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Students' Level Of Science Process Skills Acquisition And Academic Achievement During The Pandemic

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ABSTRACT

In the middle of the pandemic, most schools adopted the blended learning modality. As a result, dealing with the "New Normal" presented difficulties for private schools. This study aims to analyze the level of acquisition in science process skills of private junior high school students and its relationship to students' academic achievement in the subject. The researchers used a convenience sampling technique and a descriptive-correlational research design for 105 students. The researchers created and content-validated an instrument for students' acquisition and academic achievement to gather the data. With the help of SPSS 23, the study used descriptive and inferential statistics. The study showed that communicating skills got the highest and measuring skills got the lowest score. In addition, the study observed significant differences in the communication skills and academic achievements of students when grouped according to gender. Furthermore, there was also a significant difference in the students' responses in measuring skills and classifying skills when grouped according to monthly household income. Finally, there was a moderately positive relationship between science process skills acquisition and academic achievement. The researchers suggested recommendations for teachers, school heads, and the institution to help improve the students' science process skills.

Keywords: academic achievement, acquisition of skills, covid-19 pandemic, new normal, private junior high schools

INTRODUCTION

Prior to the SARS-CoV-2 virus, which causes Covid-19, and the enhanced community quarantine (ECQ), the Philippine Department of Education (DepEd) emphasized the importance of addressing issues and gaps in attaining quality primary education. This mandate follows the country's low ranking in the Programme for International Students Assessment (PISA). According to the 2018 PISA results, about 22% of Filipino students earned a Level 2 or above in science. These students can identify the correct explanation for well-known scientific occurrences and use that knowledge to evaluate if a conclusion is correct based on facts provided in basic situations. The Philippines was rated worst in reading performance by 79 OECD members and associate nations and second-last in math and science (Ciriaco, 2019). In response to the current situation, DepEd led national efforts to improve essential quality of education by implementing "Sulong Edukalidad" in four key areas: K to 12 reviews and update; improve learning facilities; improve and retrain teachers and school leaders through a transformed career development program; and work of all stakeholders for (Deped, 2020).

The science process skills are collection of aptitudes used in scientific activities. Science students with good procedural skills are more interested in their studies. Suppose teachers design the learning stage in such a manner. In that case, students will have chances to actively engage in learning (Safaah et al., 2017). Each scientific processability is a skill that students use in several circumstances throughout their lives. They are about a lot more than simply "science." (Durham et al., 2017)

In inquiry-based hands-on science learning, "doing" science involves putting the process into action. In general, the definition of science process skills is basically a summation of transferrable abilities appropriate for the scientific fields. Students apply these process skills to understand better how scientists explore and answer their questions. There are two types of Science Process Skills (SPS) classified into fundamental and integrated processes. The fundamental actions necessary in scientific inquiry are known as basic processes. These processes include observing, communicating, measuring, classifying, inferring, and predicting. They are the core abilities that underpin all scientific inquiries. On the other hand, the integrated process skills involve the control of variables, operational definition, formulation of hypothesis, model formulation, data interpretation, and experimentation. These mentioned skills are essential for students to design and conduct scientific investigation (Susanti et al., 2018).

Despite this, a lack of experimental activities in the classroom for scientific learning has led to many misconceptions among students, resulting in poor science learning outcomes (Widyaningsih, 2020). Science process abilities associate with student achievement. Its purpose is to address issues and come up with effective answers. (Darmaji, et.al 2020). According to Hirca's (2013) study, Fundamental process skills will serve as the foundation for developing integrated skills. To add, the paper of Dakabesi

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and Louise (2019) defined that these science process abilities will influence students to tackle environmental challenges realistically. A significant amount of work is required to develop excellent process skills and critical thinking.

In the case of academic achievement, its development together with the child's cognitive abilities are crucial (Peng & Kievit, 2020). The teacher's professional development influences classroom instruction, hence, the academic achievement of the students as well (Fischer et al., 2018). In the paper of Lei et al. (2018), student engagement and academic achievement has a moderate positive relationship. In addition, method of reporting engagement, cultural values and gender influences the students' engagement and academic achievement. Costa and Faria (2018) also showed in their study that gender did not moderate implicit theories of intelligence and students' academic achievement but the students' middle school grade. York et al. (2015) stated the common measure for academic success were grades and GPA. Kumar et al. (2021) also gained some insights regarding the dependability of GPA as a method of academic performance evaluation. There are of course different variables or factors that affects student academic performance as well. Some of these variables are demographic characteristics that directly or indirectly affect the students' academic achievement. This idea includes age, socio-economic status, and number of study hours (Ali et al., 2013); social networking sites (Alaslani & Alandejani, 2020); burnout (Madigan & Curran, 2021); frustration tolerance (Meindl et al. 2019); and teacher efficacy (Kim & Seo, 2018). These few mentioned variables play some role in the acquisition of science process skills among students to different degrees or level depending on the set-up and circumstances.

There are works of literature that focus on specific associations between science process skills and other learning factors. For example, Zeidan and Jayosi (2015) found an association between science process skills and attitude towards science subjects. Ekon and Eni (2015) also showed that gender does not influence the acquisition of science process skills. Abungu et al. (2014) also added that the science process skills approach in teaching significantly affects the students' achievement in class. Kramer et al. (2018) emphasized that a well-designed online tutorial can effectively develop undergraduate students' science process skills from a different perspective. Finally, Suman (2020) revealed a positive relationship between science process skills and students' achievement in science. From here, one can deduct the inconsistent findings of different works of literature that focus on the science process skills of students and underlying achievements.

From the national perspective, Derilo (2019) divulges the relationship between science process skills and students' performance in science in the country. In addition, Mirana (2019) disclosed that students have a positive attitude towards science. However, their science process skills were not well-developed. However, Dapitan and Caballes (2020) revealed that the level of science process skills was satisfactory in their study. The same findings by Bete (2020) study revealed a poor process skill in one science class in grade 8 students. Barantes and Tamoria (2021) also revealed the effectiveness of a learning technique to help improve basic science process skills. The researchers find it quite intriguing regarding students' science process skills from this literature, wherein recent studies showed low-performance levels. Although the government, particularly the Department of Education, has already worked to improve this status, results show the opposite. The researchers identified a dearth of studies on private institutions based on local studies about students' science process skills. This research gap motivated the researchers to do research that will focus on private junior high school students only. This research paper hopes to find its way to benefit more students in private schools and improve their academic performance in science subjects in the future.

In order to attain this endeavour, the researchers have the following objectives for this study:

1. To analyze the level of acquisition of science process skills (observing, measuring, classifying, inferencing, communicating, and hypothesizing) of private junior high school students (in particular, Biology subject);
2. To assess the academic performance of the students in the science subject;
3. To identify any variations in the level of acquisition of science process skills and academic achievement based on their demographic profile; and
4. To identify the underlying association between the acquisition level of science process skills and the academic achievement of private junior (grade 9) high school students.

The result of this study intends to contribute primarily to the growing literature about the Science Process skills among the students. The result of this study focused on the private secondary schools which has a dearth in the literature and emphasis. In addition, the students, teachers, the school administrator and other stakeholders also benefit from the result of this study since there are annual evaluation and tests which reflect the learnings of the students.

METHODOLOGY

Research Design

This study employed cross-sectional survey research. Cross-sectional research involves looking at data from a population at one specific time. Cross-sectional descriptive research determines how frequently, broadly, or severely a variable of interest occurs across a population. Some of the critical characteristics of a cross-sectional study include: the study takes place at a single point in time, it does not involve manipulating variables, it allows researchers to look at numerous characteristics at once (age, income, sex, etc.), researchers often use this method to look at the prevailing characteristics in a given population, and it can provide information about what is happening in a current population (Cherry, 2020).

Population and Sampling

This study used convenience sampling since it is the pandemic period, and gathering data is tricky. The

subjects are selected based on specific characteristics: (1) to determine the population; the researcher chose private schools located at Olongapo City operating for more than ten years in the education industry, (2) the sample of the study were students from each chosen private school enrolled in Grade (9) nine junior high school, (3) the private junior high school students utilizing blended learning modality in Olongapo City for the school year 2020-2021.

Research Instrument

This study determined that using the questionnaire checklist with the help of a google form is the most appropriate process in gathering the data needed. The investigators developed a questionnaire validated by the President Ramon Magsaysay State University (PRMSU) board of panel. After the validation from the PRMSU board, it also underwent reliability testing. The instrument generated an overall Cronbach alpha result of .983, which is highly reliable and acceptable. In the case of the instrument's subscale Cronbach alpha result, it yielded the same coefficient of .983 for the observing, measuring, classifying, inferencing, communicating, and hypothesizing.

The 1st part of the instrument was to determine the level of acquisition of the grade (9) nine junior high school students from selected private schools in Olongapo City. The instrument consisted of the following: (1-5 items) observing; (6-10 items) measuring; (11-15 items) classifying;(16-20 items) inferencing; (21-25items) communicating; (26-30 items) hypothesizing.
The 2nd part of the instrument is to determine the academic achievement on the primary and integrated science process skills of the Junior Grade 9 students from the private schools. The test consisted of 60 essential science process skills items. It includes Questions 1-10 for observing, 11-20 for measuring, 21-30 for classifying, 31-40 for inferencing, 41-50 for communicating, 51-60 for hypothesizing. The researcher utilized a multiple-choice test. The development of the performance test follows certain phases: These are: 1) planning, 2) preparing the test items, 3) trying out the test items, and 4) evaluating the instrument.

Data-Gathering Procedure

In the conduct of the study, permission from the office of the principal of the private schools were asked for the conduct of the research instruments to the target respondents. After the permit was granted, the researchers made the test questions by using google forms and send the link to the grade 9 students and for the science teachers, Google forms was also used to gather data. The conduct and retrieval of the research instrument lasted for a week. After a week, the data were retrieved thru the link and tallied, tabulated, analyzed, and interpreted according to the specific problem, and hypotheses set forth in this investigation. Based on the retrieval and the response from one hundred fifty respondents (150) from the selected private junior high school as targeted, only one hundred five (105) were retrieved with the percentage of seventy percent (70 %) retrieval accuracy and responds.

Data Analysis

The study used the following statistical treatments with the help of the Statistical Package for Social Sciences (SPSS) 23. To determine the general response of the students for the science process skills acquisition, the study used weighted mean. In order to determine if there are variances in the responses of the students when grouped according to their demographic profile, the study used Analysis of Variance. Then, the researchers used Pearson-r moment of correlation to establish whether there is a relationship between the science process skill acquisition and the academic achievement of the students. The researchers used a five-point Likert scale to represent the interpretation of the responses of the student-respondents in the study.

RESULTS AND DISCUSSION

This study intends to analyze the acquisition level of science process skills and academic achievement among private junior high school students in Olongapo City. The study also intends to find out variations in the responses of students and the relationship between the level of acquisition and the students' academic achievement. The

Table 1.Level of Acquisition of Science Process Skill in terms of Observing

Statements	Weighted Mean	Descriptive Interpretation
1. I can ask questions that can be done by collecting data.	3.35	Sometimes Used
2. I am able to collect and record data accurately.	3.24	Sometimes Used
3. I am able to describe the data gathered.	3.17	Sometimes Used
4. I am able to Observe data both quantitatively and qualitatively.	3.26	Sometimes Used
5. I am able to provide elaborative observation in terms of gathered data.	3.21	Sometimes Used
Overall Weighted Mean	3.25	Sometimes Used

Note: 1.00 - 1.79= Never Used; 1.80 – 2.59= Rarely Used; 2.60 – 3.39=Sometimes Used; 3.40 – 4.19= Often Used; 4.20 – 5.00=Always Used

succeeding tables present the results of the study.

Table 1 shows the level of acquisition of Science Process Skills of the students in terms of observing. As seen from the result of the study, statement 1, "I am able to ask a question that can be done by collecting data," garnered the highest weighted mean with 3.35. This result corresponds to a descriptive interpretation of "sometimes used." On the other hand, statement 3, "I am able to describe the data gathered," yielded the lowest weighted mean of 3.17, which translates to "sometimes used" as well in the Likert scale. The overall weighted mean of the acquisition level in Science Process Skills was 3.25, equating to "sometimes used" in the descriptive interpretation scale. In the study of Ting (2014), the author revealed that broadening the process of instructional learning beyond the classroom can enhance the capacity to observe. Hence, it can give chances to see, touch, feel, smell, and hear that demand all senses. Using the five senses to take note of the characteristics of objects and circumstances describes how something should be perceived as one of the science process skills according to (Chiappetta & Koballa, 2002).
In comparison, a study from Indonesia by Maison et al. (2019) revealed that 65% of the students have "good" science process skills on observation. Another study from Indonesia showed that observing garnered the highest score in a Science Process Skills test. This result corresponds to a "very good" category in the evaluation (Ilma et al., 2020). The present scenario of distance learning reflected the results to the science process skills in terms of observing, wherein students only acquired knowledge and concepts employing listening. Moreover, the answering module is far different from the delivery of the lesson face-to-face. Teachers can make laboratory-based activities, and students can use their five senses and arrive with sound observation and results-based conclusions.

Table 2 displays the level of acquisition of Science process skills of the respondents in terms of measuring. As observed, statement 7, "I have the basic knowledge in measurement required in scientific investigations aided with appropriate equipment or tools in measuring," produced the highest weighted mean with 3.21. This result is equivalent to "sometimes used" in the descriptive interpretation. However, statement 10, "I am able to describe the dimensions of an object or event beings

Table 2. Level of Acquisition of Science Process Skill in terms of Measuring

Statements	Weighted Mean	Descriptive Interpretation
1. I am able to perform computations required scientifically.	3.06	Sometimes Used
2. I have the basic knowledge in measurement required in scientific investigations aided with appropriate equipment or tools in measuring.	3.21	Sometimes Used
3. I am able to compare an object by using a standard unit of measure.	3.10	Sometimes Used
4. I am able to compare a nonstandard measure of object beings studied.	3.06	Sometimes Used
5. I am able to describe the dimensions of an object or event beings studied.	2.71	Sometimes Used
Overall Weighted Mean	3.03	Sometimes Used

Note: 1.00 - 1.79= Never Used; 1.80 – 2.59= Rarely Used; 2.60 – 3.39=Sometimes Used; 3.40 – 4.19= Often Used; 4.20 – 5.00=Always Used

Table 3. Level of Acquisition of Science Process Skill in terms of Classifying

Statements	Weighted Mean	Descriptive Interpretation
1. I am able to categorize subjects in terms of similarities and differences.	3.49	Often Used
2. I am able to classify terms interrelation-ship with one another.	3.27	Sometimes Used
3. I am able to classify Objects placed into rank order based on some property.	3.30	Sometimes Used
4. I am able to classify information on the basis of whether each object has or does not have a particular property.	3.12	Sometimes Used
5. I am able to do grouping or ordering of objects or events into categories based on criteria.	3.33	Sometimes Used
Overall Weighted Mean	3.30	Sometimes Used

Note: 1.00 - 1.79= Never Used; 1.80 – 2.59= Rarely Used; 2.60 – 3.39=Sometimes Used; 3.40 – 4.19= Often Used; 4.20 – 5.00=Always Used

studied," got the lowest weighted mean of 2.71, which corresponds to "sometimes used" in the descriptive interpretation. Overall, the study revealed an average weighted mean of 3.03, which translates to "sometimes used" in the descriptive interpretation of the study. Measuring expresses the amount of an object or substance in quantitative terms, as Chiappetta and Koballa (2002) stated. Measurement abilities require the use of proper equipment and do necessary calculations. It is visible to someone with a rudimentary grasp of measurement, the necessary measuring equipment or instruments, and the capacity to do scientific computation. (Ozgelen 2012; Carin et al., 2005). In a related study in Indonesia by Tonjo et al. (2018), they stated that Measuring is one of the process skills with a low achievement profile generating less than 65% of the score.

Table 3 represents the level of acquisition of Science Process skills of students in terms of classifying. Based on the table, it reflects that statement 11, "I am able to categorize subjects in terms of similarities and differences," displayed the highest weighted mean of 3.49, which corresponds to "often used" in the descriptive interpretation. Meanwhile, statement 14 gathered the lowest weighted mean with 3.12. This result corresponds to a descriptive interpretation of "sometimes used." The overall weighted mean of the level of acquisition of Science process skills in classifying was at 3.30, which translates to "sometimes used" in the Likert scale. Classifying objects and events according to their characteristics or attributes is also essential for students to grasp. According to Tanti et al. (2020) research, the importance of science process skills for junior high school students is that children learn more meaningfully. In contrast, the study of Maison et al. (2019) from Indonesia disclosed that 54.3% of the students exhibited "good" science process classification skills. From the same country in South East Asia, Ilma et al. (2020) shared that classifying got the third-highest percentage in their assessment of Science process skills among students. This result corresponds to a "very good" category. Students become aware of and actively discover concepts from existing occurrences in the environment. Significant learning comprises learners immediately learning and can recall knowledge readily.

Table 4 displays the level of acquisition of Science process skills of students in terms of inferring. As gleaned, it was statement 18, "I am able to make an educated guess about an object or event based on previously gathered data or information," that topped the group with a weighted mean score of 3.20. The result is parallel to a descriptive interpretation of "sometimes used." Nevertheless, it was statement 19, "I am able to use inferences based on the same observations," that produced the lowest weighted mean score of 3.08, which translates to "sometimes used" in the descriptive interpretation as well. The average weighted mean score of the table was 3.15, which means "sometimes used" in the descriptive interpretation as well. Inferring is the process of providing a quantitative explanation for a specific item or substance. Prediction estimates what will happen due to an occurrence, whereas inference draws inferences from an observed event. Evidence must back up our findings. We form inferences about the causes of phenomena we witness based on data gained via observation (Aydogdu & Keserciolu, 2005). From another foreign source, it challenges the current result of the study wherein the inference got a 44.61% result from the students' Science process skill test, which equates to a "very good" interpretation in the study (Ilma et al., 2020).

Table 5 displays the level of acquisition of students in the Science process skills in terms of communicating. As per result, statement 23, "I am able to use/ communicate information that can easily be related to my experiences," produced the highest weighted mean with 3.44. This result corresponds to a descriptive interpretation of the "often used" Likert scale. On the other hand, statement 22, "I am able to develop a presentation to share observations and data collection to others," garnered the lowest weighted mean score of 3.23. This result corresponds to "sometimes used" in the descriptive interpretation. Overall, the average weighted mean for the acquisition of Science process skills was 3.34, which translates to "sometimes used" in the descriptive interpretation. Abruscato (1995) states that it is vital to human effort and fundamental to scientific labour, and pertinent concepts may be conveyed through words,

Table 4. Level of Acquisition of Science Process Skill in terms of Inferring

Statements	Weighted Mean	Descriptive Interpretation
1. I am able to analyze a scientific problem that is according with the data collection.	3.13	Sometimes Used
2. I am able to explain a result of scientific investigation that is according with the data collection.	3.18	Sometimes Used
3. I am able to make an "educated guess" about an object or event based on previously gathered data or information.	3.20	Sometimes Used
4. I am able to use inferences based on the same observations.	3.08	Sometimes Used
5. I am able to use inferences as the gathered data increases evidently that will make the study substantial	3.14	Sometimes Used
Overall Weighted Mean	3.15	Sometimes Used

Note: 1.00 - 1.79= Never Used; 1.80 – 2.59= Rarely Used; 2.60 – 3.39=Sometimes Used; 3.40 – 4.19= Often Used; 4.20 – 5.00=Always Used

Table 5. Level of Acquisition of Science Process Skill in terms of Communicating

Statements	Weighted Mean	Descriptive Interpretation
1. I am able to communicate procedures & with others	3.31	Sometimes Used
2. I am able to develop a presentation to share observations & data collection to others.	3.23	Sometimes Used
3. I am able to use/ communicate information that can easily be related to my experiences.	3.44	Often Used
4. I am able to use descriptive words for which both my fellowmen can share a common understanding	3.34	Sometimes Used
5. I am able to communicate effectively to another person by providing clear and understandable information.	3.36	Sometimes Used
Overall Weighted Mean	3.34	Sometimes Used

Note: 1.00 - 1.79= Never Used; 1.80 – 2.59= Rarely Used; 2.60 – 3.39=Sometimes Used; 3.40 – 4.19= Often Used; 4.20 – 5.00=Always Used

Table 6. Level of Acquisition of Science Process Skill in terms of Hypothesizing

Statements	Weighted Mean	Descriptive Interpretation
1. I am able to create models to explain a scientific result	2.90	Sometimes Used
2. I am able to use a result of a scientific study to answer a question to a given problem.	2.96	Sometimes Used
3. I am able to hypothesize based on both good observation and inferences made about observed events.	3.17	Sometimes Used
4. I am able to hypothesize on constructed, modified, and even rejected hypothesis based on new observations.	3.10	Sometimes Used
5. I am able to hypothesize on constructed, modified, and even rejected hypothesis based on new observations.	3.23	Sometimes Used
Overall Weighted Mean	3.07	Sometimes Used

Note: 1.00 - 1.79= Never Used; 1.80 – 2.59= Rarely Used; 2.60 – 3.39=Sometimes Used; 3.40 – 4.19= Often Used; 4.20 – 5.00=Always Used

diagrams, maps, and graphs. In contrast, Ilma et al. (2020) disclosed that the students' result was "very good" in a given Science process skill test in terms of communicating. The study of Susanti et al. (2018) also unveiled that communication skills outclassed the other process skills.

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Table 6 exhibits the level of acquisition of Science process skills of the students in terms of hypothesizing. The table shows that statement 30 got the highest weighted of 3.23, corresponding to the descriptive interpretation of "sometimes used." However, it was statement 26 that produced the lowest weighted mean score with 2.90. This result equates to "sometimes used" in the Likert scale interpretation. In the end, the overall weighted mean was at 3.07, which has a similar descriptive interpretation of "sometimes used" in the Likert scale correspondingly. According to Tan and Temiz (2003), when a student develops a hypothesis, he proposes an explanation that is compatible with the observations, questions, and evidence that are accessible. In contrast, a study of Indonesian students by Maison et al. (2019) showed that 65.7% of these students have "good" hypothesizing science process

Table 7. Result of the Academic Achievement Test of Students

Academic Achievement	Overall Result	Descriptive Rating	Interpretation
Science Process Skills	M=26; SD=8	2.63	Good

Note: 1-12=Very Poor; 13-24=Poor; 25-36=Good; 37-48=Very Good; 49-60=Outstanding

Table 8. Significant Differences in the Level of Acquisition of Science Process Skills and Academic Achievement when grouped according to Profile Variables

	Gender		Age		Parent's Highest Educational Attainment		Monthly Family Income	
	t-value	*p*-value	F-value	*p*-value	F-value	*p*-value	F-value	*p*-value
Observing	-1.166	.246	0.564	.659	0.689	.659	1.864	.123
Measuring	-1.044	.299	0.929	.450	1.108	.363	2.504*	.047
Classifying	-1.514	.133	0.689	.601	0.592	.736	2.686*	.036
Inferencing	-1.598	.113	0.885	.476	0.603	.727	1.813	.132
Communicating	-2.145*	.034	0.668	.616	1.190	.318	1.511	.205
Hypothesizing	-0.901	.369	0.565	.688	1.263	.282	1.799	.135
Academic Achievement	-3.825*	.000	1.084	.369	0.945	.467	2.199	.074

*p < .05

skills.

Nevertheless, in a different study by Ilam et al. (2020), formulating a hypothesis generated a "very poor" score in a given Science process skill test. The group of Tonjo (2018) also supported this claim wherein hypothesizing generated a low achievement score of less than 65%. Formulating a hypothesis is a capacity to build models and explain outcomes or utilize a scientific study result to answer a specific situation.

Table 7 reveals the test result to evaluate the students' skills acquisition of the Science process skills. As seen, the overall result of the test got a mean score of 26 points out of the possible perfect score of 60 points. This result is further interpreted with a descriptive rating of 2.63, which has a corresponding interpretation of "good" in the Likert scale. This result somehow concurs with Derilo's (2019) findings, wherein the students' performance in science was satisfactory. In an Indonesian study, the science process skills score of the students in the post-test were categorized as "medium". This result somehow coincides with the current study's findings as well.

Table 8 displays the significant differences in the level of acquisition of Science process skills and academic achievement when grouped according to profile variables of the study. As shown from the table, for gender, only communicating garnered a significant difference among the Science process skills. The study obtained a result of t(103)= -2.145 which has a corresponding p-value of .034 which is significant at .05 alpha significance level. The rest of the skills, like observing, t(103) = -1.166, p= .246; measuring, t(103) = -1.044, p= .299; classifying, t(103) = -1.514, p= .133; inferencing, t(103) = -1.598, p= .113; and hypothesizing, t(103) = -.901, p= .369 did not yield enough results to incur variations in the respondents' answers. As for academic achievement, there exists a significant difference (t[103] = -3.825, p= .000) among the group, wherein the female students (M=2.88; SD=0.627) got better scores than the male students (M=2.40; SD=0.656). This result implies that the female students have better science acquisition skills level than the male students in this study. In terms of age, there was no significant difference in the acquisition level of observing, F(4, 100)= 0.564, p= .689; measuring, F(4, 100)= 0.929, p= .450; classifying, F(4, 100)= 0.689, p= .601; inferencing, F(4, 100)= 0.885, p= .476; communicating, F(4, 100)= 0.668, p= .616; and hypothesizing, F(4, 100)= 0.565, p= .688. The same goes for the academic achievement of the students since, F(4, 100)= 1.048, p= .369, as well. There were no significant differences in the acquisition level of observing, F(6, 98)= 0.689, p= .659; measuring, F(6, 98)= 1.108, p= .363; classifying, F(6, 98)= 0.592, p= 736; inferencing, F(6, 98)= 0.603, p= .727; communicating, F(6, 98)= 1.190, p= .318; and hypothesizing, F(6, 98)= 1.263, p= .282. Even for the academic achievement among the students, there was no noticeable variation, since F(6, 98)= 0.945, p= .467. Finally, for the monthly family income, there were significant differences observed in the measuring, F(4, 100)= 2.504, p= .047 and classifying, F(4, 100)= 2.686, p= .036 for the Science process skills among the students. Other Science process skills like observing, F(4, 100)= 1.864, p= .123; inferencing, F(4, 100)= 1.813, p= .132; communicating, F(4, 100)= 1.511, p= .205; and hypothesizing, F(4, 100)= 1.799, p= .135, did not produce significant results. These ideas apply to the academic achievement of the students as well. The findings of Raj and Devi (2014) agreed and disagreed with the current results of the study. However, another study from Nigeria by the group of Achor (2018) stated that there was no significant variation between male and female students' acquisition of science process

skills. The contrasting results from the current study and the previous ones allow other researchers to explore this particular area to add more references for future utilization and comparison.

Table 9 shows the correlation matrix between the Science process skills and the students' academic achievement. Based on the study results, it was clear that there is a significant relationship between the Science process skills and the students' academic achievement. The Pearson-r computation for observing, measuring, classifying, inferencing, communicating, and hypothesizing created a moderate positive relationship based on the generated r-values of .420, .391, .400, .449, .364, and .331, respectively. This result means that if the Science process skills of students are high, so does the academic achievement in the Science subject. Moreover, if the students have low Science process skills, they will perform poorly in their academic achievements in the subject. This result coincides with the results of Raj & Devi (2014), where they found a relationship between science process skills and achievement in science. As for Derilo (2019), science process skills correlate significantly with students' science performance. From a foreign study, Bayar (2019) also disclosed that as the academic achievement increased, so did the science process skills. Thus, all of the mentioned studies here, both foreign and local, point to the association between science process skills and students' academic achievement.

CONCLUSION

Based on the study's results, the researchers concluded that:

1. In general, students' acquisition of science process skills in terms of observing, measuring, classifying, inferencing, communicating, and hypothesizing has a general weighted mean of 3.19, which corresponds to a descriptive interpretation of "sometimes used".
2. In terms of student academic achievement at the end of the school year, the students got a mean score of 26, corresponding to a "good" score.
3. Statistical inferences showed variations in the students' responses regarding gender (communicating and academic achievement) and family monthly income (measuring and classifying).
4. There was also a moderate positive relationship between the Science process skills and the students' academic achievement in the study.

From the conclusion mentioned above, the researchers validated its hypothesis that there is an existing relationship between the level of acquisition of science process skills and students' academic achievement in the subject. Furthermore, the study also found variations in the acquisition level of science process skills when grouped according to gender and family monthly income. These results can be the basis for some innovative techniques in delivering the science subject since the country is still in the state of "New Normal."

RECOMMENDATION

The researchers recommend the following actions referenced from the above finding and conclusions.

1. The Integration of Science Process Skills needed to be well emphasized in the science subjects in the pandemic setting needed to be enhanced.
2. The utilization of science experiment approaches in blended learning settings needs to be well defined. The experimentation should be addressed well in the modality of blended learning.
3. The Head Teachers/Supervisors can secure the learning facility to utilize available learning materials well-reviewed and assessed.

Table 9. Correlation Matrix between Level of Acquisition of Science Process Skills and Academic Achievement of the Students

Science Process Skills		Academic Achievement	Remarks
Observing	Pearson Correlation	.420*	Reject Null Hypothesis
	Sig. (2-tailed)	.000	
	N	105	
Measuring	Pearson Correlation	.391	Reject Null Hypothesis
	Sig. (2-tailed)	.000	
	N	105	
Classifying	Pearson Correlation	.400*	Reject Null Hypothesis
	Sig. (2-tailed)	.000	
	N	105	
Inferencing	Pearson Correlation	.449*	Reject Null Hypothesis
	Sig. (2-tailed)	.000	
	N	105	
Communicating	Pearson Correlation	.364*	Reject Null Hypothesis
	Sig. (2-tailed)	.000	
	N	105	
Hypothesizing	Pearson Correlation	.331*	Reject Null Hypothesis
	Sig. (2-tailed)	.000	
	N	105	

*$p < .05$

4. Collaborative /Coaching or sharing of knowledge in the faculty for the science teachers is essential in the private schools to improve strategies amidst the pandemic.
5. Faculty development in the integration of Science Process Skills must be addressed appropriately and prioritized to equip science faculty and initiatives/ endeavours amidst the pandemic to ensure teaching quality.
6. The utilization of e-learning materials should be reviewed and aligned with the faculty and students' blended learning needs of science (biology subjects).

REFERENCES

Abruscato, J. (1995). Teaching children science: A discovery approach. Boston: Allyn & Bacon.

Abungu, H.E., Okere, M.I.O., Wachanga, S.W. (2014). The effect of science process skills teaching approach on secondary school students' achievement in chemistry in Nyando District, Kenya. Journal of Educational and Social Research, 4(6), 359-372. https://doi.org/10.5901/jesr.2014.v4n6p359

Achor, E.E., Odoh, C.O., & Abakpa, V.O. (2018). Use of investigative laboratory strategy in enhancing acquisition of science process skills among senior secondary Biology students. Journal of Research in Curriculum and Teaching, 1(1), 103-109. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3253713

Alaslani, K., & Alandejani, M. (2020). Identifying factors that influence students' performance through social networking sites: An exploratory case study. Heliyon, 6(4), e03686. https://doi.org/10.1016/j.heliyon.2020.e03686

Ali, S., Haider, Z. , Munir, F. , Khan, H. , & Ahmed, A. (2013). Factors Contributing to the Students' Academic Performance: A Case Study of Islamia University Sub-Campus. American Journal of Educational Research, 1(8), 283-289.

Astutik, A., Nahdiannur, M.A., Suliyanah, & Prahani, B.K. (2019). Improving science process skills of junior high school students through the implementation of collaborative creativity learning (CCL) model in physics learning. Journal of Physics: Conference Series, 1171, 012006. https://doi.org/10.1088/1742-6596/1171/1/012006

Aydoğdu, M., & Kesercioğlu, T. (2005). İlköğretimde fenveteknolojiöğretimi. Ankara: Anı Yayıncılık.

Barantes, A.K.A., & Tamoria, J.R. (2021). LARO (Learners Active Response to Operant) lessons in improving the basic science process skills of elementary pupils. Jurnal Pendidikan Biologi Indonesia, 7(1), 11-24. https://doi.org/10.22219/jpbi.v7i1.15510

Bayar, M. F. (2019). The effect of common knowledge construction model on science process skills and academic achievement of secondary school students on solar system and eclipse. Online Science Education Journal, 4(1), 4-19. https://dergipark.org.tr/en/pub/ofed/issue/45845/534892

Bete, A. O. (2020). Students' knowledge and process skills in learning grade-8 chemistry. Journal of Research, Policy & Practice of Teachers and Teacher Education, 10(1), 1-13. https://doi.org/10.37134/jrpptte.vol10.1.1.2020

Carin, A. A., Bass, J. E., & Contant, T. L. (2005). Methods for teaching science as inquiry. Upper Saddle River, N.J: Pearson/Merrill Prentice Hall.

Cherry, K. (2019). How Does the Cross-Sectional Research Method Work? https://www.verywellmind.com/what-is-a-cross-sectional-study-2794978

Chiappetta, E., & Koballa, T. (2002). Science Instruction in the Middle and Secondary Schools (5th ed). Upper Saddle River, NJ: Merrill Prentice Hall.

Ciriaco, C.M. (2019, December). DepEd vows to improve quality of education after PISA showing. Business Mirror. https://businessmirror.com.ph/2019/12/06/deped-vows-to-improve-quality-of-education-after-pisa-showing/

Costa, A., & Faria, L. (2018). Implicit theories of intelligence and academic achievement: A meta-analytic review. Frontiers in Psychology, 9, 829. https://doi.org/10.3389/fpsyg.2018.00829

Dakabesi, D., & Luoise, I.S.Y. (2019). The effectiveness of the problem-based learning model to increase the students' critical thinking skills. Journal of Education and Learning, 13(4), 543-549 https://doi.org/10.11591/edulearn.v13i4.12940

Dapitan, D.A., & Caballes, D.G. (2020). Determining the level of basic science process skills of grade 11 students. Automation and Autonomous Systems, 12(1), 1-6. https://doi.org/10.36039/AA012020001.

Darmaji, D., Kurniawan, D.A., Astalini, A., Perdana, R., Kuswanto, K., & Ikhlas, M. (2020). Does a science process skill affect critical thinking in science? Differences in urban and rural. International Journal of Evaluation and Research in Education, 9(4), 874-880. http://doi.org/10.11591/ijere.v9i4.20687

Department of Education (2020). The Basic Education Learning Continuity Plan in the Time of COVID-19. https://www.deped.gov.ph/wp-content/uploads/2020/07/DepEd_LCP_July3.pdf

Derilo, R. C. (2019). Basic and integrated science process skills acquisition and science achievement of seventh-grade learners. European Journal of Education Studies, 6(1), 281–294. https://doi.org/10.5281/zenodo.2652545

Durham, J., (2017) Science Process Skills. Inventors

of Tomorrow. https://inventorsoftomorrow.com/2017/01/19/science-process-skills/

Ekon, E.E., & Eni, E.I. (2015). Gender and acquisition of science process skills among junior secondary school students in Calabar Municipality: Implications for implementation of universal basic education objectives. Global Journal of Education Research, 14, 933- 99. http://dx.doi.org/10.4314/gjedr.v14i2.3

Fischer, C., Fishman, B., Dede, C., Eisenkraft, A., Frumin, K., Foster, B., Lawrenz, F., Levy, A.J., & Mc Coy, A. (2018). Investigating relationships between school context, teacher professional development, teaching practices, and student achievement in response to a nationwide science reform. Teaching and Teacher Education, 72, 107-121. https://doi.org/10.1016/j.tate.2018.02.011

Hırça, N. (2013). The influence of hands-on science experiments on scientific process skills according to prospective teachers' experiences. European Journal of Physics Education, 4(1), 6–14. http://www.eu-journal.org/index.php/EJPE/article/view/77

Ilma. S., Al-Muhdhar, M. H. I., Rohman, F., & Saptasari, M. (2020). The correlation between science process skills and biology cognitive learning outcome of senior high school student. Jurnal Pendidikan Biologi Indonesia, 6(1), 55-64. https://doi.org/10.22219/jpbi.v6i1.10794

Kim, K R., & Seo, E.H. (2018). The relationship between teacher efficacy and students' academic achievement: A meta-analysis. Social Behavior and Personality: An International Journal, 46(4), 529-540. https://www.ingentaconnect.com/content/sbp/sbp/2018/00000046/00000004/art00001

Kramer, M., Olson, D., Walker, J.D. (2018). Design an assessment of online, interactive tutorials that teach science process skills. CBE-Life Sciences Education, 17(2), ar19. https://doi.org/10.1187/cbe.17-06-0109

Kumar, S., Agarwal, M., & Agarwal, N. (2021). Defining and measuring academic performance of HER students- A critical review. Turkish Journal of Computer and Mathematics Education, 12(6), 3091-3109.

Lei, H., Cui, Y., & Zhou, W. (2018). Relationships between student engagement and academic achievement: A meta-analysis. Social Behavior and Personality: An International Journal, 46(3), 517-528.

Madigan, D.J., Curran, T. (2021). Does Burnout Affect Academic Achievement? A Meta- Analysis of over 100,000 Students. Educational Psychology Review 33, 387–405. https://doi.org/10.1007/s10648-020-09533-1

Maison, M., Darmaji, D., Kurniawan, D.A., Astalini, A., Dewi, U.P., & Kartina, L. (2019). Analysis of science process skills in Physics education students. Jurnal Penelitian dan Evaluasi Pendidikan, 23(2), 197-205. https://doi.org/10.21831/pep.v23i2.28123

Meindl, P., Yu, A., Galla, B. M., Quirk, A., Haeck, C., Goyer, J. P., Lejuez, C. W., D'Mello, S. K., & Duckworth, A. L. (2019). A brief behavioral measure of frustration tolerance predicts academic achievement immediately and two years later. Emotion, 19(6), 1081– 1092. https://doi.org/10.1037/emo0000492

Mirana, V.P. (2019). Attitude towards science and process skills of junior high school students. Asia Pacific Journal of Multidisciplinary Research, 7(2), 16-23. http://www.apjmr.com/wp-content/uploads/2019/05/APJMR-2019.7.2.2.02.pdf

Ozgelen, S. (2012) Students' Science Process Skills within a Cognitive Domain Framework. Eurasia Journal of Mathematics, Science & Technology Education, 8(4), 283-292. http://dx.doi.org/10.12973/eurasia.2012.846a

Peng, P., & Kievit, R.A. (2020). The development of academic achievement and cognitive abilities: A bidirectional perspective. Child Development Perspectives, 14(1), 15-20. https://doi.org/10.1111/cdep.12352

Raj, R.G., & Devi, S.N. (2014). Science process skills and achievement in science among high school students. Scholarly Research Journal for Interdisciplinary Studies, 2(15), 2435- 2443. https://oaji.net/articles/2015/1174-1421150237.pdf

Safaah. E. S., Muslim, M. & Liliawati, W. (2017) Teaching Science Process Skills by Using the 5- Stage Learning Cycle in Junior High School. Journal of Physics: Conference Series, 895, 012106. https://doi.org/10.1088/1742-6596/895/1/012106

Suman, S. (2020). Relationship between science process skills and achievement in science of secondary school students. International Journal of Creative Research Thoughts, 8(10), 3719-3726.

Susanti, R., Anwar, Y., & Ermayanti (2018). Profile of science process skills of preservice Biology teacher in General Biology course. Journal of Physics: Conference Series, 1006, 012003. https://doi.org/10.1088/1742-6596/1006/1/012003

Tan, M. & Temiz, A. K. (2003). FEN ÖĞRETİMİNDE BİLİMSEL SÜREÇ BECERİLERİNİN YERİ VE ÖNEMİ . Pamukkale Üniversitesi Eğitim Fakültesi Dergisi , 13 (13) , 89-101 . https://dergipark.org.tr/en/pub/pauefd/issue/11130/133117

Tanti, T., Kurniawan, D.A., Kuswanto, K., Utami, W., & Wardhana, I. (2020). Science Process Skills and Critical Thinking in Science: Urban and Rural Disparity. Journal Pendidikan IPA Indonesia, 9, 489-498. https://doi.

org/10.15294/jpii.v9i4.24139

Tonjo, V., Ramalis, T., & Hernani, H. (2018). The profile of science process skills of junior high school students in Lembata. International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia, 3, 448-451. Retrieved from http://science.conference.upi.edu/proceeding/index.php/ICMScE/article/view/59

Widyaningsih, D. & Gunarhadi, G. & Muzzazinah (2020). Analysis of Science Process Skills on Science Learning in Primary School. Advances in Social Science, Education and Humanities Research, 397, 679-687. http://doi.org/10.2991/assehr.k.200129.085

York, T.T., Gibson, C., & Rankin, S. (2015). Defining and measuring academic success. Practical Assessment, Research, and Evaluation, 20(5), 1-21. https://doi.org/10.7275/hz5x-tx03

Zeidan A.H., & Jayousi, M.R. (2015). Science Process Skills and Attitudes toward Science among Palestinian Secondary School Students. World Journal of Education, 5(1), 13-24. http://dx.doi.org/10.5430/wje.v5n1p13