

Spiral Progression Approach in Teaching Mathematics: an Evaluation of Teachers' Performance

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Abstract

This study examined how well Mathematics teachers understand, implement, and use the Spiral Progression Approach. The results were used to create a Mathematics Spiral Progression Enhancement Program. Thirty-seven Mathematics teachers took part in the study, which used a descriptive-correlational research design. Data came from a researcher-made questionnaire, a teacher performance assessment, and official IPCRF records. The study used descriptive statistics like frequency, percentage, mean, weighted mean, and mean percentage score to describe the data and inferential statistics to find significant relationships between variables. The results showed that teachers had a satisfactory understanding of the Spiral Progression Approach and performed satisfactorily, as shown by their IPCRF ratings. However, their knowledge of Mathematics content standards was lower than expected, which suggests a need to improve curriculum-related skills. Teachers often used strategies linked to the Spiral Progression Approach, especially in organizing lessons, sequencing, and gradually introducing mathematical concepts. However, teachers had difficulty connecting what students already knew to new ideas and linking lessons across different grades. Most demographic factors did not significantly affect teacher performance. There was a strong link between how teachers rated the Spiral Progression Approach and their knowledge of Mathematics content standards, and teachers with more experience had better IPCRF performance. Based on these results, a Mathematics Spiral Progression Enhancement Program was suggested. This program focuses on curriculum unpacking, mapping content standards, integrating concepts, transfer-based learning, peer coaching, lesson study, mentorship, and ongoing professional development. Its goal is to improve teachers' curriculum knowledge and teaching practices and to help them use the Spiral Progression Approach more effectively in Mathematics.

Keywords: Individual Performance Commitment and Review Form; Spiral Progression Approach; teacher performance assessment.

INTRODUCTION

Rationale

The spiral progression approach is a constructivist teaching method widely attributed to Jerome Bruner that refers to a curriculum design in which key concepts are presented repeatedly throughout a set of courses, with developing layers of difficulty and complexity, or in diverse applications such as mathematics. Some mathematics teachers also struggle to help their students grasp concepts because of mismatches between their teaching styles and their students' learning styles (Mangwende, E. et al., 2020).

The misalignment between teachers' instructional methods and students' learning styles has significantly contributed to the ineffectiveness of the spiral progression approach. Thus, there is a need to investigate the implementation of this approach in mathematics teaching to generate insights into how teachers' performance can be evaluated and supported to improve students' mathematical learning experiences. Evaluating teacher performance is essential for promoting quality instruction and enhancing student learning outcomes in mathematics (Department of Education, 2017; Hattie, J., 2009).

In mathematics education, evaluating teachers' performance is a central step in ensuring high-caliber instruction. Ward (2013) stated simply that teaching effectiveness is defined in terms of student learning. However, the concern arises when the Philippines has consistently ranked in the Programme for International Student Assessment (PISA) as 77th among 81 countries in Reading, Math, and Science, with scores significantly below the Organization for Economic Cooperation and Development (OECD) average, indicating a 5-6 year learning gap; Filipino students performed poorly, especially in creative thinking (second to last), though there were slight improvements from their first participation in 2018, with girls outperforming boys in reading and math (OECD, 2023). With the conflicting promise of implementing the spiral progression approach and the scores garnered from PISA, this raises the need to dig deeper into assessing teachers' effectiveness in mathematics instruction, explicitly focusing on utilizing the spiral progression approach (SPA). This research will address the underlying factors that contribute to mathematics teachers' performance in utilizing the spiral progression approach in classroom instruction. The Spiral Progression Approach has long been used as a primary approach in teaching Mathematics from Grades 7 through 10. This approach covers all necessary concepts and areas in mathematics throughout the four (4) years of Junior High School. This was so when the Department of Education (DepEd) accepted and altered the Basic Education curriculum into the K-12 curriculum to increase the worldwide recognition of Filipino graduates and professionals (Dizon et al., 2019). With its implementation came the Spiral Progression Approach (SPA) in teaching, which is at its core. Even more so, the spiral progression approach in teaching mathematics is still utilized in the introduction of the new curriculum, the Matatag Curriculum. According to DepEd Order No. 010, s. 2024, the Matatag Curriculum still uses the spiral progression approach but with decongested content and a greater focus on foundational skills, refining the spiral method to reduce cognitive overload and ensure mastery by revisiting core concepts with increasing complexity. The Matatag framework keeps the idea of gradual, deeper learning but streamlines it for better effectiveness.

As a constructivist approach, this approach exposes students to a wide variety of concepts that were given the same amount of time, whether easy or difficult ones- mathematics areas that range from Algebra to Mathematical Physics. All introductory concepts that encompass all areas in mathematics are tackled and revisited in the coming year levels, but each time, a varying level of difficulty and complexity is introduced. As a result, mathematics teachers were expected to become more than just prepared to teach mathematics effectively across different learning styles of students from different grade levels. Further, teachers encountered various challenges, especially those teaching mathematics and science.

According to Ahmad, N et al. (2016), various studies were conducted to determine the effectiveness of the approach in the field of science, but few in the field of mathematics. A study from a Junior High School in Zambales shows that the approach received a satisfactory rating from the students' perspective. Similarly, a survey from Visayas State University that investigated the Spiral Progression Approach (SPA) in Teaching Science and Mathematics brought in varying results in various subjects. Thus, these studies

concluded that teachers in these subjects must be experts and must undergo rigorous training to improve their strategies and become globally competitive educators (Batidor, P. G. et al., 2021).

At Argao Secondary Schools, the Spiral Progression Approach (SPA) has sparked a range of opinions among mathematics teachers. Some who have tried it are convinced that the approach is not as effective as the previous discipline-based approach in teaching mathematics. Others believe that the approach is best suited for top learners who can easily connect between previous and succeeding concepts. However, students with lower retention need further help from their mathematics teachers, as concepts are revisited with varying degrees of difficulty when SPA is utilized. This often leads to teachers having to reteach the same concepts or lessons from the beginning, making timeliness a challenge in meeting all the necessary competencies in a topic.

In summary, this research will evaluate mathematics teachers' performance in mathematics instruction using the spiral progression approach. The drive arises when the spiral progression approach seems to have conflicting promise in various PISA results, which ranked the entire Philippines at the bottom of the list. The Spiral Progression will be placed at the center to determine whether it is as effective as promised and promoted, along with the implementation of the K-12 curriculum. This will also be a call on whether the approach is effective, used effectively, or must be abandoned as ineffective. As PISA investigated students' performance by assessing them, this study will also investigate teachers' performance in implementing the said approach.

Literature Review

Profile of the Mathematics Teachers

A comprehensive understanding of the state of mathematics education in the Philippines requires an examination of several variables, including age, length of service, position, educational attainment, and the quantity and quality of seminars and trainings attended. Luzano's (2024) research explores the experiences of math teachers in the Philippines, providing insight into their evaluation methods. This narrative review sheds light on the evaluation strategies used by math teachers across the nation, which may or may not reflect their training and educational background.

Furthermore, the Dicedquin et al. (2023) study highlights the value of professional development initiatives for math educators in raising the standard of math education across the K–12 curriculum in the Philippines. This emphasizes how important it is for educators to keep learning and growing since it may influence their level of education and efficacy as educators. Furthermore, Sionicio & Besmonte's research from 2023 focuses on the difficulties experienced by secondary math teachers in the Bicol Region and offers insights into their backgrounds and experiences.

In terms of educational achievement, the study by Quilang & Lazaro (2022) offers an insight into the academic backgrounds of future educators by focusing on aspiring secondary mathematics teachers in state colleges located in the Northeastern Philippines. This may reflect the educational backgrounds of the nation's present math professors. Furthermore, Flores' (2019) study on the teaching competences of senior high school teachers in Batangas City provides a foundation for understanding the educational characteristics of mathematics educators in certain areas. The study conducted by Doño & Mangila (2021) on the impact of mathematics instructors' participation on student motivation and the seminars and trainings they attended highlights the significance of professional development activities. This emphasizes how involvement and ongoing learning can improve instructional strategies.

In summary, a thorough grasp of the characteristics of math teachers in the Philippines can be attained by combining the results of these studies. The country's mathematics education environment is shaped by a few factors, including age, sex, length of service, position, educational attainment, participation in seminars and trainings, and degree of engagement in professional development activities. By addressing these factors, specific interventions and policies that improve student performance and the quality of mathematics instruction in the Philippines can be implemented.

The Levels of Performance of Mathematics Teachers Utilizing the Spiral Progression Approach

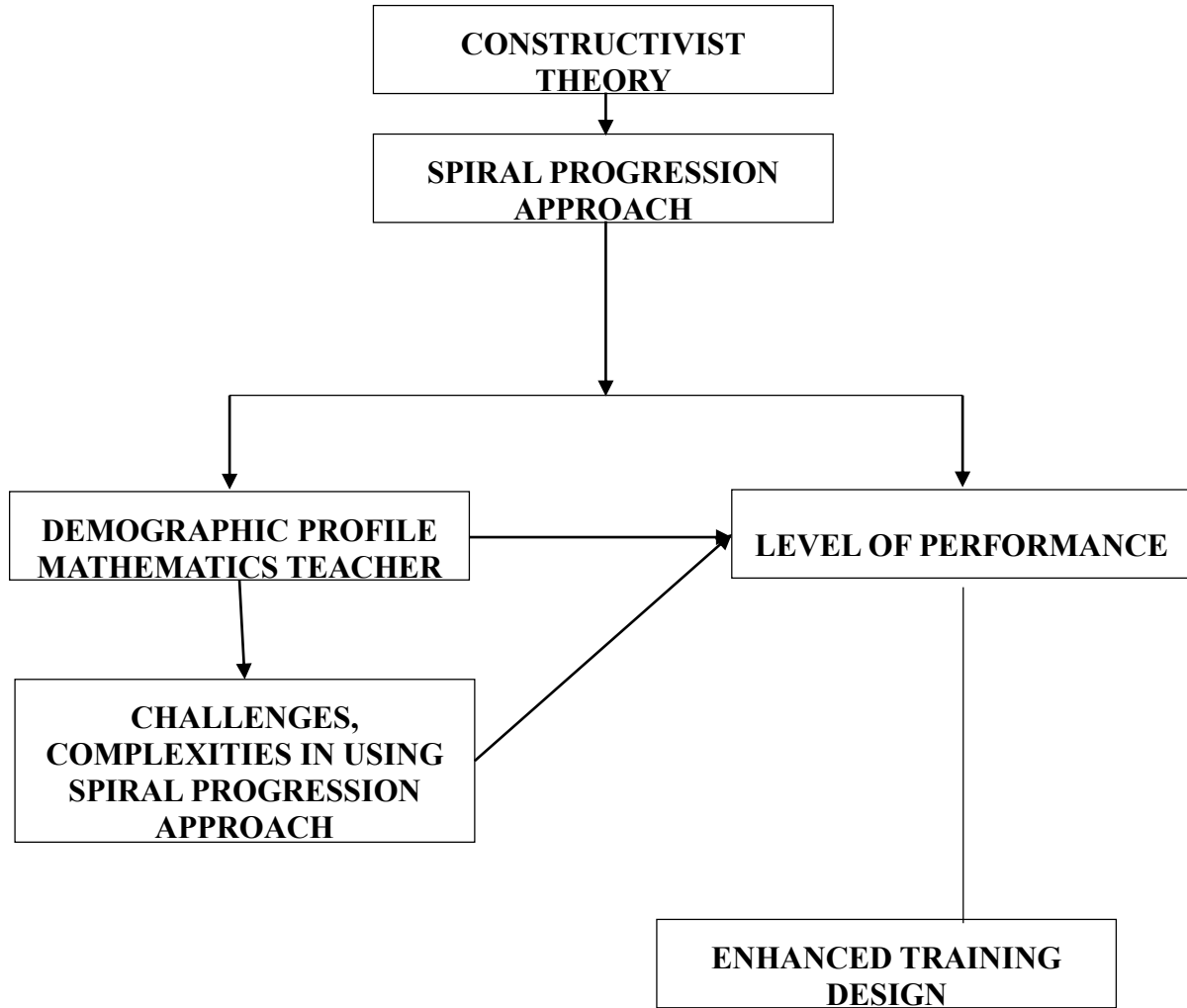
Implementing the spiral progression strategy successfully depends on teachers' willingness to accept it. Descriptive analyses have shed light on the elements affecting instructors' preparedness and the need to use this strategy to achieve the objective of producing competent graduates (Cebe, 2023). Furthermore, it has been noted that a useful tactic in teaching mathematics is integrating the development of critical thinking abilities within a spiral method, in which ideas are reviewed and expanded upon throughout grades (Jamil, 2024).

Many teaching strategies have been examined in mathematics education to see how they affect students' learning outcomes. For example, research has shown that the Realistic Mathematics Education (RME) approach improves students' comprehension of mathematical ideas and strengthens their problem-solving abilities (Dinglasan et al., 2023; Tarim & KÜTKÜT, 2021). In a similar vein, learning outcomes and mathematical connection ability have been improved with the development of SAVI approach-based instructional materials (Siagian et al., 2020).

Research on teachers' comprehension of and preparedness to use differentiated approaches in assessment procedures has also been conducted in relation to mathematics education (Yessingeldinov et al., 2022). Furthermore, the application of cooperative learning methodologies has demonstrated potential in raising students' performance on fraction word problem-solving, underscoring the significance of utilizing a variety of instructional tactics to improve learning (Atteh & Adusei, 2022).

To sum up, the spiral progression technique is a highly effective pedagogical tool in mathematics education that fosters student involvement, critical thinking, and problem-solving abilities. This method improves academic achievement by fostering a deeper understanding of mathematical concepts through gradual revisits and deepening. Teachers are key players in the successful implementation of this strategy, and their preparedness and knowledge of cutting-edge teaching techniques are critical to its success. Using a variety of teaching strategies, such as the RME and SAVI methodologies, helps improve students' mathematical skills and learning experiences. Overall, research on mathematics education emphasizes the value of flexible, student-centered teaching strategies that meet the various requirements of students and, in the end, produce better learning outcomes.

Figure 1. Theoretical Framework of the Study



The study's conceptual framework shows how crucial variables affect spiral progression mathematics teacher evaluation. The Profile of Mathematics Teachers on the left covers age, duration of employment, educational achievement, and seminars and trainings attended. This profile affects Performance Using the Spiral Progression approach, which includes knowledge of the methodology, content standards continuity, and IPCRF performance rating. Challenges and Shortcomings Faced by Teachers—student, teacher, and school—impact teachers' level of performance. Arrows show how teachers' profiles affect their performance. This process model stresses how teacher traits, instructional approaches, and educational obstacles are linked.

The study hypothesizes strong correlations between mathematics teachers' profiles and performance. Constructivist learning theory emphasizes teacher and student participation in learning, according to the literature. According to Nur et al. (2023), teachers' professional development, measured by their education and seminars, greatly affects their teaching efficacy and adaptation to new instructional approaches. Technology and critical thinking are also crucial to spiral progression mathematics training (Hanifah, 2024). This paradigm supports the idea that professional development and continuous learning help teachers overcome educational problems and improve student results (Thompson, 2020; Szabó et al., 2020). By examining these interconnected issues, the study seeks to identify the determinants that affect Philippine mathematics instruction quality.

Statement of Purpose

This study aims to evaluate the performance of Mathematics teachers in implementing the spiral progression approach at Argao National High School. Furthermore, this research study will dig deeper into the challenges they encountered in the spiral progression approach of the K to 12 curricula in terms of its complexity of implementation as a basis for an enhancement plan. Specifically, it seeks to address the following questions:

1. What is the demographic and professional profile of Mathematics teachers in terms of:
 - 1.1 Age;
 - 1.2 Length of service;
 - 1.3 Educational attainment; and
 - 1.4 Seminars and training courses attended?
2. What is the level of performance of Mathematics teachers in utilizing the spiral progression approach with respect to:
 - 2.1 Understanding of the basic principles of spiral progression;
 - 2.2 Knowledge of content standards and mapping; and
 - 2.3 Performance status based on their Individual Performance Commitment and
 - 2.4 Review Form (IPCRF) rating?
3. As perceived by the teachers, what is the assessment level of the spiral progression approach of the K to 12 curricula based on its complexity of implementation in terms of teaching strategies?
4. Is there a significant relationship between the teachers' performance:
 - 4.1 Demographic profile; and
 - 4.2 Assessment level of the spiral progression approach.
5. Based on the findings, what training design can be proposed to improve teacher performance in Mathematics instruction using the spiral progression approach?

Statement of Null Hypothesis

H01: There is no significant relationship between the teacher's performance and their demographic profile on the use of the spiral progression approach.

Ha1: There is a significant relationship between the teacher's performance and their demographic profile on the use of the spiral progression approach.

H02: There is no significant relationship between the teacher's performance and their assessment level of the spiral progression approach.

Ha2: There is a significant relationship between the teacher's performance and their assessment level of the spiral progression approach.

METHODOLOGY

This chapter describes the methods and procedures used by the researcher to collect and analyze the data. It presents the research design, research environment, participants, research instruments, data-gathering procedure, data analysis, and ethical considerations. Each component is discussed systematically to provide a clear understanding of how the study was conducted and how the findings, conclusions, and recommendations were derived.

Design

The study used a descriptive-correlational research design to examine the relationship between mathematics teachers' profiles and their performance. Descriptive research describes the characteristics of

a population, while correlational research examines the relationship between two or more variables (Fraenkel, Wallen, & Hyun, 2012). In this study, the descriptive component summarized the demographic and professional characteristics of the mathematics teachers. The correlational component examined the relationships among the teachers' profiles, performance, and identified challenges. This research design was appropriate for determining significant relationships among variables without implying causation (McMillan & Schumacher, 2014). The quantitative data were supplemented by qualitative data to provide a more comprehensive understanding of the findings.

The study evaluated the experiences and performance of mathematics teachers implementing the spiral progression approach using a quantitative research method. Quantitative research uses statistical, mathematical, or computational methods to examine measurable phenomena (Creswell, 2014). In this study, data were collected from mathematics teachers through structured surveys and questionnaires. These instruments assessed the teachers' age, length of service, educational attainment, and professional development. The surveys also evaluated the teachers' understanding and implementation of the spiral progression approach, as well as the challenges they encountered. The quantitative approach was appropriate for the study because it enabled the collection of a large amount of data that could be statistically analyzed to identify patterns, relationships, and trends (Babbie, 2020).

This study was conducted in Argao, Cebu. It focused on secondary school teachers who taught mathematics to students in Grades 7 to 10.

Participants of the Study

The population target of this study was Filipino public secondary school mathematics teachers. The study focused on mathematics teachers in Argao, Cebu. This location was chosen for its diverse teacher demographics and extensive spiral progression mathematics instruction. The study sought to explore the rural mathematics teachers' performance and the challenges by focusing on this location.

The study used complete enumeration due to the small population. This strategy ensured that subgroups like age, education, and service length (Creswell, 2014). This method offered extensive subgroup analysis and comparison, rendering it essential for studying mathematics teachers' spiral progression performance and profiles.

Complete enumeration was used. With this, the population was divided into strata by age, sex, education, and service time (Creswell, 2014). All subgroups were proportionally represented in the final sample. This study benefits from complete enumeration because it adequately collected all major mathematics teacher subgroups, permitting more precise and trustworthy comparisons across teacher profiles. This strategy improved the study's potential to find meaningful correlations and answer the research questions by appropriately representing the population's diversity (Fraenkel, Wallen, & Hyun, 2012).

Data Collection Tools

The tool for this research was adopted from Bartolome, D. J. P. (2023) and Reynoso, Marvie T. (2024)'s study titled *Assessing Teacher Involvement and Effectiveness in Implementing Spiral Progression within Mathematics Curriculum: A Philippine Perspective*, which talked about teachers' overall perception and effectiveness, resulted in varying conclusions on the use of the spiral progression approach. She adopted Bartolome's questionnaire and made some modifications to fit her study. Bartolome, who published his work a year earlier, developed a well-structured questionnaire that also fits this specific study; thus, both studies' questionnaires were utilized here. The last portion of the instrument was an adopted questionnaire from Baron, J. V. (2023) that mentioned the difficulties of implementing the spiral progression approach. Surveys were extensively used to collect quantitative data from a broad population and analyze trends,

correlations, and patterns (Creswell, 2014). Math instructors' age, length of service, educational attainment, and professional development activities were recorded on the demographic checklist. This scale accurately measured attitudes and beliefs, revealing respondents' perspectives (McLeod, 2019). Google Forms was used to distribute, complete, and collect survey data. Google Forms is ideal for managing massive survey data due to its automated data compilation and analysis (Gonzalez, 2019).

Three portions of the survey instrument matched the statement of the problem (SOP) components: First, a demographic checklist collected teachers' age, duration of employment, position, educational attainment, and seminars and trainings. This data helped analyze teachers' backgrounds and performance. The second portion assessed teachers' spiral progression method, subject standard continuity, and Individual Performance Commitment and Review Form performance by choosing the appropriate score. This section quantified the spiral progression method's effectiveness and use among teachers. The final portion was a Likert scale that presented student-, teacher-, and school-related obstacles and inadequacies. This section was vital to understanding spiral progression implementation challenges.

Data Gathering Procedure

In conducting this study, the researcher divided the data collection process into three sub-stages: pre-gathering, actual gathering, and post-gathering.

Pre-Data Gathering: In the preliminary phase of thesis writing, the researcher started by creating three titles for the title proposal, which was submitted to the dean of the Graduate School of Education for approval. After the approval from the dean, the researcher proceeded to make drafts of chapters one to three for the design hearing. After the design hearing, the researcher applied to the program coordinator. After the approval of the application, the researcher presented chapters one to three to the panelists. The researcher subsequently complied with the comments and suggestions of the panelists. Ethical considerations were given utmost importance throughout the conduct of the study, particularly in terms of ethical review, risk assessment, informed consent, regulatory compliance, and participant protection. Ethical review ensured that the study adhered to established ethical standards, particularly because it involved human participants. Risk assessment involved identifying potential physical, psychological, and social risks to the participants and ensuring that these risks were minimized and justified in relation to the potential benefits of the study. Informed consent involved providing participants with the necessary information about the study and ensuring that they understood the consent process and voluntarily agreed to participate. Regulatory compliance ensured adherence to applicable laws, regulations, and institutional policies. Participant protection safeguarded the privacy, confidentiality, rights, and overall welfare of the individuals involved in the study.

Actual Data Gathering: The advent of technology provided several advantages in the data-gathering process. To facilitate the efficient distribution, completion, and submission of the survey responses, Google Forms was used as the online data-collection platform. Each respondent was given approximately 20 minutes to complete the survey. To minimize incomplete and invalid responses, respondents' email addresses were collected for authentication and verification purposes. After the required number of responses had been obtained, the collected data were downloaded in spreadsheet format for subsequent organization, processing, and analysis.

Post Data Gathering: The researcher primarily used online platforms, such as Google Forms and Microsoft Forms, to facilitate the efficient distribution and retrieval of questionnaires. The distribution and retrieval of the questionnaires were carefully monitored and documented to ensure the quality and integrity of the data collected. Moreover, interviews were conducted either face-to-face or through online

video-conferencing platforms such as Zoom. The data-gathering process lasted for a maximum of two months because the respondents came from different schools. All collected data were stored on a secure computer, while the information obtained from the participants was kept in password-protected folders. In compliance with the principles of privacy, confidentiality, and anonymity, the researcher did not disclose or share any data obtained from the study without the participants' informed consent.

Data Analysis

The data gathered in this study were analyzed using weighted mean, frequency counts, and standard deviation. The level of significance was set at 0.05 probability. The researcher also sought the assistance of a statistician in the statistical treatment and analysis of the data, with the corresponding professional fees duly covered by the researcher.

For the interpretation of the responses, the following scoring tables were used. Table 1 presents the scoring scheme used to interpret the respondents' ratings of their level of performance, understanding of the Spiral Progression Approach, and knowledge of the content standards. The scoring scheme was based on the method used by Bartolome (2023) and the rating sheets provided by the Department of Education (DepEd).

Ethical Considerations

The study adhered to the ethical considerations, requirements, and procedures of the University of the Visayas. During the design hearing, the researcher presented the study to the panel members for review and approval and subsequently sought ethical clearance from the Research and Ethics Committee of the University of the Visayas, with Reference No. 2026-0331. The study involved teachers who voluntarily participated as respondents through an online survey.

Prior to using questionnaires adapted from previous studies, the researcher obtained permission from the respective authors or owners of the research instruments. Permission to conduct the study was also secured from the concerned school principals through formal letters requesting approval for the teachers to participate in the study.

During the conduct of the study, the researcher complied with the guidelines stipulated in the Notice to Proceed and Certificate of Acceptance issued by the Research and Ethics Committee of the University of the Visayas. An online questionnaire through Google Forms, together with the approved request letter, was disseminated to the participating schools through Facebook Messenger. Before accessing and answering the questionnaire, the teachers were provided with the necessary information about the study and were asked to provide their informed consent to participate voluntarily.

RESULTS AND DISCUSSIONS

This chapter presents the revised presentation, analysis, and interpretation of the data gathered from 37 Mathematics teacher respondents. The discussion is arranged according to the statement of the problem: the demographic and professional profile of the respondents, their level of performance in using the spiral progression approach, their assessment of the complexity of implementation in terms of teaching strategies, the relationship between selected variables, and the results-based inputs for an enhanced training design. Consistent with the quantitative format of the study, each table is introduced before presentation and interpreted after the table by emphasizing the most meaningful patterns rather than repeating every figure.

Profile of the Mathematics Teachers

Table 1 presents the demographic profile of the mathematics teacher-respondents included in the study.

Specifically, it describes the respondents in terms of **age, length of service, educational attainment, and the number of seminars and training sessions attended**. These demographic variables were gathered to provide a comprehensive description of the participants and to establish the background characteristics of the teachers involved in implementing the spiral progression approach. Understanding the respondents' profile provides important contextual information that may help explain variations in their instructional experiences and professional development.

Including demographic information is essential in educational research because it provides an overview of respondents' professional and personal characteristics. Variables such as age, teaching experience, educational qualifications, and participation in seminars and training are often linked to opportunities for professional growth and exposure to current educational practices. However, these characteristics are presented solely to describe the composition of the study participants and should not be interpreted as direct indicators of teachers' competence or effectiveness in implementing the spiral progression approach. The detailed distribution of respondents according to these demographic variables is presented in Table 1.

Table 1
Demographic and Professional Profile of the Teacher-Respondents

Demographic Variable	Category	Frequency	Percent
Age	26-30 years old	7	18.92
	31-35 years old	8	21.62
	36-40 years old	1	2.7
	41-45 years old	1	2.7
	46-50 years old	13	35.14
	Over 50 years old	7	18.92
Length of Service	1-6 years	10	27.03
	7-13 years	13	35.14
	14-20 years	4	10.81
	21-27 years	3	8.11
	28-34 years	7	18.92
Educational Attainment	Bachelor's degree	7	18.92
	With master's units	26	70.27
	Master's degree	4	10.81
Seminars and Trainings Attended	1	3	8.11
	2	2	5.41
	3	1	2.7
	5 and more	31	83.78

Legend: N = 37.

As presented in Table 1, the majority of the respondents belong to the 46-50 age bracket, with 13 respondents, or 35.14 percent of the total respondents. Following were the age groups of 31-35 years old with 8 respondents, or 21.62 percent, 36-40 years old with 1 respondent, or 2.70 percent, and 41-45 years old with 1 respondent, or 2.70 percent. Thus, it can be seen that the age composition of the respondent is

not confined to beginning teachers only, but it also includes some mid-career and matured teachers with their experience of teaching mathematics.

Regarding the length of service, a 7–13-year teaching period has been reported by the highest number of respondents which accounts for 13 respondents, or 35.14 percent of the total respondents. After them come the respondents of 1–6-year period with 10 respondents, or 27.03 percent, and the 28–34 year period with 7 respondents, or 18.92 percent. Therefore, it can be seen that the respondents belonged to various stages of their career life, although the majority of them have left the novice phase of their career.

As for educational attainment, it must be noted that most of the respondents were master's degree unit earners, which accounted for 26 teachers or 70.27 percent. Seven teachers (18.92 percent) had a bachelor's degree as the highest attained, whereas four teachers (10.81 percent) had already attained a master's degree. There was no response regarding the doctorate units, doctorate degree, and post-doctorate level of education among the respondents. In light of this finding, it is worth saying that it could be viewed as a picture of engagement in graduate studies rather than poor educational qualifications. Although most of the respondents did not have a graduate degree yet, there was a large number of master's unit earners.

The most concentrated area was seminars and training courses taken by the respondents; 31 respondents, or 83.78 percent, reported attending five or more seminars and training courses. It means that only six teachers attended fewer than five trainings and seminars. It is evident from this finding that most of the teacher respondents were already exposed to professional development activities. However, the later performance findings prove that attending training does not mean mastering the content standards and applying the spiral progression strategy in practice.

These are all in agreement with the prior discussion from the manuscript regarding how teacher profile variables like age, years of service, level of education attained, and seminars attended can be used to understand the mathematics teaching situation. Luzano (2024) noted that the background of the teachers would be important in explaining their assessment methods, while Dicediquin et al. (2023) and Doño and Mangila (2021) pointed out that professional development still has an important part to play in making the teaching more effective. From the current data, the fact that many teachers have attained master's units and attend seminars repeatedly indicates the presence of professional exposure, but the following performance data suggest that this should be considered in terms of quality and classroom practice.

Characterization of the Respondents

The majority of the respondents were experienced, professional mathematics teachers whose performance is satisfactory according to their IPCRF scores. They have years of experience in teaching, participated in seminars, and trainings, showed interest in graduate studies, and were committed to learning more.

Despite all those professional qualities, the respondents lacked competence in the area of curricular skills, namely in mathematics content standards. The respondents' knowledge in spiral progression was limited because they were unable to comprehend the content standards and failed to use instructional techniques that maintain the lesson's continuity, integration, and transference of knowledge. It proves that although the respondents are professional and possess the necessary general knowledge for working successfully, additional support should be provided to align their practice with the requirements of the curriculum and implement the spiral progression better.

In addition, the research proves that professional experience is not sufficient for the effective implementation of spiral progression. None of the demographic and professional profile variables (such as age, educational attainment, and participation in trainings) had a significant correlation with the performance of the respondents. The success of teaching in spiral progression depends more on the

knowledge of content standards and the connection between mathematical concepts in different grades. This provides further mileage in relation to determining whether the approach of instruction is well met and absorbed by the learners themselves.

In general, the respondents are competent and committed teachers who have excellent performance in teaching but require capacity building through professional development to strengthen curriculum alignment, enhance the content, and teach strategies to make meaningful connections between the prior and present mathematical concepts. The evidence shows that capacity building should continue by improving the spiral progression approach rather than the teaching experience alone.

Level of Performance of Mathematics Teachers Utilizing the Spiral Progression Approach

Table 2 shows the performance level of the mathematics teacher-respondents based on their comprehension of the basic concepts of spiral progression, mapping of content standards, and rating in the Individual Performance Commitment and Review Form. An Individual Performance Commitment and Review Form (IPCRF) of a teacher pertains to the annual evaluation instrument of teachers in the Philippines that assesses the accomplishments, competencies, and professional development of the teacher according to the Philippine Professional Standards for Teachers (PPST) Department of Education (2020). These indicators are considered complementary, as they measure curriculum-based competency and general work performance.

Table 2
Level of Performance of Mathematics Teachers

Variable	Mean	MPS	Interpretation
Level of Understanding	12.19	76.18	Fairly satisfactory
Knowledge of Content Standards	9.98	66.53	Did not meet expectations
IPCRF Rating	4.16	83.24	Satisfactory

Legend. MPS = Mean Percentage Score; IPCRF = Individual Performance Commitment and Review Form.

According to Table 2, there is an observable disparity among the three performance indicators. The teachers got a mean score of 12.19 and an MPS of 76.18 in the level of understanding. The score was considered fairly satisfactory since it was computed using the ratio of the respondents' scores against the highest possible score of 16. It implies that the respondents were capable of comprehending the fundamentals of the spiral progression approach. Still, the rating denotes that their knowledge about the subject matter could be improved considering the fact that they will be applying the approach consistently across grade levels and mathematical strands.

The performance indicator in which the respondents scored the lowest was in the aspect of knowledge of content standards. It has a mean score of 9.98 and an MPS of 66.53, which was interpreted as not meeting expectations. The score was calculated by computing the ratio of their score against to the highest possible score of 15. It is the most important observation in the performance profile because spiral progression requires the teacher's capability to identify how the content standards are sequenced, revisited, and deepened across the entire curriculum. A poor score in this section would indicate that while some teachers may be familiar with the general concept of spiral progression, they may struggle with mapping competencies, determining prerequisite skills, and relating past lessons to more difficult math lessons.

On the other hand, the IPCRF assessment yielded a mean of 4.16 and an MPS of 83.24, which is considered satisfactory. This would mean that the respondents were doing well enough according to professional responsibilities and standards. However, considering their poor scores in terms of content standards, the IPCRF score highlights another gap in the classroom—being satisfactory at work performance does not equate to good spiral curriculum mapping abilities. Hence, the enhancement program will have to pay more attention to curriculum mapping and spiral progression application in math rather than just teaching in general. The performance pattern further adds to the literature regarding the successful spiral progression depending on teacher readiness and instructional competence in content. Cebe (2023) indicated that readiness plays a role in the effective use of the spiral progression strategy, while Jamil (2024) related spiral progression curriculum work to the recurring development of mathematical thinking throughout the grades. On the other hand, the poor result in content standards is also consistent with the concern expressed by Batidor and Casinillo (2021) that teachers handling science and mathematics courses in spiral progression should have high expertise and rigorous training. Therefore, the result indicates that teachers' overall work performance is satisfactory, but more curriculum-specific competency needs to be gained.

Assessment Level of the Spiral Progression Approach in Terms of Teaching Strategies

Table 3 shows the teachers' evaluation of the spiral progression strategy through teaching strategies. The items are about how teachers prepare lessons, incorporate prior knowledge into new subject matter, and develop ideas with growing complexity. These processes are very crucial for the spiral progression strategy since the curriculum demands that concepts should be developed repeatedly and progressively.

Table 3
Assessment Level of Teaching Strategies in the Spiral Progression Approach

STATEMENTS	WM	SD	VERBAL INTERPRETATION
I prepare every Math lesson and the	2.19	1.79	Often
In preparing the lesson, I always check .	2.16	1.79	Often
When presenting a new lesson,	1.59	1.94	Sometimes
I present topics and skills appropriate	2.00	1.0	Often
As learning progresses, I present topics .	2.30	1.65	Often
I present key concepts repeatedly	2.00	1.95	Often
I encouraged the students to apply	1.92	1.72	Sometimes
I provide linkages between each lesson	1.95	1.65	Sometimes
TOTAL	2.01	1.70	Often

Legend: N = 37, 2.34-4.00 Always, 1.67-2.33 Often, 1.00 - 1.66 Sometimes

It is necessary to stress the highest and the lowest weighted means, as WM is the frequency/level of observation and SD is the variability in responses. In relation to the data on the teaching strategy, the weighted mean for all the items is 2.01, and the standard deviation is 1.70, which implies that the teachers generally indicated frequent use of the spiral progression strategies. The highest-scoring item in the teaching strategy is the progressive elaboration of topics, which received the weighted mean of 2.30 (interpreted as "often"). Thus, it can be assumed that the teachers used to develop topics progressively and

with increased depth. Also, the weighted mean for preparing the mathematics lessons with the proper balance of concepts, skills, and values is 2.19. From these results, it is evident that planning, sequencing, and reviewing of past learning were elements in the classroom teaching practices reported by the teachers. On the other hand, the low-rated indicators indicate a more specific problem. The linking of new lessons with past discussions on basic concepts resulted in the lowest weighted mean of 1.59, which was rated sometimes. Encouraging the learners to relate previous learning to current subjects was rated a weighted mean of 1.92, while relating the lessons resulted in a mean of 1.95. All these three indicators are very crucial because they form the bridging activities that characterize the spiral curriculum. This indicates that the teachers might be preparing their lessons sequentially but are unable to link new ideas to old ones. Moreover, the values of the standard deviations also indicate that there were varying practices among the respondents. Some questions yielded relatively high standard deviations, such as repeating important concepts throughout the course of study ($SD=1.95$) and relating new lessons to already taught concepts ($SD=1.94$). It is safe to say that the practices were not equally experienced or practiced by the teachers. On the other hand, the question about presenting topics appropriate for the cognitive developmental stage of the learners has the lowest standard deviation ($SD=1.10$). It can be implied that training should focus on the strategies of lesson bridging, concept mapping, transfer, and review and not on defining spiral progression.

The research results related to the teaching strategies can be considered within the context of the spiral and learner-centered approach in mathematics education. It is clear from the works by Dinglasan et al. (2023) and Tarim and KÜTKÜT (2021) that meaningful learning of mathematics occurs when teaching provides conditions for the development of problem-solving skills and conceptual understanding. In turn, Siagian et al. (2020) stressed the importance of the mathematical connections in the learning materials. Low ratings in the connection between new lessons and prior knowledge, as well as in the transfer of previous knowledge, can indicate that there is a real drawback in the application of the spiral progression in the classroom setting.

Significant Relationship Between Teachers' Performance, Profile, and Assessment Level

Table 4 shows probability values obtained regarding the correlation between the chosen profile variables, spiral progression approach assessment level, and the chosen performance indicators. Interpretation is based on the 0.05 level of significance as stipulated in the methodology section. Since the given statistical summary gave probability values only, the table has included the p-values, interpretations, and decision.

Table 4
Relationship Between Teachers' Performance, Profile Variables, and Assessment Level

Performance Indicator	Related Variable	p-value	r- value	Interpretation	Decision
Level of Understanding	Age	0.74	0.05619	Not significant	Do not reject Ho
	Length of service	0.18	0.22	Not significant	Do not reject Ho
	Educational attainment	0.23	0.2	Not significant	Do not reject Ho
	Seminars and trainings attended	0.8	0.04	Not significant	Do not reject Ho

	Assessment level of spiral progression	0.29	0.18	Not significant	Do not reject Ho
Knowledge of Content Standards	Age	0.67	0.07	Not significant	Do not reject Ho
	Length of service	0.44	0.01	Not significant	Do not reject Ho
	Educational attainment	0.62	0.09	Not significant	Do not reject Ho
	Seminars and trainings attended	0.38	0.15	Not significant	Do not reject Ho
	Assessment level of spiral progression	0.005	0.45	Significant	Reject Ho
IPCRF Rating	Age	0.47	0.12	Not significant	Do not reject Ho
	Length of service	0.005	0.46	Significant	Reject Ho
	Educational attainment	0.09	0.27	Not significant	Do not reject Ho
	Seminars and trainings attended	0.36	0.15	Not significant	Do not reject Ho
	Assessment level of spiral progression	0.93	0.016	Not significant	Do not reject Ho

Legend. Significant at $p < 0.05$.

The relationship results show that the profile variables were not significantly related to the teachers' level of understanding of the spiral progression approach. Age, length of service, educational attainment, and seminars and trainings attended all obtained p-values greater than 0.05. Thus, the null hypothesis is not rejected for these relationships. This means that differences in background profile did not correspond to measurable differences in the teachers' level of understanding based on the available data.

As for knowledge of content standards, again, none of the profile variables proved to be significant. Age, length of service, educational attainment, and seminars and trainings attended all had p-values greater than 0.05. But the assessment level of spiral progression showed a significantly positive correlation with knowledge of content standards ($p = 0.005$). It means that teachers demonstrating higher involvement in spiral progression practices also had better knowledge of content standards. In this case, too, the result can be considered instructional in meaning, since content standards mastery seems to be related to spiral progression more than to any other profile characteristic.

As far as IPCRF rating is concerned, length of service has a significantly positive correlation with it ($p = 0.005$), whereas age, educational attainment, seminars and trainings attended, and assessment level of spiral progression have no effect on it. It can be assumed that teachers with longer periods of service may perform better in class and therefore receive a higher rating in terms of the IPCRF. Yet, as in the previous case, it should not be taken for granted since the finding merely reflects an association, not causality.

Taken together, the relationship findings suggest that demographic variables alone do not sufficiently explain performance in spiral progression. The more important instructional signal is the significant association between assessment level of spiral progression and knowledge of content standards, along with the significant association between length of service and IPCRF rating. These findings support the need for a targeted enhancement plan that focuses on curriculum mapping, standards unpacking, lesson-to-lesson connection, and mentoring rather than relying only on attendance in seminars or years of service. The findings from the relationships reveal a careful interpretation of the framework used in this study. The non-significant relationships found in age, education, and training imply that the teacher profile might not be sufficient in explaining the performance in curriculum-specific areas. This finding can be supported by the constructivist approach that was discussed in the manuscript, according to which good teaching in mathematics requires much more than just the personal characteristics of the teacher but also how well the teacher organizes the learning activities and connects the learner (Thompson, 2020). The significant relationship between the level of spiral progression assessment and the content standards knowledge further confirms the focus of Hanifah (2024) on the competence of teachers in constructivist mathematics learning.

Synthesis of Findings

The findings show that the respondents were mostly experienced teachers, many of whom had attended several seminars and trainings and were pursuing graduate-level studies. Their overall work performance, as reflected in the IPCRF rating, was satisfactory. However, their knowledge of content standards did not meet expectations, and several important teaching strategies related to lesson-linking and transfer of prior learning were practiced only sometimes. The relationship analysis further showed that most profile variables were not significantly related to performance indicators, except for length of service in relation to IPCRF rating and the assessment level of spiral progression in relation to knowledge of content standards. These findings point to a clear direction for enhancement: strengthening curriculum mapping, standards alignment, and classroom strategies that help learners connect old and new mathematical concepts within the spiral progression approach.

As a final synthesis, the literature anchors help position the results as part of the broader argument of the study: teachers may have experience and professional exposure, but the effective use of the spiral progression approach depends on how well they understand content standards, connect lessons across grade levels, and translate training into classroom practice. This synthesis is consistent with the manuscript's use of constructivist theory, where learning develops through connected, progressively deepened experiences rather than through isolated lesson coverage.

This chapter presents the summary of findings, conclusions, proposed output note, and recommendations based on the results reported in the synthesis of findings. The discussion follows the sequence of the statement of the problem and does not introduce additional descriptive figures beyond those already presented. For the relationship findings, the discussion is limited to the probability values reported.

Summary of Findings

The study evaluated the performance of 37 Mathematics teacher-respondents in using the spiral progression approach. The findings are summarized according to the order of the research problems so that the conclusions and recommendations remain directly connected to the data presented.

1. On the demographic and professional profile of the respondents. The largest age group was composed of teachers aged 46 to 50 years old, with 13 respondents, or 35.14 percent. In terms of length of service, the largest group had been teaching for 7 to 13 years, also with 13 respondents, or 35.14 percent. Most

respondents were master's degree unit earners, with 26 teachers, or 70.27 percent, while 31 respondents, or 83.78 percent, had attended five or more seminars and trainings.

2. On the level of performance of Mathematics teachers. The respondents obtained a mean score of 12.19 and an MPS of 76.18 in level of understanding, interpreted as fairly satisfactory. Their knowledge of content standards obtained a mean score of 9.98 and an MPS of 66.53, interpreted as not meeting expectations. Their IPCRF rating obtained a mean of 4.16 and an MPS of 83.24, interpreted as satisfactory.
3. On the assessment level of the spiral progression approach in terms of teaching strategies. The overall weighted mean for teaching strategies was 2.01 with a standard deviation of 1.70, interpreted as often. The highest-rated item was the progressive elaboration of topics, with a weighted mean of 2.30. The lower-rated practices were associating new lessons with previously discussed concepts (WM = 1.59), encouraging students to apply previous learning to present topics (WM = 1.92), and providing linkages between lessons (WM = 1.95), all interpreted as sometimes.
4. On the significant relationship between teachers' performance, demographic profile, and assessment level. Based on the available p-values presented, age, length of service, educational attainment, and seminars and trainings attended were not significantly related to the teachers' level of understanding. For knowledge of content standards, the same profile variables were not significant; however, the assessment level of spiral progression was significantly related to knowledge of content standards ($p = 0.005$). For IPCRF rating, length of service was significantly related to performance rating ($p = 0.005$), while the other variables were not significant.
5. On the proposed training design. These findings should present results-based inputs for an enhanced training design. These inputs point to the need for curriculum unpacking and standards mapping, lesson connection and concept-linking strategies, transfer-based classroom activities, peer coaching and lesson study, mentorship anchored on experience, and quality-focused professional development.

Conclusions

From the results of the study, the following conclusions were arrived at:

1. There was diversity in the professional background of the mathematics teacher-respondents in the study. They have all had prior experience in teaching, graduate-level learning, and seminar/trainings. Nevertheless, the results of the profile should only be seen as background data and must not be automatically taken as an indicator of readiness for the implementation of the spiral progression approach.
2. There was adequate but yet improvable knowledge of the spiral progression approach among the respondents. The good rating of IPCRF implies adequate general work performance, while the low result for knowledge of content standards is indicative of a curriculum-specific concern.
3. The teachers utilized various strategies that are part of the spiral approach, including lesson preparation, sequencing, and progressive elaboration. However, the poor performance in terms of connecting past and present lessons, applying prior knowledge, and linking the lessons indicate that the primary instructional problem faced by the teachers is not just lesson preparation but the linkage of mathematical concepts from one topic to another or from one grade level to another.
4. The conclusions drawn from the relationship analysis have to be handled with caution since the findings' summary reports contain only p-values. Using the p-values provided, very few of the profile variables have been found to have any significant relationships with the performance measures. The

significant relationship between the assessment of spiral progression and the knowledge of content standards indicates the presence of an instructional relationship, while the significant relationship between length of service and IPCRF rating indicates an association with performance.

5. The results point towards the necessity of designing an enhancement training with a focus on mathematics lessons based on the spiral progression method. The design of such enhancement needs to concentrate on content standard mapping, lesson bridging, transfer of learning, and collaboration, among other aspects than counting seminars attended.

Proposed Output of the Study

"MATHEMATICS SPIRAL PROGRESSION ENHANCEMENT PROGRAM (MSPEP): A Training Design for Strengthening Teachers' Knowledge and Instructional Practices"

Rationale

Based on the study conducted, it was found out that although Mathematics teachers exhibit sufficient performance as teachers and use strategies that comply with the spiral progression model, there are still certain aspects where improvements can be made. These include their insufficient competence on content standards and difficulty in making connections between previous knowledge and mathematical principles at different grade levels. In addition to this, it can be seen that the findings of the study indicate that the need for improvement in terms of curriculum implementation and instructional strategies is greater than increasing participation in seminar trainings.

In order to overcome these issues, the following enhancement program is designed to develop teachers' skills in using the spiral progression approach.

General Objective

To enhance the competency of Mathematics teachers in implementing the spiral progression approach by improving their understanding of curriculum content standards, lesson integration, and instructional strategies that promote continuous learning across grade levels.

Specific Objectives

At the end of the enhancement program, the participants will be able to:

1. deepen their understanding of the spiral progression approach in Mathematics;
2. accurately interpret and apply Mathematics content standards in lesson planning;
3. develop instructional strategies that effectively connect prior knowledge with new mathematical concepts;
4. design lessons that demonstrate continuity and progression of mathematical skills across grade levels;
5. improve learners' conceptual understanding through meaningful lesson linkages; and
6. establish collaborative professional learning communities for continuous instructional improvement.

Table 5
Proposed Training Matrix

Activity	Objectives	Time Frame	Source of Funds	Expected Output
Orientation on Spiral Progression	Strengthen teachers' understanding of spiral progression principles	Day 1	SEF/MOOE	Improved understanding of the curriculum
Workshop on Curriculum Mapping	Align competencies and content standards across grade levels	Day 2	SEF/MOOE	Grade-level curriculum maps
Lesson Bridging Workshop	Develop strategies for connecting previous and current lessons	Day 3	SEF/MOOE	Integrated lesson plans
Content Standards Enhancement Session	Improve teachers' mastery of Mathematics content standards	Day 4	SEF/MOOE	Enhanced instructional materials
Demonstration Teaching with Coaching	Apply spiral progression strategies in classroom instruction	Day 5	SEF/MOOE	Improved teaching demonstrations
Learning Action Cell (LAC) Sessions	Share best practices and collaboratively solve instructional concerns	Monthly	SEF/MOOE	Professional learning community outputs
Monitoring and Evaluation	Assess implementation and identify areas for continuous improvement	Quarterly	SEF/MOOE	Monitoring reports and action plans

Expected Outcomes

After the implementation of the enhancement program, Mathematics teachers are expected to:

- demonstrate a deeper understanding of the spiral progression approach;
- improve their knowledge of Mathematics content standards;
- effectively connect previous and current mathematical concepts during instruction;
- develop lesson plans that clearly show progression of learning competencies;
- strengthen learners' conceptual understanding through better lesson integration;
- engage in continuous professional collaboration through Learning Action Cell (LAC) sessions; and
- improve the quality of Mathematics instruction, leading to better learner engagement and academic performance.

Proposed Framework

Identified Gaps

- Limited understanding of content standards
- Weak lesson bridging across topics
- Difficulty transferring prior learning
- Need for collaborative instructional support

Enhancement Training Program

- Curriculum Mapping
- Spiral Progression Workshop
- Lesson Bridging Strategies
- Demonstration Teaching
- Coaching and Mentoring
- Learning Action Cell (LAC)
- Continuous Monitoring

Expected Results

- Improved teacher competence
- Better implementation of spiral progression
- Enhanced lesson continuity
- Stronger conceptual learning among students
- Sustained professional development

Significance of the Proposed Output

This enrichment program acts as an intervention strategy that is specifically tailored to the issues raised about teaching as revealed in the study. Instead of putting emphasis on the number of workshops attended by the teachers, the program aims at enhancing their competency in implementing the curriculum as well as equipping them with an in-depth knowledge of the content standards, effective lesson integration, and collaborative learning. This would enable them to implement the spiral progression approach effectively.

Recommendations

In view of the results and conclusions, the following recommendations are made:

1. Administrators of schools and Mathematics coordinators can consider organizing workshops and seminars on content standards mapping and curriculum unpacking as their priorities. The reason for such a recommendation is the result that content standards knowledge did not match expectations.
2. Mathematics teachers can develop lesson plans containing prerequisite skills, existing competencies, and future relationships. This is necessary because teaching strategies rated poorly included linking new lessons with previous knowledge and transferring prior learning to the present lesson.
3. Professional development activities can be assessed not only by participants' attendance but also by outputs. Teachers can be asked to develop standards maps, demonstration lessons, transfer-based problem-solving tasks, or reflection notes demonstrating application of training in class.
4. Experienced teachers of Mathematics can become mentors, coaches, or engage in lesson studies. Due to the significant relation between IPCRF rating and length of service, as evident from the given p-value, the practical experience of experienced teachers can be utilized in planning and implementing spiral progression lessons.
5. The last manuscript must contain all the information about the statistician's results concerning relationship analysis. It means the information about the exact type of statistical test performed, the test value, the degrees of freedom, and the effect size, if possible. Such information would make the inferential part of the paper more complete and quantitatively adequate.
6. Future researchers can repeat this experiment but with larger samples or provide other pieces of evidence. For example, they can observe classes and/or analyze lesson plans and/or analyze reflective

records of the teachers in order to find out whether teachers' reports about spiral progression coincide with their work in the classroom.

In conclusion, we can say that the ways of enhancing teachers' performance in the spiral progression approach require something more than just some general professional development. The results obtained give the idea of particular instructional needs: knowledge about the progress of Mathematics standards, connections between the lessons, transfer of learners' previous knowledge, and teachers' practical assistance in planning and teaching. This information should determine the content of the enhancement program in the future.

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