools did not conformed to the given standards.

6. Correlation and Regression Analysis between the Predictors (students' previous science performance level, family monthly income, IQ, learning styles, teacher-related, and school-related predictors) and Students' Performance in Science

6.1 Correlation Analysis

The Pearson – *r* Moment Correlation analysis aided the researcher in testing the significant association of selected predictors and the students' performance in science.

According to Refugio (as cited by Alfaras, 2013), one of the uses of the analysis of the relationship between variables is that it is an aid to prediction. This is so since the reliability of the coefficients in a regression model depends on the strength of the relationship between the variables under consideration. Thus, before regression analysis was performed in this study, multiple correlation analyses were performed and presented in the following tables.

Table 6.1.A. Correlation between students' previous science grades and students' present science performance

Variables Correlated	p - value	Correlation Coefficient (r)	Interpretation
Students' previous science grades and students' present science grades	0.00001*	0.854	Significant; Large

* Significant at 0.05 level

Table 6.1.A shows that the students' previous science grades have a significant large positive correlation to the present science performance level. This means that students who performed well in the previous science grade level also performed well in the present science grade level while low performing students performed the same in both previous and present level. The result of the analysis is backed-up by the findings of Seery (2009) and Awah, et. al. (2015) which proves that prior performance of the students could significantly affect their current performance.

Table 6.1.B. Correlation between fathers' educational attainment and students' present science performance

Variables Correlated	p - value	Correlation Coefficient (r)	Interpretation
Fathers' educational attainment and students' present science performance	0.002*	0.176	Significant; Small

* Significant at 0.05 level

Table 6.1.B. shows that fathers' educational attainment has significant small positive correlation to the students' science performance level. This means that it significantly affect the level

of the present science performance of the students. The result of the analysis concurs the findings of Duncan and Magnuson (2005) and Memon, et. al. (2010) which showed that parental education has a positive influence to the academic performance of the students. Moreover, according to their findings students whose parents have high educational attainment performed well in class than those whose parents have low educational attainment.

Table 6.1.C. Correlation between mothers' educational attainment and students' present science performance

Variables Correlated	p - value	Correlation Coefficient (r)	Interpretation
Mothers' educational attainment and students' present science performance	0.00001*	0.258	Significant; Small

* Significant at 0.05 level

The correlation result shows that mothers' educational attainment has significant small positive association with the students' present science performance. This means that students whose mothers have high educational attainment have better performance in science than those whose parents have low educational attainment. The result of the analysis is aligned to the findings of Earmon (2005) which showed that mothers' education affects the academic achievement of the students and of Muola (2010) which stated that children of highly educated mothers obtain higher test scores thus obtain higher grades.

Table 6.1.D. Correlation between fathers' occupation and students' present science performance

Variables Correlated	p - value	Correlation Coefficient (r)	Interpretation
Fathers' occupation and students' present science performance	0.673*	0.139	Not Significant; Negligible

* Significant at 0.05 level

The p-value and correlation coefficient of fathers' occupation implies that there is a non-significant negligible association between fathers' occupation and students' present science performance. This means that the level of fathers' occupation has a negligible influence to the science performance of the students. Regardless of the level of fathers' occupation, students' science performance is not affected by it. The analysis further means that there are some students who performed well in science despite their fathers have low level occupations while some performed poorly in science even their fathers have high level occupations. This may be attributed to some other predictors involved in this study or some other factors that are not considered in this present study.

The result is in disagreement with the study of Castillo, et. al. (2011) which found out that parents with low income occupation contribute to the low academic performance of students. Moreover, it does not concurs the finding of Memon, et. al. (2010) which pointed out that children

from families with low socioeconomic status are less prepared than their peers from families with medium of high socioeconomic status due to inadequate resources and limited access to available resources.

Table 6.1.E. Correlation between mothers' occupation and students' present science performance

Variables Correlated	p - value	Correlation Coefficient (r)	Interpretation
Mothers' occupation and students' present science performance	0.586*	0.031	Not Significant; Negligible

* Significant at 0.05 level

The result shows that there is a non-significant negligible correlation between mothers' occupation and present students' science performance. This means that the level of mothers' occupation has a negligible influence to the science performance of the students. The analysis further means that despite the level of mothers' occupation, some students performed well in science while some performed the other way around. Perhaps it can be attributed to some other predictors involved in this study or some other factors that are not considered in this present study. The result of the analysis is some kind contrary to the findings of Castillo, et. al. (2011) and Memon, et. al. (2010) which proved that parental occupation has significant effects to the students' socioeconomic status and academic performance of the students. Both findings found out those students whose parents have high income jobs have better academic achievement while those whose parents with low income jobs have low academic achievements.

Table 6.1.F. Correlation between family monthly income and students' present science performance

Variable	p - value	Correlation Coefficient (r)	Interpretation
Family monthly income and students' present science performance	0.036*	0.119	Significant; Small

* Significant at 0.05 level

The table shows that family monthly income has a positive small correlation with the students' science performance. This means that the higher the family monthly income, the better is the performance of the students in science. The result in a little extent is in line with the findings of Duncan and Magnuson (2005) that socioeconomic status is the most important and fundamental factor which is responsible for the academic success. According to Akinsanya, et. al. (2014), low socioeconomic status further means low academic performance.

Table 6.1.G. Correlation between intelligence quotient (IQ) and students' present science performance

Variables Correlated	p - value	Correlation Coefficient	Interpretation

		(r)	
Intelligence quotient and students' present science performance	0.00001*	0.552	Significant; Large

* Significant at 0.05 level

The correlation analysis shows that the intelligence quotient (IQ) levels have significant large positive correlations to the students' science. This means that students with high level IQ have better performance in science as compared to those students with low level IQ. The result of the analysis is supported by the findings of Chandra and Azimmudin (2013) and Deary, et. al. (2006) which found out that intelligence quotient (IQ) significantly contributes to the success of students' educational achievement.

Table 6.1.H. Correlation between learning styles and students' present science performance

Variables Correlated	**p - value**	**Correlation Coefficient (r)**	**Interpretation**
Learning styles and students' present science performance	0.516	-0.037	Not Significant; Negligible

The analysis result shows that learning styles have non-significant negligible correlations to the students' present science performance level. This means that the difference of learning styles among students has no significant effects to the performance of students in science. The analysis contradicts the findings of Abidin, et. al. (2011) and Abdul Kadir (2013), learning styles have a significant relationship with the educational achievement of students. Abidin, et. al. (2011) further pointed out that learners having different learning style preference would behave differently in the way they perceive, interact and respond to the learning environment.

Table 6.1.I. Correlation between teachers' educational qualification and students' present science performance

Variables Correlated	p - value	Correlation Coefficient (r)	Interpretation (Size of Correlation)
BSE/ Electronics	0.00001*	-0.216	Significant; Small
BSED/ Biology	0.084	0.098	Not Significant; Negligible
BSED/ Mathematics	0.014*	-0.139	Significant; Small
BSED/ General Science	0.00001*	0.195	Significant; Small

* Significant at 0.05 level

The result shows that among the teachers' educational qualifications only the "BSED/ Biology" has a negligible not significant correlation with the dependent variable. "BSED/ General Science" has a significant positive small correlation while "BSE/ Electronics" and "BSED/ Mathematics" have significant negative small correlation to students' science performance. This means that teachers who have BSED/ General Science as their educational qualifications produce students who perform better

in science compared to those nonBSED/ General Science teachers. The finding is backed-up by the study of Abe (2014) and Musau and Abere (2015) which proved that students under the teacher whose educational qualification is aligned with the subject taught have high academic performance. Moreover, Unanma, et. al. (2013) stated that teachers' educational qualification s have significant effects to academic performance of students. Based on the result, all the four teachers' educational attainment could be included in the regression analysis model.

Table 6.1.J. Correlation between number of years in science teaching experience and students' present science performance

Variables Correlated	p - value	Correlation Coefficient (r)	Interpretation
Number of years in science teaching experience	0.00001*	0.302	Significant; Medium

* Significant at 0.05 level

The correlation coefficient shows that the number of years in science teaching experience has a significant positive medium correlation with the students' science performance level in science. This means that teachers with greater number of years in science teaching produce students who performed better in science compared to those under the teachers who have less experience. The analysis result is in agreement with the findings of Ladd and Sorensen (2014) and Ewetan (2014) which proved that the number of years of teaching experience is positively associated with students' test scores and students' behavior. The result of the correlation analysis on the number of years in science teaching experience is the basis for its regression analysis model.

Table 6.1.K. Correlation between teachers' trainings and seminars and students' present science performance

Variables Correlated	p - value	Correlation Coefficient (r)	Interpretation
National	0.00001*	0.265	Significant; Small
Regional	0.00001*	0.287	Significant; Small
Division	0.00001*	0.209	Significant; Small

* Significant at 0.05 level

The p-values and correlation coefficient shows that the levels of teachers' trainings and seminars have significant positive correlation to the students' science performance. The result means that teachers who have more trainings and seminars attended can produce students who perform better in science as compared to those teachers who have few trainings and seminars.

The result is supported by the findings of Angrist and Lavy (2006) and Bushra, et. al. (2011) which proved that teachers' training substantially improves students' test scores. Likewise, the study of Rahman, et. al. (2011) indicated that there is a significant correlation between teachers' traing and students' test results. The three levels of teachers' trainings and seminars are included in the regression analysis model.

Table 6.1.L. Correlation between teachers' exposure to internet access and students' present science performance

Variables Correlated	**p - value**	**Correlation Coefficient (r)**	**Interpretation**
Teachers' exposure to internet access	0.000062*	0.225	Significant; Small

* Significant at 0.05 level

The analysis result shows that there is a significant positive small correlation between teachers' exposure to internet access and students' science performance. This means that there is a positive influence of the teachers' exposure to internet access to the performance of the students in science. To a certain extent, the result is in agreement with the study of Kaya, et. al. (2012), internet-based teaching promotes higher test results than conventional teaching method, and of Mohamed and Ayeche (2010) which proved that the use of internet can contribute in improving student performance.

Table 6.1.M. Correlation between type of school and students' present science performance

Variables Correlated	**p - value**	**Correlation Coefficient (r)**	**Interpretation**
Public school	0.072	-0.102	Not Significant; Small
Private school	0.072	0.102	Not Significant; Small

The correlation coefficients (r) show that public school has a nonsignificant negative small correlation while private school has nonsignificant positive small correlation with students' science performance level. This means that type of schools in Valencia has no significant effects students' performance in science. The analysis result does not support the findings of Newhouse and Beagle (2005) and Lubienski and Lubienski (2006) which showed that students enrolled in public schools have performed well as compared to those in private schools.

Table 6.1.N. Correlation between class size and students' present science performance

Variables Correlated	**p - value**	**Correlation Coefficient (r)**	**Interpretation**
Class size	0.00001*	0.302	Significant; Medium

* Significant at 0.05 level

The result shows that class size has a significant positive medium association with students' science performance level. This means that it has a positive influence on students' performance in science. The result of the analysis does not affirm the findings of Dillon, et. al. (2006) in which class size has a negative influence to students' grades. Moreover, the result also contradicts the findings of Bascia (2010) which showed that in small class size the students performed better compared to those in bigger class size.

7. 2 Regression Analysis

The concept of simple and multiple regression analysis aided the researcher to determine which of the selected variables could significantly predict the students' performance level in science. The following tables present the initial regression coefficients which identified the assumed predictor variables that will significantly predict students' performance in science.

Table 7.2.A. Regression analysis of students' previous science performance and their present science performance

Variable	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation ($1-R^2$)
Grades in Science 7	3.18E-89*	Significant	3.177E-89*	0.729	0.271

***** $p < 0.05$; significant

Table 7.2.A shows the regression analysis between the students' previous science performance and the present performance tested at 0.05 level of significance. It shows that the R^2 is equals to 0.729. This means that grades in Science 7 accounts 72.90% of the variance in the grades in Science 8 and the other 27.10% can be accounted for the other predictors and some other variables that are not considered in this study. The significance F which is 3.177E-89 and less than the 0.05 level of significance means that the variance of 72.90% is significant. Likewise, p-value shows that there is a high significance between the previous and present students' performance in science. Thus, in 95% confidence level students' previous performance in science is a good predictor in predicting science performance level.

Based on the results of this regression analysis and the correlation analysis on Table 8.1.A, high students' previous science performance could significantly predict that the students' science performance will also be high while low performance in the previous grade level predicts low performance in the present level. The finding of this study is in agreement with the findings of Seery (2009) which proves prior performance and knowledge could significantly affect the current performance of the students and of Awah, et. al. (2015), previous performance of the students significantly predicts their current performance level.

Table 7.2.B. Regression analysis of fathers' educational attainment and students' science level of performance

Variable	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation ($1-R^2$)
Elementary level	9.91E-10	Significant	1.33E-19*	0.245	0.755
Elementary	5.43E-	Significant			

graduate	12	Non-
High School	0.074	significant
level	0.050	Non-
High School	0.057	significant
graduate		Non-
Vocational		significant
College level	0.001	Significant
College	2.01E-	Significant
graduate	07	

* $p < 0.05$; significant

Table 7.2.B shows the significance of fathers' education to the students' levels of performance in grade 8 science. According to the table, among the educational attainments only the elementary level, elementary graduate, college level and college graduate have p-values of <0.05, this means that they have statistically significant unique variance to the students' science performance. Despite the presence of some non-significant unique variances, the significance F (1.33E-19) and R^2 (0.245) tell us that the over-all significance of fathers' education attainment has a significance to the levels of performance of the student respondents in science which accounts the variance of 2.4%. this further means that with 95% confidence level, fathers' educational attainment could significantly predict the students' level of performance in science. High fathers' educational attainment could predict better performance of their children in science and low educational attainment predicts the other way around.

With this regression analysis result and correlation analysis on Table 8.1.B., "elementary level" and "elementary graduate" could significantly predict low science performance while "college level" and "college graduate" could significantly predict high science performance. The result of this study affirms the study of Duncan and Magnuson (2005) and Memon, et. al. (2010) which proves that parental education has significant effect on students' performance. According to Duncan and Magnuson (2005), the higher the parental education, the better is the academic performance of the students.

Table 7.2.C. Regression analysis of mothers' educational attainment and students' science level of performance

Variable	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation ($1-R^2$)
Elementary	0.015	Significant			
level	0.073	Non-			
Elementary		significant	2.899E-17*	0.261	0.739
graduate					
High school	0.523	Non-			
level		significant			
High school	0.135	Non-			
graduate	0.453	significant			

Vocational		Non-significant
College level	0.027	Significant
College graduate	6.172E-07	Significant

***** $p < 0.05$; significant

Table 7.2.C shows the levels of significance of mothers' education to the students' levels of performance in grade 8 science. It also shows that among the mothers' educational attainment, the "elementary level", "college level" and "college graduate" have p-values of <0.05; thus, they have significant effect to the students' levels of performance. For the over-all significance of mothers' education attainment which is 2.899E-17 shows that mothers' education has a high significance to the levels of performance of the student respondents in science with the variance of 2.61%. This further means that mothers' educational attainment could significantly predict the students' level of performance in science.

Based on this regression data and the correlation analysis on Table 8.1.C, "elementary level" could significantly predict low science performance while "college level" and "college graduate" could significantly predict high science performance. The result concurs with the findings of Earmon (2005) which proves that mother education affects the academic achievement of the students and of Muola (2010), the children of highly educated mothers obtain higher test scores thus, obtain better grades.

Table 7.2.D shows that all the fathers' occupations have p-values > 0.05 level of significance. This means that all of them have no statistically significant unique variance to the level of performance of students in science.

Table 7.2.D. Regression analysis of fathers' occupation and students' science level of performance

Variable	P – value	Interpretation	Significance F	Multiple Cosfficient of Determination (R^2)	Multiple Cosfficient of Alienation ($1-R^2$)
Group 0	0.696	Non-significant			

Group 1	0.172 0.265	Non-significant			
Group 2	0.769 0.914	Non-significant	0.152*	0.047	0.953
Group 3	0.212	Non-significant			
Group 4		Non-significant			
Group 5		Non-significant			
Group 6	0.294	Non-significant			
Group 7	0.576 0.078	Non-significant			
Group 8	0.442	Non-significant			
Group 9		Non-significant			

***** $p < 0.05$; significant

Likewise, the over-all significance of fathers' occupation which is 0.152 implies that it has no significance to the levels of students' performance in science. This also means that fathers' occupation could not significantly predict the performance of the students. The findings do not affirm the findings of Castillo, et. al. (2011) and Memon, et. al. (2010) that parents with low income occupation has negative influence to students' academic performance. Both of them pointed out that children from families with low socio-economic status are less prepared than their peers from families with medium or high socio-economic status due to inadequate resources and limited access to available resources.

Table 7.2.E. Regression analysis of mothers' occupation and students' science level of performance

Variable	P – value	Interpretation	Significance F	Multiple Coeffficient of Determination (R^2)	Multiple Coeffficient of Alienation ($1-R^2$)

Group 1	0.241 0.789	Non-significant			
Group 2	0.069 0.174	Non-significant			
Group 3	0.320	Non-significant			
Group 4		Non-significant			
Group 5		Non-significant	0.067*	0.091	0.909
Group 6	0.186	Non-significant			
Group 7	0.069 0.475	Non-significant			
Group 8	0.804	Non-significant			
Group 9		Non-significant			

***** $p < 0.05$; significant

Table 7.2.E shows that all the mothers' occupations have p-values > 0.05 level of significance. This means that all of them have no statistically significant unique variance to the level of performance of students in science. Likewise, the over-all significance of mothers' occupation which is 0.067 implies that it has no significance to the levels of students' performance in science. This also means that mothers' occupation could not significantly predict the performance of the students. The finding is in disagreement to the findings of Castillo, et. al. (2011) and Memon, et. al. (2010) that parents with low income occupation has negative influence to students' academic performance. Both of them pointed out that children from families with low socio-economic status are less prepared than their peers from families with medium or high socio-economic status due to inadequate resources and limited access to available resources.

Table 7.2.F. Analysis of family monthly income and students' science level of performance

Variable	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation ($1-R^2$)
Family monthly income	0.0357*	Significant	0.0357*	0.014	0.986

* $p < 0.05$; significant

Table 6.2.F shows that family monthly income has a p-value and significance F of 0.0357 which is lower than the 0.05 level of significance. This means that family monthly income has significance to the students' performance in science. The R^2 tells us that family monthly income accounts 1.40% significant variance to the level of performance of the students while the remaining 98.60% can be accounted to other predictors and some other variables. This further implies that with 95% confidence

level the family monthly income is a good predictor in determining the students' performance level in science. Students of better socioeconomic status perform well in science compared to those students who belong to low socioeconomic status. The result of the present study confirms the findings of Duncan and Magnuson (2005), socioeconomic status is the most important and fundamental factor which is responsible for the academic success and of Akinsanya, et. al. (2014), low socioeconomic status further means low academic performance.

Table 7.2.G. Regression analysis of intelligent quotient and students' science level of performance

IQ Level	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation ($1-R^2$)
Extremely low	0.053	Nonsignificant			
Borderline	0.047	Significant			
Lower average	0.886	Nonsignificant	1.465E-23*	0.333	0.667
Average	0.214	Nonsignificant			
Higher average	0.011	Significant			
Superior	0.044	Significant			
Very superior	0.147	Nonsignificant			

****** $p < 0.05$; significant

Table 7.2.G shows the p-values of the IQ levels such as "borderline", "higher average" and "superior" are significant in terms of its unique variance while the other levels have no statistical significant unique variance. Despite the presence of nonsignificant unique variance, all IQ levels share a great deal of common variance to the dependent variable with an over-all significance of 1.465E-23 which is lower than 0.5 level of significance. This tells us that IQ has significance to the levels of performance of the student respondents in science. The data also shows that the levels of IQ accounts 33.30% of the variance to the students' science performance level. Based on the result, intelligent quotient could significantly predict the students' levels of performance in science. The higher the IQ of the students, the better also is their performance in science. The finding supports the study of Chandra and Azimmudin (2013) that IQ is responsible for the academic outcome and the success in life. Likewise, the finding confirms the work of Deary, et. al. (2006) that IQ significantly contributes to the success of students' educational achievement.

Table 7.2.H. Regression analysis of learning styles and students' science level of performance

Learning styles	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation

					$(1-R^2)$
Intuiting	0.566	Nonsignificant			
Thinking	0.853	Nonsignificant			
Sensing	0.942	Nonsignificant			
Feeling	0.984	Nonsignificant			
Intuiting/ sensing	0.407	Nonsignificant			
Intuiting/ thinking	0.426	Nonsignificant	0.591	0.0365	0.964
Intuiting/ feeling	0.366	Nonsignificant			
Thinking/ feeling	0.599	Nonsignificant			
Feeling/ sensing	0.631	Nonsignificant			
Intuiting/ feeling/ thinking	0.696	Nonsignificant			
Intuiting/ feeling/ sensing	0.906	Nonsignificant			
Thinking/ sensing	0.949	Nonsignificant			
Intuiting/ thinking/ sensing	0.014	Significant			

Table 7.2.H shows the levels of significance of learning styles to the students' levels of performance in grade 8 science tested at the 0.05 level of significance. It also shows that among the learning styles only the "intuiting/thinking/sensing" has significant unique variance since its p-value is <0.05. however, the significant unique variance of "intuiting/thinking/sensing" is overpowered by the unique variance of other learning styles which contribute to a nonsignificant over-all variance. For the over-all significance of learning styles which is 0.591 shows that students' learning styles has no significance to the levels of performance of the student respondents in science. This further means that learning styles could not significantly predict the students' levels of performance in science. The result of this study does not support the findings of the studies of Abidin, et. al. (2011) and Abdul Kadir (2013) which according to them, learning styles have a significant relationship with the educational achievement of students.

Table 7.2.I. Regression analysis of teachers' education qualifications and students' science level of performance

Teachers' Education	**P – value**	**Interpretation**	**Significance F**	**Multiple Coefficients of**	**Multiple Coefficients of**

Qualification				**Determination (R^2)**	**Alienation ($1-R^2$)**
BSED/Gen. Sci.	0.032	Significant			
BSED/Math	0.003	Significant	1.447E-06*	0.0787	0.921
BSE/Electronics	0.000	Significant			

***** $p < 0.05$; significant

Table 7.2.I shows that at the 0.05 level of significance, teachers' education qualification such as BSED/Gen. Sci. and BSED/Biology have significance. This means all of them have significant unique variance to the performance of students in science while BSED/Biology has nonsignificant unique variance. Likewise, the over-all value of significance which is 1.447E-06 implies that teachers' education qualification accounts 7.89% significant variance to the students' level of performance in science. Considering the results of this regression analysis and the correlation analysis in Table 8.1.1, BSED/General Science could predict high students' science performance while BSED/Math and BSE/Electronics could predict low science performance. This also means the more appropriate the educational qualification of a teacher, the better is the students' performance in science. The result concurs with the findings of of the studies of Buddin and Zamarro (2009) and Unanma, et. al. (2013) which proves that teachers' educational qualifications have significant effects to academic performance of students. Likewise, it is in line with the study of Abe (2014) and Musau and Abere (2015) which showed that students who are under the teachers whose educational qualification is aligned with the subject taught have high academic performance.

Table 7.2.J. Regression analysis of teachers' science teaching experience and students' science level of performance

Variable	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation ($1-R^2$)
Teachers' Science Teaching Experience	6.067E-08*	Significant	6.067E-08*	0.0910	0.909

* $p < 0.05$; significant

According to Table 7.2.J, teachers' science teaching experience has a significance value of 6.067E-08 that is lower than the 0.05 level of significance. This implies that teaching experience of the teachers has significance to the students' performance in science, thus, it could be a good predictor for the level of students' performance in science. Based on the finding, students under the teachers who have enough experience in Science teaching perform well in the subject. The result is in agreement with the study of Dial (2008) which proves that teacher experience had an effect on student achievement and in the findings of Ladd and Sorensen (2014), it was positively associated with students' test scores and students' behavior. Likewise, the finding of this present study supports the study of Ewetan (2015) which found out that schools having more teachers with above 10 years teaching experience achieved better results than schools having more teachers with 10 years and below teaching experience.

Table 7.2.K. Regression analysis of teachers' trainings and seminars attended and students' science level of performance

Seminars/ Trainings Attended	**P – value**	**Interpretation**	**Significance F**	**Multiple Coefficient of Determination (R^2)**	**Multiple Coefficient of Alienation ($1-R^2$)**
National	0.776	Nonsignificant			
Regional	0.033	Significant	6.0487E-06*	0.0841	0.916
Division	0.453	Nonsignificant			

***** $p < 0.05$; significant

Table 7.2.K shows that with the three levels of seminars and trainings attended by the teacher respondents, it is the regional level that has significant unique variance to the students' science performance. However, the over-all value of significance for the teachers' trainings and seminars attended which is 6.0487E-06 implies that they have highly significant effect to students' level of performance in science and which account to 8.41% of variance. The finding further shows that teachers' trainings and seminars attended is a good predictor in determining the level of performance of students in science specifically the science trainings and seminars at the Regional Level. The result of this present study is in line with the findings of Angrist and Lavy (2006) and Bushra, et. al. (2011) which proves teachers' training substantially improves students' test scores. Likewise, it supports the study of Rahman, et. al. (2011) in which they concluded that teacher training was positively related to effective teaching and of Bushra, et. al (2011) which also concluded that students' test result under trained teachers are significantly better than those under the untrained teachers.

Table 7.2.L. Regression analysis of teachers' exposure to access internet connection and students' science level of performance

Variable	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation ($1-R^2$)
Teachers' Exposure to Access Internet Connection	6.51E-05*	Significant	6.5068E-05*	0.051	0.949

***** $p < 0.05$; significant

Table 7.2.L shows that teachers' exposure to access internet connection has a p-value of 6.5068E-05 that is lower than the 0.05 level of significance. This means that there is a significant relationship between the teachers' exposure to access internet connection and the students' level of performance in science, thus, it could be considered as a good predictor. Based on the regression data and the correlation analysis on Table 8.1.1, students under the teachers who have enough exposure to access internet connection for science related readings perform well in the subject. The result is in agreement with the findings of the study of Kaya, et. al. (2012) in which internet-based teaching promotes higher test results than conventional teaching method. Moreover, the present finding concurs the findings of Mohamed and Ayeche (2010) which proves that the use of internet can contribute in improving student performance.

Table 7.2.M. Analysis of type of school and students' science level of performance

Type of School	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation ($1-R^2$)
Public	0.2305	Nonsignificant	0.07540	0.010	0.990
Private	0.1074	Nonsignificant			

Table 7.2.M shows that the p – value and significance F of the type of school is higher than 0.05 level which means there is no significance between the predictor and the level of students' performance in science. This further means that the type of school in Valencia District could not significantly predict the level of performance in science. The result is contrary to the findings of Newhouse and Beagle (2005) and Lubienski and Lubienski (2006) which showed that type of schools whether they are publicly and privately administered affect students' acquisition of cognitive skills. Moreover, both findings of Newhouse and Beagle (2005) and Lubienski and Lubienski (2006) showed that students enrolled in public schools have performed well as compared to those in private schools.

Table 7.2.N. Regression analysis of class size and students' science level of performance

Variable	P – value	Interpretation	Significance F	Multiple Coefficient of Determination (R^2)	Multiple Coefficient of Alienation ($1-R^2$)
Class Size	0.118	Nonsignificant	0.11795	0.0079	0.992

Table 7.2.N shows that the p – value and significance F of the class size which is 0.118 is higher than 0.05 level. This means that there is no significance between class size and the level of students' performance in science. This further means that the class sizes of the respondent schools in Valencia District could not significantly affect the students' level of performance in science. The finding of this study does not affirm the findings of Dillon, et. al. (2006) in which class size has a negative influence to students' grades. They further stressed that the average grades of the students declines as class size increases. Moreover, this finding also contradicts the finding of Bascia (2010) which showed that in small class size the students performed better compared to those in bigger class size.

4. Conclusions

Based on the results & discussions, the authors derived the following conclusions:

1.1. The parents of the student respondents in Valencia District, Negros Oriental are high school level and high school graduate.

1.2. The parents of the student respondents have low income occupations.

1.3. The student respondents' family monthly income is below the official poverty threshold, thus, they belong to low socioeconomic status.

1.4. The student respondents are proficient in executing job related tasks that involve cognitive ability. They are also able to learn a trade in a hands-on manner and perform tasks involving decisions and able to learn from written materials.

1.5. The student respondents have developed the fundamental knowledge, skills, core understanding and with little guidance from the teacher and/or with some assistance from peers. They can transfer these understanding to performance tasks.

1.6. The student respondents have developed the fundamental knowledge, skills, core understanding and with little guidance from the teacher and/or with some assistance from peers. They can transfer these understanding to performance tasks.

1.7. The student respondents perceive inner meaning and relationships of what is occurring. They do not always believe what they see, instead look to what the potential significance might be.

1.8. Most of the teacher respondents in Valencia District have appropriate educational qualifications that are in line with the subject being taught.

1.9. Most of the teacher respondents are still new to science teaching profession.

1.10. In terms of training and seminars, they need to attend more trainings and seminars in regional and national levels.

1.11. There are only few hours allotted by the teacher respondents to access internet per week. They need to have more time to access the internet for their class instruction.

1.12. Majority of our student respondents are from public schools and only few from private schools.

1.13. The mean class size of the school respondents is a little bit higher to the standard class size which is 45, thus, overcrowding is one of the problems of the school respondents.

1.14. All school respondents have no problems in terms of books but need to fully follow the science equipment standards based on DepEd – NSTIC standards.

1.15. Science laboratory equipment and apparatus of the secondary schools in Valencia District are not conformed with the NSTIC standards.

1.16. Students' previous science performance, parents' educational attainment, parents' occupation, intelligence quotient (IQ), teachers' educational qualification, number of years in science teaching experience, levels and numbers of seminars and trainings attended and teachers' internet access significantly predict the level of students' performance in science; thus, they are considered as predictors. However, learning styles, class size, parents' occupation, type of school, student-book ratio, and conformity of science equipment and apparatus cannot predict students' level of performance.

5. Recommendations

The offer the following recommendations:

1. Teachers may conduct profiling on their students to identify the parents' educational attainment to adjust the teaching-learning process to the needs of the students whose parents are low in educational attainment. It is also recommended that our government should take steps to enhance parents' education through adult education program.
2. The government may take steps to enhance parents' occupation through different livelihood programs.
3. Parents may join some of the government livelihood programs to have an additional income.
4. Teachers may give tasks to students based on their IQ levels. They may utilize teaching strategies and techniques that could enhance the students' IQ level.

5. Teachers may adjust their teaching strategies to the levels of their students' performance and find ways how to improve their levels to Proficiency or Advance levels.
6. Teachers may determine their students who are in Approaching Proficiency level in the previous grade level and utilize teaching strategies and techniques that could enhance their level of performance to Proficiency or Advance levels.
7. Teachers may utilize teaching strategies and techniques that will fit to intuitive learners.
8. Teachers' educational qualification could significantly predict students' science performance, thus, it is recommended that education administrators and supervisors may hire those teachers whose educational qualifications are appropriate in teaching K to 12 Science.
9. Teachers with less experience may do their best to improve more their teaching styles and strategies through pursuing continuing education.
10. School administrators and supervisors may encourage and send their teachers to different trainings and seminars in division, regional, national and international levels.
11. School administrators may encourage their teachers to have a regular access of the internet for their class instructions.
12. School administrators of public schools may encourage those parents who are financially capable to send their children in private schools. Likewise, it is recommended that our government should widen the coverage of their Government Assistance for Students and Teachers in Private Education (GASTPE) program.
13. The class size of the school respondents is higher than the standard class size thus; it is recommended that supervisors, school administrators and teachers may train the teacherson how to handle big class sizes. Likewise, the government may focus on building more classrooms to avoid overcrowding of classes.
14. The Department of Education may maintain the 1:1 student-book ratio by updating the production of books based on the annual enrolment of the schools.
15. The Department of Education may provide science equipment to every school specially the public schools which are in the standard of NSTIC.
16. Educational supervisors, school administrators, and teachers may consider the significant predictors and make an action plan on how to enhance the levels of students' performance in science. Also, the government may initiate programs and projects that could help enhance the performance of the students especially on predictors such as parental education and occupation and school science equipment. The government may initiate adult education and livelihood programs for parents. On the other hand, teachers may enroll to continuing studies, attend trainings and seminars, and have regular access to the internet for their class instructions.

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