

# Academic Performance in Science of Grade 7 Learners

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*Abstract* — This study aimed to assess 1st, 2nd and 3rd quarter performance of Grade 7 students in the subject Science. Specifically, it dealt with the profile variables of the respondent, namely: age, sex, birth order, no of siblings, family structure and category of school. It determined the Academic Performance of Grade 7 across the three quarters. It also determined the level of mastery of the respondents for the most essential learning competency of Science 7. Moreover, the study whether or not significant difference between the academic performance in Science across the profile variables. Finally, it determined the significant relationship of respondents academic performance and the profile variables.

It was found that there is a significant difference between the academic performance and mastery level of respondents across the following profile variables; School and Sex There are significant relationships between the mean percentage score with the variables; sex and school.

Based from the salient findings, it shows that majority of the respondent- belong to 13 years of age predominantly females; most of whom are teacher III in position. Most of them have 2 siblings and 1st in birth order and belong to nuclear type of family. The grand overall weighted mean (GWOM) obtained by the respondent for their academic performance is 92 outstanding for Large School followed by mega, medium and lastly for small schools. For Over-all weighted for the mean percentage score for the three quarters 69.52 which falls to the descriptive rating of good The Grand over all weighted mean (GWOM) for the most essential competency; Medium school has the highest mastery level of 3 and Large School has the lowest mastery level of 2. Both are in Moving towards Mastery. Based on the weighted the following competencies are identified as the least mastered competencies for the three quarters in the different schools category.

The study recommends that teachers shall use variety of strategies to give what is best to students. Teachers should conduct action research to test the validity of strategies for the improvement of learners. Teachers should determine the different factors affecting the performance of students to give better treatment. Positive feed backing, conduct of INSET to tackle diagnosed problem inside the campus. Science teachers shall be given special trainings every 6 months to update their knowledge and strategies to deliver quality education. School heads shall evaluate the situation of teachers to lessen the stress upon working on a project as such utilization of all resources.

This study aimed to evaluate Grade 7 students' performance in the first, second, and third quarters of the Science course. It specifically addressed the respondent's profile characteristics, including age and sex. The number of siblings, the household structure, and the school type. It determined the Grade 7 student's overall academic performance across the three quarters. Additionally, the study assessed whether there was a statistically significant difference in the respondents' degree of

mastery of the most crucial learning skill in science, which is competency number 7. Finally, research established a substantial correlation between the academic standing of the respondents and the profile characteristics.

It has been found that there is a substantial difference in respondents' academic performance and mastery level across the following profile variables: sex and school. There are also significant associations between the mean percentage score and these variables.

***Keywords — Academic Performance, level of mastery***

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## I. Introduction

The importance of science education to individuals and society at large is acknowledged globally. It is an essential tool in society at large. The National Policy on Education in Nigeria (FRN, 2004, Bichi 2017) has advocated improvements in the teaching and learning of Science, Technology, and Mathematics (STM) in order to lay a solid foundation of technologically oriented manpower in line with the needs of national development efforts. Therefore, learning sciences becomes more important not only for the well-being of the individual but also for society as a whole (Odubunmi, 2015).

In addition, there is a rapid transformation of the world's industry, technology, communication, agriculture, and medicine. As a result, there is an increasing need for science at the individual as well as the wider socio-economic and political level, both locally and internationally as a way of predicting the ever-occurring events in the world.

Young people are called to take a stance on socio-scientific issues, to become more critical and problem-solving so as to meet the challenges of the day. There is no doubt that science and technology are driving forces in preparing students for the globalized world of work, new technologies, and knowledge-based society. Science became the benchmark of technology all over the world which lead to the decision of the further enhancement of Science subjects globally (Mnjokava, 2016).

In K to 12 science curriculum will provide learners with a repertoire of competencies important in the world of work and in a knowledge-based society. It envisions the development of scientifically, technologically, and environmentally literate and productive members of society who are critical problem solvers, responsible stewards of nature, innovative and creative citizens, informed decision makers, and effective communicators. This curriculum is designed around the three domains of learning science: understanding and applying scientific knowledge in local settings as well as global context whenever possible, performing scientific processes and skills, and developing and demonstrating scientific attitudes and values.

As a whole, the K to 12 science curriculum is learner-centered and inquiry-based, emphasizing the use of evidence in constructing explanations. Concepts and skills in Life Sciences,

Physics, Chemistry, and Earth Sciences are presented with increasing levels of complexity from one grade level to another in spiral progression, thus paving the way to a deeper understanding of core concepts. The integration across science topics and other disciplines will lead to a meaningful understanding of concepts and their application to real-life situations.

In addition, education has been the primary focus of different governments for centuries. The government has worked hard to make sure that the schools particularly the basic education continue to provide a mechanism that can make it intellectually capable to be part and contributor to the economy. In fact, education is the main bridge by which economically and socially marginalized adults and children can lift themselves up with the aid of education (Hardcastle as cited by Victorino, 2011).

Science subject is a no exemption in terms of performance aspects. Filipino students' poor achievement levels in Sciences have been documented for several years now. One of which, the Philippines joined the Programme for International Student Assessment (PISA) of the Organization for Economic Co-operation and Development (OECD) in 2018, as part of the Quality Basic Education reform plan and a step towards globalizing the quality of Philippine basic education. The country participated in PISA, to establish a baseline in relation to global standards, and benchmark the effectiveness of the reforms in moving forward. The PISA results, along with assessments and studies, can aid policy formulation, planning, and programming. Released on December 3, the 2018 PISA results revealed that the Philippines scored 353 in Mathematics, 357 in Science, and 340 in Reading, all below the average of participating OECD countries. With the PISA results also reflecting the learners' performance in the National Achievement Test, DepEd recognizes the urgency of addressing issues and gaps in attaining quality of basic education in the Philippines. (<https://www.deped.gov.ph>, 2019)

In addition, In the Trends in International Math and Science Study (Martin, Mullis, Gonzalez, & Chrostowki, 2004), Filipino grade 4 students ranked third from last out of 25 countries in science, with an average rating of 332. The average international rating was 489, and the highest rating by any country was 565. The grade 8 students ranked fourth from last out of 46 countries with an average rating of 377 in science. The average international rating was 474, and the highest rating by any country was 578. The TIMSS also showed that among grade 4 students, girls performed better than boys, but that this advantage of girls was no longer found in grade 8.

Everything got changed when the COVID-19 pandemic had significant impacts on society, education and all sectors. In particular, educational systems have had to adapt to mostly virtual methods of instruction with school closures in effect for much of the last year in most of the United States. Online learning proved difficult to implement even before the pandemic made it essential, presenting challenges for students, educators, and staff (Gillett-Swan, [2017](#)).

The Next Generation Science Standards (NGSS; the NGSS Lead States, [2013](#)) envision science learning as three-dimensional (3D), incorporating Science and Engineering Practices

(SEPs), Crosscutting Concepts (CCCs), and Disciplinary Core Ideas (DCIs) in order to elicit student interest and engagement in science. It had begun to address the gap brought by the pandemic ERA.

To continue the point of view even before the pandemic, of the K-12 standards of Grade 7, learners can distinguish mixtures from substances through semi-guided investigations. They realize the importance of air testing when conducting investigations. After studying how organ systems work together in plants and animals in the lower grade levels, learners can use a microscope when observing very small organisms and structures. They recognize that living things are organized into different levels: Cells, tissues, organs, organ systems, and organisms. These organisms comprise populations and communities, which interact with non-living things in ecosystems. Learners can describe the motion of objects in terms of distance and speed, and represent this in tables, graphs, charts, and equations. They can describe how various forms of energy travel through different mediums. Learners describe what makes up the Philippines as a whole and the resources found in the archipelago. They can explain the occurrence of breezes, monsoons, and ITCZ, and how these weather systems affect people. They can explain why seasons change and demonstrate how eclipses occur (K to 12 Science Curriculum Guide August 2016).

Studies reveal that Filipino students have low retention of concepts, have limited reasoning and analytical skills, and have poor communication skills which they cannot express ideas or explanations of events and phenomena in their own words (UP NISMED). In addition, a large percentage of Grade 6 and fourth year students in selected schools cannot apply concepts to real-life problem solving situations nor design an investigation to solve a problem (UP NISMED). Many educators and graduate student researchers have identified several factors behind the low performance in Science of Filipino students. These are: quality of teachers, the teaching-learning process, the school curriculum, instructional materials, and administrative support (DOST-SEI). In these sense, the researcher interests to find out whether Grade 7 students in San Manuel still reflect the previous findings that Filipino students have low retention rate in relation to expected competencies to be mastered as prescribed in the Philippine Science Curriculum Framework for Basic Education and in the streamlined most essential learning competencies (MELCs). Filipino students' poor achievement levels in science have been documented for several years now. The national mean score in the science test of the National Elementary Achievement Test was 41.5%. A recent National Achievement Test showed that in 2005, the mean score in the science test was 54.1% for grade 6 students, and only 14.8% of grade 6 science students attained mastery levels of the science curriculum goals. For the 4th year high school students, the National Achievement test in science showed a mean score of 39.5%; only 1.8 % of the students attained mastery levels of science curriculum goals. These low achievement levels are also documented in the international assessments of science education.

Science in the Philippines is in a spiral curriculum, grade 7 is not an exemption. The learning competencies for each quarter are based on the most essential part of learning. Learning is not effective without assessment.

For the past year, Flores Integrated School quarterly performance based on their grades got a mean percentage score of 81. The result showed a low over all in mean due to this result the researcher would like to conduct a research with regards to the academic performance of students in Science. Along with this the researcher would like to propose academic strategies to enhance further the acquisition of knowledge to student.

### **Literature Review**

In Uganda, intensive education in Science Subject has been started to increase the students' level of performance in Science. Poor performance in science subjects is increasing from time to time among secondary school students in Tanzania, East Africa as well as in Africa and the globe at large in recent years (Jidamwa, 2012, Moja 2017).

According to Science Education in Europe (2011), International student assessment surveys carried out under agreed conceptual and methodological frameworks with a view to providing policy-oriented indicators, in Europe indicate that there is a decrease of relative standings in the performance of science subjects among European members.

Ajaja (2008), found out that poor performance in science subjects in secondary schools has been a serious concern to educationists, business organizations, and government at large. This problem has been due to a lot of factors which include the absence of incentives and motivation on teachers so as to increase their efficiency and effectiveness in order to bring about improved performance of students.

In addition, the poor performance in science subjects is increasing from time to time in many secondary schools in Tanzania in recent years; the poor performance in science subjects is seen in national examination results. According to data collected from the National Examinations Council of Tanzania (NECTA), the pass rates (grade A to D) for the National Form Four Examination results in Mathematics were about 31%, 24%, and 18% in 2007, 2008, and 2009, respectively, as well as the pass rates for Chemistry were 33%, 31% and 28%, Biology pass rates were 46%, 41 and 43% while physics pass rates were 29% 26% and 27% respectively for the year 2007, 2008 and 2009 (Hamilton et al., 2010). The academic performance of students is a key feature of education (Rono, 2013). It is considered to be the center around which the whole education system revolves. Narad and Abdullah (2016) opined that the academic performance of students determines the success or failure of any academic institution. Singh, Malik, and Singh (2016) also argued that the academic performance of students has a direct impact on the socioeconomic development of a country. Similarly, Farooq, Chaudhry, Shafiq, and Behanu (2014), asserted that students' academic performance serves as a bedrock for knowledge acquisition and the development of skills. Additionally, Farooq et al., (2011) emphasized that the

top priority of all educators is the academic performance of students. According to Narad and Abdullah (2016), academic performance is the knowledge gained that is assessed by marks by a teacher and/or educational goals set by students and teachers to be achieved over a specific period of time. They added that these goals are measured by using continuous assessment or examination results.

The country is only one of the few countries suffering from low key performance in Science. In the study of Mabula (2015), it was shown that there is a continuation of failure, and poor performance in science subjects in secondary schools National Examinations, and there is a continuous dropout from science subjects, the drop out is more serious in Physics and chemistry subjects as compared to mathematics and biology which are compulsory to all students. (Majo, 2016).

## II. Methodology

### Research Design and Strategy

The descriptive-survey-correlation design will be used for the investigation. In quantitative research, researchers gather numerical information from people or groups and typically put this information to statistical studies to see whether there are any links between them. The researcher believe that the descriptive approach of research would be most appropriate given the goal of the investigation. Descriptive methods, as the name suggests, are used to describe a population's or phenomenon's features without trying to modify the variables. The descriptive-correlation method is used to determine the relationship to two variables whether the relationship is perfect, very high, high, marked, or moderate, slight or negligible (Cacay, 2019).

### Population and Locale of the Study

The subject of this research will be the Public Schools in 6<sup>th</sup> Congressional District of Pangasinan II. The respondents will be the Secondary Teachers teaching Science subjects for the School Year 2022-2023. Complete enumeration of the respondents will be used in this study. Shown in Table 1 will be the respondents of the study which projects the name of schools and the number of teacher-respondents for each school.

**Table 1:**  
*Population of the Study*

Cluster/Group	Name of the School	Number of Respondents
Mega	Flores Integrated School	1
Mega	Juan C. Laya National High School	1
Mega	Tayug National High School	1
Mega	Luciano Millan National High School	1

Mega	Eastern Pangasinan Agricultural Colleges	1
Large	San Nicolas National High School	1
Large	Natividad National High School	1
Large	San Quintin National High School	1
Large	Balungao National High School	1
Large	Calepaan Integrated School	1
Medium	Sta. Maria East Integrated School	1
Medium	Sta Cruz Integrated School	1
Medium	Ariston Bantog National High School	1
Medium	Robert B. Estrella National High School	1
Medium	Sto. Domingo National High School	1
Small	Don Robert B. Estrella National High School	1
Small	San Juan National High School	1
Small	Carusocan Sur National High School	1
Small	Carusocan Norte National High School	1
Small	Toboy National High School	1
	<b>Total</b>	<b>20</b>

**Source:** Records Section, Schools Division of Pangasinan II

### **Data Gathering Tools**

A survey questionnaire will be used to the Public School Teachers. The questionnaire will be administered to the Secondary Science Teachers of particularly those teaching grade 7 Science in 6<sup>th</sup> Congressional District of Pangasinan II. The total population will be 45 respondents.

### **Data Gathering Procedure**

Prior to the administration of the instrument, a Letter of Request to conduct the Study will be addressed to the Schools Division Superintendent, Dr. Lorna G. Bugayong, CESO V and the school heads/ principals of secondary schools of the said division.

To determine the content validity of the instrument, the questionnaire checklist will be presented to 5 experts which includes education supervisor in science, master teacher, school head, guidance counselor and a teacher III.

### **Treatment of Data**

To treat the data which will be gathered, the following statistical tools will be used:

The Statistical treatment to be employed in problem number 1 will be the use of frequency counts and percentages as well as averaging for the grades of students.

The result shall be interpreted using a descriptive rating from the Likert Scale.

Performance Rating	Descriptive Rating
75 below	Poor
76-80	Unsatisfactory
81-85	Satisfactory
86-90	Very Satisfactory
91-100	Outstanding

On the other hand, the statistical treatment to be employed in problems 2, 3 and 4 will be the computation of the Mean while on problem #4 the T-test will be employed.

In addition, the gathered data will be processed using Excel and the Statistical Package for Social Science (SPSS) application windows software. The following statistical tools will be used in the study mean for the grades, mean percentage score and mastery level of students.

For sub- problem Number 4, on what is the significant difference of the students' academic performance and mean percentage score, to explore the variations and significant differences, one-way analysis of variance (ANOVA) will be used.

Pearson r will be utilized for the relationship to be determined between academic performance and mastery level of students in Science (#5 problem).

### III. Results and Discussion

#### PROFILE OF THE RESPONDENTS

Table 2 below presents the frequency and percentage distribution of the respondents across the variable categories.

##### Profile of the Respondents

Table 2 below presents the frequency and percentage distribution of the respondents across the variable categories.

**Table 2**  
***Frequency and Percentage Distribution of the Respondents-Students n=150***

Variable	Variable Categories	Frequency	Percent
Age	12 years old	70	46.66
	13 years old	73	48.67
	14 years old	5	3.3
	15 years old	1	.67
	16 years old	1	.67



Sex	Male	63	42
	Female	87	58
Number of Siblings	Only child	26	17.33
	2	54	36
	3	46	30.67
	More than 4	24	16
Birth Order	1 <sup>st</sup>	47	31.33
	2 <sup>nd</sup>	44	29.33
	3 <sup>rd</sup>	28	18.67
	4 <sup>th</sup>	19	12.67
	5 and above	12	8
Family	Nuclear	76	50.67
	Extended	42	28
	Single Parent	20	13.33
	Step Family	12	8

**Age.** Most of the respondents are students under the age of 13 with the total of 73 or 48.67 of the total respondents (150), 46.66 percent or 70 of the respondents are 12 years old, 5 in total for 14 years old and 1 each for ages 15 and 16 years old.

**Sex.** 87 of the respondents are female or 58 percent of the total respondents while 42 percent are males with 63 counts.

**Number of siblings.** 54 respondents have 2 sblings, 46 or 30.67 percent have 3 siblings, 26 of the respondents are only child and only 16 percent or 24 have more than 4 siblings.

**Birth Order.** Most of the respondents are first child with a total of 47 or 31.33 percent. 29.33 percent or 44 of them are second in order, 28 in total are third child and 19 of the respondents are in 4<sup>th</sup>.and only 12 is in 5<sup>th</sup> order.

**Family.** The respondents with highest count belong to nuclear family, 76 or 50.67 percent in total. 28 percent is Extended family with 42 in total. Single parent Family is 13.33 percent or a total of 20. while Step Family has a total of 12 or 8 percent.

in Social Sciences and Technology Volume 5 Issue 2, 2020 Camarero-Figuerola, M., Dueñas, J. M., & Renta-Davids, A. I. (2020). The relationship between family involvement and academic variables: A systematic review. Research in Social Sciences and Technology suggest that there are implication patterns and other family variables related to parenting and home structure that promote the future academic success of adolescents. George, Cabrera, and Kurban (2018) argue that family involvement has a positive impact on teens' access to college.

### Frequency and Percentage of School- respondents

The table 3 contains the number of School with their category.

**Table 3**  
***Frequency and Percentage Distribution of the School- Respondents n=20***

Variable	Variable Categories	Frequency	Percent
Type of School	Small	5	25
	Medium	5	25
	Large	5	25
	Mega	5	25

The respondents of chosen schools are based on their population. Each category has five participating schools. The categories are small, medium, large and mega. Each categories have five respondents which is the 25 % of the total number of schools which is 20.

**Table 4**  
**Academic Performance of Students for Quarter I- III n=20**

Variable	OWM- Quarter I	OWM- Quarter II	OWM- Quarter III	Mean	Transmuted Rating
Small School	88	89	91	89	Very Satisfactory
Medium	89	90	92	90	Outstanding
Large	91	92	93	92	Outstanding
Mega	89	91	92	91	Outstanding

*Legend:*

<i>Grading Scale</i>	<i>Descriptive Value</i>
90-100	Outstanding
85-89	Very Satisfactory
80-84	Satisfactory
75-79	Fairly Satisfactory
Below 75	Did not meet expectations

Large schools have the highest mean for quarter I which is equivalent to the transmuted rating of Outstanding, followed by Medium and Mega with 89, very satisfactory. The lowest is 88 from

Level of Mastery of Respondents for the Most Essential Competencies

Table 5 contains the data of the mastery level of respondents in different schools from quarter I, II and III.

**Table 5**  
*Mastery of Respondents for Most Essential Learning Competencies for Quarter I*

Quarter I	Weighted Mean	Transmuted Rating
1. Describe the different levels of biological organization from cell to biosphere.	2.70	Moving Towards Mastery
2. Differentiate plant cell from animal cell according to the presence and absence of certain organelles.	2.70	Moving Towards Mastery
3. Identify parts and functions of compound microscope.	2.85	Moving Towards Mastery
4. Identify the beneficial and harmful microorganism	2.50	Averagely Mastered
5. Differentiate asexual reproduction from sexual reproduction.	2.60	Averagely Mastered
6. Describe the different ecological relationships found in an ecosystem.	2.25	Averagely Mastered
Over-all Weighted Mean (OWM)	2.80	Moving Towards Mastery

The result of the table isn't yet in the alarming level of mastery however Solomo (2021) stated the availability of instructional materials helps in mastering a certain competency hence, government support plays an important role in securing learning resources that could be distributed to different public schools.

**For Quarter II**
*Mastery of Respondents for Most Essential Learning Competencies for Quarter II*

<b>Quarter II</b>	<b>Weighted Mean</b>	<b>Transmuted Rating</b>
1. Express concentration of solutions quantitatively by preparing different concentrations of mixtures according to uses and availability of materials.	2.35	Averagely Mastered
2. Distinguish mixtures from substances based on a set of properties.	2.65	Moving Towards Mastery
3. Recognize that substances are classified into elements and compounds.	2.65	Moving Towards Mastery
4. Investigate the properties of acidic and basic mixtures using natural indicator	2.63	Moving Towards Mastery
5. Describe some properties of metals and non-metals such as luster, malleability, ductility and conductivity.	2.52	Averagely Mastered
Over-all Weighted Mean (OWM)	2.05	Averagely Mastered

Quarter II MELCS has an over-all weighted mean of 2.80 , with the descriptive rating of Moving Towards Mastery. Indicator 3. gained the highest mean with an overall score of 2.85 that falls under Moving Towards Competency. In, contrast with Indicator 6 “*Describe the different ecological relationships found in an ecosystem*” for having the lowest mean of 2.25 with a descriptive rating of Averagely Mastered.

**For Quarter III**
*Mastery of Respondents for Most Essential Learning Competencies for Quarter III*

<b>Quarter III</b>	<b>Weighted Mean</b>	<b>Transmuted Rating</b>
1. Describe the motion of an object in terms of distance or displacement, speed or velocity, and acceleration.	2.35	Averagely Mastered
2. Create and interpret visual representation of the motion of objects such as tape charts and motion graphs.	2.65	Moving towards mastery
3. Infer that waves carry energy.	2.80	Moving towards mastery
3. Infer that waves carry energy.	2.80	Moving towards mastery
4. Describe the characteristics of sound using the concepts of wavelength, velocity, and amplitude.	2.85	Moving towards mastery
5. Explain color and intensity of light in terms of its wave characteristics	3.92	Mastered

For Quarter III the over – all weighted mean of the respondents is 2.89 with a descriptive rating of Moving towards Mastery. Quarter III Most Essential competencies have something to do with physics.

Indicator 5 obtain the highest mean “*Explain color and intensity of light in terms of its wave characteristics*” obtaining the descriptive rating of mastered. In contrast with Indicator 1 “*Describe the motion of an object in terms of distance or displacement, speed or velocity, and acceleration*” with descriptive rating of averagely mastered.

One-way Analysis of Variance of Profile Variables on the Competency Mean Score

Table 6, shows the one way analysis for the significant difference of the respondents across the profile variables.

One way variance is used to determine the significant relationship of each variables to the components tested.

**Table 6**  
***One-way Analysis of Variance of Profile Variables on the Competency Mean Score***

Source	SS	MS	F	p-value
<b>School</b>				
Between Groups	1.896	.948	4.090	0.019
Within groups	27.587	.232		
Total	29.483			
<b>Sex</b>				
Between Groups	.010	.005	0.020	.980
Within groups	29.473	.248		
Total	29.483			
<b>Age</b>				
Between Groups	1.172	1.172	4.954	0.028
Within groups	28.147	.237		
Total	29.318			
Source	SS	MS	F	p-value
<b>No. of Siblings</b>				
Between Groups	1.896	.948	4.090	0.019
Within groups	27.587	.232		
Total	29.483			
<b>Birth Order</b>				
Between Groups	.014	.004	0.020	.180
Within groups	28.473	.243		
Total	28.487			
<b>Family</b>				
Between Groups	1.072	1.072	4.854	0.030
Within groups	28.147	.237		
Total	29.319			

There was a significant difference in the students' mastered competencies in Grade 7 according to school at the 0.05 level [ $F(2,119) = 4.090, p < 0.05$ ]. Post-hoc comparison using Tukey LSD test indicated that significant differences were found between Medium School ( $M = 3.00$ ) and Large School ( $M = 2$ ); and between Small School ( $M = 2.78$ ) and Large school ( $M = 2$ ). This means that students in Medium School have higher mastery in Grade 7 competencies compared with Large School and Small School.

#### **IV. Conclusion**

The following are the conclusions drawn from the salient findings:

The respondents are relatively old young grade 7 students and predominantly female. Performances of the students are affected by their School and Sex. The least mastered competencies differ from one school to another. The academic performance of students relies on their level of mastery and the level of teachers delivering the learning.