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Status of laboratory resources and science process skills of grade 11 learners in the division of Eastern Samar, Philippines

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Abstract

Instructional resources play a significant role in the development of man's scientific thinking. Thus, a hybridized descriptive correlational inquiry was conducted to examine the present availability and utilization statuses of science laboratory resources and the mastery level on integrated science process skills among 274 Grade 11 learners in three secondary schools in the division of Eastern Samar, Philippines. The data gathered from the researcher-developed questionnaire on the availability and utilization status of basic science laboratory resources, and an adopted integrated science process skills test of Monica (2005) for the school year 2019-2020 were analyzed via frequency and percentage, median, Spearman rho, and Pearson r test of correlations. Findings revealed that there were only few available resources which were occasionally utilized in science instruction, while the 11th Grader-participants showed a very low mastery level on integrated science process skills. Also, a significant difference in terms of availability, utilization, and mastery levels existed among the three participating secondary schools in the division of Eastern Samar. Hence, it is recommended for the education sector to propose and develop a laboratory resource management system so that the availability and utilization of science instruments will be maximized, and an intervention program be provided among students to heighten their present integrated science process skills mastery level.

Keywords: *availability, integrated science process skills, mastery level, science laboratory resources, utilization*

Introduction

For more than 60 years now, the Philippine educational system had come to fully recognize the relevance of science education via various programs such as that of scientific investigatory explorations aims towards the instantaneous development of a scientific man. It is common knowledge that Filipinos are outstanding in science and mathematics. However, science education in the country cannot be considered as a strength considering annual National Achievement Test (NAT) results, and international surveys coming from the Trends in International Mathematics and Science Studies (TIMSS) and the recent 2018 Program for International Student Assessment (PISA).

The National Education Testing and Research Council (2013) disclosed the mastery mean performance of 41.35% on science concepts, which is far below the standard set by the Department of Education at 75%. In 2014, the Department of Education (DepEd) reported a shortage of science laboratories in regions III, IV-A, X, XI, and XII, with an average of only one in ten schools having its laboratory. In the National Capital Region, the ratio improved with three laboratories for every

ten schools; however, the findings showed that the rest of the regions did not have any science laboratories (Villar, 2018). The use of laboratory resources is a distinctive feature of an established science curriculum (Tafa, 2012). Okoli and Egbunonu (2010) described the use of laboratory methods that engages students towards a functional learning approach through available interactive resources and equipment to express ideas and make lessons exciting, and easy to understand.

In some studies, learners' non-familiarization of laboratory equipment causes poor performance in examination (Ihejiamaizu and Ochui, 2016; Mamman, Misau, and Agboola, 2018). Similarly, Nwagbo (2012) and Olufunke (2012) opined that inadequacy and non-utilization of laboratory facilities cause students' poor performance. Additionally, Olufunke's (2012) study found that schools with the highest frequency of utilization of equipment had the highest mean score. In the readings of Mukami (2009), she wrote that most of the ill-performing institutions spent less cash on the acquisition of teaching and learning resources and that exposure to laboratory resources has a positive impact on the science performance of the students.

Colvill and Pattie (2002) postulated that one critical factor in the attainment of scientific literacy among secondary students is through acquiring integrated science process skills. Akinbobola and Aolabi (2010) posited these skill-sets are needed in realizing the potential of Science and Technology to solve societal problems. Also, Feyzioglu (2009) opined that the acquisition of the skills would help the students to become problem solvers; hence confirm the need for learners to combine both of their scientific processes and environmentally acquired knowledge for them to inculcate the essence of the present educational program ultimately – the K-12 enhance primary education curriculum in practice and understanding.

It is in this premise that the researcher came up of this problem; hence this study assessed and compared the status of science laboratory resources in terms of its availability and utilization, and the mastery level on integrated science process skills among Grade 11 learners in three secondary schools in the schools' division of Eastern Samar for the school year 2019-2020. Furthermore, the researcher correlated the status of science laboratory resources and the mastery level of the participants on integrated science process skills to establish the relationship between the two variables under consideration.

Objectives of the study

This study correlated the status of science laboratory resources and the mastery level on integrated science process skills among Grade 11 learners in three secondary schools in the schools' division of Eastern Samar namely: Taft National High School (TNHS), Oras National High School (TNHS), and Arteche National High School (ANHS) for the school year 2019-2020. Specifically, this study answered the following objectives:

1. Determine the status of science laboratory resources in three selected secondary schools in the schools' division of Eastern Samar as perceived by Grade 11 students in terms of;
    1.1 Availability; and
    1.2 Utilization.
2. Assess the mastery level on integrated science process skills of Grade 11 students in three selected secondary schools in the schools' division of Eastern Samar.
3. Determine the relationship between the mastery level on integrated science process skills and status of science laboratory resources in terms of;
    3.1 Availability; and
    3.2 Utilization.

Conceptual framework of the study

This study is anchored on the theories formulated by well-known educational researchers and authorities in the field of conventional and modern instructional approaches to education.

Prime mover of Instructional philosophy in the persons of Aladejana and Aderibigbe (2007), they believed that it is the responsibility of the educational community to provide conducive laboratory environment which is comfortable and that liberates learners

into an open exchange of ideas with respect and thought consideration, hence promoting learner-centered characteristics such as that of; promotion of learner's scientific curiosity; provisions of reward mechanism; encouraging healthy questioning; and meaningful understanding. Moreover, fostering of scientific human enterprise through existing academic resources enhances aesthetic and intellectual understanding of a child said Omiko (2015) which enables learners to useful meaning to their environment and later on develop relevant life skills (Akani, 2015).

Piaget's cognitive constructivist theory proposed that children progress can be assessed through child ability to constructs understanding based on his/her environmental experiences. Within Piaget's theory, the basis of learning is discovery: to understand is to discover, or reconstruct by rediscovery and such conditions must be complied with if in the future individuals are to be developed who are capable of production and creativity and not simply repetitive (Olaedo, 2018). This implies that teachers should create situations that would help the learners to discover facts by themselves. In this case, the teacher should establish an explorative environment for the learners to explore facts or truth by themselves. The true nature of learning resources is when it is sought, not being told. Dale's Cone of Experience relates related successful transfer of learning to resources. The top of the cone has the abstract strategies that are more teachers centered and require fewer resources while at the bottom are the learner centered strategies that allow for greater autonomy of the learner and require more resources. The top of the cone begins with verbal symbols and at the bottom there is the direct purposeful experience such as student working with apparatus in the laboratory (Mukami, 2009). This implies that an instructional leader such as that of a teacher should be acquitted with the use of a variety of methods and procedures of teaching science since most teachers in the past are more concerned with the theoretical approach rather than the practical approach.

Finally, the researcher embraced Jerome Bruner's constructivism theoretical arguments that learning is an active process in which learners construct new ideas or concepts based upon their current or past knowledge and that the generation of knowledge and meaning comes from interaction between their experiences and their ideas, and that of Dewey's pragmatic educational point of view that gives emphasis on learner's acquisition of scientific literacy through science process skills (Obliopas, 2017). These theories are associated with pedagogic approaches that promote active learning and discovery processes. Hands on experiences are therefore necessary for effective science process skills and that the teacher should try and encourage students to discover principles by themselves.

It is in these underlying theories and concepts derived, that an investigation be conducted in order to examine closely how instructional resources availability and utilization such as laboratory resources capacitates learners' mastery level and acquisition of science process skills via predictive/criterion framework

In this study, the researcher examined the availability of laboratory resources and extent of utilization of laboratory resources as the predictive variable, while the Grade 11 learners' mastery level in both basic and integrated process skills among three selected schools in the northern part of Eastern Samar was the predictive variable. Results of the two phase-examinations was correlated to examine the nature of their relationship.

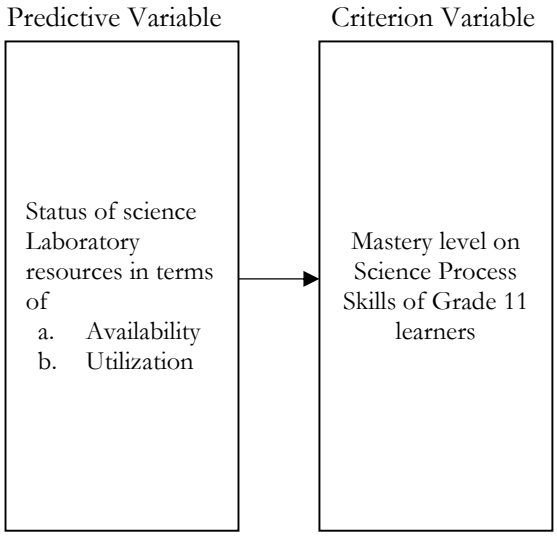

Figure 1. Conceptual framework of the study

Methodology

Research design

The researcher employed correlational approach in assessing the statistical relationship between the status of science laboratory resources in terms of its availability and utilization using three-way and five-point rating scheme via a researcher-developed instrument containing 38 item-basic science laboratory resources and the Grade 11 learners' mastery level on integrated science process skills in the selected schools in the schools' division of Eastern Samar, namely; Oras National High School, Arteche National High School and Taft National High School during the school year 2019-2020.

Respondents of the study and sampling method

The respondents of this study were Grade 11 students who are officially registered in the learners' information system (LIS) in the selected secondary schools offering senior high school program for the school year 2019-2020. They were proportionately determined by multiplying the respective Grade 11 population with 274 and dividing the product by 934, which is the total research population. The researcher utilized random sampling in determining the respondents of the study. Table 1 below shows the sampling frame of the respondents and the respective sample size in the chosen locales.

Table 1. Respondents' sampling frame

School	Population (S)	Sample Size (s)
Arteche National High School	251	74
Oras National High School	350	98
Taft National High School	333	102
Total	**934**	**274**

Research instrument

A researcher-developed -questionnaire comprising of 38 laboratory resources in Biology, Earth Science, Physics and Chemistry was employed in determining the status of science laboratory resources in terms of its availability and extent of utilization. This instrument was validated among Science Teachers in two non-participating secondary schools in the schools' division of Eastern Samar, who are diploma holder in Teaching Science and teaching the said subject for more than five years now. The first part of the instrument asked for teacher-respondents profile including their name (but not totally required for ethical consideration), and assigned school.

The second part is a checklist-based questionnaire containing 38 basic science laboratory resources to be responded available/available but not functional/not available for the first part, while a five-point Likert scale will be utilized for the extent of utilization of science laboratory resources. In examining the mastery level on integrated science process skills of Grade 11 students, the researcher adopted a valid Integrated Science Process Skills Test of Monica (2005), consisting of 30 items with four options each. The instrument is comprised of 6 items on identifying and controlling variables, 6 items on stating hypothesis, 6 items on operational definitions, 9 items on graphing and interpreting data, and 3 items on experimental design. The said instrument got a 0.81 reliability value. Moreover, the developed instrument could be readily adopted to local use to monitor the acquisition of science process skills by the learners (Monica, 2005).

Data gathering procedure

The data gathering was conducted in two separate manners; through a three-part survey questionnaire and administering of integrated science process skills test to the respondents in the three selected school. The data gathering proceeded after the compliance of all the requisite permission from concerned government agencies. Initially, the researcher sought permission to conduct the study from the Dean of the College of Graduate Studies of Eastern Samar State University, Borongan City through a letter of request. When the said approval be given, another letter addressed to the Schools Division Superintendent of the

Schools Division of Eastern Samar, Department of Education (DepEd), Region VIII, was secured.

Upon the acceptance of the approval by the Schools Division Superintendent of the Schools Division of Eastern Samar, several letters addressed to the Secondary School Principals of the three selected school for their individual approval of the study. Only upon their consent that the survey using the test instrument was conducted among 274 respondents.

Data analysis

The data were tabulated, organized, analyzed and interpreted with the use of descriptive as well as inferential statistical tools, including frequency count, percentage, median, Kruskal Wallis H-test, One-way Analysis of variance (ANOVA), and Spearman's rank correlation at 0.05 level of significance.

Ethical considerations

This study followed the appropriate research ethics guidelines. from participants was provided, and a permit was ensured upon using their given data. The participants were assured that these data will be kept confidential and cannot be used in any legal actions against them. Numerical codes were assigned to schools such as A for Taft National High School, B for Oras National High School, and C for Arteche National High School. Moreover, the heads in each school were informed about the findings of this study.

Results and discussion

Status of science laboratory resources in the school division of Eastern Samar as perceived by Grade 11 students in terms of Availability

Table 2 shows the availability status of thirty-eight fully enumerated basic science laboratory resources as perceived by the respondents enrolled in three selected secondary schools in the schools' division of Eastern Samar for the school year 2019-2020. The table indicates that there are 26 out 38 basic science laboratory resources responded "Not available" among the participating schools such as Beaker, Bruner lamp glass, Clamp pulley, Graduated cylinder, Round balloon, Hand lens, Slides, Tripod stand, Bunsen burner, Erlenmeyer flask, Evaporating dish, Funnel, Mortar and pestle, Stirring rod, Test tube clamp, Test tube rack, Wire gauze, Centrifuge, Clear styrene cone and racks, Glass dropper, Forceps, Pipettes, Sterile centrifuge tubes, Triple beam balance, Plastic lab vials, and Whirl packs.. While the remaining twelve science laboratory resources were responded "Available" namely; First aid kit, Protractor, Plastic ruler, Tape measure, Ordinary thermometer, Glass rod, Measuring cylinder, Microscope, Storage bottle, Boiling tube, Test tube, and Plastic scoops.

Results show that majority of the instruments were not available for usage in Science classes among secondary schools in the schools' division of Eastern Samar, most specially glassware-based laboratory resources, due to the present conditions of the laboratory classrooms, wherein some of them were not yet organized in a manner expected from a laboratory classroom, and that most of the laboratory resources were observed to be located in a regular classroom that lacks laboratory sinks and proper ventilation in case of chemical leakage. Furthermore, the result is limited on the perceived availability in the use of science laboratory resources among Grade 11 students; other factors on this construct was not examined.

These results are related to Pareek (2019), who made mention in his paper that secondary schools are yet adequate in the delivery of science instruction due to lack of available and functional laboratory resources. Mukami (2009) said that the inadequacy of practical works has a negative impact and is one of the major causes of students' poor performance in Science. Moreover, Antonio (2018) asserted that the completeness of the essential features of the laboratory room placed learning excitingly. Likewise, Igwe (2003) concluded that one of the ways of developing scientific attitudes in children is through engaging in practical work. These findings have many implications for teaching and learning Science. For instance, some practical works cannot be adequately implemented in the classroom due to the unavailability of some laboratory resources, resulting in teachers using

other means in teaching the subject that are not appropriate for the expected learning competencies, and poor development of science attitude values and interest.

Table 2. Status of science laboratory resources in the school division of Eastern Samar as perceived by Grade 11 students in terms of Availability

ITEMS	Available		Not Available	
	f	%	f	%
Beaker	88	*32.1*	186	***67.9***
Burner Lamp Glass	73	*26.6*	201	***73.4***
Clamp Pulley	49	*17.9*	**225**	***82.1***
First Aid Kid	**250**	***91.2***	24	*8.8*
Graduated Cylinder	132	*48.2*	**142**	***51.8***
Protractor	**225**	***82.1***	49	*17.9*
Round Balloon	107	*39.1*	**167**	***60.9***
Ruler, Plastic	**251**	***91.6***	23	*8.4*
Tape Measure	**256**	***93.4***	18	*6.6*
Ordinary Thermometer	**236**	***86.1***	38	*13.9*
Glass Rod	**144**	***52.6***	130	*47.4*
Hand lens	86	*31.4*	**188**	***68.6***
Measuring cylinder	**143**	***52.2***	131	*47.8*
Microscope	**210**	***76.6***	64	*23.4*
Slides	117	*42.7*	**157**	***57.3***
Storage Bottle	**157**	***57.3***	117	*42.7*
Boiling tube	**161**	***58.8***	113	*41.2*
Tripod stand	83	*30.3*	**191**	***69.7***
Bunsen Burner	36	*13.1*	**238**	***86.9***
Erlenmeyer Flask	34	*12.4*	**240**	***87.6***
Evaporating Dish	70	*25.5*	**204**	***74.5***
Funnel	115	*42.0*	**159**	***58.0***
Mortar and Pestle	76	*27.7*	**198**	***72.3***
Stirring Rod	73	*26.6*	**201**	***73.4***
Test tube	**164**	***59.9***	110	*40.1*
Test tube clamp	108	*39.4*	**166**	***60.6***
Test tube rack	93	*33.9*	**181**	***66.1***
Wire Gauze	70	*25.5*	**204**	***74.5***
Centrifuge	31	*11.3*	**243**	***88.7***
Clear Styrene Cone and Racks	47	*17.2*	**227**	***82.8***
Glass dropper	116	*42.3*	**158**	***57.7***
Forceps	52	*19.0*	**222**	***81***
Pipettes	47	*17.2*	**227**	***82.8***
Plastic Scoops	**167**	***60.9***	106	*38.7*
Sterile centrifuge tubes	62	*22.6*	**212**	***77.4***
Triple beam balance	54	*19.7*	**220**	***80.3***
Plastic Lab Vials	63	*23.0*	**211**	***77.0***
Whirl-pack	47	*17.2*	**227**	***82.8***

Status of science laboratory resources in the school's division of Eastern Samar as perceived by Grade 11 students in terms of Utilization

Table 3. Status of science laboratory resources in the school's division of Eastern Samar as perceived by Grade 11 students in terms of Utilization

Item	Median	Qualitative Rating
Beaker	2	**Occasionally**
Burner Lamp Glass	2	**Occasionally**
Clamp Pulley	1	Rarely
First Aid Kid	4	Many times
Graduated Cylinder	2.5	Occasionally/Sometimes
Protractor	4	Many times
Round Balloon	2	**Occasionally**
Ruler, Plastic	4	Many times
Tape Measure	4	Many times
Ordinary Thermometer	4	Many times
Glass Rod	2	**Occasionally**
Hand lens	2	**Occasionally**
Measuring cylinder	2	**Occasionally**
Microscope	3	Sometimes
Slides	2	**Occasionally**
Storage Bottle	3	Sometimes
Boiling tube	3	Sometimes
Tripod stand	2	**Occasionally**
Bunsen Burner	1	Rarely
Erlenmeyer Flask	1	Rarely
Evaporating Dish	1	Rarely
Funnel	2	**Occasionally**
Mortar and Pestle	2	**Occasionally**
Stirring Rod	2	**Occasionally**
Test tube	3	**Sometimes**
Test tube clamp	2	**Occasionally**
Test tube rack	2	**Occasionally**
Wire Gauze	2	**Occasionally**
Centrifuge	1	Rarely
Clear Styrene Cone and Racks	1	Rarely
Glass dropper	2	**Occasionally**
Forceps	1	Rarely

Pipettes	2	**Occasionally**
Plastic Scoops	3	Sometimes
Sterile centrifuge tubes	1	Rarely
Triple beam balance	2	**Occasionally**
Plastic Lab Vials	2	**Occasionally**
Whirl-pack	1	Rarely

Table 3 shows the utilization status of thirty-eight fully enumerated basic science laboratory resources as perceived by the respondents enrolled in three selected secondary schools in the schools' division of Eastern Samar for the school year 2019-2020. Data revealed that none of the 38 basic science laboratory resources was used "Always" in the science instruction, five basic science laboratory resources were used "Many times" namely; First Aid Kit, Protractor, Plastic Ruler, Tape Measure and Ordinary Thermometer, 5 of them were used "Sometimes" including; Microscope, Storage Bottle, Boiling tube, Test Tube and Plastic Scoops, 1 laboratory resource was used "Sometimes/Occasionally", the graduated cylinder, 18 laboratory instruments were used "occasionally" namely; Beaker, Burner, Glass rods, Hand lens, Measuring cylinder, Slides, Tripod Stand, Funnel, Mortar and Pestle, Stirring rod, Test tube clamp, Test tube rack, Wire Gauze, Glass dropper, Pipettes, Triple beam balance and Plastic vial, and nine laboratory resources were used "Rarely" including; Clamp Pulley, Bunsen Burney, Erlenmeyer Flask, Evaporating Dish, Centrifuge, Clear Styrene Cone and Racks, Forceps, Sterile Centrifuge Tubes and Whirl-pack. Findings show that 18 out of the 38 basic science laboratory resources were used "Occasionally" and only one resource was used sometimes/occasionally in science instruction among Grade 11 students in the selected secondary schools in the schools' division of Eastern Samar. Corollary, it can be deduced from the data that none of the basic science laboratory resources are being always utilized in the class.

These results are affirmed by Muhammad (2017) report, that the non-utilization of resources in the laboratories can grossly affect the science performance of the students and Verspoor (2008) who said that learners in SSA country are only exposed to laboratory facilities by just 20%, while most of the time are taught via reading and copying from textbooks. These findings negate the substantial importance of exposing learners with laboratory equipment to provide real experiences and ways to help learners confront their learning difficulties. Motswiri (2004) mentioned in his paper that by providing opportunities for skills development in logical thinking and organization, laboratory experiences allowed learners to solve problems, especially to Science, technology and societal issues, and provide the opportunity of building values, especially those related to nature of Science. In addition, Omosewo (2006) said that a deeper understanding of the science and technology process could only be achieved through laboratory activities that give concrete experiences to substantiate the theoretical aspect that has been taught. This is quite true since the laboratory-based instruction is useful in providing training for keen observation, supplied detailed information, and arouse pupils' interest (Adebisi, Babayeju & Gbadebo, 2016).

Furthermore, the findings have some implications for science education. Teachers, especially in the secondary education must be geared with formal training on the use of laboratory resources in science instructions since the appropriate use of laboratory facilities, enable the learners to gain direct experience in conducting experiments. Moreover, the Department of Education should examine the present conditions of laboratories, the use of science resources, and learning facilities as they constitute great marks in the attainment of scientific literacy. Lastly, the school administrators with the help of the science department head/ coordinator and master teachers must provide an annual instructional plan on what topic requires the used and when to utilize laboratory facilities among teachers to provide necessary trainings via Learning Action Cell (LAC), especially to out-of-field and novice teachers.

Mastery level on integrated science process skills of Grade 11 students among three secondary schools' division of Eastern Samar

Table 4. Mastery level on integrated science process skills of Grade 11 students among three secondary schools' division of Eastern Samar

Percentage Score	Descriptive Equivalent	Oras		Taft		Artech e	
		f	%	f	%	f	%
96 – 100	Mastered	0	0	0	0	0	0
96 – 95	Closely Approaching Mastery	0	0	0	0	0	0
66 – 85	Moving Toward Mastery	0	0	0	0	0	0
35 - 65	Average Mastery	0	0	0	0	0	0
15 - 34	Low Mastery	2	*2.1*	1 3	*12. 7*	1 3	*17. 6*
5 – 14	Very Low Mastery	9 0	*91. 8*	8 7	*85. 3*	5 9	*79. 7*
0 - 4	Absolutely No Mastery	6	*6.1*	2	*2.0*	2	*2.7*

Table 4 shows the mastery level on integrated science process skills of Grade 11 student enrolled in three selected secondary schools in the schools' division of Eastern Samar for the school year 2019-2020.

The process of teaching and learning science that uses various teaching approaches in has extra advantages in terms of providing opportunities for the inculcation of science process skills since it manages to provide the students the opportunity to learn independently and acquire at least some of the science process skills (Rauf, Rasul, Mansor, Othman, & Lyndon, 2013). Data in Table 2 shows that no student coming from the three selected schools reached the "mastered", "closely approaching mastery", "moving towards mastery" and "average mastery" levels in the assessment given. Respondents from Oras National High School got the following results, there were two students (2.15%) who got a "Low Mastery" level, 90 students (91.8%) got a "Very Low Mastery" level and six students (6.1%) got an "Absolutely No Mastery" level. For Taft National High School, 13 students (12.7%) got a "Low Mastery" level, 87 students (85.3%) got a "Very Low Mastery" level, and two students (2.0%) got an "Absolutely No Mastery" level. While in Arteche National High School, 13 students (17.6%) got a "Low Mastery" level, 59 students (79.7%) got a "Very Low Mastery" level, and two students (2.7%) got an "Absolutely No Mastery" level.

Results show that 17.6% of the student from Arteche National High School reached low mastery level, while 2.0% of the students from Taft National High School reached an absolutely no mastery level on integrated science process skills. Furthermore, the reveals that the majority of the student from the three secondary schools lie on the very low mastery level with 91.8% of them came from Oras National High School.

These findings imply that the majority of the students find integrated science process skills quite difficult to deal with. This occurrence is entirely justifiable since the selection of research locales was based on the bottom three performing secondary schools in the first and second periodical tests for the school year 2019-2020 based on the Division Monitoring and Evaluation report accessed by the researcher from the Education Program Supervisor for Science, Dr. Rhea N. Coles, though respondents from all these schools were chosen randomly. Saat (2004) reflected this kind of result as a state of disequilibrium, characterized by students who have not acquired the necessary skills fully or internalized it. This is in line with the findings of Nwosu and Okeke (2005) that there is a very low development of science process skills among first year students in the tertiary level and that of Chiapetta's (2006) observation in which most adolescents have not yet reached their full formal reasoning capacity and Akinbobola and Afolabi (2010), that integrated science process skills are more difficult to improve because they are not used to being taught. Likewise, Rabacal (2016) found out that that human perception or observation, measurement or estimation, arrangement, forecast, and relational abilities that constitute fundamental exploratory aptitudes focusing on exploratory strategy, investigative speculation and basic intuition that

are nowadays ordinarily utilized. It is worth noting that majority of students these days are failing in this kind of standard assessment which is a requirement in the tertiary education especially Science related course, despite that fact that learning these skills' set showed to empower students answer many of their questions and interpret what they observe in order to make inferences and predictions about human observations (Duban, Aydogdu & Erten, 2014).

Findings imply that the science education sector and the Department of Education in a whole must work together to formally and adequately expand learners' understanding on integrated science processes since the fulfillment of one's aspiration require relevant and functional education and a high level of reasoning to solve world problems of today. Furthermore, since the data reveal that there are many students who fell in "Low Mastery" up to "Absolutely No Mastery" levels in the integrated science process skills test, this may imply that aid or intervention program must be given to these students for them to improve their present level and therefore achieve scientific literacy. This study proved that skills which is abstract should be developed through the teacher's facilitating ability while teaching using any kind of approach. Children should not be left on their own and hoped to be able to acquire specific skills with less intervention from the teacher.

Test on significant relationship between the mastery level on integrated science process skills and status of science laboratory resources

Table 5. Test on significant relationship between the mastery level on integrated science process skills and status of science laboratory resources

Status of Laboratory Resources	Grade 11 Students Mastery Level on SPS		p-value	Decision	Interpretation
	Result	Interpretation			
Availability	r = -.061	Negligible	.312	Failed to reject H_0	Not Significant
Utilization	ρ = 004	Negligible	.945	Failed to reject H_0	Not Significant

As presented in Table 5 reveals results on the test of relationship between students' mastery level on science process skills and the status of science laboratory resources in terms of availability and utilization. In determining the relationship between availability and mastery level on science process skills among students, a Point-biserial correlation via Pearson r as references was utilized since the availability variable has two categories and it followed a normal distribution. The result shows that the two variables have negligible indirect relationships visible with the negative value of r (-.061). On the other hand, test on the relationship between mastery level and utilization status was run using Spearman rho correlation due to the non-normality of the two variables. Furthermore, the result showed a negligible yet direct relationship between the two variables, as shown by the positive value of rho (.004). However, since the p-values for Availability and Utilization are both higher than the level of significance set at 0.05, the null hypothesis is retained, and no significant relationship was established on two sets of variables.

The result displays a negated relationship primarily due to the poor performance displayed by the participants and the unavailability and poor utilization of basic science laboratory resources. This finding is related to Afolabi (2002) and Commeyras (2003) who found no relationship among class size and students' academic performance and process skills acquisition, and Akani (2015) who detected no significant difference between the mean response of students on the learning of scientific methods and matching of their abilities through the laboratory experiences they are exposed to. However, this result is opposed by available literature such as Rabacal (2016) who found a positively significant and linear relationship between science process skills taught in laboratory applications and efficient laboratory use of the students, Gocmencelebi and Sanli (2011) demonstrated that the utilization of laboratory instruments essentially develops students' science procedure abilities

and the findings of Okebukola as cited by Afolabi (2010), that the acquisition of science process skills highly depends on the opportunities provided by the teachers. Moreover, Hanuscin (2007) affirmed that positive learning is affected by the space and amount of learning materials available in the classroom. Likewise Geleta (2018) highlighted the use of laboratory facilities in improving learners' skills to pose scientifically oriented questions, formulate scientific hypothesis, design relevant experiments, undertake scientific and social experiments, formulate and revising scientific enlightenments, and share valid scientific arguments, and that of Odutuyi (2015) student cohesiveness dimension of laboratory learning environment significantly effect on the learners' attitude, closely followed by Rule clarity.

Summing it up, the results derived in this study showed that the number of available and not available laboratory resources varied, in which the latter was higher than the other, when their differences were compared to schools, a significant difference was made. Hence, this implies that Department of Education (DepEd's) logistic division should ensure equal distribution of science laboratory resources to ensure an almost equal delivery of instruction among science teachers. This study was limited in that it examined a small, relatively homogenous sample of secondary schools whose science performances lie at the bottom based on the DMEA result. The result of this study does not necessarily represent the whole division of Eastern Samar as to the schools' status of laboratory resources and mastery level of the students, specifically the Grade 11 students only. This instrument should continue to be revised until higher reliability is reached.

Conclusion and recommendations

Based on the findings derived, the majority of the basic science laboratory resources are not available, while those that are available resources are only occasionally utilized in science instruction among Grade 11 students in the three secondary schools in schools' division of Eastern Samar for the school year 2019-2020. Most of the Grade 11 students have a very low mastery level, and that no one achieved mastered level on integrated science process skills test. Further analysis revealed significant differences in the availability and utilization statuses of science laboratory resources among the three participating secondary schools. Also, there is a significant difference in the integrated science process skills mastery levels of the Grade 11 students. Finally, the availability and utilization statuses of science laboratory resources when associated with the Grade 11 integrated science process skills mastery levels, shown no significant relationship.

Hence, the following recommendations are offered. Science supervisors of the Department of Education (DepEd) must regularly monitor the availability and use of scientific laboratory resources by schools to provide up-to-date information on their current condition. The education sector must spearhead a mass training among secondary teachers on the proper use of laboratory resources and other related pedagogies that will expose learners to the use of such learning tools in the science classroom. The mastery level on integrated science process skills needs to be raised to the average mastery level by providing necessary intervention programs and more exposure to the use of laboratory equipment in teaching practical science concepts. The Department of Education must develop an online management system in order to update the availability of laboratory resources in each school to provide more resources to schools that needed them the most. Lastly, every school must heighten the teaching of integrated science process skills among Senior High School students in a manner enjoyable and easy to catch-up with.

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