SCIENCE INSTRUCTION THROUGH SPIRAL PROGRESSION: DEVELOPING DIGITIZED LEARNING TOOLS FOR ENHANCED LEARNER ENGAGEMENT

HARIET G. TALBO
Institute of Graduate and Professional Studies,
Lyceum-Northwestern University
Dagupan City

Abstract :

This study examined the implementation of Science instruction through the Spiral Progression Approach in San Manuel District, Tarlac Province Division, during the School Year 2025–2026. Specifically, it determined the profile of Science teachers in terms of highest educational attainment, present position, years of experience in teaching Science, specialization, and relevant in-service trainings attended. It also assessed the extent of implementation of the Spiral Progression Approach under the K to 12 Basic Education Curriculum, identified its perceived advantages and disadvantages, and determined the common teaching strategies employed in its implementation. A descriptive research design was utilized. Findings revealed that most Science teachers are professionally qualified in terms of educational attainment, position, teaching experience, specialization, and relevant trainings attended. The Spiral Progression Approach was found to be moderately implemented across public schools. Teachers perceived that the approach presents both advantages and disadvantages in classroom practice. Among the teaching strategies employed, discovery/inquiry-based learning, collaborative learning, and experiential learning were identified as the most commonly used and most effective strategies within the context of the spiral progression program. Based on the findings, intervention strategies were proposed to strengthen the implementation of the Spiral Progression Approach and support the development of digitized instructional materials to enhance learner engagement. The study recommends that teachers be encouraged and supported in pursuing graduate studies through scholarship opportunities to further develop their professional qualification. Additionally, more accessible and relevant trainings and seminars should be provided to enhance teachers' competence in implementing the Spiral Progression Approach effectively.

Keywords: *Spiral Progression Approach, Science instruction, Digitized instructional materials*

INTRODUCTION

From the range of evidence in the science education literature, it is very clear that science education is faced with numerous problems that need to be addressed so that the goal of equipping students to live effectively in our modern age of science and technology will not become a daydream. It is, however, believed that if appropriate steps are not taken to address these lingering barriers to reform, the citizens will not be able to develop scientific literacy useful for coping in the modern scientific and technological world. Efforts at developing scientifically literate citizens by improving the quality of science teaching and learning in schools is a laudable reform that should preoccupy the mind of the policy makers and all the key stakeholders in science education.

It is imperative for the issues involved to be examined empirically in the context of science education. Gaining the support of the key stakeholders in exploring and revealing what is actually happening in science teaching and learning in our schools and for them to formulate a realistic ideal picture of science teaching and learning through which recommendations for closing the gaps between the actual and ideal could be developed, is necessary to improve the quality of science education for students.

Before the implementation of the K to 12 Curriculum, the Philippines was the only country in Asia and among the three remaining countries in the world that has a 10-year basic education program. International universities and professions call for a 12-year education program. Add the fact that our shorter schooling years breed younger graduates, most of whom are younger than the legal age of 18 to enter the work force, and arguably not as emotionally prepared for the demands that higher education, employment and entrepreneurship call for.

The Philippines is committed to achieving its Education for All (EFA) goals not only for the development for each Filipino, but also for the overall social and economic progress of the country.

Part of the Philippine Education for All Plan of Action 2015, is Critical Task No. 5, "the expansion of basic education, targeting that by 2015, the Philippines has lengthened its cycle of basic education schooling to make it 12 years (DepEd Discussion Paper, 2010).

President Benigno S. Aquino (2010) said that: "We need to add two years
to our basic education. Those who can afford to pay up to fourteen years of schooling before university, thus their children are getting in to the best universities and the best jobs after graduation. I want at least 12 years for our public school children to give the man even chance of succeeding." (DepEd Discussion Paper, 2010).

DepEd Undersecretary Dr. Yolanda S. Quijano, one of the speakers invited in the International Conference Workshop, "Addressing the K to 12 Curricular Enhancement in Philippine Education 2012" held at Sison Auditorium in Lingayen, Pangasinan last January 19-21, 2012 underscored the fact that the proposed K to 12 curricular reform is a green light to the Philippine Education as it will open the gates for better and superior education that will fare well in the international standards.

Taba (2002) believed that inductive thinking was the way to develop higher order thinking skills. These are features of a spiral curriculum. First, the concepts are revisited. The students revisit the concepts and the subject's content frequently throughout the academic 10 year. Bruner suggested that such a curriculum would be structured "around the great issues, principles and values that a society deems worthy of the continual concern of its members (Emling, 2007). Second, each visitation increases depth of knowledge. The prior concepts and subject content are enriched with new knowledge with each visitation. Each recursive visitation has added knowledge and skills that increase learning opportunities. These drive the student toward mastery of the subject matter. Third, all knowledge and skills are tied back to the foundational basis, the knowledge of the students. New knowledge and skills are linked directly to the learning of previous concepts and subject content of the previous spiral.

The learning of previous foundational materials is fundamental to future learning. In 2003, Dowding gave his description of spiral curriculum as the sequencing which provides linkages between the lesson and the student's learning experience. As new knowledge and skills are introduced too, the student subsequent lessons intertwined with previously learned information (Dowding, 2003). Previous knowledge that is learned in earlier visitations of the spiral is linked to future learning in later spiral visitation. The first spiral visitation introduces foundational material-basic knowledge-so that the student is not overwhelmed. Fourth, student's proficiency is increased. The student's achievement level increases with each visitation, until finally the concepts and subject content are mastered. The gains in achievement can be tested through standard assessment procedures (Harden & Stamper, 2009). The spiral curriculum is quite different from the traditional linear curriculum usually found in the nation's classrooms.

Touger (2001) researched a spiral curriculum design for college students involving the wave phenomena. The researcher described a single introductory course for non-science and physics majors, emphasizing wave aspects of selected physics phenomena rather than traditional Newtonian mechanics. Modes of presentation, consistent with the notion of a spiral syllabus, were explained with reference to the cognitive and educational theories of Bruner and Piaget. The results were non-conclusive.

The DepEd Order No. 31, s. 2012, describes the new curriculum this way: "The overall design of the Grades 1 to 10 curriculum follows the spiral approach across subjects by building on the same concepts developed in increasing complexity and sophistication starting from grade school. Teachers are expected to use the spiral progression approach in teaching competencies.

The first thing to notice about this description is that the spiral approach is used not only for science and math subjects (as often misunderstood) but for all subjects. The second thing to notice is that the spiral approach is used from Grade 1 to Grade 10. This means that the curriculum is not divided into elementary school and high school, the way it used to be. There is now vertical articulation or a seamless progression of competencies from the first grade of elementary school to the last grade of junior high school. The seamlessness actually continues all the way to the university curriculum, but DepEd Order No. 31,s. 2012 is only about Grades 1 to 10. Future DepEd Orders and CHED memorandum orders will take the curriculum all the way to graduate school.

The spiral approach is a technique often used in teaching where first the basic facts of a subject are learned, without worrying about details. Then as learning progresses, more and more details are introduced, while at the same time they are related to the basics which are reemphasized many times to help enter them into long-term memory.

The basic idea behind spiral progression approach is to expose the learners to a wide variety of concepts/topics, skills and attitudes that are deemed of "continual concern of everyone "until they are mastered.

A spiral curriculum design is one in which "key concepts are presented repeatedly throughout the curriculum, but with deepening layers of complexity."

After a mastery of the initial topic, the student "spirals upwards" as the new knowledge is introduced in next lessons, enabling him/her to reinforce what is already learned. In the end, a rich breadth and depth of knowledge is achieved.

With this procedure, two purposes are served: 1. The previously learned concept is reviewed hence improving its retention 2. The topic may be progressively elaborated when it is reintroduced leading to a broadened understanding and transfer of learning.

The Spiral Curriculum was proposed by Bruner (1966). In structuring a course, certain prerequisite knowledge and skills must be first mastered which in turn provides linkages between each lesson as the students "spirals upwards" in a course of study.

The Learning Spiral is a curriculum design framework which will help science teachers construct lessons, activities or projects that target the development of thinking skills and dispositions which do not stop at identification, instead facilitate implementation of the desired performance.

It is a curriculum design tool which will help develop concrete and practical thinking-centered lessons that make students performances of understanding explicitly .It maybe used to structure an entire project which can readily fit into the regular curriculum and can help design thinking centered-lessons.

The Department of Education Order (DO) no. 31, series of 2012, describes the new curriculum this way: "The overall design of the Grades 1 to 10 curriculum follows the spiral approach across subjects by building on the same concepts developed in increasing complexity and sophistication starting from grade school. Teachers are expected to use the spiral/progression approach in teaching competencies."

The first thing to notice about this description is that the spiral approach is used not only for science and math subjects (as often misunderstood) but for all subjects. The second thing to notice is that the spiral approach is used from Grade 1 to Grade 10. This means that the curriculum is not divided into elementary school and high school, the way it used to be. There is now vertical articulation or a seamless progression of competencies from the first grade of elementary school to the last grade of junior high school. The seamlessness actually continues all the way to the university curriculum, but DO 31 is only about Grades 1 to 10. Future DOs and CHED memorandum orders will take the curriculum all the way to graduate school.

According to Martin (2008), spiral curriculum is a design framework which will help science teachers construct lessons, activities or projects that target the development of thinking skills and dispositions which do not stop at identification. It involves progression and continuity in learning science. 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.

After the mastery of the initial topic, the student "spirals upwards" as the new knowledge is introduced in the next lesson, enabling him/her to reinforce what is already learned. In the end, a rich breadth and depth of knowledge is achieved. With this procedure, the previously learned concept is reviewed hence improving its retention. And also the topic may be progressively elaborated when it is reintroduced leading to a broadened understanding and transfer (Mantiza, 2013).

Then following are advantages and disadvantages of spiral progression approach as cited by Snider (2004). According to him, spiral progression approach avoids disjunctions between stages of schooling, it allows learners to learn topics and skills appropriate to their developmental/cognitive stages, and it strengthens retention & mastery of topics & skills as they are revisited & consolidated. But, the problem with the spiral design is that the rate for introducing new concepts is often either too fast or too slow. All concepts are allotted the same amount of time whether they are easy or difficult to master. Units are approximately the same length, and each topic within a unit is 1 day's lesson. And some days there will not be enough time to introduce. The fact that an entire class period must be devoted to a single concept makes it difficult to sequence instruction to ensure that students acquire necessary pre-skills before introducing a difficult skill.

Learning is the way individual acquire knowledge. Learning is influenced by social interactions, interpersonal relations and communications with others (Lucas, 2010). Learning according to Espiritu (1999) is process

gathered from relatively permanent change in behavior that resulted from practice or interaction with the environment. Bustos (2005) furthered explained that the process of learning, memory and understanding are directly related to behavior. Almost all human behavior is learned. Learning takes place all the time. The brain keeps a track of all the events taking place in our life. Learning is resulted from experience gained by the individual. Experience according to Smokler (2009) is anything that can be reflected upon. These complex learning experiences work even better when students can share them with their peers. Neuroscientists believe that the human brain is constructed socially (Einsenberg, cited in Gunn et al, 2007) this is especially for teenagers, who may be designed in filter out the stimuli of authority figures and family member in favor of those of their peers. When students actively process together, they discuss, consider and grapple and some times. Their rethink their original ideas and positions, all activities that help strengthen neural connections and increase learning. Smokler (2009) also added that learning involves movement. Movement is crucial to the learning process. The cerebellum which contains neurons is activated during learning process. Feinstein (2004) confirmed that the adolescent who engages in challenging cognitive activities increases and strengthens the neurons involved in coordinating thinking skills. Learning also involves memory or remembering. In spiral progression approach, memory is very important factor. There are two basic theories to explain as how we memorize events. According to one theory, memory is said to be stored in the brain as a memory trace. When we learn or experience something, impulses are generated in the nerves of the brain. These impulses impart their effects in the brain in the form of a record. According to the other theory, sensations created by learning produce some permanent changes in the brain which remain there in the form of memory (Espiritu, 2008).

The study of Baltazar (2014) determined the implementation of K to 12 Basic Education Curriculum in Lingayen District, Division of Pangasinan I. Descriptive method of research was used in gathering the data and information pertinent to the conduct of the study. The degree of implementation of the K to 12 Basic Education Curriculum in terms of curriculum is considerably responsive with an average weighted mean of 3.72. In terms of the instructional materials, it is considered as moderately adequate as evidenced by an average weighted mean of 2.96. The respondents considered the degree of implementation of the K to 12 Basic Education Curriculum in terms of physical facilities as fairly equipped or 3.46 average weighted mean. The Grade I teachers in Lingayen encountered many problems in teaching in the implementation of the K to 12 Basic Education Curriculum. Among the 18 problems listed by the researcher, two were described as serious—inadequacy of textbooks on 1:1 textbook-pupil ration and inadequacy of teaching guides and manuals based on 1:1 TM- teacher ration.

Sto. Domingo's study (2004) dealt with the assessment of the implementation of the Art Education Curriculum in the nine pre-schools in Makati City and Dagupan City during the school year 2003-2004. The results of the evaluation were used as bases for the development of an Art Education Teaching Design for pre-schools. The assessment of the Art Education Curriculum of pre-schools involves two components, namely: Administrative components (Profile of the teaching staff, Physical facility and media/materials/supplies and equipment) and Pedagogical components (Art activities provided and Schedule of art classes). The study also dealt with the problems encountered in the teaching of art education such as those related to activities, art materials/ equipment, time allotment and related to location/size of the area.

Involved in the investigation were 45 teachers of Art Education from six pre-schools in Makati City and three schools in Dagupan City. The six schools in Makati City include Childstart International, Creative Play Corner, Early Learning Center, Golden Angels Superlearning Center, International Center for Beginning Beginners, Pre-school Camp Inc. The three schools in Dagupan City include Pangasinan Universal Institute, Creative Montessori Center, and La Maria Academy.

In as much as the K to 12 curricular reform in the Philippine system of education has been a controversial and hotly-debated issue, conducting a study along this area is definitely necessary and significant. This study attempted to take a closer look and find out the status of the Spiral Progression Approach in teaching Science 3 in the new normal education which is one of the salient features of the K to 12 Curriculum.

Statement of the Problem

This study sought to assess the Science Instruction through Spiral Progression: Developing Digitized Learning Tools for Enhanced Learner Engagement San Manuel District in Tarlac Province Division during the School Year 2025-2026.

Specifically, it sought to answer the following sub-problems:

1. What is the profile of the Science teachers in terms of the following:

1.1 highest educational attainment;

1.2 number of years of experience in teaching of Science; and
1.3 relevant in-service training attended.
2. What is the extent of implementation of the Spiral Progression Approach in the teaching of Science?
3. Is there a significant relationship between the profile of Science teachers and their extent of implementation of Spiral Progression Approach in the teaching of Science?
4. What are the advantages and disadvantages of Spiral Progression Approach?
5. What are the common teaching strategies used in teaching Spiral Progression Approach?
5. Based on the findings, what digitized materials in Science using Spiral Progression Approach can be proposed?

METHODOLOGY

This chapter discusses the research design, sources of data, instrumentation and data collection and the tools for data analysis.

Research Design

The study used descriptive method of investigation. Descriptive research design is intended to gather information about existing conditions. It described the situation as it exists at the time of the study and to explore the causes of the phenomenon.

This study assessed profile of the Science teachers in terms of highest educational attainment, number of years of experience in teaching of Science, and relevant in-service training attended; the extent of implementation of the Spiral Progression Approach in teaching Science in the new normal education; significant relationship between the profile of the Science teachers and the extent of implementation of the Spiral Progression Approach; the advantages and disadvantages of Spiral Progression Approach; the common teaching strategies used in teaching Spiral Progression Approach.

Sources of Data

This study was conducted in San Manuel District in Tarlac Province Division during the School Year 2025-2026.

Instrumentation and Data Collection

The research instrument used in gathering the data in this study was a researcher-made questionnaire, since there is no standard questionnaire. Part 1 of the questionnaire elicited valuable data relative to the profile of the Science teachers such as highest educational attainment, present position, number of years of experience in teaching of Science, relevant in-service training attended.

The second part involved the extent of implementation of the Spiral Progression Approach in teaching Science .

The third part covered the advantages and disadvantages of Spiral Progression Approach.

The last part covered the common teaching strategies used in teaching Spiral Progression Approach.

The researcher-made questionnaire was presented to the adviser first then to the members of the Reading Committee for initial evaluation. Then the instrument was submitted for final evaluation and validation by other Science teachers on questionnaire construction and content- related to the implementation of Spiral Progression Approach. The product of this process was the questionnaire in its final form.

The approval and permission to conduct the study were obtained by the researcher from the Schools Division Superintendent of Tarlac Province Division.

Tools for Data Analysis

To derive valid and accurate results, appropriate statistical measures will be employed.

To answer sub-problem 1 regarding the professional profile of the Science teachers, frequency counts and percentages, using the formula below, was used.

$$\text{Percentage} = \frac{F}{N} \times 100$$

Where:

F = Frequency
N = total number of respondents

` To answer sub-problem 2, the implementation of Spiral Progression Approach, the average weighted mean (AWM) will be used.

$$\sum WM$$

I

Where: ∑WM = Weighted Mean
I = no. of items/indicators

Rating	Mean Range	Descriptive Equivalent
5	4.21 - 5.00	Fully Implemented (FI)
4	3.41 - 4.20	Greatly Implemented (GI)
3	2.61 - 3.40	Moderately Implemented (MI)
2	1.81 - 2.60	Slightly Implemented (SI)
1	1.00 - 1.80	Not Implemented (NI)

To answer sub-problem 3, on the significant relationship between the profile of the teachers and their extent of implementation of Spiral Progression Approach, Chi-square was used.

To answer sub-problem 4, advantages and disadvantages of Spiral Progression Approach, the average weighted mean (AWM) was used using the following mean scale.

Rating	Mean Range	Descriptive Equivalent
5	4.21 - 5.00	Always (A)
4	3.41 - 4.20	Often (O)
3	2.61 - 3.40	Sometimes (S)
2	1.81 - 2.60	Rarely (R)
1	1.00 - 1.80	Not at All (NA)

To answer sub-problem 5, the common teaching strategies used in teaching Spiral Progression Approach, the frequency counts and percentages was used.

RESULTS AND DISCUSSION

This chapter presents the elements of presenting and interpreting data to answer the sub-problems posited in the chapter of the study.

Profile of the Science Teachers

The profile of the Science teachers in San Manuel District, Tarlac Province Division in terms of highest educational attainment, present position, number of years of experience in teaching of Science, and relevant in-service training attended was presented in Tables 1a-1d.

Table 1a
Profile of the Teachers in Terms of Highest Educational Attainment

Highest Educational Attainment	Frequency	Percentage Rate
With M.A/Med/MS Units	18	54.55
MAEd/Med/MS	11	33.33
With Doctoral Units	4	12.12
Total	**33**	**100**

It can be seen in Table 1a that majority of the Science teachers have MA/MEd units with 18 or 54.55%. There is also 11 or 33.33% who are MAEd/MEd graduates. It is also reflected in the table that 4 or 12.12% is pursuing their doctoral degree.

Analysis of the findings shows that most of the teacher-respondents took units in masteral degree for their professional growth, most especially teachers are motivated to take units in the masteral degree for the purpose of reclassification. However, it is observed that after taking some masteral units, the teachers do not pursue their thesis writing. Financial constraints most probably the main reason which hinder them to finish the course.

Table 1b

Profile of the Teachers in Terms of Present Position

Highest Educational Attainment	Frequency	Percentage Rate
Master Teacher II	3	9.09
Master Teacher I	5	15.15
Teacher III	13	39.39
Teacher II	4	12.12
Teacher I	8	24.24
Total	**33**	**100**

Table 1b presents the profile of the Science teachers in terms of present position. It is reflected in the table that majority of the Science teachers are Teacher III with 13 or 39.39%. Next is Teacher I with 8 or 24.24%. There is also 5 or 15.15% Master Teacher I, 4 or 12.12% Teacher II, and 3 or 9.09 Master Teacher II.

It is visible that most of the respondents are Teacher III. According to Harry (2007), a well-informed and well-experienced teacher such as a Teacher III could unleash genuine learning for the learners. The educational attainment of the Science teachers help them promoted.

Table 1c

Profile of the Teachers in Terms of Number of Years of Experience in Teaching of Science

Number of Years of Experience in Teaching of Science	Frequency	Percentage Rate
10 years and below	16	48.48
11-20 years	13	39.39
21-30 years	4	12.12
Total	**33**	**100**

Most of the Science teachers with 16 or 48.48% have 10 years and below teaching experience in Science while 13 or 39.39% of them have been teaching for 11-20 years. The other 4 or 12.12% has been in the service for 21-30 years.

Experienced teachers are on the average more effective in raising student achievement than their less experienced counterparts. This happens not just because experienced teachers are more likely to work in and classrooms with more advantaged students.

Table 1d

Profile of the Teachers in Terms of Relevant In-service Training Attended

Level	Frequency	Percentage
International	12	36.36
National	11	33.33
Regional	27	81.81
Division	33	100

*** Multiple Responses**

In terms of relevant in-service training attended, all of the Science teachers have already attendance in the Division level like the Division Science Congress. In the Regional level, 27 out of 33 or 81.81% have seminars in this level like the Regional Mass Training for Science in the K to 12 Curriculum. It is also reflected in the table that 11 or 33.33% attended in the National level. In the International level, there are 12 or 36.36% who have attendance in this level like seminar in Science Education.

The table shows that Science teachers are educationally qualified in terms of seminars attended which help them a lot in performing their duties to their students. The seminars help them grow professionally.

Implementation of the Spiral Progression in the Teaching of Science

The extent of implementation of the Spiral Progression Approach in the teaching of Science 3 is presented in Table 2.

Table 2

Extent of Implementation of Spiral Progression Approach

Indicators	Weighted Mean	Descriptive Equivalent
1. Teaches and learns process is based on the Spiral Progression Approach.	3.59	GI
2. Utilizes research-based practices and materials.	3.41	GI
3. Utilizes individual and cooperative learning activities to improve the competency of the learners for higher learning.	3.51	GI
4. Ensures vertical articulation and seamless progression of competencies.	3.56	GI
5. Provide variety of learning experiences.	3.23	MI
6. Utilizes of highly academic universal standards in teaching to produce globally competitive graduates.	3.31	MI
7. Explores integrative and interactive strategies for meaningful and holistic development of the students.	3.72	GI
8. Provides differentiated activities for the learners.	3.54	GI
9. Conceptualizes the curriculum to make it culture-sensitive, responsive, flexible and suitable using Spiral Progression Approach.	3.56	GI
10. Implements Spiral Progression Approach in all subject areas being taught.	3.44	GI
11. Reinforces what is actually learned through the use of indigenous materials.	3.44	GI
12. Employs Content-Based Instruction in teaching.	3.44	GI
13. Allows gradual mastery from one grade level to the next.	3.59	GI
14. Builds students prior knowledge and perspective into structural.	3.57	GI
15. Infuses local knowledge and perspective into structural layer of the institution.	3.33	MI
16. Creates a more inclusive environment through presentation of the different world views to enhance and enrich the educational experiences.	3.26	MI
17. Conceptualizes the curriculum to make it culture-sensitive, responsive, flexible and suitable community.	3.23	MI
18. Learns through repeated exercises of a concept.	3.31	MI
19. Learns best by building on students' current knowledge.	3.62	GI
20. Returns to basic ideas as new subject and concepts are added.	3.90	GI
21. Implements/use the specific features of the Spiral Progression Approach in teaching Science	3.82	GI
22. Has knowledge of the learning contents of the Grade level subject areas that lend themselves to the Spiral Progression Approach.	3.82	GI
23. Coordinates with the teachers of preceding and succeeding Grade levels.	3.92	GI
Average Weighted Mean	**3.37**	**MI**

Legend

Point Value	Mean Range	Descriptive Equivalent
5	4.21-5.00	Fully Implemented (FI)
4	3.41-4.20	Greatly Implemented (GI)
3	2.61-3.40	Moderately Implemented (MI)
2	1.81-2.60	Slightly Implemented (SI)
1	1.00-1.80	Not Implemented (NI)

It can be observed that Spiral Progression Approach is moderately implemented as reflected by the average weighted mean of 3.37. It is further shown in the table that majority of the indicators of Spiral Progression Approach were rated moderately implemented. The highest mean rating was given to the indicator "Coordinates with the teachers of the preceding and succeeding grade levels about topics" with 3.92 or greatly implemented. This is being followed by the indicator "Returns to basic ideas as new subject and concepts are added" with 3.90 or greatly implemented. The lowest mean rating was given to the indicator "Conceptualizes the curriculum to make it culture-sensitive, responsive, flexible and suitable to the community with 3.23 or moderately implemented. The result shows that Spiral Progression Approach could help a lot in improving

the performance of the learners. The topics are related with the lessons in other year or grade levels where learners can really learn more and they are more expose to a wide variety of concepts/topics, skills and attitudes that are deemed of "continual concern of everyone" until they are mastered.

Advantages and Disadvantages of Spiral Progression

The advantages and disadvantages of Spiral Progression Approach are presented in Tables 3a-3b.

Table 3a

Advantages of Spiral Progression

Indicators	Mean	Descriptive Equivalent
1.Avoids disjunction between stages of schooling	3.34	Often
2. Allows learners to learn topics and skills appropriate to their development/ cognitive stages.	3.60	Often
3. Allows learners to learn topics and skills as they are revisited and consolidated.	3.27	Sometimes
4. It strengthens retention and mastery of topics and skills as they revisited and consolidated	3.06	Sometimes
5. It allows learners to gain valid experiences.	3.26	Sometimes
AWM	**3.31**	**Sometimes**

Legend

Rating	Mean Range	Descriptive Equivalent
5	4.21 - 5.00	Always (A)
4	3.41 - 4.20	Often (O)
3	2.61 - 3.40	Sometimes (S)
2	1.81 - 2.60	Rarely (R)
1	1.00 - 1.80	Not at All (NA)

Table 3a reveals how the participants perceived the advantages of spiral progression approach. It can be seen in the data that participants rated the advantages of spiral progression approach as "Sometimes" with a composite mean of 3.31. This implies that teachers perceive spiral progression to be sometimes an advantage but not always. In simpler terms, it is a case by case, depending upon a situation or context. Moreover, it is interesting to note that in advantage number 1 which states that spiral progression avoids disjunction between stages of schooling, not all teachers believe that avoiding disjunction is an advantage of this approach, much more for public school teachers, who gave this advantage the lowest rate.

Table 3b

Disadvantages of Spiral Progression

Indicators	Mean	Descriptive Equivalent
1. Does not promote sufficient review once units are completed.	3.13	Sometimes
2. The rate of introducing new concept is often either too fast or too slow.	3.46	Often
3. All concepts are allotted the same amount of time whether they are easy or difficult to master.	3.26	Sometimes
4. It is difficult to sequence instruction to ensure that students acquire necessary pre-skills before introducing difficult skills.	3.59	Often
5.Many students fail to master important concepts	3.40	Sometimes
AWM	**3.37**	**Sometimes**

Legend

Rating	Mean Range	Descriptive Equivalent
5	4.21 - 5.00	Always (A)
4	3.41 - 4.20	Often (O)
3	2.61 - 3.40	Sometimes (S)
2	1.81 - 2.60	Rarely (R)
1	1.00 - 1.80	Not at All (NA)

Table 3b reveals how the participants perceived the disadvantages of spiral progression approach. It can be seen in the data that teacher- respondents rate the disadvantages as "Sometimes" with a composite mean of 3.37. This reveals that respondents perceive the disadvantages of spiral progression as "Sometimes."

Common Teaching Strategies Used

Table 4

Common Teaching Strategies Used

Strategies	Frequency	Percentage
1. Discovery/Inquiry Learning	30	90.91
2. Collaborative Learning	28	84.85
3. Experiential Learning	29	87.88
4. Cooperative	27	81.82
5. Jig-Saw Puzzle	23	69.70
6. Buzz Session	23	69.70
7. Child-Centered Approach	26	78.79
8. Round-robin	24	72.73
9. Think-pair-share	24	72.73
10. Role play	28	84.85
11. Portfolio's and Journal	28	84.85
12. Whole Brain Teaching	24	72.73
13. Group Investigation	27	81.82

Table 4 shows the frequency and percentage of respondents. Out of 33 respondents, majority of teachers have been using the discovery/inquiry learning, which has a total of 30 or 90.91%. Collaborative learning has a total of 28 or 84.85%. Another is experiential learning with 29 or 87.88%, cooperative and group investigation with 27 or 81.82%, jigsaw puzzle with 23 or 69.70, buzz session with 23 or 69.70%, child-centered with 26 or 78.79%, round robin with 24 or 72.73%. Portfolio's and Journal has a total of 28 or 84.85%. Think pair-share a with 24 or 72.73%, role play has a total of 28 or 84.85%. Testing of independence or preference through "Goodness of Fit" test, reveals that among the strategies, there are only five preferred strategies. They are discovery/inquiry learning; collaborative learning; role play; portfolio's and journal, and experiential learning.

Summary

This study sought to assess the Science Instruction through Spiral Progression: Developing Digitized Learning Tools for Enhanced Learner Engagement San Manuel District in Tarlac Province Division during the School Year 2025-2026.

The study used the descriptive method of investigation. The study described the profile of the Science teachers in terms of highest educational attainment, present position, number of years of experience in teaching of Science, relevant in-service training attended; the extent of implementation of the Spiral progression Approach in the teaching of Science 3; the advantages and disadvantages of Sprial Progression Approach, and the common teaching strategies used in teaching Science using Spiral Progression Approach.

Profile of the Science Teachers

Highest Educational Attainment

Majority of the Science teachers have MA/MEd units with 18 or 54.55%. There is also 11 or 33.33% who are MAEd/MEd graduates. It is also reflected that 4 or 12.12% is pursuing their doctoral degree.

Present Position

Majority of the Science teachers are Teacher III with 13 or 39.39%. Next is Teacher I with 8 or 24.24%. There is also 5 or 15.15% Master Teacher I, 4 or 12.12% Teacher II, and 3 or 9.09 Master Teacher II.

Number of Years of Experience in Teaching of Science

Most of the Science teachers with 16 or 48.48% have 10 years and below teaching experience in Science while 13 or 39.39% of them have been teaching for 11-20 years. The other 4 or 12.12% has been in the service for 21-30 years.

Relevant In-service Training Attended

All of the Science teachers have already attendance in the Division level like the Division Science Congress. In the Regional level, 27 out of 33 or 81.81% have seminars in this level like the Regional Mass Training for Science in the K to 12 Curriculum. It is also reflected in the table that 11 or 33.33% attended in the National

level. In the International level, there are 12 or 36.36% who have attendance in this level like seminar in Science Education.

Implementation of the Spiral Progression Approach in the Teaching of Science

Spiral Progression Approach is moderately implemented as reflected by the average weighted mean of 3.37. It is further shown in the table that majority of the indicators of Spiral Progression Approach were rated moderately implemented. The highest mean rating was given to the indicator "Coordinates with the teachers of the preceding and succeeding grade levels about topics" with 3.92 or greatly implemented. This is being followed by the indicator "Returns to basic ideas as new subject and concepts are added" with 3.90 or greatly implemented. The lowest mean rating was given to the indicator "Conceptualizes the curriculum to make it culture-sensitive, responsive, flexible and suitable to the community with 3.23 or moderately implemented.

Advantages of Spiral Progression

Teachers rated the advantages of spiral progression approach as "Sometimes" with a composite mean of 3.31. This implies that teachers perceive spiral progression to be sometimes an advantage but not always.

Disadvantages of Spiral Progression

Teacher- respondents rate the disadvantages as "Sometimes" with a composite mean of 3.37. This reveals that respondents perceive the disadvantages of spiral progression as "Sometimes."

Common Teaching Strategies Used

Majority of teachers have been using the discovery/inquiry learning, which has a total of 30 or 90.91%. Collaborative learning has a total of 28 or 84.85%. Another is experiential learning with 29 or 87.88%, cooperative and group investigation with 27 or 81.82%, jigsaw puzzle with 23 or 69.70, buzz session with 23 or 69.70%, child-centered with 26 or 78.79%, round robin with 24 or 72.73%. Portfolio's and Journal has a total of 28 or 84.85%. Think pair-share a with 24 or 72.73%, role play has a total of 28 or 84.85%.

Conclusions

Based on the findings of the study, the following conclusions were drawn:

1. Generally, most of the Science teachers are educationally qualified in terms of educational attainment, present position, number of years of experience, relevant in-service trainings attended and specialization.
2. Spiral Progression Approach is moderately implemented by the Science teachers
3. Public school teachers perceive that sometimes spiral progression in science has advantages and disadvantages.
4. Significant statistically, discovery / inquiry learning, collaborative learning and experiential learning are the most commonly used and most effective teaching strategies of public school teachers under the context of spiral progression program.
5. The proposed intervention strategies will help the teachers implement the Spiral Progression Approach in teaching Science.

Recommendations

On the basis of the foregoing findings and conclusions, the following policy statements are recommended:

1. Encourage teachers to finish their graduate studies by providing scholarships to teachers who are interested to continue their studies to uplift their professional qualification.
2. Send teacher to trainings/seminars related to the implementation of the Spiral Progression Approach to improve their competence and skills.
3. More seminars/trainings should be given free to teachers to address the needs identified in the implementation of Spiral Progression Approach.
4. Similar studies should be conducted in other school or division by any interested researcher in order to find out if the Spiral Progression Approach as a feature of the K to 12 Curriculum is well-implemented.

REFERENCES

Bruner, Jerome. 1966. The Process of Education. Cambridge, MA: Harvard University Press.

Dewey, John. 1916. "Democracy and Education".

Palma, Jesus C. 1992. Curriculum System: A Handbook for School Practitioner in Basic Education. 24K Printing Co., Inc. Manila.

Saylor, J.G. and Alexander, W.H. 1974. "Planning Curriculum for Schools, 3rd Edition, Holt Rinehart and Winston.
Zulueta, Francisco M. 2002. "Teaching Strategies and Educational Alternatives" Vol.2, Academic Publishing Corp.
Alonzo, AC. Evaluation of a model for supporting the development of elementary
School teachers' science content knowledge. Proceedings of the Annual International Conference of the Association for the Education of Teachers in Science; Charlotte, NC. 2002.
Bilbao, Puritan., Paz Lucida, PhD, Tomas a C. Iringan, Ph.D. Rodrigo B. Javier, Ph D. Curriculum Development. Mandaluyong: Lorimar publishing.2008.
Brown, R., Pressly, M., Van Meter, P., and Schuder, T., A quasi-experimental validation of Transactional strategies instruction with low-achieving second-grade teachers. New York: International reading Association.2004.
Corpuz, Brenda B.,Ph.D., and Gloria G. Salandanan, Ph.D. Principles of Teaching 1 -2nd Edition. Quezon City: Lorimar Publishing, Inc., c2011.
Crawford, B. A. Learning to teach science as inquiry in the rough and table of practice. Journal of Research in Teaching (2007).
Cruz, Gloria L. Standard-Based Assessment and Grading in the K to 12 Program (October 9, 2013).
Presented at the DLSU Research Congress 2015 De La Salle University, Manila, Philippines March 2-4, 2015
Davis, Edith G. A Study of the Effects of an Experimental Spiral Physics Curriculum Taught to Sixth Grade Girls and Boys (2007).
Dhorsan, Adelaide and Chachualo, Albertina. 2008. "The Local Curriculum in Mozambique: The Santa Rita Community School in Xinavane." Prospect..
DiBiaso, D. et.al. 2003. Evaluation of a Spiral Curriculum Model to Technical Training Curricula.
Dowding, T.J. 2003. The Application of a Spiral Curriculum Model to Technical Training Curricula.
Emling, J. F. 2007. Value Perspective Today: Toward Integration with Jean Piaget's New Discipline in Relation to Modern Educational Leaders, Fairleigh Dickinson University Press.
Fang, Zhihui, Linda L., Lame and Roes M. Pringle. 2010. Language and Literacy in Inquiry- Based Science Classrooms, Grade 3-8. United States: Corwin Sage Company.
Frando, Milagros F., Ph, D. 2009. General Psychology. Mandaluyong City: Books Atbp. Publishing Corp.
Greenstein, Laura. Assessing 21st century skills. A Guide to Evaluating Mastery and and Brookway, D. (2006). The Nations Report Card: Science 2005

Haeusler, Carole. Examining the curriculum and assessment framework of the Australian Curriculum: Science. Volume 33 Number 1, 2013; Pages 15– 30.
Harry, Rechilda R. 2007. "The Role of Teachers in Attaining DepEd Vision", The Modern Teacher.
Healey, Henry and DeStefano, Joseph. 2007. "Education Reform Support: A Framework for Scaling Up School Reform." From: "USAID: Advancing Basic Education and Literacy Project.".
Houtz, Barbara. 2010. Teaching Science Today. Huntington Beach CA: Shell Education.
Ilarde, Isabelinadel Pan. 2003 Science and you in the 21st Century Science and Technology: Third year Chemistry Textbook. Quezon City: JMC Press, Inc.
Makhila, Aggrey Sonny. 2008. Teachers Perceptions Toward Subject Specialization by Primary School Teachers. University of Botsawanna.
Miller, E. 2005. "The Childscope Approach: A Handbook for Improving Primary Education Through Local Initiative." Geneva: UNICEF.
Muskin, Joshua. 2009. "Speech. 16th Annual ILearn Conference and 13th Youth Summit". Morocco, Al Akhawayn University.
Papong, E. "The Influence of John Dewey's Educational Thoughts on Philippine Education, 2012.
Poliquit, Monica O. 2011. "The Enhance K to 12 Basic Education Program". The Modern Teacher, Vol. 60 No. 1.
Taba, H. 2002. "Curriculum Development: Theory and Practice. New York, NY: Harcourt, Brace & World.
Taylor, Peter. 2005. "How can Participatory Processes of Curriculum Development Impact on the Quality of Teaching and Learning in Developing Countries?" From: "UNESCO: Background Paper for the Education for All Global Monitoring Report 2005: The Quality Imperative." Geneva: UNESCO.
Baltazar, Eralie D. **2014. "The Implementation of the K to 12 Basic Education Curriculum in Lingayen Districts, Division of Pangasinan I,** Unpublished Thesis, The Adelphi College.

Bustamante, Gracesilda A. 2013. "**The Implementation of the K to 12 Basic Education Curriculum in Burgos District, Division of Pangasinan I**, Unpublished Thesis, The Adelphi College.
Donato, Sahlee C. 2014. **"Implementation of the Spiral Progression Approach in the Teaching of Science to Grade 8 Students in the Public Secondary Schools in Bani, Pangasinan**" Unpublished Masters Thesis, Lyceum Northwestern University Graduate and Professional Studies, Dagupan City.
Franche, Dollie G. 2009. "**Status of Implementation of Restructured Basic Education Curriculum**, Unpublished Thesis, Philippine Normal University.
Sto. Domingo, Maria Raezza. 2004. **"Implementation of the Art Education for Pre-school",** Unpublished Thesis, Lyceum Northwestern University, Dagupan City.
RA 10533 or the Enhanced Basic Education 2013
R.A. 9155 known as the Governance of Basic Education Act of 2001
1987 Philippine Constitution
Batas Pambansa 232
CEAP National Convention, 2012
DepEd Order No. 31, s. 2012 "Policy Guidelines on the Implementation of the Grade 1 to 10 of the K to 12 Basic Education Curriculum (BEC) Effective School Year 2012-2013"
DepEd Discussion Paper, 2010
Department of Education, K to 12 Basic Education Program Primer, 2011
Education Act of 1982
SEAMEO INNOTECH, 2012
UNESCO Asia/Pacific. "Building the Capacities of Curriculum Specialists for Educational Reform." (Final Report of the Regional Seminar: Vientiane, Laos 2002). Bangkok: UNESCO, 2002.
http://newsinfo.inquirer.net419261/k-12-stiil-struggling
http://www.wisn.org/what-is-indigenous-science.html (Ronron Calunsod, Kyodo News)
http://www.wisn.org/what-is-indigenous-science.html
http://www.philstar.com/education-and-home/805199/new-curriculum