International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Impact of the Emergency Remote Teaching-Learning Approach on Acquisition of Scientific Skills

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Abstract: ***This study aimed to assess the impact of emergency remote teaching-learning approach on acquisition of scientific skills by Grade 8 learners. The research population comprised of 297 learners of the Schools Division of Pangasinan II. The study utilized quantitative descriptive research design. Based on the result, the observing skills acquired during ERT revealed the most of the learners were fairly satisfactory and satisfactory. In inferring skills, some were outstanding and very satisfactory. In measuring, most of the respondents were outstanding. In communicating, most of the learners were outstanding and satisfactory. With regard to classifying, learners acquired fairly satisfactory and satisfactory. On the account of predicting, most of the students were satisfactory and very satisfactory. All of the skills were significantly different to the learners' performance in science subjects. This means that the learners were capacitated with the skills of observing, inferring, measuring, communicating, classifying, and predicting.***

Keywords: academic performance: emergency remote teaching-learning: scientific skills: quarterly grades

1. Introduction

COVID-19 has induced the largest remote learning experiment in history. Decisions have to be made by policy makers in the midst of grave scientific uncertainty due to a fatal threat. While legitimate public health concerns led to school closures, research suggests that students have paid a heavy price in lost learning. Additionally, there is growing proof that the pressure and isolation of online learning are factors in young people's mental health problems. As schools embrace best practises, remote classrooms have gotten better, but they are still challenging for children who have academic difficulties, social isolation, or a lack of resources. (Chen et al., 2020)

And so, Ray (2020) defined remote learning as an opportunity that provides both students and teachers to remain connected and engaged with the content while working from their homes. Opportunities for remote learning are frequently associated with crises that endanger the security of the students. According to Ali (2020)'s research, in addition to resources, staff confidence, staff preparation, and student accessibility and motivation all play significant roles in ICT integrated learning.Also, the study proposes that staff members should use technology and technological gadgets to enhance learning especially during these exceptional times.

As a result, it has been approved and required the use of remote learning strategy in response on the remote learning situation and a key element in ensuring continued learning during trying times.

2. Methodology

The descriptive research design was used in this study. Hence, the difference between the level of performance in Scientific skills and the third quarter grade in Science under the remote teaching-learning approach were distinguished.

On the first part of the questionnaire, 60 test items were categorized by the researcher in terms of observing, inferring, measuring, communicating, classifying, and predicting. There are six sets of test that was administered to the students. Each test has similar number of items, i.e. a total of 10 items. The second part was the identification of respondents' third quarter grade. Grades used were shown on their Report Card during this school year. Finally, the last part indicated the experiences of learners on the implementation of the said approach using 5-point Likert scale with fifteen indicators align on the anticipated insights of learners written on the third part of the instrument.

The distribution of the test and questionnaires were conducted via online. Google forms was sent to respondents and response was recorded once it sent back by the server. About the description of the instrument, the researcher provided enough information with regard on the purpose and general instruction on filling out the online survey.

In order to come up with valid and reliable results, appropriate statistical tool was used. The Statistical Packages for Social Science (SPSS 21.0) is employed for statistical analysis, and the 0.05 level was identified to determine the significant differences of the results.

3. Results and Discussion

In this study, the researcher determined the emergency use of remote teaching and learning as learning modality in today's education system. They had taken a test that would measure their acquired skills in science. The said tests were thoroughly constructed by the researcher for the purpose of identifying how the said learning modality has been benefiting learners.

a) Acquired Scientific Skills in Observing

Table 1 presents the evaluation of Grade 8 learners on their Scientific Skills acquired in observing from the emergency

remote teaching-learning approach as revealed on their scores.

The table entails that most of the learners have fairly satisfactory scores (105 or 35.4%). On the other hand, 97 or 32.7% of the learners are satisfactory. Moreover, 47 or 15.8% of the learners are very satisfied. In addition, 28 or 9.4% are outstanding. Unfortunately, 20 or 6.7% of the learners did not meet the expectation. This implies that the learners are still fairly satisfactory in observing that involves number or quantity and can elaborate detailed, accurate, and productive observations.

Table I: Acquired Scientific Skills in Observing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Did Not Meet Expectation	20	6.7	6.7	6.7
	Fairly Satisfactory	105	35.4	35.4	42.1
	Satisfactory	97	32.7	32.7	74.7
	Very Satisfactory	47	15.8	15.8	90.6
	Outstanding	28	9.4	9.4	100.0
	Total	297	100.0	100.0	

Thus, results clearly show that emergency use of remote teaching and learning is still useful to learners in classifying and observing things and situations.

b) Acquired Scientific Skills in Inferring

This describes the acquired scientific skills in inferring of the Grade 8 learners in the Division of Pangasinan II.

Table 2: Acquired Scientific Skills in Inferring

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Did Not Meet Expectation	2	0.7	0.7	0.7
	Fairly Satisfactory	55	18.5	18.5	19.2
	Satisfactory	48	16.2	16.2	35.4
	Very Satisfactory	78	26.3	26.3	61.6
	Outstanding	114	38.4	38.4	100.0
	Total	297	100.0	100.0	

Table 2 portrays the scientific skills in inferring as acquired by the Grade 8 learners. As could be gleaned on the table, most of the learners are outstanding with a frequency of 114 or 38.4%. There are also learners that are very satisfied with 78 or 26.3%. Moreover, there are 55 or 18.5% learners who are fairly satisfactory. On the other hand, 48 or 16.2% are satisfactory. Lastly, 2 or 0.7% of the learners did not meet the expectation.

Accordingly, learners are also very satisfactory in inferring things through an emergency remote teaching and learning. It implies that learners usually can make assumptions based on what they learned and generate tentative assumptions of guess about an object and gather data or information.

Findings of the present study cannot be supported by Teo and Goh (2019) who used test items generally assessed students' inference skills and mean abilities and eventually found out that learners were generally 'weak' in making inference in Science. Yet, the researchers recommend the need of developing students' Science inference.

c) Acquired Scientific Skills in Measuring

This study aimed to determine the impact of the emergency remote teaching-learning approach of the Grade 8 learners in the Schools Division of Pangasinan II.

Table 3: Acquired Scientific Skills in Measuring

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Did Not Meet Expectation	2	0.7	0.7	0.7
	Fairly Satisfactory	33	11.1	11.1	11.8
	Satisfactory	37	12.5	12.5	24.2
	Very Satisfactory	66	22.2	22.2	46.5
	Outstanding	159	53.5	53.5	100.0
	Total	297	100.0	100.0	

Table 3 on the previous page discusses the acquired scientific skills in measuring grade 8 learners. Based on the table, most of the learners are outstanding with a frequency of 159 or 53.5%. In addition, 66 or 22.2% got very satisfactory results. By then, 37 or 12.5% of the learners are satisfactory. Moreover, 33 or 11.1% are fairly satisfactory. Lastly, 2 or 0.7% of the learners did not meet the expectation. It indicates that learners are able to measure using standard and nonstandard measurement and estimate dimensions of an object or event.

d) Acquired Scientific Skills in Communicating

This study aimed to determine the impact of the emergency remote teaching-learning approach of the grade 8 learners in the Schools Division of Pangasinan II. Communicating is one of the variables in this study.

Table 4: Acquired Scientific Skills in Communicating

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Did Not Meet Expectation	1	0.3	0.3	0.3
	Fairly Satisfactory	72	24.2	24.2	24.6
	Satisfactory	87	29.3	29.3	53.9
	Very Satisfactory	49	16.5	16.5	70.4
	Outstanding	88	29.6	29.6	100.0
	Total	297	100.0	100.0	

Table 4 indicates the percentage and frequency counts of the acquired scientific skills. It could be gleaned on the table that most of the students are outstanding, which is 88 or 29.6%. Moreover, 87 or 29.3% are satisfactory. Additionally, 72 or 24.2% are fairly satisfactory. 49 or 15.5% are very satisfactory. Lastly, 1 or 0.3% of the learners did not meet the expectation.

According to Sekolah (2018), communication skill is one skill that is very needed in this 21st century. Preparing and

teaching this skill in teaching physics is relatively important. The focus of this research is to optimizing of students' scientific communication skills after the applied higher order thinking virtual laboratory (HOTVL) on topic electric circuit. This research then employed experimental study particularly posttest-only control group design. The subject in this research involved thirty senior high school students which were taken using purposive sampling. A sample of seventy (70) students participated in the research. An equivalent number of thirty-five (35) students were assigned to the control and experimental group. The results of this study found that students using higher order thinking virtual laboratory (HOTVL) in laboratory activities had higher scientific communication skills than students who used the verification virtual lab.

e) Acquired Scientific Skills in Classifying

This study aimed to determine the impact of the emergency remote teaching-learning approach of the Grade 8 learners in the Schools Division of Pangasinan II. Classifying is one of the variables discussed in this study.

Table 5: Acquired Scientific Skills in Classifying

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Did Not Meet Expectation	14	4.7	4.7	4.7
	Fairly Satisfactory	161	54.2	54.2	58.9
	Satisfactory	91	30.6	30.6	89.6
	Very Satisfactory	16	5.4	5.4	94.9
	Outstanding	15	5.1	5.1	100
	Total	297	100	100	

Table 5 elucidates the frequency and percentage of the result in classifying as a scientific skill acquired by the learners. Accordingly, most of the learners are fairly satisfactory (161 or 54.2%). Moreover, 91 or 30.6% of the learners are satisfactory. Meanwhile, 16 or 5.4% are very satisfactory; 15 or 5.1% are outstanding; and 14 or 4.7% did not meet the expectation. This implies that learners are satisfactory in sorting objects based on my observation and group based on similarities, differences, and interrelationships.

Result may negate the study of Maranan (2017) that classifying skill was the mastered skill and satisfactorily by the student, however, she claimed that if one is able to classify things satisfactorily do not necessarily mean that they understand the lesson well. With this, Ramish (2017) suggested that classifying skills should be emphasized to support the learners' understanding Science of concepts in order to develop other higher order thinking skills.

f) Acquired Scientific Skills in Predicting

This study aimed to determine the impact of the emergency remote teaching-learning approach of the Grade 8 learners in the Schools Division of Pangasinan II.

As can be gleaned on the table, most of the learners are satisfactory in acquiring the scientific skills in predicting (133 or 44.8%). Meanwhile, 79 or 26.6% are very satisfactory. Moreover, 56 or 18.9% are fairly satisfactory. Additionally, 25 or 8.4% are outstanding. Unfortunately, 4 or 1.3% of the learners did not meet the expectation. Thus, results clearly show that emergency use of remote teaching and learning is still useful to learners in inferring things and situations.

Table 6: Acquired Scientific Skills in Predicting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Did Not Meet Expectation	4	1.3	1.3	1.3
	Fairly Satisfactory	56	18.9	18.9	20.2
	Satisfactory	133	44.8	44.8	65.0
	Very Satisfactory	79	26.6	26.6	91.6
	Outstanding	25	8.4	8.4	100.0
	Total	297	100.0	100.0	

g) Level of Academic Performance of Learners

Remote learning is likely to play an increasingly prominent role in education wherein the learning setting is facilitated by their para teachers or parents and/or learning by themselves. Widespread adoption of remote learning is taking place in most nations across the globe in response to lockdown.

Table 2 explicates the level of performance of learners on the third quarter grade in Science this school year.

Table 7: Acquired Scientific Skills in Classifying

Science Skills	Mean	Frequency	%
Outstanding	90-100	88	29.62
Very Satisfactory	85-89	108	36.36
Satisfactory	80-84	72	24.24
Fairly Satisfactory	75-79	29	9.76
Did not meet expectations	Below 74	0	0
Total		297	100

It can be seen that the scores portray differences of performances with regard to the learned Scientific skills. Hence, 108 or 36.36% of the students have obtained a grade of 85-89 bringing them to a very satisfactory performance. While 88 or 29.62% are very satisfactory with the grade ranging to 90-100. Fortunately, none of the learners got failing grades; meaning, almost all of them have met the expectations on the said subject using emergency remote learning.

Since almost all learners have passed a certain quarter grade, it explicitly indicates that the emergency use of remote modality as an emerging teaching and learning process is effective and strongly recommended for use.

In this regard, the findings lean on the adopted proposition of Burke (2020) that remote learning can be as good or better than in-person learning for the students according to research. On the other hand, the rapid and mass introduction of remote learning did not result in a major decline in student satisfaction and can be as effective for performance as other learning delivery modes. (Castro and Tumibay 2019)

Furthermore, according to Rahman (2020) as cited by Bendici (2020), Science skills still be practiced and acquired

remotely, that is, the said modality is effective and powerful because it helps the student put their own pieces together in their mind. It is a heavier cognitive drive that results in a higher performance and focuses on the key points that will help facilitate student thinking, reasoning, and discussion.

H. Difference of Scientific Skills and Level of Performance through a Remote Teaching-Learning Approach

Table 8: Acquired Scientific Skills in Classifying

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Observing	-4.3535	1.9778	0.1148	-4.5794	-4.1277	-37.935	296	.000
Pair 2 Inferring	-3.3300	1.9134	0.1110	-3.5485	-3.1115	-29.993	296	.000
Pair 3 Measuring	-3.6667	1.9864	0.1153	-3.8935	-3.4398	-31.811	296	.000
Pair 4 Communicating	-4.0034	2.1348	0.1239	-4.2472	-3.7596	-32.318	296	.000
Pair 5 Classifying	-3.0168	2.1332	0.1238	-3.2604	-2.7732	-24.373	296	.000
Pair 6 Predicting	-1.7138	2.8668	0.1663	-2.0412	-1.3864	-10.303	296	.000

Synthesis of data on Table 8 discloses the significant difference in scientific skills and level of performance through a remote teaching-learning approach. As can be gleaned on the table all of the skills is significantly different to the learners' performance in Science subjects (.000). This means that the learners are capacitated with the skills of observing (.000), inferring (.000), measuring (.000), communicating (.000), classifying (.000) and predicting (.000).

Yet, the acquired skills and level of performance differ to each other**.** The obtained values were actually lower than .05 alpha level. Therefore, hypothesis is rejected among the said variables.

Moreover, according to Jason and Namin (2006) cited by Harsha (2017) the advantages of remote learning to students reinforce student's motivation, generating students' positive attitude towards overall learning, achieving Science basic skills and intensifying interpersonal relationships.

4. Conclusion

Learners are satisfactory in sorting objects based on my observation and group based on similarities, differences, and interrelationships. Emergency use of remote teaching and learning is still useful to learners in classifying and observing things and situations.

Almost all of learners have passed a certain quarter grade, it explicitly indicates that the emergency use of remote modality as an emerging teaching and learning process is effective and strongly recommend for use.

Inferring, measuring, and classifying show significant relationship to the performance the learners. Therefore, hypothesis is rejected among the said variables. On the other hand, observing, communicating, and predicting show no significant relationship to the performance of the students in Science. Therefore, hypothesis is accepted among the said variables.

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