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FACTORS AFFECTING THE IMPLEMENTATION OF SPIRAL PROGRESSION APPROACH IN RELATION TO STUDENTS' ACADEMIC PERFORMANCE IN MATHEMATICS

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Abstract: **The study aimed to determine the factors affecting the implementation of spiral progression approach among secondary teachers of Zone 1, Division of Zambales in relation to students' academic performance during school year 2016-2017. The study made use of descriptive research design with questionnaire as the main instrument in gathering data and information from the seventy four (74) public and private secondary Mathematics teachers from Zone 1 composed of Sta. Cruz districts, Candelaria and Masinloc districts. The teacher-respondents agreed that curriculum, teacher, student and school factors affected the implementation of the Spiral Approach. The academic performance of the students were rated "approaching proficient" in the first and second grading period. There is significant difference on the perceived factors affecting the implementation of the Spiral Approach. There is no relationship between the academic performance and the factors affecting the implementation of Spiral Approach. There is a high significant relationship on the academic performance between the first and second grading period.**

Keywords: **Spiral Progression, Academic Performance, Mathematics.**

1. INTRODUCTION

The Philippines is the last country in Asia and one of the three countries worldwide(Angola and Djibouti are the two) which had implemented the K-12 Curriculum.But in the year 2012, after considering various proposals, Philippines have finally and successfully implemented one of its major educational reforms, the K-12 curriculum. The K-12 program serves as a response to the urgent need to improve the quality of its basic education. The K-12 program aims at decongesting and enhancing the basic education curriculum for learners to master basic competencies lengthening the cycle of basic education to cover kindergarten through year 12. (Sea Meo Innotech,2012:1) As it reach its fifth year of implementation, the Department of Education throughout its 221divisions, have finished planning in advance. In the physical aspect, building and classrooms have been established, more junior and senior high school teachers have been hired, learning materials from elementary to junior high have been produced, and more specially, the K-12 curriculum is standard and competence-based. It is inclusive and built around the needs of the learners and the community. Under this K-12 curriculum is the underlying principles of spiral progression approach. Jerome Bruner is the proponent of this approach with principles derived from John Dewey. This spiral progression approach is simply an improved model of learning from simple to complex. As more facts and principles on each topic are encountered, the understanding grows in breadth and depth, leading to gradual mastery of the topics. In simpler terms, one learns best through the repeated

experience of a concept. According to Resurreccion and Adanza (2016), progression describes pupils' personal journeys through education and ways, in which they acquire, apply and develop their skills, knowledge and understanding in increasingly challenging situations. Continuity is concerned with ways in which the education system structures experience and provides sufficient challenge and progress for learners in a recognizable curricular landscape. Therefore, spiral progression approach is an approach or a way on how to implement the spiral curriculum. Scholars and other education specialist had made their studies over the effectiveness of this spiral progression approach in teaching. Advantages of using this model includes mastery of concepts learned, improved retention wherein what is already learned is being reinforce, and rich breadth and depth of knowledge is achieved. Compared to the Disciplinal Approach, this spiral progression approach promotes teaching as more integrative and multidisciplinary.Mathematics from K-10 is a skills subject. By itself, it is all about quantities, shapes and figures, functions, logic and reasoning. Mathematics is also a tool of science and a language complete with its own notations and symbols and "grammar" rules, with which concepts and ideas are effectively expressed. The contents of mathematics include Numbers and Number Sense, Measurement, Geometry, Patterns & Algebra and Statistics and Probability.

In the K-12 Curriculum, where spiral progression approach is used, these different mathematics contents have already been included starting from elementary up to high school. From the very basic skills on each content, there is a gradual inclusion of new concepts for every year in increasing depth of knowledge. In addition, the teacher recalls or revisits the previously learned knowledge of the students before adding such concepts resulting to mastery of the topics. And for what is expected, at the end of their Grade 10, they have mastered all these mathematics concepts. Spiral curriculum states that a curriculum should revisit basic ideas, building on until students had grasped the full formal concept. This kind of education aims to facilitate learning not to induce. The teacher will provide information and the students must analyze and organize ideas to discover learning. It will help children to develop symbolic learning that may stay longer in their mind. However critics cited some disadvantages entwined with the use of spiral progression approach in teaching. Moreover, certain problems in the field of teaching has aroused due to some problems of the said new approach. The researcher believed that before finding solutions and better ways to solve such issues, identifying the roots of the problems should be prioritized first. Hence, this study is made.

2. OBJECTIVES OF THE STUDY

The study aimed to determine the factors affecting the implementation of spiral progression approach among secondary teachers of Zone 1, Division of Zambales in relation to students' academic performance in mathematics during school year 2016-2017. Specifically, the study assessed factors affecting the implementation of spiral progression approach in teaching mathematics among secondary teachers be described in terms of Curriculum Factor, Teacher Factor, Student's Learning Ability, and School Factor; calculate the mean academic performance of the students in Mathematics during their first and second grading period; test the difference in the factors affecting the implementation of spiral progression approach in teaching mathematics when grouped according to the different dimensions; test and determine significant relationship between the academic performance and the level of implementation of the spiral progression approach; test significant relationship in the academic performance between the first and second grading period.

3. MATERIALS AND METHODS

The study useddescriptive research design through questionnaires and documentation as the main instrument in gathering the required data. The descriptive method involves collection of data in order to test the hypothesis and to answer questions concerning the implementation of Spiral Progression Approach in teaching Mathematics in Zone 1 in the Schools Division of Zambales.The study had been conducted in public and private secondary schools in Zone 1, Division of Zambales. Zone 1 is composed of Sta. Cruz District; Candelaria District and MasinlocDistrict. These municipalities were located at the northern part of the province.

The respondents in the study were the seventy four (74) secondary Mathematics teachers of Zone 1, Division of Zambales. The survey questionnaire composed of two parts was used as the main instrument. The first part dealt with the average of the academic performance of the students in mathematics. The second part dealt with the factors affecting the implementation of spiral progression approach in teaching mathematics as to the following elements: curriculum, teacher factor, student's learning ability and school factor.The completed questionnaire was extracted from a previous study.

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4. RESULTS AND DISCUSSION

Table 1 shows the summary table on the assessment of the teacher-respondents towards the factors affecting the implementation of Spiral Progression Approach. The teacher respondents agreed that teacher, curriculum, students' learning ability and school factors affect the spiral approach. However, the teacher factor had the highest rating of 4.16 and ranked 1st. Likewise, the curriculum factor with overall weighted mean of 3.41 which ranked 4th and had the lowest rating.

Table 1: Assessment of the Respondents towards the Factors affecting the Implementation of Spiral Approach

Factors	Overall Weighted Mean	Qualitative Interpretation	Rank
Curriculum Factor	3.41	Agree	4
Teacher Factor	4.16	Agree	1
Student's Learning Ability	3.47	Agree	3
School Factor	3.78	Agree	2

The academic performance in Mathematics in the First Grading Period for the Section A, nobody obtain an academic performance of Beginning with numerical rating of 74 and below; there were 4 or (5.40%) whose academic performance was Developing with numerical rating of 75-79. The academic performance of 26 or (35.10%) was Approaching Proficient with numerical rating of 80-84; 38 or (51.40%) was Proficient with numerical rating of 85-89; and 6 or (8.10%) was Advance with numerical rating of 90 and above. The mean rating of 85.11 was interpreted to have a Proficient academic performance.For Section B, nobody obtain an academic performance of Beginning with numerical rating of 74 and below; there were 10 or (13.50%) whose academic performance was Developing with numerical rating of 75-79. The academic performance of 24 or (32.40%) was Approaching Proficient with numerical rating of 80-84; 32 or (43.20%) was Proficient with numerical rating of 85-89; and 6 or (8.10%) was Advance with numerical rating of 90 and above. The mean rating of 84.57 was interpreted to have an Approaching Proficient academic performance.For Section C, nobody obtain an academic performance of Beginning with numerical rating of 74 and below; there were 12 or (16.20%) whose academic performance was Developing with numerical rating of 75-79. The academic performance of 33 or (44.60%) was Approaching Proficient with numerical rating of 80-84; 20 or (27.00%) was Proficient with numerical rating of 85-89; and 9 or (12.20%) was Advance with numerical rating of 90 and above. The mean rating of 83.77 was interpreted to have an Approaching Proficient academic performance.For Section D, nobody obtain an academic performance of Beginning with numerical rating of 74 and below; there were 7 or (9.50%) whose academic performance was Developing with numerical rating of 75-79. The academic performance of 25 or (33.80%) was Approaching Proficient with numerical rating of 80-84; 41 or (55.40%) was Proficient with numerical rating of 85-89; and 1 or (1.40%) was Advance with numerical rating of 90 and above. The mean rating of 84.43 was interpreted to have an Approaching Proficient academic performance. Overall, the computed average performance rating of the students in the four groups or section in Mathematics was 84.47 interpreted as Approaching Proficient (AP).

The academic performance in Mathematics in the Second Grading Period for the Section A, nobody obtain an academic performance of "Beginning" with numerical rating of 74 and below; there were 4 or (5.40%) whose academic performance was "Developing" with numerical rating of 75-79. The academic performance of 26 or (35.10%) was Approaching Proficient with numerical rating of 80-84; 38 or (51.40%) was Proficient with numerical rating of 85-89; and 6 or (8.10%) was Advance with numerical rating of 90 and above. The mean rating of 85.11 was interpreted to have a "Proficient" academic performance.For Section B, nobody obtain an academic performance of "Beginning" with numerical rating of 74 and below; there were 10 or (13.50%) whose academic performance was "Developing" with numerical rating of 75-79. The academic performance of 24 or (32.40%) was "Approaching Proficient" with numerical rating of 80-84; 32 or (43.20%) was "Proficient" with numerical rating of 85-89; and 6 or (8.10%) was "Advance" with numerical rating of 90 and above. The mean rating of 84.57 was interpreted to have an "Approaching Proficient" academic performance.For Section C, nobody obtain an academic performance of "Beginning" with numerical rating of 74 and below; there were 12 or (16.20%) whose academic performance was "Developing" with numerical rating of 75-79.

The academic performance of 33 or (44.60%) was "Approaching Proficient" with numerical rating of 80-84; 20 or (27.00%) was "Proficient" with numerical rating of 85-89; and 9 or (12.20%) was "Advance" with numerical rating of 90 and above. The mean rating of 83.77 was interpreted to have an "Approaching Proficient" academic performance.For Section D, nobody obtain an academic performance of "Beginning" with numerical rating of 74 and below; there were 7 or (9.50%) whose academic performance was "Developing" with numerical rating of 75-79. The academic performance of 25 or (33.80%) was "Approaching Proficient" with numerical rating of 80-84; 41 or (55.40%) was "Proficient" with numerical rating of 85-89; and 1 or (1.40%) was "Advance" with numerical rating of 90 and above. The mean rating of 84.43 was interpreted to have an "Approaching Proficient" academic performance. Overall, the computed average performance rating of the students in Mathematics was 84.47 interpreted as "Approaching Proficient" (AP). The data implies that in the Second grading period, Section A group obtain a proficient level which indicates that the student has developed the fundamental knowledge and skills and core understanding and can transfer these understandings through authentic performance tasks. For the other sections obtained the level of "approaching proficient" which indicates that the student has developed the fundamental knowledge and skills and core understanding and, with little guidance from the teacher and / or some assistance from peer groups, can transfer these understandings through authentic performance tasks. (DepEd Order No. 73, s. 2012).

The Analysis of Variance to test differences on the perceived factors affecting the implementation of Spiral Approach is presented in Table 2.

Table 2: Analysis of Variance to test differences on the factors affecting the implementation of Spiral Approach

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	3.539908	3	1.179969	16.22898	7.758E-07	2.86626555
Within Groups	2.61747	36	0.07270			
Total	6.157378	39				

There were significant differences on the perception towards factors affecting the implementation of Spiral Approach manifested in the computed F value of 16.22898 which is greater than the F critical value of 2.86626555. This can be attributed to the higher rating provided by the respondents on the teacher factor affecting spiral approach.

The Pearson Product Moment Coefficient of Correlation to test relationship between academic performance and the factors affecting the implementation of Spiral Approach is presented in Table 4.

Table 3: Pearson Product Moment Coefficient of Correlation to test relationship between academic performance and the factors affecting the implementation of Spiral Approach

Sources of Correlations		**Academic Performance**	**Factors affecting implementing Spiral Approach**
Academic Performance	Pearson Correlation	1	-0.026
	Sig. (2-tailed)		0.824
	N	74	74
Factors affecting implementing Spiral Approach	Pearson Correlation	-0.026	1
	Sig. (2-tailed)	0.824	
	N	74	74

There was a negligible correlation between the academic performance and the factors affecting the implementation of Spiral Approach manifested in the computed Pearson r-value of -0.026. This indicates that the academic performance is not influenced by perceived factors such as the curriculum, student, teacher and school factors. This finding somewhat

similar to the study of Nastasi (1999) the use of CL raised expectations the more times cooperative learning was used in the classroom. Students were encouraged to engage in conversation, which was more likely to enhance motivation and attitudes toward learning. When motivation and attitudes toward learning were changed, student's grades began to increase (Putnam, 1997). Baloche (1998) stated that in order to raise the expectation level of a classroom the teacher needed to empower all students by giving them responsibilities within the cooperative group.

The Pearson Product Moment Coefficient of Correlation to test relationship on the academic performance between the First and Second Grading Period is presented in Table 5.

5. CONCLUSION

The teacher-respondent is a typical female, in her middle adulthood, Teacher 1, married and had been in the service for almost a decade and have masteral units in the graduate studies. Curriculum, teacher, student and school factors affect the implementation of the Spiral Progression Approach. The students' academic performance is approaching proficient in the first and second grading period.. There is significant difference on the perceived factors affecting the implementation of the Spiral Approach. There is no relationship between the academic performance and the factors affecting the implementation of Spiral Approach.

REFERENCES

[1] Alwardt, R. (2012). Investigating the Transition Process When moving from a Spiral Curriculum Alignment Into a Field-Focus Science Curriculum Alignment in Middle High School.UMI Dissertation Publishing.

[2] Baloche, L. (1998). The cooperative classroom empowering learning. Upper Saddle River, New Jersey: Prentice-Hall, Inc.

[3] Bol, L. Nunnery, J. &Whicker, K. (1997).Cooperative learning in the secondary mathematics classroom.The Journal of Education Research. 91 (1),42-48.

[4] Bruner, J. (1960/1977). The Process of Education. Cambridge, MA: Harvard University Press.

[5] Clark, S. (2010). Jerome Bruner: Teaching, Learning and the Spiral Curriculum. Community and Thought in Education.

[6] Davis, E. (2007). A Study of the Effects of an Experimental Spiral Physics Curriculum Taught to Sixth Grade Girls and Boys (2007).

[7] Department of Education (2010).Salient Points on the Enhanced K to 12 Basic Education Program. www.gov.ph/k-12

[8] DepEd Order 73, s. 2012 "Guidelines on the Assessment and Rating of Learning Outcomes Under the K to 12 Basic Education Curriculum" Dewey, J. (1910/1997). How We Think. New York: Dover Publications.

[9] Duncan, R.G., Rogat, A., &Yarden, A. (2009).A learning progression for deepening students' understanding of modern genetics across the 5th- 10th grades.Journal of Research in Science Teaching (this issue).

[10] Ed. M. (2014). The Role of Jerome Bruner's Spiral Approach in the Reformation of the Philippine Educational System

[11] Espiritu,S. &Bustos A.(1996). Psychological, Anthropological and Sociological Foundations of Education. Katha Publishing Co. Inc.

[12] National Council of Teachers of Mathematics.(1991). Professional standards for teaching mathematics. Reston, VA: Author.

[13] Panitz, T. (1997). Collaborative versus Cooperative Learning: A Comparison of the Two Concepts Which Will Help Us Understand the Underlying Nature of Interactive Learning. Retrieved from http://www.capecod.net/-TPanitz/Tedspage

[14] Panitz, T. (1999).The motivational benefits of cooperative learning.New Directions for Teaching and Learning. 78,59-67.

[15] Resurreccion, J. &Adanza, J. (2015) Spiral Progression Approach in Teaching Science in Selected Private and Public Schools in Cavite. DLSU Research Congress 2015 De La Salle University, Manila, Philippines March 2-4, 2015

[16] Robinson, D.R., Schofield, J.W., Steers-Wentzell, K.L. (2005). Peer and cross-age tutoring in math: Outcomes and their design implications. Educational Psychology Review, 17 (4), 327-362. Retrieved January 10, 2007, from Academic Search Premier database.

[17] Scriven, M. & Paul R. (1987). Critical Thinking and Education Reform.8th Annual International Conference. Summer 1987.

[18] Ulep.S.A. (2012). Spiral Progression in the K 12 Curriculum Mathematics Curriculum. University of the Philippines. National Institute for Science and Mathematics Education Development (UP NISMED)

[19] Weaver, R. (2006). The Benefits of Cooperative Learning in the Secondary Math Classroom. Defiance College.