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Science-Related Factors on Learners' Academic Performance

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A B S T R A C T

This study determined the relationship between Science-related factors and the academic performance of Grades 5 and 6 learners in San Ildefonso North District, San Ildefonso, Bulacan during the School Year 2023 – 2024. With explanatory sequential mixed methods as research design and 217 Grades 5 and 6 learners as respondents of the study, findings revealed that the assessments of the learners as regards Science-related factors in terms of teachers' personal attributes and teachers' professional competence as very evident. Meanwhile, Science-related factors in terms of social implications of Science, interest in learning science and school resources was assessed by the same respondents as evident. On the other hand, Science-related factors in terms of availability of apparatus were assessed by these respondents as moderately evident. The learners' academic performance in Science was described as "very satisfactory". Highly significant relationship was found between science-related factors and learners' academic performance. Based on the findings of the study, these conclusions were drawn: The teachers are capable enough to teach Science. The learners performed well in Science. Positive relationship existed between Science-related factors and learners' academic performance.

Keywords: Learners' Interest in Science, Academic Performance, School Resources, Science Related Factors

Introduction

Science is a very interesting and somewhat difficult subject. According to dela-Cruz (2016) science is an excellent subject and part of the three kings of school subjects worldwide. However, in the Philippine schools, different factors are considered hindrance to make science teaching and learning more effective. Filipino students suffered from low retention of concepts, limited reasoning and analytical skills, and poor communication skills.

Based on Republic Act 10533, Section 15, Commitment to International Benchmarks and DepEd Order No. 29, s. 2017 on Policy Guidelines on System Assessment in the K to 12 Basic Education Program, the Department of Education's participation in TIMSS 2019 will provide the Department with an additional tool to measure the effectiveness of the enhanced basic education curriculum and its delivery systems. Further, the results of TIMSS will inform and support education policy decision making; identify weaknesses in the education system; and serve as benchmark to measure school effectiveness and determine the alignment of national standards (DepEd Order No. 55, s. 2010).

This concern was heightened by the release last December 2019 of the results of the 2018 Programme for International Student Assessment (PISA) of the Organization for Economic Co-operation and Development (OECD). The performance of the country in the recent PISA confirms the unexpressed suspicion that there is a long-standing problem of quality of education in the country. Among 79 high- and middle-income countries, the country was last in reading, and second to the last in Mathematics and in Science (Orbeta et al., 2020).

A recall of the results of the 2018 PISA released in December 2019 will tell us that overall, the country ranks second to the last in each of the Mathematical and Scientific literacies, and last in Reading literacy among the 79 high- and middle-income countries that participated. Fifteen-year-old students in the Philippines scored lower in reading, mathematics and science than those in most of the countries and economies that participated in PISA 2018. The country's average score in reading was 340 score points, on a par with that of the Dominican Republic. No country scored lower than the Philippines and the Dominican Republic. In mathematics and science, students in the Philippines scored 353 and 357 points, respectively, on a par with performance in Panama. The Philippines outperformed the Dominican Republic in mathematics and science. Over 80% of students in the Philippines did not reach a minimum level of proficiency in reading, which is one of the largest shares of low performers amongst all PISA-participating countries and economies (OECD, 2019).

Nevertheless, the quality of science education in the country is still considered low as compared to that of other countries despite the advent of the K-12 program. The country's high school students, in particular, still show poor performance in the standardized exams, including the National Achievement Tests (NAT). It was reported that the Philippines ranked number sixty-four (64) out of one hundred forty (140) countries worldwide in terms of mathematics and science according to the 2015-2016 Global Competitiveness Report of the World Forum, and also ranked seventy-ninth out of one hundred thirty-eight (138) countries based on the data (Dela Cruz, 2017).

Science as one of the equally important subjects in the basic education is always a part of national and international assessments as bases for quality education. Homden (2017) specified that Science is probably the most long-standing and significant academic discipline which encompasses a wide array of subjects. A significant learning objective of Science as a subject entails utilization of laboratory experience to enhance its mastery, expound scientific reasoning skills, foster comprehension of the intricacy and uncertainty of experiential works, promote functional skills, which thereby cultivate the love of this discipline of study.

Science education in the country is at its edge. When it comes to science, numerous aspects can be attributed to the country's current dilemma. Kaptan and Timurlenk (2012) as cited by Sadera et.al., (2020), stated that some of the pressing challenges in learning science are an insufficient number of science teachers, lack of motivation among learners and low self-assurance in learning science, huge numbers of students in every class, broken connection with other lessons, inadequate number of laboratory equipment and facilities, insufficient time distribution for science education despite the intensive curriculum. Philippine education's problems harshly limit how most public schools can teach science to their students. Knowing these restrictions in science teaching, it is not a surprise how our fellow Filipinos perceive science (Ambag, 2018).

The researcher conducted a study to explore the relationship between science-related factors and learners' academic performance in science. This study aimed to understand how various factors related to science influence learners' academic performance in science.

Statement of the Problem

This study determined the relationship between Science- related factors and the academic performance of Grades 5 and 6 learners in San Ildefonso North District, San Ildefonso, Bulacan during the School Year 2023 – 2024.

Specifically, it will seek answers to the following questions:

1. How may learners' Science-related factors be described in terms of:

    1.1 social implications of Science;

    1.2 interest in learning science;

    1.3 teachers' personal attributes;

    1.4 teachers' professional competence;

    1.5 school resources; and

    1.6 availability of apparatus?

2. How may learners' academic performance be described in terms of their grades in Science in the first grading period?

3. Is there a significant relationship between the learners' Science-related factors and their academic performance?

4. What are the views and insights of the learners as regards the contribution of Science-related factors on their academic performance?

5. What program of activities can be crafted from the results of the study?

Hypothesis

There is no significant relationship between the learners' Science-related factors and their academic performance.

Conceptual Framework

From the reviewed related studies, theories and related literature, the researcher came up with a paradigm which served as guide in the conduct of the study and which is exhibited in Figure 1. The shows that the independent variable in the study are the Science-related factors. These variables were hypothesized to influence (as implied by the arrowhead) the dependent variable which is the learners' academic performance in Science.

Independent Variable   Dependent Variable

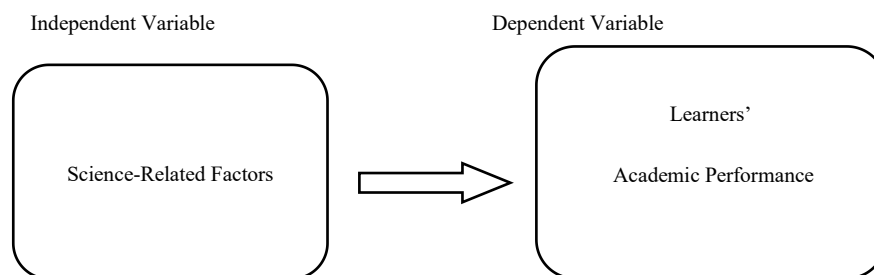Science-Related Factors → Learners' Academic Performance

Figure 1. Paradigm of the Study

METHODOLOGY

Research Design

This main concern of the study was to explore the correlation between Science-related factors and learners' academic performance in Science. Additionally, the views and insights of the learners as regards the importance of Science-related factors on their academic performance were solicited. Thus, the explanatory sequential design was applied to attain these objectives.

According to Creswell (2013), the mixed-methods sequential explanatory design consists of two distinct phases: quantitative followed by qualitative. Initially, the researcher collected and analyzed the quantitative (numerical) data in this method. In order to further explain the quantitative results from the first phase, the qualitative (text) data was gathered and examined second in this order. The second qualitative phase expanded upon the previous quantitative phase and the two phases were connected in the intermediate stage in the study. The rationale for this approach was that the quantitative data and their subsequent analysis provided a general understanding of the research problem. The qualitative data and their analysis refined and explained those statistical results by exploring participants' views in more depth.

For this study, the assessments of the learners as regards Science-related factors were obtained through a survey questionnaire. On the other hand, semi-structured interview was conducted to collect the leaners' views about the importance of Science-related factors on their academic performance.

Results of the interview were utilized to validate the quantitative findings of the study. Moreover, this was also used to further explain and to arrive at a more in-depth discussions of the quantitative findings of this research.

Data Gathering Technique

Before the administration of survey questionnaire and conducting of interview which involved direct interaction between the researcher and the respondents, the researcher first requested approval from the Superintendent of Schools Division of Bulacan to use the selected Grades 5 and 6 learners from elementary schools in San Ildefonso North District as respondents for the study.

Since the target respondents were under 18 years old, an assent form and consent form were secured from the respondents' parent or guardian before the conduct of the study.

Adapted and modified questionnaire was used to gather the quantitative data for the study. The Science-related factors questionnaire was adapted from Pedrona (2020). Meanwhile, the learners' academic performance was based on their grades in Science in the first grading period which were obtained from their teachers.

After gathering the required quantitative data for the study, it was treated and analyzed. Based on the results of the quantitative data analysis, the researcher formulated the questions for the semi-structured interview.

During the interview, the respondents were given the chance to read the notes and removed any offensive portions if they wished to. In order to prevent disruptions of classroom activities, interviews were conducted before and after school hours.

Once the qualitative data from the interviews are collected, analysis was followed. The qualitative results were used to validate the quantitative findings and provide a deeper understanding on the topic.

Sampling Procedures

Proportional stratified simple random technique was utilized to select the respondents of the study. In this technique, the sample is selected by randomly choosing individuals from each stratum in proportion to their representation in the overall population. This ensures that the sample reflects the diversity and characteristics of the entire population.

According to Gay and Diehl as cited by Hashim (2010), generally the number of respondents acceptable for a study depends upon the type of research involved - descriptive, correlational, or experimental. For descriptive research the sample should be 10% of the population for a larger population as large as 1000. But if the population is small (as small as 500 and below) then 20% may be required. Since the total population is too large (N=2170), only 10 percent or 217 Grades 5 and 6 learners were selected at random and requested to participate in the quantitative data collection.

Table 1. *Distribution of Respondents of the Study*

School	Grade 5		Grade6		
	N	n	N	n	Total
Anyatam ES	101	10	106	11	21
Bubulong Malaki ES	50	5	44	4	9
Bubulong Munti ES	50	5	55	6	11
Buhol na Mangga ES	19	2	23	2	4

Bulusukan ES	46	5	45	4	9
Calasag ES	76	8	62	6	14
Calawitan ES	65	7	72	7	14
Garlang ES	28	3	23	2	5
Lapnit ES	52	5	36	4	9
Makapilapil ES	54	5	41	4	9
Mataas na Parang ES	43	4	45	5	9
Nabaong Garlang ES	44	4	36	4	8
Pulong Tamo ES	43	4	35	4	8
San Ildefonso ES	192	19	201	20	39
San Juan ES	50	5	33	3	8
Sta. Catalina Bata ES	61	6	44	4	10
Sta. Catalina Matanda ES	60	6	42	4	10
Sumandig ES	40	4	28	3	7
Telapatio ES	30	3	18	2	5
Umpucan ES	50	5	27	3	8
Total	1154	115	1016	102	217

For the qualitative part, a total of ten (10) learners were selected for the interview. This included five (5) male learners and five (5) female learners. Fishbowl technique was used to select learners for an interview. In this method, all names of the learners were written on a slip of paper with numbers, which were folded tight, so the numbers are hidden. Male was separated from female. Then, the researcher selected five (5) slips randomly from each group. The selected ten (10) learners participated in a semi-structured interview, where their opinions and insights on the importance of Science-related factors in their academic performance were sought.

Data Analysis Scheme

Upon completing the needed quantitative data, some statistical tools were used for the analysis and interpretation.

Weighted mean was computed to describe the Science-related factors.

Mean and standard deviation on the other hand were computed to describe the learners' academic performance in Science.

Correlation analysis was performed to determine if significant relationship existed between Science-related factors and learners' academic performance in Science.

For the collected qualitative data, thematic analysis was done.

RESULTS AND DISCUSSIONS

The Learners' Science-Related Factors

Filipino students' poor achievement levels in science have been documented for several years now. Many different studies have analyzed the sources of the problem and these analyses have pointed to a range of interrelated factors. However, the central idea of the present research is to first study the representation of science-related factors that may influence the academic achievement of secondary school students .

The assessments of the Grades 5 and 6 learners as regards selected science related factors such as social implications of Science, interest in learning science, teachers' personal attributes, teachers' professional competence, school resources and availability of apparatus are presented in Tables 2 and 7.

Social Implications of Science

The "social implication" of Science is the manner in which it affects the population. It expresses and measures the actual benefits of Science for the society. At the center of the social implications of technology are humans – it is humans who make the technology and humans who benefit, or are harmed, by it.

It can be observed from Table 2 that item number 3, "I see my teacher as a role model" garnered the highest computed weighted mean of 4.72 with a verbal description of "very evident" and standard deviation of 0.89. This computed standard deviation which is the lowest among the computed SD listed in the table indicates that the responses of the students for item number 3 is closer to the mean. A closer look at the table shows that item number 6, "I want to have a job related to science in the future" yielded the lowest computed weighted mean of 3.36 with a verbal description of "moderately evident" and standard deviation of 1.12. This highest computed SD reveals that there is a greater variability on the responses or the students' responses are more scattered with respect to the mean. Further perusal of the tabulated data reveals that the overall mean was calculated at 4.11 which is verbally interpreted as "evident".

Results of the analysis imply that students see their Science teachers as people who inspire and encourage them to strive to learn their lessons, live to their fullest potential and see the best in themselves. Further, they admire their Science teachers, that they learn through them, through their commitment to excellence and through their ability to make them realize their own personal growth.

In accordance to the findings of the present study, Manju (2023) opined that a role model teacher is someone students admire and someone they aspire to be like. They look to them for advice and guidance. Additionally, he stated that role model can be anybody: a parent, a sibling, a friend but some of their most influential and life-changing role models are teachers. Teachers play important role in student's life to become successful in career and business.

In the conducted interview with the learners, they were asked "How can your Science teachers be role models for you?" Most or almost all respondents replied that they considered or treated their Science teachers more than class teachers. Further, they added that their Science teachers are their role models who inspired and drive them outside of the classroom just as much as they teach them inside. Moreover, they said that their teachers in Science are approachable and served not only as teachers but like a mother, sister and a friend for them.

Interest in Learning Science

Interest is a crucial element for students' academic success not only in Science but in all subjects as well. Students engage in the learning process and learn more when something interests them. Interest in learning science is a component that can predict the quality of learning and the level of current and future engagement of students.

It can be gleaned from Table 3 that item number 1, "I pay attention during science class" received the highest computed weighted mean of 4.36 with a verbal description of "very evident" and standard deviation of 0.86. Meanwhile, item number 8, "I like reading science articles" got the lowest computed weighted mean of 3.28 with a verbal description of "moderately evident" and standard deviation of 1.24. The overall mean was registered at 4.02 which is verbally described as "evident."

These findings indicate that students firmly believed that when they focus their minds in listening to their teachers' discussion in Science, they would be able to learn and absorb their lessons.

In conformity with the findings of the study, Gallen et al., (2023) asserted that paying attention is a critical cognitive ability that improves over the course of development and predicts important real-world outcomes, such as academic achievement. Results of their study showed that attention was positively related to performance on targeted assessments, as well as broad academic measures. Moreover, they found that attention was more predictive of targeted Science sub-skills. Their findings add to the understanding of how sustained attention is linked to academic skills assessed in more 'real-world', naturalistic school environments and have important implications for designing tools to support student's academic success.

In the conducted interview with the learners, they were asked "how do you show your interest in Science?" Most learners answered that they showed their interest in Science by listening to the discussions of their teachers. Additionally, they said that once their teacher entered the classroom, they focus their attention to the topics for the day.

Teachers' Personal Attributes

Personal attributes basically mean traits that make up Science teachers' personality, which define who they are. Teacher's personal attributes more than any other factor could motivate students to continue attending a class.

Table 4 shows that item number 1, "My teacher motivates me to do well in science" received the highest computed weighted mean of 4.72 with a verbal description of "very evident" and standard deviation of 0.88. Meanwhile, item number 3, "I feel comfortable asking science-related questions to my teacher" got the lowest computed weighted mean of 3.18 with a verbal description of "moderately evident" and standard deviation of 1.22. The overall mean was registered at 4.23 which is verbally described as "very evident."

These results signify that Science teachers strongly believed that motivation is really essential in learning the presented lessons. Further, they agreed that when the learners are motivated, they can easily absorb Science concepts.

In conformity with the findings of the present study, Wang (2022) reiterated that motivation is positively related to academic performance throughout all age groups, and it has a more vital influence on students' performance as they grow up. Moreover, the relationship between motivation and academic performance was also influenced by other factors. Motivation has positive and negative mediators or moderators that influence their effect on performance, often related to effort, engagement, anxiety, and learning strategies.

In the conducted interview with the learners, they were asked "What is the best characteristic of your Science teacher that you like most and why?" Majority of the respondents replied that what they like most about their teachers is the way they motivated them before starting the lesson proper. Moreover, they also stated that when they feel motivated, they become more interested in learning the topics in Science.

Teachers' Professional Competence

Professional competence can be defined as the teachers' capability to master their subjects in-depth and the way to appropriately deliver it to the students. Teachers' professional competence—their professional knowledge, skills, beliefs and motivation—is a critical predictor of teachers' professional wellbeing and success.

It can be seen from Table 5 that item number 1, "My teacher explains the lesson clearly" registered the highest computed weighted mean of 4.60 with a verbal description of "very evident" and standard deviation of 0.78. On the other hand, item number 10, "My teacher let use the laboratory apparatuses and equipment during experiments" got the lowest computed weighted mean of 4.02 with a verbal description of "evident" and standard deviation of 1.10. The overall mean was recorded at 4.29 which is verbally described as "very evident."

These results suggested that the elementary school learners believed that their teachers have an adequate knowledge in discussing lessons in Science which is very vital for them to understand and obtain higher scores and grades in the subject. Further, these learners affirmed that their teachers have the mastery of the subject matter in Science which can positively affect their performance.

Similar to the present findings, the study conducted by Duru (2020) revealed that subject mastery significantly affects the academic performance of secondary school students. The study recommends that continuous training workshops and seminars should be organized for practicing teachers, school administrators should devise means to identify and tackle weaknesses in teachers' subject knowledge; and subject mastery should be a criterion for recruitment of teachers in secondary schools.

In the conducted interview with the learners, they were asked "How knowledgeable is your teacher in Science?" Most of the respondents answered that they see their teachers as competent because they can explain the topics very well. Further, they also stated that their teachers can easily answer all their questions which they believed is strong evidence that they have the mastery of the lessons.

School Resources

School resources provide a source of learning experience for the learners, assisting the process of interaction between students and teachers during the teaching/learning process. At the same time, school resources help students to learn and increase their experience, meeting different learning needs.

As manifested in Table 6, item number 1, "Our school has knowledgeable science teachers" registered the highest computed weighted mean of 4.56 with a verbal description of "very evident" and standard deviation of 1.01. Meanwhile, item number 5, "Our school allows us to use the computer laboratory room for research purposes" received the lowest computed weighted mean of 3.12 with a verbal description of "moderately evident" and standard deviation of 1.28. The overall mean was recorded at 3.86 which is verbally described as "evident."

These results indicate that the learner respondents believed that their respective school has a teacher who is competent enough to teach Science which is very important for them to learn more on the subject. Further, these respondents see their teachers who are rich in terms of knowledge in Science which they can share in the class.

In the same vein, Catalano, and Asselta (2019) asserted that if teachers are educated properly in science content and science teaching methods, they will have high levels of scientific literacy and scientific knowledge which will result to higher academic performance of their students. Further, they reported that teacher content knowledge in general is positively related to student achievement, teacher well-being and classroom quality (e.g., a supportive environment), among other variables.

In the conducted interview with the learners, they were asked "How adequate are the Science resources in your school?" Almost all respondents replied that they have no enough Science equipment which they can use in laboratory activities in their respective schools. Though they their teachers show expertise in using Science equipment and apparatus, still their school can't provide all materials needed in performing experiments.

Availability of Apparatus

The quality of teaching and learning experience depends on the extent of the adequacy of laboratory facilities in elementary and secondary schools and the teacher's effectiveness in the use of laboratory facilities with the aim of facilitating and providing meaningful learning experiences in the learners.

Table 7. The Learners' Science-Related Factors in terms of Availability of Apparatus

Item Statement	Mean N=217	VD	SD
1. We follow proper borrowing of science equipment.	3.48	ME	1.08
2. All the science equipment are in good condition.	3.10	ME	1.12
3. The science equipment are well kept and secured.	3.28	ME	1.09
4. Safety equipment are available in the laboratory room.	3.22	ME	1.00
5. There are available apparatuses in the laboratory room.	3.86	E	0.98
6. We used the required science equipment in the laboratory for every science activity.	3.12	ME	1.05
7. Safety equipment are available in the laboratory room.	3.24	ME	1.04
8. The equipment are enough for all grade level.	3.55	E	1.10
9. Laboratory safety measures are posted inside the laboratory room.	3.29	ME	1.00
10. The laboratory has enough equipment.	3.18	ME	1.10
Overall Mean	3.33	ME	1.06

Legend:

Scale	Verbal Description
4.21 – 5.00	Very Evident (VE)
3.41 – 4.20	Evident (E)
2.61 – 3.40	Moderately Evident (ME)
1.81 – 2.60	Slightly Evident (SE)
1.00 – 1.80	Not Evident (NE)

As presented in Table 7, item number 5, "There are available apparatuses in the laboratory room" obtained the highest computed weighted mean of 3.86 with a verbal description of "evident" and standard deviation of 0.98. Meanwhile, item number 2, "All the science equipment are in good condition" got the lowest computed weighted mean of 3.10 with a verbal description of "moderately evident" and standard deviation of 1.12. The overall mean was recorded at 3.33 which is verbally described as "moderately evident."

These results imply that only few elementary schools have the separate room for their laboratory works. Most of them performed their laboratory activities in their own classrooms.

In accordance to these findings, Borja and Marasigan (2020) found in their research conducted in the Philippines that students were not able to perform laboratory experiments and activities as there are issues regarding the adequacy of laboratory materials and apparatuses, class size, time duration of an experiment, available laboratory room, and safety. To address the issues, teachers provide the materials for the students to perform the experiment and/or download YouTube videos of experiments or activities that show the science concepts being discussed. The Department of Education is fully aware of this current condition thus, laboratory activities need not utilize expensive apparatuses and materials. Nevertheless, science and technology in the high school level will not advance unless appropriate materials and laboratory facilities will be provided. Based on this study, the researchers suggested that the government should support the funding of Science laboratories and at the same time decrease class size for the students to reach optimum development of learning as they believe that Science experiments will help students to have better retention and appreciation of the science concepts.

In the conducted interview with the learners, they were asked "How sufficient are the Science apparatuses in your school?" Almost all respondent answered that they do not have laboratory rooms that contains Science apparatus. Further, they also said that most of the times they improvised some necessary materials needed in laboratory activities which they performed only in their respective classrooms.

The Learners' Academic Performance

Academic performance refers to the measurement of the learning level achieved by students and is considered a key indicator of the effectiveness of educational institutions. Academic performance is the measurement of student achievement across various academic subjects.

Table 8. Distribution of Respondents According to Academic Performance in Science

Grade	f (N=217)	Percent	Verbal Description
90 and above	108	49.77	Outstanding (O)
85 – 89	102	47.00	Very Satisfactory (VS)
80 – 84	7	3.23	Satisfactory (S)
75 – 79	0	0.00	Fairly Satisfactory (FS)
74 and below	0	0.00	Did Not Meet Expectations (DNE)
Mean	89.00		
Verbal Description	Very Satisfactory (VS)		
Standard Deviation	2.26		

Table 8 presents the distribution of learners' academic performance in Science. It can be noticed from the table that almost one-half or 49.77 percent obtained grades that lie within the highest bracket of 90 and above which is verbally described as "outstanding". On the other hand, only 3.23 percent received grades from 80 to 84 with a verbal interpretation of "satisfactory." A closer look at the table reveals that the mean was recorded at 89 with a verbal description of "very satisfactory". Meanwhile, the standard deviation which measures the spread of the learners' grades from the mean was calculated at 2.26.

These results disclosed that the grades of the learners in Science is heterogenous in nature. Further, results also showed that learners performed well in the aforementioned subject.

In consonance to the present findings, Dela Cruz (2023) also found in her study that the majority of the respondents obtained an outstanding performance in Science during face-to-face classes. While only a few respondents received "Poor" performance. The mean provides an overall measure of the quality of teaching. Based on thematic interpretation, most respondents perceived the quality of teaching during face-to-face classes as "Excellent". The results indicated room for improvement in enhancing the quality of teaching for those who rated it as "Poor".

In the conducted interview with the learners, they were asked to describe their academic performance in Science. The majority of the respondents replied that through the effectiveness and resourcefulness of their teachers, they were able to understand their lessons in Science which resulted in higher grade in the subject.

The Relationship between the Learners' Science-Related Factors and their Academic Performance

Table 9 displays the results of the correlation analysis which was done to determine if significant relationship existed between the learners' science-related factors and their academic performance.

Table 9. Results of Correlation Analysis on the Relationship between Learners' Science-Related Factors and their Academic Performance

Science-Related Factors	Learners' Academic Performance
social implications of Science	0.855** (0.000)
interest in learning Science	0.899** (0.000)
teachers' personal attributes	0.869** (0.000)
teachers' professional competence	0.749** (0.000)
school resources	0.578** (0.000)
availability of apparatus	0.453** (0.009)

Legend: ** = highly significant ($p \leq 0.01$)

It can be observed from the table that highly significant relationship was found between learners' science-related factors such as social implications of Science (p=0.000), interest in learning Science (p=0.000), teachers' personal attributes (p=0.000), teachers' professional competence

(p=0.000), school resources (p=0.000), and availability of apparatus (p=0.009) and their academic performance. This highly significant relationship was brought about by the fact that the computed probability values that ranged from 0.000 to 0.009 for the aforementioned variables are less than the 0.01 level of significance. Further observation of the tabulated results reveals that direct relationship (as implied by the positive sign of the correlation values that ranged from 0.453 to 0.899) existed between learners' science-related factors and their academic performance. This indicates that as the level of social implications of Science, interest in learning Science, teachers' personal attributes, teachers' professional competence, school resources, and availability of apparatus increases, the level of learners' academic performance also increases.

These results imply that when the leaners have positive beliefs, higher learning interest about Science, and when their teachers are competent enough to teach the subject as well as when the school has adequate resources in Science, the learners would be able to achieve higher academic performance.

In conjunction to the present findings, the results of the study conducted by Toli and Kallery (2021) also showed a significant positive correlation between interest and academic achievement. This study reconfirms that enhancing interest could lead to better learning outcomes and its evidence-based methodology can be equally applied when introducing students to other difficult concepts of science.

Accordingly, the results presented by Andala (2023) also showed that there is a statistical significance high degree of positive relationship between teachers' competence and students' academic performance. The study concludes that the competence of teachers, expertise, teaching methods and students' participation in lessons and good instructions at schools successfully promote the students' academic performance.

In the same vein, the results of the study conducted by Abidoye et al., (2022) showed that highly significant relationship existed between the availability and utilization of Science apparatus and students' academic performance. It was also significant based on gender and on year teaching experience of Basic science teachers. According to the findings, it is suggested that; the educational authorities and the school system should encourage the use of available resources by providing for them, the necessary materials that will influence Basic Science performance and enhance students learning. Basic Science teachers should re-assess their classroom instructional practice because there is a need for them to shift from instructional practice that will give the male and female teachers' equal opportunities to excel in instructional activities.

In the conducted interview with the learners, they were asked "How important are the science related factors such as social implications of Science, interest in learning science, teachers' personal attributes, teachers' professional competence, school resources and availability of apparatus in obtaining higher grade in Science?" These respondents replied that all these factors play an important role for them to perform well in Science. Further, they added that when they have interest in the subject, they will be more motivated to listen and understand the topic being discussed by their teacher. Additionally, they said that when their teachers are intelligent enough to teach Science, they will be more inspired to study their lessons which eventually resulted to higher grades.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Findings

This study determined the relationship between Science-related factors and the academic performance of Grades 5 and 6 learners in San Ildefonso North District, San Ildefonso, Bulacan during the School Year 2023 – 2024.

Using the procedures described in the preceding chapter, the answers to the problems raised in this study were ascertained and summarized as follows: Findings revealed that the assessments of the learners as regards Science-related factors in terms of teachers' personal attributes and teachers' professional competence as very evident. Meanwhile, Science-related factors in terms of social implications of Science, interest in learning science and school resources was assessed by the same respondents as evident. On the other hand, Science-related factors in terms of availability of apparatus was assessed by these respondents as moderately evident.

The learners' academic performance in Science was described as "very satisfactory".

Highly significant relationship was found between science-related factors such as social implications of Science, interest in learning Science, teachers' personal attributes, teachers' professional competence, school resources, and availability of apparatus and learners' academic performance.

Conclusions

Based on the findings of the study, the following conclusion was drawn:

The teachers are capable enough to teach Science. The learners performed well in Science. Positive relationship existed between Science-related factors and learners' academic performance.

Recommendations

In light of the findings and conclusions of the study, the following recommendations are hereby offered:

1. The school may provide various competitions related to Science such as dramatization of the lives of Scientist to further increase the learners' interest in the subject.

2.　The teachers may strengthen their discussions on the importance of Science to increase the learners' perceptions about social implications of Science.

3.　The teachers with the supervision of their principal may solicit the assistance of NGOs and the successful alumni of the school to build separate laboratory rooms and purchase of Science apparatus.

4.　For future researchers, further research along this line could be conducted. The same study may be conducted to high school students to further understand the significance of Science-related factors on academic performance.

REFERENCES

Abaidoo A. (2018). Factors contributing to academic performance of students in a Junior High School. *Munich, GRIN Verlag*, https://www.grin.com/document/450284.

Abidoye, F.O., Adebisi, A.M., Rihanat, A.A. & Aliyu, M.Z. (2022). Availability of laboratory facilities on students' performance in upper basic schools in Kwara State, Nigeria. *International Journal of Educational Research Review*,7(2), 262-267.

Ackerman, CE. (2018). What Is Self-Efficacy Theory? *International Journal of Modern Education*, 6(4), 28-49.

Ambag, R. (2018). Teaching Science in the Philippines: Why and How We can do better. Retrieved at https://www.flipscience.ph

Andala, H. O. (2023). Teachers' Competence and Students' Academic Performance in Secondary Schools. *Journal of Education*, 6(1), 73-90.https://doi.org/10.53819/81018102t5182Abstract

Borja, JM and Marasigan, AC (2020). Status of Science Laboratory in a Public Junior High School in the Philippines. *International Journal of Research Publication* (Volume: 46, Issue: 1), http://ijrp.org/paper-detail/959

Catalano, A. and Asselta, L. (2019). Exploring the Relationship between Science Content Knowledge and Science Teaching Self-Efficacy among Elementary Teachers. *IAFOR Journal of Education*, Volume 7 – Issue 1.

Creswell JW. (2013). *Qualitative inquiry and research design: choosing among five approaches*. Thousand Oaks, CA: Sage.

Dela Cruz, FMF. (2023). Academic performance of Grade 8 learners in science during face-to-face class at General Emilio Aguinaldo National High School. *World Journal of Advanced Research and Reviews*, 19(01), 563–579.

Dela Cruz, M.J.S. (2017). Science Ed and a Thinking Society. *Philippine Daily Inquirer*, 2017.

Dela Cruz, R. (2016). *The Science Dilemma in Philippine Schools*; Wednesday, September 26, 2012 12:00 AM. http://www.mb.com.ph/articles/374863/the-science-dilemma-philippine-schools K to 12 Science Curriculum Guide (August 2016). http://lrmds.deped.gov.ph/.

DepEd Order No. 55, s. 2010 - Policies and Guidelines on Strengthening Science and Mathematics Education at the Secondary Level. Retrieved from https://www.deped.gov.ph/2010/05/17/do-55-s-2010-policies-andguidelines-on-strengthening-science-and-matematics-education-at-the-secondary-level/

Dunkake, I., and Schuchart C. (2015). Stereotypes and teacher characteristics as an explanation for the classspecific disciplinary practices of pre-service teachers. *Teaching and Teacher Education*, 50, 56–69. doi:10.1016/j.tate.2015.04.005

Duru, PO. (2020). Effects of Teacher Subject Mastery on the Academic Performance of Secondary School Students in Jalingo Local Government Area of Taraba State. *Journal of Contemporary Education Research*, Vol. 20 No. 8, 344-365.

Gallen, C.L., Schaerlaeken, S., Younger, J.W. et al. (2023). Contribution of sustained attention abilities to real-world academic skills in children. *Sci Rep* 13, 2673 (2023). https://doi.org/10.1038/s41598-023-29427-w

Gay, L.R. & Diehl, P.L. (1992). *Research Methods for Business and Management*. New York: Macmillan.

Hashim, Y.A. (2010). Determining sufficiency of sample size in management survey research activities. *International Journal of Organisational Management & Entrepreneurship Development,* 6(1), 119-130.

Homden, B. (2017). Why Study Science? The Sciences Explained. *Kaplan International Pathways Blog*. https://www.kaplanpathways.com/about/news/study-science-sciences-explained

Lai, S.-L., Stevens, C., Martinez, J. and Ye, R. (2015). A cross-national study of students' attitudes toward school. *Pastoral Care in Education*, 33(1), 33–46. doi:10.1080/02643944.2015.1005120.

Manju, G. (2023). Teachers are the role models to students. *International Journal of Creative Research Thoughts*, 1(7), 1-8.

Mulela, M.M. (2016). Effects of Availability and Use of Laboratories On Students Performance In Science Subjects In Community Secondary Schools In Kinondoni Municipality. http://repository.out.ac.tz/1155/1/Mercy.doc.

Naz, K. (2016). Effects of teachers' professional competence on students' academic achievements at secondary school level in Muzaffarabad District. https://www.grin.com/document/352095.

OECD (2019). Programme for International Student Assessment (PISA) Results from 2018. Available at https://www.oecd.org/pisa/publications/PISA2018_CN_PHL.pdf

Olalekan, A. B. (2016). Influence of peer group relationship on the academic performance of students in secondary schools: A case study of selected secondary schools in Atiba Local Government Area of Oyo State. Global Journal of Human-Social Science, 16, 4.

Orbeta, AC, Melad, KA and Potestad, M. (2020). Correlates of Test Performance of 15-year-old Students in the Philippines: Evidence from PISA. *Economics of Education Review*, 6(8), 41-48.

Pedrona, LML (2020). Science- Related Factors Affecting Students' Attitude towards Science and their Academic Performance. *Journal of Science Education*, 30(12), 15-79.

Prabha, S. (2016). Laboratory Experiences for Prospective Science Teachers: A Meta-analytic Review of Issues and Concerns. *European Scientific Journal*, December 2016 edition vol.12, No.34, p. 235. Retrieved online from https://goo.gl/qN8nP8

Sadera, JRN; Rianna Yvette S. Torres, Danilo V. Rogayan, Jr. (2020). Challenges Encountered by Junior High School Students in Learning Science: Basis for Action Plan. *Universal Journal of Educational Research,* 8(12A), 7405-7414. DOI: 10.13189/ujer.2020.082524.

Samson O, Sunday Adewale OLALEYE and Olayemi Joshua IBIDOJA (2020). University Student's Academic Performance: An Approach of Tau Statistic. Proceedings of the 36th International Business Information Management Association (IBIMA), ISBN: 978-0-9998551-5-7, 4-5 November 2020, Granada, Spain.

Singh, S.P. (2016). Factors Affecting Students Performance. *Indian Journal of Research*, 2016.

Toli, G.; and Kallery, M. (2021). Enhancing Student Interest to Promote Learning in Science: The Case of the Concept of Energy. *Educ. Sci.*, 11, 220. https://doi.org/10.3390/educsci11050220

Wang, Y. (2022). Self-Determination Theory in Education: The Relationship between Motivation and Academic Performance of Primary School, High School, and College Students. *Advances in Social Science, Education and Humanities Research*, volume 670.

Wentzel, Kathryn, and Miele, David, eds. (2016). *Handbook of Motivation at School*. Abingdon: Routledge.