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Analysis of Science Teachers on the Spiral Progression Approach as a Framework for School Program Design

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Abstract
Republic Act 10533 in 2012, the first law in the Philippines to utilize the spiral progression. This act not only extends basic education by two years but also emphasizes the importance of universal kindergarten. With this, the researchers conducted this study on science teachers' spiral progression analysis as a framework for school program design. It includes 21 of the district's 29 science teachers. The results revealed that most participants are aged 35-44, with 6-10 years of experience. Most teachers had only a Bachelors' degree specializing in Biology or General Science. Teachers spend the most time at district-sponsored seminars (20.76 hours per respondent). Out-of-district institutes provided the second most teacher training hours (20.38). Principals and master teachers mentor teachers twice or thrice a week via a School Learning Action Cell. There aren't enough textbooks and teaching materials. Science laboratories, for example, are scarce. Earth Science and Biology topics were rated as "well-mastered" by the teachers. However, they only rated "somewhat mastered" on topics in chemistry and physics. Specialization, experience, and training all impact teacher spiral progression readiness' of the teacher. It should be noted that teachers should receive training and continuous education to improve their knowledge specifically in chemistry and physics topics.
Keywords: *Spiral Progression Approach, Science Teachers, Science Curriculum, Readiness.*

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I. INTRODUCTION

Debates on issues about the quality education provided to students has been shaken the system of education Philippines throughout the history. Diverse curricula and approaches have been imposed, and updates have been implemented in the belief that this will improve the overall quality of education. Philippine lawmakers, in collaboration with the Department of Education, increased their efforts and submitted a slew of proposals for science curricula that aim to improve the level of knowledge of students in the country. Thus, the Philippine government initiates the use of a spiral progression approach.

The "Act Enhancing the Philippine Basic Education System," also known as Republic Act 10533 of the Philippines, was the legislative act to enforce in every classroom the spiral progression approach in the Philippines in 2012 [1]. This act will not only will this act extend basic education by two years and reaffirm the importance of universal kindergarten, but it will also establish the standards and guidelines that the Department of Education must adhere when designing a curriculum [2]. She also reiterated that a spiraling progression approach will be used to ensure students' mastery of knowledge and skills at each level according to one provision of this prescription. Learners are exposed to various concepts and disciplines in a step-by-step spiral progression approach until they have mastered the material at increasing levels of complexity.

Based on the Revised Basic Education Curriculum (RBEC), Secondary science is divided into four categories, which are Integrated Science, Chemistry, and Physics. In this curriculum, Integrated Science was taught in the first, Biology in the second, Chemistry in the third, and Physics in the fourth year [3]. However, in the new curriculum, those four major areas are all taught to students at the same time rather than sequentially. This was implemented in 2012. Aside from that, it has been said that to reflect the shift in emphasis, integrated science was renamed Earth Science [4].

For science teachers, this framework will assist them in developing lesson plans, activities, and projects that do not stop at the point of identification. Within the world of science, there is a progression and continuity that must be maintained. Progression refers to students' unique learning journeys and how they obtain, utilize, and improve their skills in increasingly challenging situations. An important part of keeping the education system going is making sure that students have enough challenge and progress to keep them interested and motivated through their education. So, a spiral progression approach is a way to use the spiral curriculum that moves in a logical way.

Although this spiral curriculum has numerous positive effects, it has also been observed to present significant challenges to science teachers. The implementation of the Spiral Progression Approach had a massive effect on science teachers, who were the ones who were the most affected by the change. Many academic studies show that some Secondary Science Teachers are having a hard time at work because of the difficulties they have having to teach the new curriculum. It is the most accurate way to state that not all science teachers are enrolled in the General Science major, which prepares them to teach all areas of science. Thus, this investigation was carried out as part of this endeavor.

1.1.1 Theoretical Framework

Apart from extending the basic education cycle, the curricula for the subjects included in this new program are distinct from those in the previous one. The Philippine K–12 science curriculum is, overall, learner-centered, and inquiry-based, with an emphasis on using evidence to establish rationalizations. Unlike previous curricula, which emphasized fragmented and disintegrated content, the K–12 curriculum emphasizes the development of critical thinking, creative thinking, problem-solving, teamwork, and in-formation literacy [5].

The proponent of spiral progression approach is Jerome Bruner based on John Dewey's principle. In the book The Process of Education, Bruner argues that curricula should be structured in such a way that they follow a spiral progression from simple to complex and require students to continuously build on their prior knowledge (1960/1977).

It is believed that people come up with new ideas based on what they have already learned. People learn the skills and knowledge they require one at a time, but it takes time for them to do so. The best way to accomplish this is to go over the main concepts again and make connections between new knowledge or skills and the ones you already possess. In contrast to the old curriculum, which required students to learn a large amount of information in a short period of time, the K-12 curricula are decongested and simple to comprehend. In addition, it places a strong emphasis on understanding to achieve mastery, and it ensures that the transition between grade levels and the continuum of skills is seamless by spiraling through the content [6]. Students were expected to learn a thorough knowledge, skills, and values in a short span of time under the old curriculum. However, this did not happen. In the past, learning was more focused on the content, which had been broken up and disintegrated over time (p. 4). The K to 12 Education Program tries to address these issues by changing the way things are done.

A spiral curriculum of Bruner is a method of teaching in which the same subjects are revisited frequently throughout a student's educational journey [7]. Bruner postulated three distinct stages of human cognition: Enactive, or manipulating and interacting with objects, Iconic, or manipulating images of objects or phenomena, and Symbolic, or manipulating representations of actual objects or phenomena [8]. Thus, assuring that learner is challenged and progressed in a predictable curricular landscape is the goal of continuity. So, a spiral progression approach is a way to implement a spiral curriculum.

Teachers are still having difficulty implementing the Spiral progression in their classrooms, de-spite the efforts of the Department of Education to improve students' performance using the Spiral progression. A flaw in the spiral design is the rate at which new concepts are introduced, which is either too fast or too slow, resulting in less effective learning [9]. A concept is given the same amount of time to mastery regardless of how easy or difficult it is to grasp. It is critical for teachers to have a thorough understanding of every scientific concept. Given that a single concept requires the attention of an entire class period, it is difficult to plan instruction in such a way that students learn all the prerequisite skills before moving on to more difficult concepts.

The Philippine Department of Education (DepEd) believes that the spiral progression approach is the most effective way to address the country's educational challenges. The findings of this study may provide insight into the perspectives of science teachers on the spiral progression approach. It is critical to gain an understanding of their perspectives and insights into the approach because teachers are the primary drivers of curriculum development. If teachers do not have a thorough understanding of the curriculum, they will be unable to implement it correctly and efficiently in their respective teaching environments.

1.1.2 Research Question

The purpose of this study was to determine assessment of Science Teachers to the Spiral progression approach which will serve as the framework in school program design. Specifically, it sought answers to the following questions:

i. What describes the profile of the science teachers in terms of age, number of years in teaching, educational attainment, area of specialization, extent of training attended?

ii. How do science teachers assess the level of readiness of spiral progression in terms of technical support (Monitoring, Mentoring, Motivation), school facilities, level of readiness in terms of the extent of Knowledge?
iii. What describes the extent of the positive experience encountered by the science teachers in the implementation of the spiral progression approach?
iv. Is there a significant relationship between the profile and the science teacher's perception as to the Level of Readiness in terms of the extent of knowledge in the subject matter?

II. MATERIALS AND METHODS

1.2.1 Research Design

This research utilized a mixed method incorporating both quantitative and qualitative method. For the quantitative data, a Descriptive-correlational research design was used in assessing the relationships between the profile and the science teacher's perception as to the Level of Readiness in terms of the extent of knowledge in the subject matter. A thematic approach was used to describe the challenges and the experiences the science teachers have in the spiral progression approach.

1.2.2 Sampling and Population

The participants in this study were science teachers from public secondary schools in the Narra del Norte District who were asked to participate. No matter what field of specialization they teach in, science teachers are included in this category. G-Power analysis was used to select the participant to ensure that the desired number of participants were taken into consideration.

1.2.3 Research Instrument and Data Gathering Procedure Sampling and Population

The research instrument was retrieved and adopted from the TIMSS science teacher survey questionnaire which was used to measure the perceptions of the secondary science teachers on the extent of implementation of a spiral progression approach in teaching science. A questionnaire was distributed in two parts: Part I sought information on the profile of secondary school teachers, and Part II solicited information on the perceptions of teachers about technical support, facilities, the extent of their knowledge, the extent of their training, and the extent of positive experiences they encounter on the implementation of spiral progression. A different scale was used on the given variables. The responses were measured with the following descriptions and numerical weights below.

The weight descriptions for the Level of Readiness in Spiral Progression Implementation in terms of School Facilities are as follows: A great deal (4), Quite a lot (3), A little (2), and Not at all (1). To interpret the result on the level of readiness on spiral progression Implementation in terms of school facilities the scale and description; Extremely High (3.25 – 4.0), High (2.50 – 3.24), Moderate (1.75 – 2.49), Low (1.00 – 1.74) were used

The Level of Teachers' Readiness in Terms of the Extent of Their Knowledge to Topics is measured on a scale consisting of Strongly Agree (4), Agree (3), Disagree (2), Strongly Disagree (1). The following scale and descriptions were used to interpret the results on the level of readiness on spiral progression implementation in terms of school facilities: Very Well Mastered (3.25 – 4.0), Somewhat Mastered (2.50 – 3.24), Not Well Mastered (1.75 – 2.49), Poor Mastery (1.00 – 1.74) were used.

To determine the extent of positive experience with the spiral progression approach implementation, participants were asked to rate their positive experiences on a scale from 1 to 5, with 5 being the highest and 1 being the lowest, and their responses were interpreted as follows: Excellent (4.21 - 5.0), Good (3.41 - 4.20), Fair (2.61 - 3. 40), Poor (1.81 - 2.60), Bad (1.0 - 1.80).

1.2.4 Data Analysis

The frequency counts, mean, weighted mean, and standard deviation was used for descriptive data. Further, a Multiple Linear Regression was utilized to determine the significant association between the profile and the science teacher's perception as to the Level of Readiness in terms of the extent of knowledge in the subject matter. In addition, in the case of qualitative questions, an open coding is carried out by selecting the keywords or phrases used and an axial coding in which categories and codes will be linked and then connected. with key terms. The researcher will map the results of the study to develop a framework for school program design to be adopted by the school.

III. RESULT AND DISCUSSION

The results obtained are as discussed below

Table 1: Respondents' Profile

Variables		Frequency	Percent
Age	under 25	1	4.8
	25 - 34 years old	5	23.8
	35 - 44 years old	12	57.1
	45 - 54 years old	2	9.5
	55 years old or more	1	4.8
Teaching Experience	5 years and below	2	9.5
	6 - 10 years	9	42.9
	11 - 15 years	6	28.6
	16 - 20 years	1	4.8
	21 years and above	3	14.3
Educational Attainment	Bachelor's degree or Equivalent	13	61.9
	Master's Degree of PhD	8	38.1
Area of Specialization	Biology	9	42.9
	General Science	9	42.9
	Science Education	2	9.5
	Others (Master of Education Management)	1	4.8
Total		**21**	**100.0**

The table above shows the profile of the respondents. The respondents' profile is shown in the table above. As can be seen, the majority of respondents are between the ages of 35 and 44 years old; there is only one (1) respondent under the age of 25 and one (1) respondent 55 years or older; two (2) respondents between the ages of 45 and 54; and five (5) respondents between the ages of 25 and 34 years old. According to the respondents' teaching experience, most of them had 6 – 10 years of experience, six (6) of them already had 11 – 15 years of science teaching experience, three (3) of them already had 21 years or more of teaching experience, and there was only one (1) for 16 – 20 and 5 years or less of teaching experience, respectively. Furthermore, it can be deduced from the table that many of the teachers only had a bachelor's degree or an equivalent qualification. Only 8 respondents have a master's degree, out of a total of 21 respondents. As can be seen in the table, nine of the respondents are specialists in Biology or General Science. While pursuing their Masters' Degree, only one (1) of them pursued a Science Education major, while the other two (2) pursued Educational Management, which was a non-science-related major.

The profile of the teachers has something to do with being in their profession. Teachers' ability to be the most influential person in a classroom is significantly influenced by their age, years of experience, and field of specialization. Several of Rice's findings, which were published in her book, found that teacher experience, as well as teacher preparation programs and degrees, were all associated with improved teacher effectiveness [10]. Teacher preparation programs and degrees were also found to be associated with improved teacher effectiveness. It's even more likely that teachers who get more education help their students with math and science at high school, especially if they get their degrees from schools that teach those fields.

Table 2: Extent of Trainings Attended by the Teachers

Training	N (21)	Average Number of Hours
Within-district workshops or institutes focused on a specific topic, provided by or within the district (For private schools, including workshops offered by the school.)	12	20.76
Out-of-district workshops and institutes focused on a specific topic, provided outside of the district (For private schools, include workshops offered outside the school.)	11	20.38
Teacher collaboratives or networks, connecting teachers regionally, state-wide, nationally, or internationally (do not include activities described in questions a through	12	15.62
Out-of-district conferences, provided by professional organizations, regional centers, the state department of education, etc.	11	17.43
Immersion or internship activities, in which a teacher spends a concentrated period working in a lab or industrial setting with professionals in his subject area.	9	10.86
The teacher resource center, which provides professional development materials and is staffed by a lead or resource teacher.	9	12.00
Committees or task forces focusing on curriculum, instruction, or student assessment.	8	8.95
Teacher study groups that meet regularly, in face-to-face meetings, to further your knowledge in your discipline or of pedagogical approaches.	14	10.52

other forms of organized professional development related to your science teaching. (Do not include reading or other work you have done on your own.) Specify ____________________________	7	5.90

Table 2 above shows the extent of training attended by the science teachers. As observed the most numbered of training attended by the teachers in terms of the average hours is the seminars and workshops organized within the district with 20.76 average hours from among the 12 respondents which focuses on the specific topics. An average of 20.38 hours were also recorded as the second-highest average hours on the training of teachers provided by out-of-district institutes.

Eventually, from the time that the spiral progression was made available, the number of hours spent on training in teaching in line with their subject of specialization has averaged a maximum of 20 hours, with the remainder being less than 20 hours. This simply implies that teachers do not have adequate training in their areas of specialization. According to R.A. 10912, also known as the Continuing Professional Development Act of 2016, teachers are required to earn a minimum of 45 CPD units within three years [11]. Accordingly, continuous teacher training involving all important players in science communication, such as the media and researchers at research institutions as well as universities and business companies, may aid in filling in the gaps between the connection of theoretical knowledge and practical examples, thereby in-creasing the students' perception of science [12]. Teachers' training is an ongoing process that pro-motes teachers' teaching skills, assists them in mastering novel knowledge, and in developing better or newer proficiency, all of which aid in improving students' learning [13]. A positive impact on students' attitudes, as well as their academic performance, has been demonstrated in the past when teachers receive on-going professional development [14, 15].

Table 3: Assessment on Spiral Progression in terms of the Level of Technical Support provided to Teachers (Monitoring, Mentoring, Motivation)

	Frequency	Percent
once a week	7	33.3
2 or 3 times a week	10	47.6
Every other month	1	4.8
once or twice a year	3	14.3
Total	21	100.0

The level of technical support to teachers through monitoring, mentoring, and motivation was shown in the table above. It reveals that teachers have twice or thrice times received mentoring from their respective school heads and master teachers. Seven (7) of the respondents said that they receive their mentoring once a week. Three (3) from among the 21 respondents receive technical support once or twice a year and only one (1) respondent said that he received the mentoring he needed for every other month.

The frequency with which technical assistance is provided to teachers is shown in Table 3 above. In this case, science teachers from Narra del Norte District received sufficient and appropriate technical assistance regularly, with some receiving assistance as frequently as twice or three times a week through their School Learning Action Cell (SLAC). Mentoring assists teachers in a variety of areas, including curriculum, teaching strategies, and interpersonal communication skills. Subsequently, technical assistance such as mentoring, and coaching is considered essential in ensuring that programs are implemented effectively, and that higher or better learning outcomes are achieved in the end [16].

Table 4: Assessment on Spiral Progression Implementation in terms of School Facilities

	Mean	SD	Interpretation
Shortage of science laboratory	2.14	1.108	Moderate
Shortage of laboratory apparatus and equipment	2.24	1.179	Moderate
Shortage of other instructional equipment for students' use	2.29	1.056	Moderate
Shortage of equipment for your use in demonstrations and other exercises	2.24	1.136	Moderate
Inadequate physical facilities	2.29	1.102	Moderate
Shortage of textbook or supplementary materials	2.52	.981	High

*** Extremely High (3.25 – 4.0), High (2.50 – 3.24), Moderate (1.75 – 2.49), Low (1.00 – 1.74)**

In terms of school facilities, teachers from Narra del Norte District believed that there is a high shortage of textbooks and supplementary materials needed for teaching which contributes to the learning of the students. It can also be seen that there is a moderate shortage of science laboratories, laboratory apparatus, and equipment, instructional equipment for demonstration purposes, and other exercise and other physical facilities.

These shortages pose a big challenge on the part of the teachers and the school administrators to enhance the learning of the students.

Science is a discipline in which physical facilities such as laboratories, apparatus, equipment, and other similar items are required to generate knowledge. The learning environment's rules for engagement include the facility, which is more than just a container for the educational process. The layout and design of a facility benefits students, teachers, and members of the community because it makes them feel more at ease in their surroundings (Jeffery A. Lackney, n.d).

Table 5: Assessment on Spiral Progression of Teachers' Readiness in Terms of the Extent of Knowledge to Topics

Topics	Mean	SD	Interpretation
Earth's physical features (layers, landforms, bodies of water, rocks, soil)	3.29	0.72	Very Well Mastered
Earth's atmosphere (layers, composition, temperature, pressure)	3.33	0.73	Very Well Mastered
Earth processes and history (weather and climate, physical cycles, plate tectonics, fossils)	3.24	0.70	Somewhat Mastered
Very Earth in the solar system and the universe (Interactions between Earth, sun, and moon; relationship to planets and stars)	3.29	0.72	Very Well Mastered
Human body - structure and function of organs and systems	3.29	0.64	Very Well Mastered
Human bodily processes (metabolism, respiration, digestion)	3.24	0.54	Somewhat Mastered
Human nutrition, health, and disease	3.29	0.56	Very Well Mastered
Biology of plant and animal life (diversity, structure, life processes, life cycles)	3.33	0.66	Very Well Mastered
Interactions of living things (biomes and ecosystems, interdependence	3.38	0.59	Very Well Mastered
Reproduction, genetics, evolution, and Speciation	3.19	0.68	Somewhat Mastered
Classification of matter (elements, compounds, solutions, mixtures)	3.10	0.94	Somewhat Mastered
Structure of matter (atoms, ions, molecules, crystals)	3.00	0.89	Somewhat Mastered
Chemical reactivity and transformations (definition of chemical change, oxidation, combustion)	2.90	0.77	Somewhat Mastered
Energy and chemical change (exothermic and endothermic reactions, reaction rates)	2.81	0.81	Somewhat Mastered
Physical properties and physical changes of matter (weight, mass, states of matter, boiling, freezing)	3.10	0.94	Somewhat Mastered
Subatomic particles (protons, electrons, neutrons)	3.00	0.95	Somewhat Mastered
Energy types, sources, and conversions (chemical, kinetic, electric, light energy; work and efficiency)	2.95	0.92	Somewhat Mastered
Heat and temperature	2.95	0.92	Somewhat Mastered
Wave phenomena, sound, and vibration	2.90	0.94	Somewhat Mastered
Light	2.86	0.85	Somewhat Mastered
Electricity and magnetism	2.71	0.78	Somewhat Mastered
Forces and motion (types of forces, balanced/unbalanced forces, fluid behavior, speed, acceleration)	2.95	0.92	Somewhat Mastered

*** Very Well Mastered (3.25 – 4.0), Somewhat Mastered (2.50 – 3.24), Not Well Mastered (1.75 – 2.49), Poor Mastery (1.00 – 1.74)**

Gleaning from the table above science teachers are "very well mastered" in Earth Science and Biology. Although they are "somewhat mastered" in chemistry and physics the rate shows that it is nearly "not well mastered. The result agreed on the specialization the teachers have during their bachelor's degree. Relating their specialization, most of them graduated as biology and general science major, hence they have mastered the topics related to earth science and biology. The Standard Deviation (SD) also implies that the respondents' degree of agreement on the mastery of the topics is quite the same. Standards-based, teachers must be well-versed in science, learning, and science education to foster an environment in which they and their students can collaborate as active learners [18].

Based on the result of Table 5, the standard of teachers as "learning specialists" is not easily attained in a quiet manner. Correspondingly, teachers are supposed to perform and explore innovative information that is essential to their basic professional practice in their respective fields as professionals in their field [19]. This is consistent with the findings of Guimaraes and colleagues (2014), who discovered that teachers with more content knowledge have a significantly larger impact on students' academic performance, with the influence being even stronger at the school level [20].

Table 6: Rating on the Positive Experiences of Science Teachers on Spiral Progression

Rating Description	f	Percent
Poor	2	9.5
Fair	7	33.3
Good	10	47.6

Excellent	2	9.5
Total	**21**	**100**

***** *Excellent (4.21 - 5.0), Good (3.41 - 4.20), Fair (2.61 - 3. 40), Poor (1.81 - 2.60), Bad (1.0 - 1.80)*

Reflected from the table above is the teachers' rating on their degree of positive experience towards the implementation of the spiral progression. The majority (10) of the teachers rated their experiences as good, seven (7) among them rated it as fair, and two (2) rated it as poor and excellent. Further, it can also be inferred from the table that most of the teachers have good experience towards spiral progression.

The results further showed that teachers have good experiences with the given curriculum. From the culled statement of the teachers, one of the teachers said that "All of my experiences are very coherent to my professional development though it is timing it is gives us the inspiration to do more". Another one said, "Although some topics were not very well mastered, because of the spiral progression approach, I learned to study and review them and be prepared before teaching". Moreover, as being said by one of the respondents that "For me, it is really good to have a spiral progression approach but sometimes there are lessons that are not in a spiral way." In addition, other says "It is fun to teach science teaching using spiral progression approach because you can focus to all branches in science." However, some of the respondents said that "there was lack of supplementary materials for the enrichment of science education to implement the spiral progression." It may be difficult for some teachers, especially those who have been in the field for a long time, to adapt to the new curriculum, but they are making their best efforts [9].

Table 7: Significant Relationship between the Profile and Level of Readiness

	Coefficients	Standard Error	t Stat	P-value
Age	-0.084	0.060	-1.399	0.187
Educational Attainment	0.080	0.086	0.931	0.370
specialization	-0.063	0.027	-2.372	0.0353
Teaching experience	0.078	0.032	2.457	0.0302
Meetings attended	-0.003	0.045	-0.063	0.9512
Mentoring received	0.068	0.039	1.758	0.1043
Ave. Hours of Trainings	0.006	0.002	2.768	0.0170

**Significant at $p<.05$*

A multiple linear regression analysis was run to determine the significant relationship between the profile of the respondents and their level of readiness. As shown, the computed p-values of 0.035, 0.030, and 0.017 of specialization, experience, and training respectively were less than the significance level of 0.05. This leads us to the conclusion that there is a significant relationship exists between the respondents' profiles in terms of specialization, experience, and training and their level of readiness. This implies further that the level of readiness of the teachers is dependent on their specialization, experience, and training.

Table 7 demonstrated that the profile of the teachers such as their field of specialization, the number of years in teaching, and the extent of the training they have attended is significantly associated with their level of readiness in terms of the extent of knowledge of the topics the teacher possesses. The number of years of service a teacher devotes to the teaching profession improves his or her teaching profession in terms of mastery of content and delivery of instruction, and the number of seminars and training designed and required to be attended by the teachers aligned to their needs in the teaching world were found to be significant in increasing their level of readiness and performance in the teaching world were found to be significant in increasing their level of readiness and performance [21].

IV. CONCLUSION

Most respondents are between the ages of 35 and 44, and others belong to below 35 and above 44 years of age. According to the respondents' teaching experience, most had 6–10 years, six (6) had 11–15 years, three (3) had 21 years or more, and only one (1) had 16–20 and 5 years or less. Many teachers only had a bachelor's degree or an equivalent qualification. In terms of specialization, most of them specialized in Biology and General Science. The district-sponsored seminars and workshops are the most frequented training by teachers, with an average of 20.76 hours per respondent. The second-highest average hours were recorded on teacher training provided by out-of-district institutes at 20.38.

Teachers have been mentored by their school principals and master teachers twice or three times a week. Technical support has been given through School Learning Action Cell administered by the school. There is a severe lack of textbooks and teaching materials that contribute to student learning. A moderate shortage of science laboratories, laboratory apparatus, and equipment, instructional equipment for demonstration, and other physical facilities can also be seen. Earth Science and Biology teachers are "very well mastered". In chemistry and physics, they are "somewhat mastered," but not "well mastered."

Most teachers had positive spiral progression experiences. Moreover, specialization, experience, and training have a significant relationship with the teacher's level of readiness towards the implementation of the spiral progression approach.

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