SPIRAL PROGRESSION APPROACH IN TEACHING JUNIOR HIGH SCHOOL MATHEMATICS

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ABSTRACT

This study determined the influence of the spiral progression approach in teaching junior high school mathematics. The study utilized a descriptive method of research with test and research-made questionnaire as the main data gathering instrument. Frequency distribution, mean, standard deviation, weighted mean, composite mean and Pearson r were utilized as statistical tools to treat gathered data. Findings showed that students have low performance in Mathematics in the National Achievement Test (NAT) and were only in the Beginning level of achievement when it comes to their critical thinking and problem solving in the five areas in Mathematics namely Numbers and Number Sense, Measurement, Patterns in Algebra, Geometry and Probability and Statistics. Moreover, there was no significant relationship between the performance of students in Mathematics on NAT and their level of understanding in critical and problem solving skill in the five areas in Mathematics. Results also revealed that teachers had encountered problems in using spiral progression approach in teaching Mathematics.

Keywords: Spiral progression approach, mathematical achievement, critical thinking, problem solving, National Achievement Test (NAT)

INTRODUCTION

Mathematics is one of the significant tools for survival in this modern world. It is not a hyperbole to say that proficiency in mathematics is a must for every person to be a productive member of the community. As Orale et al. (2018) pointed out, mathematics and science education are regularly thought to be the essential variables for long-term monetary and mechanical advancements of countries. Twenty-first century teaching and learning are viewed as a means of developing individuals who are prepared for the challenges of everyday living at home, in the community and the larger global society and as an investment for nation-building or economic development of a country by providing manpower equipped with the necessary skills and knowledge. Different countries have long recognized the importance of producing not just mathematically and scientifically literate but also proficient students who will in turn be the key persons in improving the country's economy. Nurturing excellence in mathematics among students is crucial for a country's development as they will be vanguard of a competitive, knowledge-based global economy. Members of the Organization for Economic Cooperation and Development (OECD) invest highly in mathematics education, spending over 100 billion US dollars each year. While this is a major investment, they believe that the returns are many times larger. In a recent survey conducted by OECD, they discovered that establishment aptitudes in mathematics majorly affect a person's life possibilities. The survey indicated that individuals with helpless mathematics aptitudes have fewer chances to have better – paying and all the more remunerative positions. With this, it very well may be said that the imbalance in the dispersion of mathematics

aptitudes across populaces is firmly connected with how riches are shared inside countries. Furthermore, the study indicated that numerically talented individuals are likewise bound to chip in, to participate in political cycles and to confide in others. Consequently, reasonableness, respectability, and comprehensiveness in open approach are additionally firmly connected with the abilities of individuals (Van del Wart, 2016).

Being a developing country that dreams of becoming “economic tiger” in Asia, it is noteworthy to look into the mathematical proficiency of students in the Philippines. In the 2003 Trends in International Mathematics and Science Study (TIMSS), the second year of secondary school learners from the Philippines positioned fifth from the base in Math. In addition, TIMSS progressed 2008 outcomes demonstrated that all in all, Philippines performed least among 10 taking an interest nation in mathematics generally speaking and just as in explicit substance territories and psychological spaces as far as normal scale score and percent right reactions. Contrasting the scale scores of the students with the benchmark levels, just a single percent of the Filipino students arrived at the serious level (Cullinane, 2013).

Such dismal performance of the Philippines has been accounted to several reasons. The most notable of which is the overloaded curriculum because of the 10-year basic education program wherein topics and skills covered 12 years in other countries are compressed in ten years only. Other reasons cited are the shortage of qualified math teachers and the teacher-centeredness of the math classroom. This dreary performance in math has led President Aquino to include in his blueprint for education the strengthening of mathematics curriculum and building a culture for math through math club movements and math fairs.

Recognizing the importance of developing Filipino learners who are mathematically proficient and globally competitive, the Philippine government has ventured into a reform program for basic education. The Enhanced Basic Education Program launched in 2011 features a mandatory kindergarten and 12 years of basic education.

The new mathematics educational plan guarantees congruity of gaining from Kindergarten to Grade 10. In addition, movement of subjects at the auxiliary level is spiral, instead of the order-based arithmetic in the old educational program. There are five content areas in the arithmetic educational program namely, Numbers and Number Sense, Measurement, Patterns and Algebra, Geometry and Statistics and Probability (Capate, 2015). To accomplish capability in mathematics, a striking element in the K-12 Educational plan is the utilization of spiral progression approach to guarantee coordinated and consistent learning in science. As indicated by SEAMEO INNOTECH's K-12 Toolbox, the new educational plan guarantees smooth change between grade levels and a continuum of capabilities through winding movement where learning of information, aptitudes, qualities, and mentalities increment inside and out and broadness, guaranteeing coordinated and consistent learning.

Recognizing the importance of quality mathematics education in building a strong and prosperous nation, it is important to look into the mathematical proficiency of the batches under the K-12 Basic Education Program in which mathematics is taught using the Spiral Progression Approach. Results of TIMSS 2003 Advanced 2008 revealed that the mathematics proficiency of Filipinos was not at par with international standards. It is worth noting that such data was taken when the spiral approach has not yet been adapted in the Mathematics program in the Philippines.

This study sought to determine the influence of spiral progression approach in teaching secondary high school Mathematics. Also, this wanted to identify the problems met in the utilization of this approach. Studying this teaching approach will be beneficial for educators in dealing with complexities in the field and in coping with the global changes in education.

OBJECTIVES OF THE STUDY

This study is conducted to determine the influence of spiral progression approach in teaching junior high school Mathematics.

In particular, it aimed to:

1. determine the performance of Grade 9 students in Mathematics based on the National Achievement Test (NAT).
2. assess the students' level of achievement in critical thinking and problem solving along the following areas:
    - 2.1 Number and Number Sense;
    - 2.2 Measurement;
    - 2.3 Patterns and Algebra;
    - 2.4 Geometry; and
    - 2.5 Probability and Statistics.
3. ascertain the significant relationship between the Mathematics performance in NAT and level of achievement in critical thinking and problem solving.
4. identify the problems met upon the utilization of spiral progression approach in teaching Mathematics.

METHODOLOGY

The study made use of the descriptive method of research to discover the influence of the spiral progression approach in teaching junior high school Mathematics using the process of description, analysis, interpretation and recording of data. The participating respondents of the study were Grade 9 students and Grades 7 and 8 Mathematics teachers who were teaching for at least six years in the public junior high schools of Area 1, Division of Batangas. The total number of Grade 9 students and Grades 7 and 8 Mathematics teachers gathered from the Division Office of Batangas Province were 9873 and 131, respectively. Using the Raosoft sampling with five percent margin of error, the researcher arrived at 370 student respondents and 98 teacher respondents as the sample population. The respondents were stratified among the schools of Area 1.

The researchers gathered information from websites, books and research studies in the field of education and in mathematics in designing the questionnaire and researcher-made test. The test and questionnaire underwent the process of construction, validation, administration, and scoring. The researchers went to the Division of Batangas Province, Provincial Sports Complex and asked permission from the SDS to allow them to conduct survey in the select public junior high schools. They went to the chosen schools and asked the permission of the principal for the administration of the test and the survey questionnaire. They administered the questionnaires to the select student and teacher-respondents and at the same time, provided the respondents with specific explanations to clear each topic and guide them to answer each item with full coherence and accuracy. On the same day of administering the questionnaire, all the copies were retrieved. Documentary analysis was also done to describe the students' performance in Mathematics in the NAT as part of the study's objective. The researchers requested the guidance counselors of the respondents to provide a copy of the NAT results in Mathematics for documentary analysis. The results were obtained from 2017 National Achievement Test Certificate of Rating, which is the students' permanent school record. The teachers willingly granted the request of the researchers upon the assurance of the confidentiality of the information. Frequency distribution, mean, standard deviation, Pearson r, weighted mean and composite mean were utilized as statistical tools to treat gathered data.

RESULTS AND DISCUSSION

This section contains the analysis and interpretation of data regarding the influence of spiral progression approach in teaching junior high school mathematics.

1. Performance of Grade 9 Students in Mathematics based on the NAT

The result of NAT in Mathematics was gathered through the cooperation of all the guidance counselors of the schools where the study was conducted. NAT result was divided into three progressive indicators per subject area, problem solving, information literacy and critical thinking. The illustration of the students' performance in Mathematics was shown in the table below. It was assessed through the result of NAT-MPS from the Bureau of Education Assessment (BEA) Philippines.

Table 1
National Achievement Test Results in Mathematics

Progressive Indicator	Mean Percentage Score	Standard Deviation	Proficiency Level
Problem Solving	34.27	20.70	Low Proficient
Information Literacy	31.30	18.62	Low Proficient
Critical Thinking	35.79	20.67	Low Proficient
Average of MPS	**33.79**	**14.59**	Low Proficient

Results from Table 1 reveal that the students had low performance in Mathematics in the NAT. This was attested by a mean percentage of 33.79. A closer look on the table shows that learners have low proficiency in problem solving, information literacy and critical thinking with mean percentage scores of 34.27, 31.30 and 35.79 and standard deviations of 20.70, 18.62 and 20.67, respectively. Based on the results gathered, it can be gleaned that the use of spiral progression approach creates a negative impact on the state of Philippine Mathematics education particularly on students' performance in Mathematics. The factors that possibly have created this impact were the readiness of the school, the teachers, the students and the resources that sustained the curriculum.

`According to Dagaraga (2013), the K to 12 program worsened the performance of public high school students in the NAT because of the teachers who lacked the skills to handle subjects required in the additional two years of schooling. Teachers can teach basic skills and basic subjects but find it difficult with regard to Algebra, Trigonometry, and Pre-Calculus. Aside from that, according to the teachers interviewed on television, teachers were not yet prepared.
Furthermore, despite the fact that the student-respondents' performance in Mathematics and the National MPS fell under the same interpretation, there was still a big difference on their MPS and standard deviation. From this, it could be taken that spiral progression approach caused a big influence on Batangueño students' performance in Mathematics. Its implementation created a bad impact on institutional performance profile of the said area.

Rapid shift in curriculum and approach had affected students' performance. Adjustments to the 2010 Secondary Education Curriculum (SEC) were still on the process when the curriculum then shifted to K to 12 that uses spiral approach. However, learning resources, student's readiness, teacher's expertise and facilities for required activities were important things to consider before introducing a new approach to education. NAT 2017 is a standardized test used to measure the effectiveness of the new K to 12 curriculum. It was intended to decide the students' scholastic levels, qualities, and shortcomings. The information learned during the time was isolated into five classes: English, Filipino, Mathematics, Science, and Araling Panlipunan and were tried for what the students know. A few decades prior, the Philippines was one of the pioneers in training yet it was at the base of the rundown at present. With this, one of the creation undertakings of EFA 2015 is to build the level and nature of exertion in educational program improvement and guidance.

The above sign relates to the possibility of Samala (2017) in her investigation about the elements influencing NAT execution of secondary schools in the Division of Bulacan where he expressed that review propensities have a positive connection with NAT execution in science. By and large subjects, there are four

factors that influence the NAT result. The components included inspirational acts of the family, the utilization of innovation, media, and study propensities. Of the four variables, inspirational acts of the family had a negative relationship with the students' scholarly exhibition.

2. Students' Achievement in Critical Thinking and Problem-Solving Test

2.1 Level of Achievement in Critical Thinking and Problem Solving in Number and Number Sense

Table 2
Level of achievement in critical thinking and problem solving in number and number sense

Level of Achievement	Frequency	Percentage
Beginning i(74.99% iand ibelow)	353	95
Developing i(75.00% i- i79.99%)	0	0
Approaching iProficiency i(80.00% i- i84.99%)	10	3
Proficient i(85.00% i- i89.99%)	3	1
Advanced i(90.00% iand iabove)	4	1
Total	**370**	**100**
Mean Percentage Score	**49.8**	
Standard Deviation	**17.44**	
Verbal Interpretation	**Beginning**	

As can be seen in Table 2, out of 370 respondents, majority of the students were at the beginning level of achievement in critical thinking and problem solving in Number and Number Sense with 353 or 95 percent. This was followed by the 10 students or three percent, who were in the approaching proficiency level of achievement. Next were four students or one percent who were in the advanced level of achievement and three students or one percent who were in the proficient level of achievement. On the other hand, there were students who were in the developing stage.

Taking into considerations the mean score, it can be gleaned from the table that students were only in the beginning level of achievement based on the mean percentage score of 49.8. The standard deviation of 17.44 implies that there was a big discrepancy between the score distribution from the mean. Therefore, students' individual mathematics achievement in Number and Number Sense really varies; a student may have mastered the coverage of the different content areas while some others did not.

The above outcomes indicate that students faced struggles in coping with the ideas of numbers, operations, estimation, properties, and their applications. Result of interview conducted by the researcher showed that the common scenario in mathematics education nowadays was the inability of high school students to master the basic operations on integers. This problem is dreary since these are the fundamental skills which students need to master before dealing with the more complicated ones.

2.2 Level of Achievement in Critical Thinking and Problem Solving in Measurement

Table 3
Level of achievement in critical thinking and problem solving in measurement

Level of Achievement	Frequency	Percentage
Beginning i(74.99% iand ibelow)	259	70
Developing i(75.00% i- i79.99%)	0	0
Approaching I Proficiency i(80.00% i- i84.99%)	72	19
Proficient i(85.00% i- i89.99%)	0	0
Advanced i(90.00% iand iabove)	39	11
Total	**370**	**100**
Mean Percentage Score	**56.05**	
Standard Deviation	**25.48**	
Verbal Interpretation	**Beginning**	

As can be gleaned in Table 3, there were 259 students or 70 percent who were in the beginning level of achievement in critical thinking and problem solving in Measurement. This was followed by 72 students or 19 percent who were in advance proficiency level. Next were 39 students or 11 percent who were in the advanced level. On the other hand, there were no students who were in the developing and proficient levels of achievement. A closer look on the table reveals that students were in the beginning level of achievement in critical thinking and problem-solving skills in Measurement attested by a mean percentage score of 56.05. Also, the standard deviation of 25.48 denotes that there was a big difference between the score distribution from the mean. Therefore, students' individual mathematics achievement in Measurement really differs. It can be inferred from these results that some students may have mastered the coverage of the different content areas while some others have not.

The above outcomes imply that students had low level of critical thinking and problem solving skills in Measurement. They were toward the beginning level of understanding the utilization of numbers and measures to depict, comprehend, and look at numerical and solid items. Likewise, they have a low level of authority among themes, for example, length, mass and weight, limit, time, cash, and temperature, just as applications including edge, region, surface region, volume, and edge measure. These were upheld by the idea of Ulep (2013) which expressed that estimation is troublesome in light of the fact that it includes three abilities in particular, distinguishing what is to be estimated, picking a unit of measure, and deciding the quantity of unit. These three brought misperception among coming about to low degree of comprehension in the estimation-related ideas.

2.3 Level of Achievement in Critical Thinking and Problem Solving in Patterns in Algebra

As shown by Table 4, 337 students or 91 percent were in the beginning level of achievement. This was followed by the 22 students or six percent who were in the approaching proficiency level.

Table 4
Level of achievement in critical thinking and problem solving in patterns in algebra

Level of Achievement	Frequency	Percentage
Beginning i(74.99% iand ibelow)	337	91
Developing i(75.00% i-i79.99%)	0	0
Approaching iProficiency i(80.00% i- i84.99%)	22	6
Proficient i(85.00% i-i89.99%)	0	0
Advanced i(90.00% iand iabove)	11	3
Total	**370**	**100**
Mean Percentage Score	**44.84**	
Standard Deviation	**20.8**	
Verbal Interpretation	**Beginning**	

Next were 11 students or three percent who were in the advanced level. Lastly, there were no students who were in the developing and proficient levels of achievement. On the other hand, a closer look on the table shows that the mean percentage score of 44.84 implies that the student respondents were in the beginning level of achievement in critical thinking and problem solving in Patterns in Algebra. A standard deviation of 20.8 also reveals that there was a big discrepancy between the score distribution from the mean.

The results indicate that students encountered difficulties in studying pattern examples, connections, and changes among shapes and amounts, the utilization of arithmetical documentations and images, conditions, and above all, capacities, to speak to and break down connections. This was aligned with the dismal finding in the study of Orale et al. (2018) which stated that most of the high school students demonstrated minimal skills in Algebra particularly in interpreting problems, formulating successful strategies, understanding linear systems or building rules to represent functions. Students showed lack of skills in generalizing even linear relationships. Hence, students did not attain mastery in algebra, contrary to the

expected outcome of using the spiral progression approach.

2.4 Level of Achievement in Critical Thinking and Problem Solving in Geometry

Table 5
Level of achievement in critical thinking and problem solving in geometry

Level of Achievement	Frequency	Percentage
Beginning i(74.99% iand ibelow)	367	99
Developing i(75.00% i-i79.99%)	0	0
Approaching iProficiency i(80.00% i- i84.99%)	3	1
Proficient i(85.00% i- i89.99%)	0	0
Advanced i(90.00% iand iabove)	0	0
Total	**370**	**100**
Mean Percentage Score	**40.67**	
Standard Deviation	**15.36**	
Verbal Interpretation	**Beginning**	

It can be deduced from Table 5 that the 99 percent of the student-respondents were in the beginning level of achievement in critical thinking and problem solving in Geometry. Only three students or 1 percent were in the approaching proficiency level and there were no students who were in the developing, proficient and advanced levels of achievement.

A mean percentage score of 40.67 denotes that students were having hard times in dealing with the properties of two-and three-dimensional figures and their connections, spatial perception, thinking, and mathematical demonstrating and confirmations. These discoveries corresponded with the end made by Ulep (2013) in his investigation which said that trouble in educating and learning Math has brought about mass disappointment in assessments among. He expressed that for the most part experienced challenges around there and performed ineffectively in auxiliary school science exercises. Likewise, he called attention to that numerous neglected to get a handle on key ideas in calculation and leave arithmetic classes without learning the essential wording. His investigation likewise gave few factors that make learning calculation ideas troublesome which incorporate educators' technique for guidance, mathematical language, envisioning capacities and lacking school educational program.

2.5 Level of Achievement in Critical Thinking and Problem Solving in Probability and Statistics

Table 6
Level of achievement in critical thinking and problem solving in probability and statistics

Level of Achievement	Frequency	Percentage
Beginning i(74.99% iand ibelow)	369	100
Developing i(75.00% i-i79.99%)	0	0
Approaching I Proficiency i(80.00% i-i84.99%)	0	0
Proficient i(85.00% i-i89.99%)	1	0
Advanced i(90.00% iand iabove)	0	0
Total	**370**	**100**
Mean Percentage Score	**39.87**	
Standard Deviation	**14.75**	
Verbal Interpretation	**Beginning**	

It can be gleaned from the above table that majority of the student-respondents were in the beginning level of achievement in critical thinking and problem solving in Probability and Statistics. There was only one student who was in the proficient level. The mean percentage score of 39.87 reveals that among the five content areas, Probability and Statistics was the toughest one.

The above result infers that students are battling in gathering and arranging information utilizing diagrams, tables, and charts, understanding, investigating and deciphering information, managing vulnerability and making expectations about results. Based on an interview conducted by the researcher, students considered Probability and Statistics as a tough area in mathematics because topics relative to this area were new to them and being exposed to these brought them confusions. Also, the interview revealed that problems and exercises

in this content area require full attention that every single detail in the computation part must be given much focus and carefulness.

3. Significant Relationship between the Mathematics Performance in NAT and Students' Achievement in Critical Thinking and Problem Solving

Table 7
Significant Relationship between the Mathematics Performance in NAT and Students' Achievement in Critical Thinking and Problem Solving

Variables		r -value	p - value	Decision on H_o	Interpretation
Students' Achievement in Critical Thinking and Problem Solving					
Mathematics Performance on the National Achievement Test	Number and Number Sense	0.011	0.415	Failed to reject	Not Significant
	Measurement	0.017	0.374	Failed to reject	Not Significant
	Patterns and Algebra	0.001	0.494	Failed to reject	Not Significant
	Geometry	0.040	0.221	Failed to reject	Not Significant
	Statistics and Probability	0.074	0.077	Failed to reject	Not Significant

It can be gathered from the table over that the computed correlation values of 0.011, 0.017, 0.001, 0.040 and 0.074 respected p-values of 0.415, 0.374, 0.494, 0.221 and 0.077, individually were more prominent than the level of significance of 0.05. This demonstrates the that the null hypothesis of no significance has neglected to be rejected. Accordingly, there was no significant relationship between the performance of grade 9 students in Mathematics on the National Achievement Test and their level of understanding in critical and problem-solving skill in the different content areas in Mathematics such as Number and Number Sense, Measurement, Patterns in Algebra, Geometry, and Statistics and Probability.

Superfluity of the two tests might be brought about by various elements. These incorporate the ones who made the test, the inclusion of the test, the degree of trouble, the students' learning capacity and level of readiness, when both tests were led and the contrast between them as to its motivation. These confer to the thoughts of Coloma (2017) that the NAT is a Philippine-made government sanctioned test intended to decide students' accomplishment level, qualities, and shortcomings towards the end of the school year and to decide the pace of progress in essential training regarding singular school inside certain 0time periods. Then again, the researcher-made test is considered as summative evaluation built to survey the individual accomplishment of the in the class. This is regularly arranged and regulated for testing homeroom accomplishment of assessing the technique embraced by the instructor and other curricular projects of the school. To include, the nature of the analyst made test shifted and, in this way, had no deliberate and generally checking method. NAT, then again, is made to remember all the standards and guidelines considered under managed specialists and test-production gatherings or association. On the other hand, the study of Imam et al. (2013) which focused on the correlation of mathematics performance and Notre Dame Educational Association (NDEA) Achievement Test contradicted the results of the present study. In his study, he found out that there was a positive correlation between the two variables.

4. Problems Met in the Utilization of Spiral Progression Approach in Teaching Junior High School Mathematics

Findings on the problems met in using spiral progression approach as perceived by teacher-respondents stated that the rapid transition between concepts and failure to provide solid foundation for many topics were covered but not briefly, which gained a weighted mean of 3.12 and were assessed as agree. This indicates that in spiral progression approach, all ideas were dispensed a similar measure of time whether they were simple or hard to ace. In this way, it doesn't reinforce maintenance and dominance of themes and abilities regardless of whether they were returned to and merged on the grounds that the past ideas may not be seen again until they were secured the next year.

The above finding was upheld by the possibility of Tomson (2020) which expressed that the issue with the plan of spiral approach is the pace of presenting new themes or ideas. It is either excessively quick or excessively moderate. Beside that the ideas were distributed with a similar measure of time whether it was anything but difficult to ace or not. It was hard to guarantee that the understudies secured essential pre-abilities before presenting a troublesome aptitude on the grounds that there won't be sufficient time in presenting a few points.

Having a weighted mean of 3.06 and 3.04, low understanding of concepts among learners, inability of learners to learn topics and skills appropriate to their developmental and cognitive stages and poor retention and mastery of topics and skills even if they were revisited and consolidated were interpreted as agree. It means that the current approach used in teaching junior high school mathematics did not promote mastery of knowledge in light of the fact that the past ideas may not be seen again until they were secured the next year. It adjusts to the possibility of Orale et al. (2018) that expressed that the motivation behind why numerous students neglected to ace the significant ideas was that numerous subjects were secured quickly. It does not advance adequate audit once units were finished. There might be some audit of the recently presented point however it may not be seen again once the understudies proceed onward to the following section.

Least among 20, tedious preparation on the part of the teachers since they must learn and teach all junior Mathematics subject areas was assessed as agree with a weighted mean of 2.82. It can be inferred from the results that Mathematics teacher agreed that the utilization of spiral progression approach really leads to the formation of problems on their part, the learners, the content and the education system itself. This indication was parallel with the idea of Resurreccion et al. (2016) which stated that the rapid shift of curriculum leads to the formation of problems on both teachers and learners. Teachers get ready units which roughly were similar length and every theme inside a unit was a one-day lesson. The way that a whole-time frame must be dedicated to a solitary idea makes it hard to arrange guidance and guarantee that understudies secured vital pre-abilities before presenting a troublesome expertise. Another weakness of the spiral approach is that it does not advance adequate survey once units are finished.

To sum up, the composite mean of 2.96 indicates that the teachers were in agreement that they were encountering problems in using spiral progression approach in teaching junior high school Mathematics. This implies that the arrival of the current approach has led to the formation of different problems both encountered by learners and teachers. This finding is relative to the interview conducted which said that teachers find a hard time in adjusting, thus affects the delivery of instruction, revisiting of topics became time-consuming and the outcome was not aligned to the objective of the spiral progression approach that the students should not easily forget the concept especially the basics.

CONCLUSIONS

In the light to the findings, the following conclusions are drawn.

1. Students have low performance in Mathematics in the National Achievement Test.
2. The Grade 9 students are only in the Beginning level of achievement when it comes to their critical thinking and problem solving along the following areas namely, Number and Number Sense, Measurement, Patterns in Algebra, Geometry, and Statistics and Probability.
3. There is no significant relationship between the Mathematics performance of grade 9 students on the National Achievement Test and their achievement in critical and problem-solving skill along the following areas namely, Number and Number Sense, Measurement, Patterns in Algebra, Geometry and Statistics and Probability.
4. Teacher-respondents were in agreement that they are encountering problems in using spiral progression approach in teaching Mathematics.

RECOMMENDATIONS

Based on the findings and conclusions drawn from the collected data, the researcher recommends the following:

1. Curriculum analysts, developers and implementers may consider the findings of this study in order to create a successful Philippine Mathematics education through the use of spiral progression approach.
2. The scope of the study may be expanded in order to have more reliable results. This may be done by conducting a study dealing with the previous and present approaches in teaching Mathematics. Also, similar studies may be conducted on other subject areas where spiral progression approach is utilized.
3. The future researchers may also identify some strategies to address the problems that they can see on spiral progression approach.
4. Future researchers may also add other activities such as teaching guides and learning materials that may enhance the students' Mathematics skills using the spiral progression approach since it is the present approach to teaching.

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