

Relative Effectiveness of Contextualized Learning Activity Sheets (Las) In Grade 9 Science Instruction

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Abstract — This research investigated the relative effectiveness of Contextualized Learning Activity Sheet in Grade 9 Science instruction. The used of simple random sampling is used to equally select the research investigation respondents. There are 132 students who were randomly used as respondents based on Krejcie Morgan table Using quantitative descriptive and experimental study, the researcher determined the level of pre-test and post-test performance of the Grade 9 students in Science in terms of mean, median, standard deviation, skewness, kurtosis, index of difficulty, and index of reliability. The significant difference in the performance and competency of the Grade 9 students in pre-test and post-test were also determined. Further, it also determined the relationship of the post-test across the profile variables. The contextualized learning activity sheet was utilized in this study. The pre-test and posttest were administered on the Grade 9 students and results were analyzed, using different statistical tools. The findings showed that there was a significant change in the posttest result compared to the pretest result. Thus, the researcher recommends the use of contextualized learning activity sheet in grade 9 Science instruction.

Keywords — *Contextualized Learning Activity Sheet*

I. Introduction

Contextualization is a process in which the students will learn within the context of learning. It is an application to a deep understanding of concepts. It becomes increasingly important as it allows for curriculum enhancement about the diverse background of learners. Contextual learning is a process that connects to the brain to create patterns that have meaning. Further, it attaches academic content to the context of real life. Thus, it also helps long-term store memory, which will help learners apply it to their job obligations later in life (Ruzanna Davtyan, 2014). Moreover, the Manila Bulletin Issue on July 1, 2020, cited that DEPED prepares self-learning modules (SLM) for education's new normal. The education secretary Leonor Briones assured the public that the agency had prepared various alternative delivery modalities as a response to the COVID-19 pandemic situation in the country. Recently, the DEPED released division memorandum No 48 s 2020 on the development of activity sheets intended for remediation, reinforcement, and advancement as the school developed supplementary learning materials. This memorandum highlights the creation of contextualized localized activities for distance learning to respond to the needs of the learners. Locally, the study of Jimmy Rey O. Cabardo (2014) entitled the Effectiveness Of Grade 8 Enhanced Learning Materials in Science for the Open High School Program in the K To 12 Basic Education Curriculum showed a significant

difference between the pretest and posttest performance of OHSP students using the Learning Materials of DepEd and the Enhanced Learning Materials in Grade 8 Science. Moreover, the researcher determined whether the contextualized Learning Activity Sheets (LAS) for Grade 9 learners of Alwindia-Aguso High School, Tarlac City, is functional or not in improving academic performance in Science.

Literature Review

In the Ingrid Sanchez Tapia, 2020, *International Perspectives on the Contextualization of Science Education*, she mentioned how science learning could be more relevant for students and teachers across diverse ethnic and language backgrounds and socio-economic statuses. The study provides a new practical approach in science education, bringing it closer to students' lives and accelerating global scientific literacy. Through contextual teaching and learning (CTL), modern methods to science teachings such as inquiry, problem and project-based, cooperative learning, and authentic assessment can also be employed (*Journal of Elementary Science Education*, Vol. 16, No. 2 Fall 2004). Likewise, contextualization and localization; in teaching science is a new approach to learning, as highlighted in the K to 12 curricula. The educational system in the country is upgrading learners to be globally competitive with the employment of contextualization and localization in the k to 12 curricula in pursuit of quality education and scientific literacy. According to Quisumbing (2017), it is remarkable for the teacher to develop instructional material to guide students in the academic performance. With the presence of this instructional material, the learning process can be fun because of the healthy exchange of information from the student and teacher.

II. Methodology

This chapter contains the research design, population, and locale of the study, the data gathering instrument and procedure, the sources of data, and the statistical tools to obtain valid and reliable information about the study.

Research Design and Strategy

The researcher used of quantitative descriptive and experimental studies to gain knowledge about the causes of a phenomenon.

In this study, the one-group pre-posttest design in which one group has a pre-experimental evaluation followed by an investigation of the influence of the variables under study (Guevara & Lambicio, 2011). This study also involved the repeated measurement of the same individuals at two (2) time points. Further, this design allows a concrete analysis of changes in a measure over time or to assess the effect of an intervention (*Statistics Solution.com*). This design is appropriate for the study since it involves evaluating the relative effective of the use of contextualized learning activity sheet (LAS).

Moreover, the descriptive research design was used by the researcher to define the respondents and other quantifiable information utilized by the statistical inference. According to Zulueta & Costales (2005), descriptive research provides information about variables by assigning numerical values. The respondent-students' profile and their corresponding performance in pre-test and post-test were the basis for evaluating the relative effectiveness of the current learning materials which is the Contextualized LAS used in this study.

Population and Locale of the Study

The respondents were Grade 9 students of Alwindia-Aguso High School Tarlac City. There were five (5) sections with 33 students and (1) section with 35 students with a total of 200 students enrolled in these sections. Based on Krejcie and Morgan's (1970) sample size table, from 200 students, there were 132 students considered for sampling.

III. Results and Discussion

This chapter presents the results, analysis, and interpretation of data relative to the questions raised to determine the effectiveness of contextualized learning activity sheet (L.A.S.) in grade 9 science instruction.

Respondent's Profile

Table 1 below presents the profile of the respondents in terms of age, sex, monthly family incomes, number of siblings, and parents' highest educational attainment.

Respondent's Profile

(n=132)

	Description	f	%
Age	14	41	31.06
	15	59	44.70
	16	25	18.94
	17	5	3.79
	18	2	1.52
Sex	Male	58	43.94
	Female	74	56.06

Monthly Family Income

P5, 000 and below	50	37.88
P5, 001 – P10, 000	58	43.94
P10, 001 – P15, 000	17	12.88
P15, 001 – P20, 000	5	3.79
P20, 001 – P25, 000	0	0.00
P25, 001 and above	2	1.52

Number of Siblings

0	5	3.79
1	17	12.88
2	48	36.36
3	33	25.00
4	10	7.58
5	8	6.06
6	4	3.03
7	5	3.79
8	2	1.52

Mother Highest Educational Attainment

Elementary Undergraduate	1	0.76
Elementary Graduate	18	13.64
High School Undergraduate	6	4.55
High School Graduate	86	65.15
College Undergraduate	5	3.79
College Graduate	12	9.09
Graduate Studies	0	0.00
Vocational	4	3.03

Father Highest Educational Attainment

Elementary Undergraduate	2	1.52
Elementary Graduate	35	26.52
High School Undergraduate	4	3.03
High School Graduate	74	56.06
College Undergraduate	7	5.30
College Graduate	6	4.55
Graduate Studies	0	0.00
Vocational	4	3.03

Table 1 revealed that most of the respondents are 15 years of age or 44.70%, and the least is 18 years old, or 1.52%. The majority of the respondents in terms of sex are female, 74 or 56.06%, compared to the males, 58 or 43.94%. Most of the respondents belong to income bracket P5, 000-P10, 000 or 43.94%, and the least belong to P25, 000 and above with 1.52%.

Moreover, most of the respondents have two (2) siblings, with 48 or 36.36%. Lastly, most parents are high school graduates with 86 or 65.15% (mother) and 74 or 56.06% (father).

The Pre-Test and Post-Test Performance

Table 2 showed the result of Pretest and Post-test results, noting the following indices: highest and lowest score, mean, median, standard deviation, kurtosis, skewness, index of difficulty, and index of reliability.

Table 2

Pre-test and Post-test Performance

LEVEL OF PERFORMANCE	
PRE-TEST	
Highest Score	24
Lowest Score	4
Mean	11.409
Median	10
Standard Deviation	5.233
Skewness	0.749
Kurtosis	-0.374
Index of Difficulty	0.456
Index of Reliability	0.82
POSTTEST	
Highest Score	25
Lowest Score	13
Mean	21.644
Median	23
Standard Deviation	3.007
Skewness	-1.422
Kurtosis	0.948
Index of Difficulty	0.866
Index of Reliability	0.81

According to table number 2, in the 25 item pretest conducted to Grade 9 students on the following topics electronic structure of matter, chemical bonding, the variety of carbon compounds, and mole concept in the second quarter coverage of MELC, the highest score is 24, and the lowest score is only four (4). To further define the meaning of these results, the mean of the scores computed an equivalent value of 11.409. The result suggests that the average score of

the students is below the passing score, which is 15, and that the student's performance is not satisfactory.

On the other hand, after administering the learning activity sheet, the prescribed learning materials, the post-test was conducted and revealed the highest score of 25 and the lowest score of 13. The mean of the post-test scores is 21.644, which is significantly higher than pre-test and suggested a better performance of the students after using the contextualized Learning Activity Sheet (LAS). Based on the study of Dy and Cubillas (2018), by using Contextualized Learning Material, teachers can enhance the level of understanding of the students. Moreover, the contextualization of the content as required by the DepEd makes the competencies relevant, meaningful to all learners.

In the Ingrid Sanchez Tapia, 2020, *International Perspectives on the Contextualization of Science Education*, she mentioned how science learning could be more relevant for students and teachers across diverse ethnic and language backgrounds and socio-economic statuses. This study provides a new practical approach in science education, bringing it closer to the students' lives and accelerating global scientific literacy.

Consequently, to describe how scores spread out the results and how far they deviate from the average or mean, the standard deviation was considered by the statistical tools. The result showed in the pre-test that the Standard Deviation in the set of scores of the students is 5.233 while the Standard Deviation in the post-test is 3.007, which only shows that the pre-test score is more dispersed and consistent.

According to Gawali S. (2021), skewness essentially measures the symmetry of the distribution, while kurtosis determines the heaviness of the distribution tails. In addition, to determine the probability of the arrangement of the variables from the normal distribution, the skewness will be measured by the data gathered. Based on the result of the skewness in the pre-test (0.749), it reveals a positive moderately skewed where the low scores were clustered in the left portion, and the majority of these scores of the students fall below the average score. On the other hand, the skewness of the posttest (-1.422) showed negative highly skewed where the set of scores was clustered to the right portion, and most of these scores are more than or higher than the recorded average score.

Likewise, the kurtosis values will determine whether the data are heavily tailed or light-tailed relative to the normal distribution. According to the results in Table 2, the kurtosis values for pre-test (-0.374) and posttest (0.948) showed that the distribution is both platykurtic, which reveals that the distribution is shorter and spread out. Tails are thinner than the normal distribution, which only appears that data are light-tailed or lack outliers.

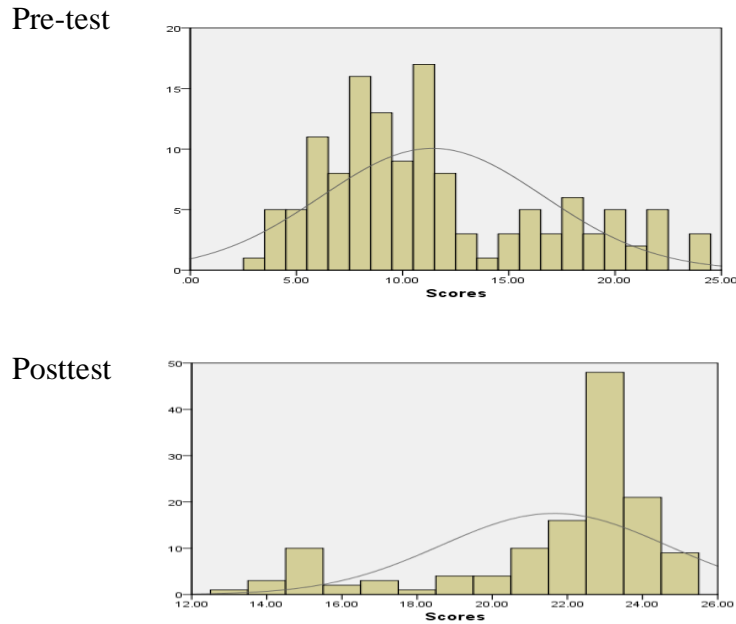


Figure 2. Kurtosis of Pre-test and Post-test

Kurtosis is a measure of the combined sizes of the two tails. It measures the amount of probability in the tails. The value is often compared to the kurtosis of the normal distribution, which is equal to 3. If the kurtosis is greater than 3, then the dataset has heavier tails than a normal distribution (more in the tails). If the kurtosis is less than 3, then the dataset has lighter tails than a normal distribution (less in the tails). We can see in these figures the peakedness of the distribution of pretest and posttest scores. These figures only show that the distributions are flat and spread out as indicated by the black curve lines. If the skewness is between -0.5 & 0.5 , the data are nearly symmetrical. If the skewness is between -1 & -0.5 (negative skewed) or between 0.5 & 1 (positive skewed), the data are slightly skewed. If the skewness is lower than -1 (negative skewed) or greater than 1 (positive skewed), the data are extremely skewed. (Survana Gawali, 2021)

The study of Kim et al. (2012) found the difficulty indices of the multiple-choice questions in pharmacy studies at the remembering, understanding, and applying levels to be higher than the questions at the analysis and synthesis/evaluation levels.

Item difficulty is relevant for determining whether students have learned the concept being tested. It also plays an important role in the ability of an item to discriminate between students who know the tested material and those who do not.

The index of difficulty is based on the number of examinees that answered the items correctly. The higher the value is, the easier is the test item.

To determine the index of difficulty of each item, the formula is as follows:

$$c \div s = p$$

Where:

p = index of difficulty

c = the number of examinees who answered the test items correctly

s = total number of examinees

Legend:

Index of difficulty are categorized as follows:

0-.19 - Very Difficult (VD)

.20-.80 - Moderately Difficult (MD)

.81 - Easy (E)

The computed index of difficulty in the pretest is 0.456 which belongs to the moderately difficult (MD) category. Whereas, the posttest index of difficulty is 0.866 which means, it is under the category of easy (E). It shows that the student's performance after using the contextualized learning activity sheet (LAS) improved and it makes them easier to answer the posttest.

Reliability means that the scores of an instrument are stable and consistent (Creswell, 2005). The indicators that should be observed in the reliability values are Cronbach alpha (α) value, person reliability value, person measure, and valid responses (Azrilah Abdul Aziz, 2010). The consistency responses examined by the Rasch model interpretation on a person and item reliability are explained with Kuder-Richardson (KR-20) and coefficient alpha (Cronbach, 1984) values. This analysis applied KR-20 to determine reliability within the range of 0.00 to 1.00. Reliability values close to 1.00 indicate that the investigated factors can be measured. Fraenkel and Wallen (1996) stated that the reliability item can be accepted if the alpha is .70 to .99, whereas Kubiszyn and Borich (2000) suggested that α value within the .80 to .90 range is acceptable. In social science, the acceptable α value is .60 (Ghazali, 2008), which is also practiced by other researchers. To determine the index of reliability the formula is as follows:

$$r_{KR20} = (k/k-1) (1-\Sigma pq/\sigma^2)$$

Where:

– r_{KR20} is the Kuder-Richardson formula 20

– k is the total number of test items

– Σ indicates to sum

- p is the proportion of the test takers who pass an item
- q is the proportion of test-takers who fail an item
- σ^2 is the variation of the entire test

The computed pretest index of reliability is 0.82 and the index of reliability in the posttest is 0.81. This analysis applied KR-20 within the range of 0.00 to 1.00. Values close to 1.00 stated that the reliability item can be accepted.

Table 3

Significant Difference between Pre-Test and Post-Test Performance

	Mean	Std. Deviation	Std. Error Mean	95% Interval Difference Lower	Confidence of the Upper	t	df	Sig. (2-tailed)
Pre-test	11.409	5.233						
Post-test	21.644	3.006						
Difference	10.235	6.127	0.533	9.180	11.290	19.192	131	0.000

Based on table number 3 as to the significant difference between pre-test and post-test performance, the result showed that the significant value is less than 0.05 level of significance; it revealed the significant difference between the two (2) tests. Further, it also displays that there was strong evidence that the use of LAS led to improvements in scores. With the utilization of LAS, one can be 95% confident that the correct mean increase on scores lies somewhere just under 10 points and just over 11 points which is a relatively substantial increase in scores of students. So the t value is significant.

The contextual learning approach utilized in the learning activity sheets provides opportunities for students to play a vital role in the learning procedure and help these learners develop and find science concepts through science process skills. As mentioned by Anita Ekantini & Insih Wilujeng, 2018 that worksheets effectively increase student literacy. Similarly, the study of Husna M. Syamsurizal and Maison (2015); Yildirim N, Sevil K, and Alipasa A, (2011); R R P Megahati, F Yanti, and D Susanti, (2013) proved that the use of student worksheets is effective to improve student learning outcomes, participation, and mastery.

Table 4

Significant Relationship of the Post-Test across Profile Variable
Correlations

		Age	Sex	Monthly Income	No. of Siblings	Mother Highest Educational Attainment	Father Highest Educational Attainment
PRETEST	Pearson Correlation	-.093	-.250**	.244**	-.003	.275**	.131
	Sig. (2-tailed)	.287	.004	.005	.975	.001	.135
	N	132	132	132	132	132	132

Using Pearson Correlation, at 5% significance level, there is no significant relationship between pretest and age (sig. 0.287); pretest and no. of siblings (sig. 0.975); and pretest and father highest educational attainment (sig. .135). There is a significant relationship between pretest and sex (sig. 0.004); pretest and monthly income (sig. 0.005); and pretest and mother highest educational attainment (sig. 0.001).

Correlations

		Age	Sex	Monthly Income	No. of Siblings	Mother Highest Educational Attainment	Father Highest Educational Attainment
POST-TEST	Pearson Correlation	-.080	-.039	.044	-.116	.060	-.035
	Sig. (2-tailed)	.363	.657	.617	.184	.493	.689
	N	132	132	132	132	132	132

Using Pearson Correlation, at a 5% significance level, there is no significant relationship between post-test and the profile variables.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRETEST	11.409	132	5.233	.456
	POST-TEST	21.644	132	3.007	.262

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 PRETEST POST-TEST	-10.235	6.127	.533	-11.290	-9.180	-19.192	131	.000

$t(131) = -19.192, p < 0.000.$

With a 5% significance level, we reject the null hypothesis. This means that there is a significant difference between Pretest and Post-test scores. From the Paired Samples Statistics table, we see that there is an improvement in the test scores from 11.409 ± 5.233 to 21.64 ± 3.007 .

IV. Conclusion

Based on the findings of the study, the following conclusions were drawn by the researcher.

1. The respondent-students in Grade 9 are typical students whose father and mother are mostly high school graduates.
2. The use of LAS was found to be relatively effective as indicated by the statistical values and indices.
3. The respondent-students significantly improved their performance.
4. The performance of the students improved regardless of their profile variables.

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