Learning Competence of Junior High School Students in Spiral Curriculum in Chemistry in the New Normal

ALVIN LANDINGIN SAPLAN
Public School Teacher at Benigno V. Aldana National High School
Brigada Eskwela School Coordinator in Science Department
alvin.saplan@deped.gov.ph

Abstract — The study determined the Learning Competence of Junior High School Students in Chemistry at Benigno V. Aldana National High School in the municipality of Pozorrubio, Pangasinan. The main gathering instrument used by the researcher in this study is the twenty-five (25) items multiple-choice performance test per grade level in Chemistry. The researcher in each grade level prepared a table of specifications to ensure the equity in the distribution of items on the different topics of Chemistry. A survey questionnaire determined the respondents' profile and attitudes towards learning Chemistry.

The study revealed that there are no relationships between the levels of learning competencies of the respondent-junior high school students and the profile variables such as age, grade level, sex, monthly family income of parents and attitude towards learning chemistry except with the variables Highest Educational Attainment for both fathers and mothers in grade 7 and grade 8; occupation of mothers in grade 8; and Monthly Family Income of Grade 10 students. The null hypothesis which states that there are no significant mean differences in the level of learning competence of the Junior high school students in Chemistry across the profile variables is accepted. This means that the profile variables do not differentiate the levels of learning competences of JHS Students.

Keywords — Learning competence, performance test, Test-item analysis

I. Introduction

Under the Republic Act 1033 or the Enhanced Basic Education 2013, K-12 was introduced in the S.Y. 2012-2013. Science Education is one of the subjects that proceed to many revisions reinforced through a spiral approach that leads to reorganizing the curriculum from simple to complex, focusing the student's understanding of scientific principles and concepts.

This study will determine the mastery of the Junior high school students' learning competencies in Chemistry.

In 21st century learning, people explore experience and understand the world around them in many new and different ways. Learning and education are no exception, with technology providing access to virtually any information at the touch of a screen. With access to all of this information, it would seem that newer generations would be pushing the envelope on intellectually competent. However, students and early-career professionals fall short (Ridwan et al., 2017).

In science, there has been a mismatch in teacher preparation as the Philippines advances toward implementing the K-12 curriculum. Now, a scientific teacher education program prepares instructors to specialize in a particular subject (e.g., integrated science, biology, chemistry, and physics). However, in the K-12 curriculum, they must teach all the sciences in a spiral progression approach. Hence, this study analyzed science teachers' experiences teaching chemistry in the K-12 curriculum to identify their challenges and overcome them. The results indicate that the teacher's chemistry content, pedagogy, and assessment are unsatisfactory. The success of teacher in teaching chemistry depends on factors affecting instruction, teacher ability, in-service training, job satisfaction, upper-management support, laboratory adequacy, school resources, and assessment tools, which has an impact on the ultimate beneficiaries of education: the students (Orbe et al., 2018).

The Philippines' primary education system is affected by two issues: high dropout rates in primary and secondary schools. And learners in Grades IV and VIII lack understanding of specific skills and topics, as seen by poor performance on standardized assessments. Both dropout rates and poor performance in routine exams indicate failure in early education (De Dios 2012).

DEPED has formulated different learning modalities that consider the access and availability of technology and connection for learning. It employs distance learning designed to continue education even if the teachers and students are physically remote through online/offline technologies, tv and radio, and printed modules. Also, blended learning is the combination of any of these modalities, while homeschooling is primarily done at home with a caregiver as a teacher (F.B. Pitagan, 2020)

According to Pitagan (2020), even before the pandemic, the revision of the K-12 Basic Education Curriculum has been ongoing; however, the process has been accelerated, resulting in the identification of 5,689 Most Essential Learning Competencies (MELCs) from a total of 14,171 (a 60% reduction). It is done through retaining, merging, clustering, removing, rephrasing existing competencies to address congestion and overlaps (DEPED MELCS, 2020).

Literature Review

Chemistry is a complicated subject, an observation that sometimes repels learners from continuing with studies in Chemistry. Chemistry teachers have taken college courses above the level they are assigned to teach. Still, they report needing help using technology in science instruction, teaching classes with special needs students, and using inquiry-oriented teaching methods. According to the informed estimate discussed at the meeting, thousands of chemistry teachers in the Philippines. According to the same data source, 99 percent of Chemistry teachers have completed a college course in General Introductory in Chemistry, 93 percent have done so for Organic Chemistry, 68 percent have had Analytical Chemistry, and 51 percent have had Physical Chemistry (Lozares, 2018). However, students' performance affects other factors aside from the teacher factor. The student and environmental factors influenced the students'

performance in science topics such as chemistry. The task for chemistry teachers, students, parents, high school administrators, curriculum developers, and the government is to stimulate enthusiasm and provide an enabling atmosphere for effective teaching of chemistry and the sciences in general (Edomwonyi-Otu & Avaa, 2011). Since the spiraling of science competencies is one of the most trending features in the new science curriculum (Montebon, 2014), this change had a significant impact on the high school chemistry curriculum. For chemistry teaching to be effective, pre-service and in-service chemistry teachers must educate about the discipline they teach structured in knowledge (Erduran et al., 2006).

According to DepEd Secretary Leonor Briones, Filipino students' performance in large-scale assessments tends to be low proficiency levels in the National Achievement Test (NAT) 2019, Particularly in Science, Math, and English.The DepEd administered NAT to the pupils in Grades 6 and students of Grade 10 and 12. Aside from the NAT results, the Department of Education also released the latest results of the Program for International Student Assessment (PISA) of the Organization for Economic Co-operation and Development's (OECD), which showed that Filipino students ranked last out of 79 countries and were near last in Science and Mathematics. (Malipot, 2019).

The key lies in seeing Chemistry from the point of view of the learners. Such learners approach each topic with all kinds of ideas already stored in long-term memory (Lozares, 2018). Learner-centered approaches, such as inquiry-based learning pedagogy–concepts and skills in providing pedagogy that will enable learners to improve their cognitive, emotional, and psychomotor domains–are used throughout the K-12 curriculum (Montebon, 2014). The K-12 scientific curriculum is learner-centered and inquiry-based in general, emphasizing using evidence to create explanations. Spiral development presents concepts and skills in Biology, Physics, Chemistry, and Earth Science with increasing levels of complexity from one grade level to the next, allowing for a deeper comprehension of valuable concepts. (SEAMEO INNOTECH, 2012).du

II. Methodology

This chapter presents the research design and the methods used in the study entitled Learning Competence of Junior High School Students in Spiral Curriculum in Chemistry in the New Normal. It includes the research design, subjects and sampling of schemes, data gathering instruments, data gathering procedures, and statistical data treatment.

Data Gathering Tool

A random sampling technique was used in selecting the respondents of this study since the selected junior high school students in Benigno V. Aldana National High School is equal to 352 involved in this study as respondents using Slovin's formula.

The main gathering instrument used by the researcher in this study is the twenty-five (25) items multiple-choice performance test per grade level in Chemistry. The researcher in each grade level prepared a table of specifications to ensure the equity in the distribution of items on the different topics of Chemistry.

A survey questionnaire determined the respondents' profile and attitude towards learning Chemistry.

Data Gathering Procedure

A letter was sent by the researcher to the Superintendent of Schools Division Office of Pangasinan II requesting permission to conduct a study and distribute questionnaires on the junior high school students enrolled during 2021-2022.

The researcher presented a letter asking permission to the Principal of Benigno V. Aldana National High School to diagnose the learning competence of selected Junior high school students in Chemistry.

The questionnaires were distributed carefully upon the approval of the study. The researcher instructed the respondents to answer the questions honestly to gather accurate and complete data significant to the study.

The questionnaire was administered, tallied, and subjected to statistical treatment.

Treatment of Data

The data gathered were tallied, analyzed, and interpreted according to the specific problems stated in the study utilized the statistical tools to answer the study's particular issues.

To answer Problem No. 1, which focused on the profile of the students concerning their age, grade level, sex, monthly family income of parents, and educational attainment of the parents, frequency counts, weighted mean, and the percentage were used.

$$WM = \frac{\sum fx}{n}$$

$$AWM = \frac{\sum WM}{c}$$

Where: WM = weighted mean of each category
AWM = average weighted mean for each area
f = number of respondents per bracket
n = total number of respondents
x = point value per classification
c = total number of categories

The formula is shown on the next page.

$$P = \frac{f}{n}(100\%)$$

Where: P= Percentage

f= number of respondents per bracket

n= total number of respondents

To answer Problem No. 2, Likert scale was used in the attitude towards learning Chemistry and a 25-item teacher-made performance test, Mean and Standard Deviation, was used.

To answer the specific Problem No. 3, which focuses on mean differences in the level of learning competence of the respondent-Junior High School students across the profile variables, the ANOVA and t-test were used to test the null hypotheses at 0.05 alpha level of significance.

To answer problem No. 4, the Pearson r Coefficient of Correlations was used to determine whether or not there are significant relationships between the levels of learning competencies of the respondent-Junior High School students and the profile variables.

Specific problem No. 5, which calls for a proposed enhancement program for developing the level of learning competence of Junior High School students in Chemistry. The basis of identifying the objectives and activities for enhancing the learning competence of Junior High School students in Chemistry.

III. Results and Discussion

Table 1

SOP 1 Frequency and Percentage Distribution of the Respondent-Students Across the Profile Variables

Variable	Variable Category	Frequency	Percent
1. Age	12-13 years' old	90	26%
	14-15 years' old	162	46%
	16-17 years' old	75	21%
	18-19 years' old	25	7%
3. Sex	Male	126	36%
	Female	226	64%
4. Monthly Family Income	Less than 5,000	106	30%
	5,001 ----- 10,000	93	26%
	10,001 ----- 20,000	73	21%
	20,001 or more	77	22%
Missing	No response	3	1%
5. Highest Educational Attainment Of The Parents (Father)	Elementary graduate	24	7%
	High school graduate	149	42%
	Bachelor's degree	124	35%
	Master's degree/Doctor's degree	33	9%
Missing	No response	22	6%
6. Highest Educational Attainment Of The Parents (Mother)	Elementary graduate	16	5%
	High school graduate	165	47%
	Bachelor's degree	121	34%
	Master's degree/Doctor's degree	39	11%
Missing	No response	11	3%
7. Occupation Of Parents (Father)	Menial	112	32%
	Technical	132	38%
	Professional	72	21%
Missing	No response	36	10%
8. Occupation Of Parents (Mother)	Menial	179	51%
	Technical	18	5%
	Professional	120	34%
	No response	35	10%

SOP 1 Profile of the Respondents

The study was conducted within the Schools Division Office of Pangasinan II, specifically at Benigno V. Aldana National High School.

The Frequency and Percentage Distribution of the Respondents' Profile Variables in terms of age illustrates that most of the student-respondents fall on the age bracket of 14-15 years' old

which is 46% of the population, followed by 90 students in the age bracket of 12-13 years' old which is 26%. So forth, there are 75 students in the age bracket of 16-17 years' old which is 21% of the population and the least falls in the age bracket of 18 to 19 years' old which is 7% in the total population.

On the other hand, the Frequency and Percentage Distribution of the Respondents' Profile Variables in terms of sex presents that majority of the respondents are female, which is 64% of the total number of population compared to male which covers 36% of the total population.

As presented on the table, the Frequency and Percentage Distribution of Students' monthly family income presents that 106 student-respondents have less than 5,000 which is 30%, followed by 93 students have 5,001 - 10,000 monthly family income which is 26%, along with this there are 77 student-respondents have 20,001 or more monthly family income which is 22%. So forth, there are 73 students with 10,00 - 20,000 monthly family income which is 21% and three (3) students did not respond which is 1%.

On the Highest Educational Attainment of Father factor, Table I presented that majority of the respondents' father attained High school graduate which has a percentage of 42% of the total population, along with this, there are 124 students who has a father that obtained Bachelor's degree which is 35%, followed by 33 students whose father attained Master's degree/Doctor's degree which is 9%. So forth, there are 24 student-respondents whose father attained Elementary graduate which is 7% and the 22 students did not respond which is 6%.

On the other hand, the Frequency and Percentage Distribution of the Respondents' Profile Variables in terms of Highest Educational Attainment of Mother shows that majority of the respondents' mother attained High school graduate which has a percentage of 47% of the total population, along with this, there are 121 students who has a mother that obtained Bachelor's degree which is 34%, followed by 39 students whose mother attained Master's degree/Doctor's degree which is 11%. So forth, there are 16 student-respondents whose father attained Elementary graduate which is 5% and the 11 students did not respond which is 3%.

On the other hand, the Frequency and Percentage Distribution of the Respondents' Profile Variables in terms of occupation of Mother of the respondents show that most of the respondents answered that their Mother is a Menial worker which is 51% of the total population that is equivalent to 179 responses. So forth, 120 Mothers of the students are Professionals which is 34%, followed by 35 respondents which did not respond to the question and the least answered that their Mother is a technical worker.

Table 2

Attitude towards learning Chemistry

(Adopted from Querol, 2005)

Course Content Indicator Statement	Weighted Mean	Transmuted Rating
1. Chemistry involves too many terminologies to memorize.	4.15	P
2. Terminologies used in Chemistry are hard to understand.	3.51	P
3. Chemistry is confusing.	3.50	P
4. Many Phenomena used in Chemistry makes it difficult.	3.50	P
5. Spatial scale in Chemistry makes it difficult.	3.42	SP
6. The Chemistry process is difficult to understand.	3.36	SP
7. Performing experiment make Chemistry difficult.	3.16	SP
8. Periodic table of elements is difficult.	3.09	SP
9. Scientific theories, principle, and laws are boring and difficult.	2.86	SP
10. I find Chemistry irrelevant and not useful to everyday life.	2.53	SP
OVER ALL WEIGHTED MEAN (OWM)	3.31	SP

Legend:

WM Score Range	Descriptive Rating	Transmuted Rating
4.50-5.00	Always (A)	Very Positive (VP)
3.50-4.49	Often (O)	Positive (P)
2.50-3.49	Sometimes (S)	Slightly Positive (SP)
1.50-2.49	Seldom (SL)	Negative (N)
1.00-1.49	Never (N)	Very Negative (VN)

It can be gleaned on the table 2 or the so called Attitude towards learning science in Chemistry that the course content number 1 “Chemistry involves too many terminologies to memorize” obtained 4.15 average weighted mean which has a transmuted rating of “Positive”; “Terminologies used in Chemistry are hard to understand” obtained 3.51 average weighted mean which has an “Positive” transmuted rating, while “Chemistry is confusing” and “Many Phenomena used in Chemistry makes it difficult” both obtained 3.50 which have a transmuted rating of “Positive”; “Spatial scale in Chemistry makes it difficult” obtained 3.42 average weighted mean which has a transmuted rating of “Slightly Positive”; “The Chemistry process is difficult to understand” has an average weighted mean of 3.36 which has “Slightly Positive” transmuted rating; “Performing experiment make Chemistry difficult” has an average weighted mean of 3.16 which has “Slightly Positive” transmuted rating; “Periodic table of elements is difficult” obtained weighted mean of 3.09 with a transmuted rating of “Slightly Positive”; “Scientific theories, principle, and laws are boring and difficult” has a weighted mean of 2.86 which has “Slightly Positive” transmuted rating; and “I find Chemistry irrelevant and not useful to everyday life” obtained 2.53 average weighted mean which has a transmuted rating of “Slightly Positive”.

Table 3

SOP 2 Consolidated Test Scores of the Respondent-JHS Students and their Statistical Indices

	Highest Score	**Lowest Score**	**Mean**	**Std. Deviation**	**Skewness (std error)**	**Kurtosis (std error)**
Grade 7	22	4	11.59	3.15	-.229(.257)	.447(.508)
Grade 8	18	5	11.71	3.29	-.069(.257)	-.958(.508)
Grade 9	21	2	8.25	3.82	.815(.257)	.632(.508
Grade 10	20	2	10.97	3.91	-.183(.257)	-.118(.508)

Table 3 presents the consolidated test scores of the Respondent-JHS Students and their statistical indices.

Data from the performance test of Grade 7, Grade 8, and Grade 10 students show a negative value of skewness with a mean of 11.59, 11.71 and 10.97 respectively. This means that most of the Grade 7, Grade 8, and Grade 10 students obtained higher scores in the test.

Further, the value of skewness in Grade 9 students is positively skewed with a mean of 8.25. This means that most of the Grade 9 students obtained scores tending towards the low scores. The Grade 9 students obtained the lowest mean among the other grade levels. This is due to its fact that their test for Grade 9 was rated “Difficult” in the table 12 showing the difficulty level of its test items.

Table 4

SOP 3 Consolidated Mean Differences in the Level of Learning Competence of the JHS Students across the Profile Variables

Variable	Grade 7 F-value / t-value	Grade 8 F-value / t-value	Grade 9 F-value / t-value	Grade 10 F-value / t-value
7. Age	t=1.843ns	t= 1.562ns	t=0.738ns	t=0.425ns
Sig. (2-tailed)	(0.069)	(0.122)	(0.462)	(0.672)
8. Grade Level	***	***	***	***
9. Sex	t=1.016ns	t= -0.518ns	t=-.560ns	t=-1.099ns
Sig. (2-tailed)	(0.313)	(0.606)	(0.577)	0.275
10. Monthly Family Income	F=0.605ns	F=0.545ns	F=0.652ns	F=2.727ns
Sig. (2-tailed)	(0.613)	(0.653)	(0.584)	0.049
11. Highest Educational Attain of Fathers	F=8.058*	F= 3.182*	F=0.193ns	F=1.040ns
Sig. (2-tailed)	(0.00009)	(0.028)	(0.901)	(0.379)
12. Highest Educational Attain. of Mothers	F=5.006*	F= 1.828ns	F=0.815ns	F=1.239ns
Sig. (2-tailed)	(0.003)	(0.149)	(0.489)	(0.301)
13. Occupation of Fathers	F=0.776ns	F= 5.841*	F=0.525ns	F=0.011ns
Sig. (2-tailed)	(0.464)	(0.004)	(0.593)	0.989
14. Occupation of Mothers	F=0.018ns	F= 2.434ns	F=0.194ns	F=0.400ns
Sig. (2-tailed)	(0.982)	(0.094)	(0.824)	(0.672)
15. Attitude Towards Studying Chemistry	F=0.987ns	F= 1.032ns	F=1.081ns	F=0.987ns
Sig. (2-tailed)	(0.521)	(0.475)	(0.416)	(0.523)

*** t cannot be computed because at least one of the groups is empty
*Significant at 0.05 level of significance
ns=not significant

Table 4 presents the mean differences in the level of learning competence of the JHS Students across the profile variables.

All the statistical values, i.e., the t-value and the F-value presented in the table, which are the indicators of mean differences in the levels of learning competences of JHS students in Chemistry, are not significant at 0.05 alpha level of significance in all Grade-levels across the profile variables, with only a few exceptions. This means that the null hypothesis stating, “There are no significant mean differences in the levels of learning competences of JHS students across the profile variables, namely: age, sex, monthly family income, occupation of mothers and attitude towards studying Chemistry,” is accepted.

This means that the levels of learning competences of the respondent-JHS students in Chemistry in all Grade-levels are not differentiated by these variables. Regardless of the age, whether or not male or female, or whatever occupation of their mothers, or their levels of attitudes towards studying Chemistry, the learning competence of these student are similar to each other.

However, among Grade 7 and Grade 8 students, F=8.058* sig. at 0.00009 and F=3.182* sig.at 0.028 respectively across the variable, "highest educational attainment of the fathers," are significant at the alpha level of 0.05, which indicate that the null hypothesis on these variables, is rejected. This means that the variable, "highest educational attainment of fathers," is a factor that differentiates the levels of learning competence of the respondent-JHS students, specifically among Grade 7 and Grade 8 students. However, this is not true with the Grade 9 and Grade 10 students.

In addition, the mean differences in the levels of learning competence of Grade 7 students are significantly across the variable, "highest educational attainment of mothers." This means that the learning competences of Grade 7 students vary from each other when they are grouped by the highest educational attainment of their mothers. However, this is not the case with the Grade 8, Grade 9, and Grade 10 students.

Therefore, the null hypothesis stating, "There are no significant differences in the levels of learning competences of Grade 7 students in Chemistry across the variable, "highest educational attainment of mothers," is rejected. This means that the differences of the levels of learning competences of Grade 7 students with respect to this variable are actually real.

Further, the mean differences in the levels of learning competences of Grade 8 students across the variable, "occupations of fathers" is significant at the 0.05 alpha level. This means that the null hypothesis stating, "There are no mean differences in the learning competence of Grade 8 students with respect to this variable is rejected. These differences are actually real. However, this is not the case with the Grade 7, Grade 9, and Grade 10 students.

As cited by Momanyi et al., 2015 on their study on Effect of Students' Age on Academic Motivation and Academic Performance among High School Students in Kenya, found that There is no significant effect of age in the student's academic performance.

Since the spiraling of science competencies is one of the most trending features in the new science curriculum (Montebon, 2014), this change had a significant impact on the high school chemistry curriculum. For chemistry teaching to be effective, pre-service and in-service chemistry teachers must educate about the discipline they teach structured in knowledge (Erduran et al., 2006). However, students' performance affects other factors aside from the teacher factor. The student and environmental factors influenced the students' performance in science topics such as chemistry. The task for chemistry teachers, students, parents, high school administrators, curriculum developers, and the government is to stimulate enthusiasm and provide an enabling atmosphere for effective teaching of chemistry and the sciences in general (Edomwonyi-Otu & Avaa, 2011).

Table 5

SOP 4 Consolidated Relationships Between the Levels of Learning Competencies of the Respondent-Junior High School Students and the Profile Variables

Variables	Coefficient of Correlation	Grade 7	Grade 8	Grade 9	Grade 10
Age	r-value	-0.195ns	-.166ns	-0.079ns	-0.046ns
	Sig. (2-tailed)	0.069	0.122	0.462	0.672
Sex	r-value	-0.109 ns	.056ns	0.060ns	0.118ns
	Sig. (2-tailed)	0.313	0.606	0.577	0.275
Monthly Family Income	r-value	0.138 ns	.072ns	-0.087ns	0.218s
	Sig. (2-tailed)	0.204	0.505	0.425	0.042
Highest Educl Attain. of Fathers	r-value	0.291s	0.252s	0.061ns	-0.033ns
	Sig. (2-tailed)	0.009	0.021	0.585	0.766
Highest Educl Attain. of Mothers	r-value	0.350s	0.224s	0.033ns	0.133ns
	Sig. (2-tailed)	0.001	0.039	0.765	0.221
Occupation of Fathers	r-value	0.054 ns	0.150ns	0.078ns	-0.017ns
	Sig. (2-tailed)	0.641	0.182	0.492	0.882
Occupation of Mothers	r-value	0.017ns	0.222s	0.068ns	0.004ns
	Sig. (2-tailed)	0.877	0.047	0.550	0.970
Attitude Towards Studying Chemistry	r-value	-0.278ns	-0.040ns	-0.171ns	-0.071ns
	Sig. (2-tailed)	0.009	0.715	0.111	0.514

*=Significant at 0.05 alpha level of significance.

ns=Not significant at 0.05 alpha level of significance.

Table 5 presents the relationship between the level of learning competencies of the JHS students and their profile variables. Pearson r Coefficient of Correlations is used to indicate the relationships.

The r-values, shown on Table 5, indicating the relationships between the levels of learning competences of the respondent-JHS students in Chemistry are not significant at the alpha level of significance. This is true among the JHS students across the year-level, Grade 7, Grade 8, Grade 9, and Grade 10. Therefore, the null hypothesis stating, "There are significant relationships between the levels of learning competences of the JHS students and the profile variables, namely: age, sex, monthly family income, highest educational attainment of the attitudes towards studying Chemistry, the learning competence of these student are similar to each other.

However, among Grade 7 and Grade 8 students, F=8.058* sig. at 0.00009 and F=3.182* sig.at 0.028 respectively across the variable, "highest educational attainment of the fathers," are significant at the alpha level of 0.05, which indicate that the null hypothesis on these variables, is

rejected. This means that the variable, "highest educational attainment of fathers," is a factor that differentiates the levels of learning competence of the respondent-JHS students, specifically among Grade 7 and Grade 8 students. However, this is not true with the Grade 9 and Grade 10 students.

In addition, the mean differences in the levels of learning competence of Grade 7 students are significantly across the variable, "highest educational attainment of mothers." This means that the learning competences of Grade 7 students vary from each other when they are grouped by the highest educational attainment of their mothers. However, this is not the case with the Grade 8, Grade 9, and Grade 10 students.

Therefore, the null hypothesis stating, "There are no significant differences in the levels of learning competences of Grade 7 students in Chemistry across the variable, "highest educational attainment of mothers," is rejected. This means that the differences of the levels of learning competences of Grade 7 students with respect to this variable are actually real.

Further, the mean differences in the levels of learning competences of Grade 8 students across the variable, "occupations of fathers" is significant at the 0.05 alpha level. This means that the null hypothesis stating, "There are no mean differences in the learning competence of Grade 8 students with respect to this variable is rejected. These differences are actually real. However, this is not the case with the Grade 7, Grade 9, and Grade 10 students.

As cited by Momanyi et al., 2015 on their study on Effect of Students' Age on Academic Motivation and Academic Performance among High School Students in Kenya, found that There is no significant effect of age in the student's academic performance.

Since the spiraling of science competencies is one of the most trending features in the new science curriculum (Montebon, 2014), this change had a significant impact on the high school chemistry curriculum. For chemistry teaching to be effective, pre-service and in-service chemistry teachers must educate about the discipline they teach structured in knowledge (Erduran et al., 2006). However, students' performance affects other factors aside from the teacher factor. The student and environmental factors influenced the students' performance in science topics such as chemistry. The task for chemistry teachers, students, parents, high school administrators, curriculum developers, and the government is to stimulate enthusiasm and provide an enabling atmosphere for effective teaching of chemistry and the sciences in general (Edomwonyi-Otu & Avaa, 2011).

IV. Conclusion

The learning competence of the Junior High School Student as reflected in their attitude towards learning chemistry, learning practices in taking notes and doing assignments is not found to be correlated with their academic performance. However, certain profile variables, like highest educational attainment and occupation of parents are sources of variation and are correlated with

their academic performance. The academic performance as reflected in the test scores tended to group toward the higher scores as shown in the negative skewness and kurtosis that is positive.

The Chemistry learning materials which followed the spiral curriculum where in accordance to the MELCs and the academic performance of each year level was generally good; this occurred despite the pandemic conditions when the learning was mostly through the modular approach.

V. Recommendations

Based on the salient findings and conclusion, it is highly recommended that the spiral curriculum in chemistry for grade 7, 8, 9, and 10 should be implemented with some modifications specifically, the topics introducing the Quantum Mechanics model.

SOP 5 Proposed Enhancement Program in Learning Chemistry in the New Normal

This proposal is designed to enhance the learning abilities of the Junior High School students in Chemistry and can be implemented in one school year. The proposal is divided into 6 areas such as Collaborative Learning Strategies, this can be done through establishing LAC sessions, attending webinars, online learning, and minimal one-on-one teaching. Second, Critical Inventive Strategies, in this area, the students will be introduced to research programs. The teacher also makes a Self-learning module to enrich to students critical thinking skills. Third, Personalized Instruction Strategy, the teacher makes a various interactive video lessons in the different topics in chemistry to develop the learning skills of the students. The fourth area is Creative Project Learning Activity, in this area, the students can make an experiment in their science research by using Science Laboratory Apparatus that will develops their Science processing Skills. Fifth, Multimedia Driven Strategies, the school will be granted laptops, tablets, computers with the access to internet that will help the students gather information on their research.

All students are required to participate during online webinars, must answer self-learning modules by watching video lessons, and make group science research by using internet access and science laboratory apparatus. This program will give them an opportunity to interact with their school mates and learn together. In conducting research, the program will also provide adviser for each group to monitor the progress of the students.

SOP 5 Proposed Enhancement Program in Learning Chemistry in the New Normal

Key Concerns	Objectives	Strategies	Persons Involved	Time Frame	Budget	Expected Outcome
A. Collaborative Learning Strategies	1. To make plans in school to enhance and enrich collaborative learning Strategy. 2. To organize LAC (Learning Action Cell) Sessions in School.	- E-learning or online learning - attend webinars and workshops - use networking access to information - establish support system through one-on-one coaching	Students, Teachers, Head Teachers.	July to December	Php. 20,000	60 percent of the students enhance and enrich this strategy through E-learning.
B. Critical and Inventive Strategies	1. To come up with students' learning development policies and mechanics along this strategies 2. To develop skills of students through various conduct of researches to raise teaching in Chemistry	- Conceptualized and implement students development program design suited for this area of teaching and learning strategy - Making Science Investigatory Projects - Writing Self-learning Modules and making teachers guide and manuals focused on critical thinking	Students School Heads, Teachers, Supervisors, Division Officials Students Teachers, Researchers, School Heads, Division Officials	1st quarter Year Round	Php. 20,000 Php. 50,000	A development plan is designed suited for various area of teaching and learning strategies. At least 5 researches were made per grade level
C. Personalized Instruction Strategy	1. To develop students to watch online video lessons focus on the new normal learning.	- Watching online video lessons to keep oneself informed about new trends on personalized instruction in teaching and learning	Students, Sponsors, Teachers, Trainers, School Heads	July to January	Php. 50,000	All students attend online trainings/ webinars
D. Creative Project Learning Activity	1. To enrich students' competencies, skills and techniques	- Granting instructional materials in Chemistry to developed competencies, skills and techniques - Seek assistance for funding LGU, NGO and other government	Students, Teachers, Sponsors, LGUs, NGOs, Special Education Fund	July to March	Php. 500,000	1 laboratory facility funded with complete instructional materials in Chemistry.
E. Multimedia Driven Strategy	1. To acquire various multimedia devices and instructional materials to enhance teaching and learning	- Purchase of laptops, projector, internet, etc. - Solicitations, donations - Seek assistance from other agencies	Students, School Heads, Teachers, Donors, Civic Spirited, Alumni, Sponsors, DepEd	Year round	Php. 500,000	All schools must be provided with electronic media, gadgets.

Figure 2: Proposed Enhancement

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AUTHOR'S PROFILE

ALVIN L. SAPLAN

The author was born on January 20, 1995, at Pozorrubio, Pangasinan. He finished his Bachelor of Secondary Education: General Science at Urdaneta City University – Urdaneta City, Pangasinan. He is currently a Teacher I in Department of Education and he was assigned at Benigno V. Aldana National High School, Pozorrubio, Pangasinan, Philippines. He is teaching Grade 7, Science. His previous work background was a Substitute teacher in DepEd Pangasinan II Division.