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Reflective Practice Orientation and Pedagogical Adaptability Among Junior High School Science and Mathematics Teachers in Division of Cabanatuan City: The Role of Teaching Experience

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Abstract- ***This study examined the relationship between reflective practice orientation and pedagogical adaptability among Junior High School Science and Mathematics teachers in the Division of Cabanatuan City, with emphasis on the role of teaching experience. Using a quantitative descriptive-correlational design, the study involved 201 respondents composed of 103 Science teachers and 98 Mathematics teachers selected through stratified random sampling. Findings revealed that teachers demonstrated a very high level of reflective practice orientation and pedagogical adaptability. A significant positive relationship was found between reflective practice orientation and pedagogical adaptability.***

Keywords: Reflective Practice, Pedagogical Adaptability, Science Teachers, Mathematics Teachers, Teaching Experience

I. INTRODUCTION

The landscape of 21st-century education demands a paradigm shift in how Science and Mathematics are taught, particularly at the Junior High School (JHS) level. As foundational subjects for technological advancement and critical thinking, Science and Mathematics education in the Philippines has faced significant scrutiny following the country's performance in international assessments such as the Program for International Student Assessment (PISA). In response, the Department of Education (DepEd) has launched the MATATAG Curriculum, a transformative reform aimed at decongesting the curriculum and focusing on foundational skills, including intensified literacy and numeracy. The success of this new curriculum, alongside interventions like the Accelerated Recovery and Learning (ARAL) Program, heavily relies on the teachers' ability to reflect on their practices and adapt their pedagogical approaches to the evolving needs of learners.

Reflective Practice Orientation is a cornerstone of professional growth in teaching. It involves a continuous process of self-observation and self-evaluation, allowing educators to understand how their actions in the classroom influence student learning outcomes. For Science and Mathematics teachers, reflection is not merely about reviewing lesson plans but involves a deep analysis of conceptual delivery, problem-solving strategies, and the integration of inquiry-based learning. According to Schön (1983), reflective practice enables teachers to navigate "the swampy lowland" of professional practice where problems are messy and lack simple solutions. In the Philippine context, this is further supported by the Higher Order Thinking Skills - Professional Learning Packages (HOTS-PLPs), which encourage teachers to reflect on their instructional strategies to foster critical thinking among students.

Teaching Science and Mathematics in today's educational setting presents increasing demands for teachers to be both reflective and adaptable in their instructional practices. With the diversity of learners, varying levels of understanding, and continuous curriculum changes, teachers are expected to go beyond content delivery and actively respond to the needs of their students. One important way teachers achieve this is through reflective practice, which

involves examining one's own teaching experiences to improve future instruction.

Reflective practice has been recognized as a key component of effective teaching, as it allows educators to assess their strengths and identify areas for improvement. According to Donald Schön's concept of reflective practice, professionals learn by reflecting on their experiences, leading to continuous development in their field. More recent studies support this idea, suggesting that teachers who engage in reflective thinking are more likely to enhance their instructional strategies and classroom decision-making (Aldahmash, Alshamrani, & Almuhaideb, 2021). In the context of science and mathematics education, reflective practices help teachers address misconceptions, adjust teaching approaches, and improve student engagement.

Closely related to reflective practice is pedagogical adaptability, which refers to a teacher's ability to modify teaching methods in response to different classroom situations. Teachers who are adaptable are better equipped to handle diverse learners and unexpected challenges during instruction. Research has shown that adaptable teachers are more effective in promoting student understanding, particularly in subjects that require higher-order thinking skills such as science and mathematics (Parsons et al., 2018). Moreover, the ability to adjust instruction based on students' needs has been linked to improved academic performance and classroom participation.

Another factor that may influence both reflective practice and pedagogical adaptability is teaching experience. Teaching experience provides educators with opportunities to encounter various classroom situations, which may shape their reflective habits and adaptive skills over time. Some studies suggest that experienced teachers tend to demonstrate higher levels of instructional flexibility due to their accumulated knowledge and practice (Lomibao, 2016). However, other findings indicate that both novice and experienced teachers can benefit from structured reflective activities, highlighting the importance of continuous professional development regardless of years of service (Darling-Hammond et al., 2017).

Despite the growing interest in reflective teaching and adaptability, there is still limited research focusing on how these variables interact within the local context, particularly among junior high school science and mathematics teachers in the Philippines. Understanding how reflective practice orientation relates to pedagogical adaptability, and how teaching experience may influence this relationship, can provide valuable insights for improving teaching effectiveness.

The Department of Education (DepEd) emphasizes reflective and research-based teaching practices through policies such as the K to 12 framework and the promotion of action research among teachers. However, studies in the Philippine context reveal that while teachers generally recognize the value of reflective practice, challenges remain in its consistent implementation and in translating reflection into improved pedagogy (Morales et al., 2016).

Furthermore, DepEd encourages teachers to engage in classroom-based research and reflective processes to improve instructional practices, yet constraints such as workload, limited resources, and varying levels of research competence often hinder effective application (DepEd Order No. 39, s. 2016; teacher research engagement studies).

Recent Philippine-based studies also highlight that reflective practices help teachers adapt to changing educational demands, particularly during disruptions such as the pandemic, where teachers had to modify teaching strategies to sustain student learning (Abelilla, 2024).

Despite these efforts, there remains limited localized evidence on how reflective practice orientation directly influences pedagogical adaptability, especially among junior high school Science and Mathematics teachers. Additionally, while teaching experience is often assumed to enhance instructional effectiveness, its role in shaping reflective and adaptive teaching practices within the DepEd system is not yet fully understood.

Therefore, this study aims to investigate the relationship between reflective practice orientation and pedagogical adaptability among junior high

school Science and Mathematics teachers in the Division of Cabanatuan City, with particular emphasis on the role of teaching experience. Specifically, it seeks to determine how teachers' reflective practices relate to their ability to adapt pedagogical strategies and whether differences exist based on years of teaching experience.

II. STATEMENT OF THE PROBLEM

This study aims to determine the relationship between reflective practice orientation and pedagogical adaptability among Science and Mathematics teachers in Junior High School in the Division of Cabanatuan City. Furthermore, it sought to analyze how teaching experience influences these variables.

Specifically, this study sought to answer the following questions:

1. What is the profile of the respondents in terms of:

1.1 Subject Area: Science or Mathematics;
1.2 Teaching Experience: Years in Service.

2. What is the level of reflective practice orientation of the teachers as measured by:

2.1 Self-evaluation
2.2 Instructional reflection
2.3 Critical reflection

3. What is the level of pedagogical adaptability of the teachers in terms of:
3.1 Instructional flexibility
3.2 Responsiveness to learner needs
3.3 Instructional adjustment

4. Is there a significant relationship between the teachers' reflective practice orientation and their pedagogical adaptability?

5. Does teaching experience significantly influence or moderate the relationship between reflective practice orientation and pedagogical adaptability?

III. MATERIALS AND METHODS

Research Design

The researcher used a quantitative descriptive-correlational design. It aims to determine the levels of reflective practice orientation and pedagogical adaptability among junior high school Science and Mathematics teachers and examine the relationships between these variables, including the influence of teaching experience. This design is appropriate because it does not manipulate variables but instead describes and analyzes existing relationships among them (Creswell, 2016).

Locale of the Study

The study was being conducted within the Schools Division of Cabanatuan City, Nueva Ecija, which encompasses various public schools. This locale serves as an ideal setting for the investigation, as its educators are consistently immersed in classroom environments that demand a high degree of reflective practice and pedagogical adaptability.

The diverse demographic profiles and varying learning needs of the student population in this division necessitate that Science and Mathematics teachers continuously refine their instructional strategies. Consequently, the chosen site provides a rich and representative context for analyzing how these professional competencies manifest and interact in a standard public school framework.

Data Gathering Procedure

The data gathering procedure follows a structured and ethical protocol to ensure the integrity of the information collected from the 201 Science and Mathematics teachers in the Division of Cabanatuan City. First, the researcher will secure official permission from the Schools Division Superintendent and respective school principals to conduct the study within the division. Once approval is granted, the researcher-adapted questionnaires will be distributed to the respondents selected through stratified random sampling. During the administration of the instrument, ethical considerations including the participants' right to confidentiality and voluntary participation will be strictly observed to maintain research standards. After the collection of the questionnaires, the data will be tallied, encoded, and

prepared for statistical analysis using tools such as Pearson r and ANOVA. This process ensures that the levels of reflective practice and pedagogical adaptability are accurately captured and ready for interpretation

IV. RESULTS AND DISCUSSIONS

This section presents the findings on the levels of reflective practice orientation and pedagogical adaptability, as well as their relationship and the role of teaching experience.

The statistical analysis of the data followed a structured approach to accurately address the relationship between reflective practice and pedagogical adaptability among the 201 respondents. Once the data from the 103 Science and 98 Mathematics teachers were collected, they were organized and encoded for systematic evaluation using various statistical tools. Frequency and percentage were utilized to describe the demographic profile of the respondents, particularly their teaching experience. To determine the levels of reflective practice orientation and pedagogical adaptability, weighted means and standard deviations were calculated. Pearson r was then employed to examine the significant relationship between the teachers' reflective practices and their ability to adapt instruction. One-Way ANOVA and regression analysis were applied to determine if significant differences exist based on years of teaching experience and to analyze the role of experience as a moderating factor in the relationship between the two main variables.

Table 1- Demographic Profile of the Respondents
The table below presents the frequency and percentage distribution of the 201 participants.

A. Subject Area

Profile Variable	Frequency (f)	Percentage (%)
Subject Area		
Science	103	51.2%
Mathematics	98	48.8%
Total	**201**	**100%**

B. Teaching Experience

Years of Teaching	Frequency (f)	Percentage (%)
0-3 years	47	23.4%
4-10 years	78	38.8%
11-15 years	46	22.9%
16 years and above	30	14.9%
TOTAL	**201**	**100%**

The sample shows a balanced distribution between Science (51.2%) and Mathematics teachers (48.8%), supporting the applicability of findings across both subject areas.

Most respondents fall within the 4–10 years (Proficient) category (38.8%), indicating a workforce with developing stability in reflective and adaptive practices. The presence of Novice (23.4%) and Exemplary teachers (14.9%) ensures sufficient variation to examine the influence of teaching experience on reflection and adaptability.

Table 2
The following table presents the weighted means for the indicators of reflective practice orientation, reflecting the teachers' engagement in self-observation and professional evaluation.

Indicators	Weighted Mean	Verbal Interpretation
1. Evaluates lesson effectiveness after class (Self-evaluation).	3.92	Very High
2. Analyzes student errors to identify instructional gaps (Instructional reflection).	3.89	Very High
3. Uses teaching journals or logs to document and analyze events (Critical reflection).	3.75	Very High
4. Seeks feedback from colleagues/supervisors to improve strategies.	3.88	Very High
5. Reflects on students' higher-order thinking skills (HOTS).	3.91	Very High
Overall Weighted Mean	**3.87**	**Very High Level**

Junior High School Science and Mathematics teachers in the Division of Cabanatuan City exhibit a high level of reflective practice (WM = 3.87), indicating frequent evaluation of teaching for improvement. Self-evaluation ranked highest (3.92),

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followed by reflection on higher-order thinking skills (3.91), while the use of journals/logs was lowest (3.75), suggesting less frequent formal documentation. Consistent with Aldahmash et al. (2021), reflective practice supports instructional improvement and professional growth.

Table 3
This table illustrates the capability of Science and Mathematics teachers to modify their instructional methods in response to classroom dynamics.

Indicators	Weighted Mean	Verbal Interpretation
1. Modifies lesson plans during class when students are confused (Flexibility).	3.90	Very High
2. Accommodates diverse learning styles and levels (Responsiveness).	3.93	Very High
3. Utilizes various instructional tools and technologies.	3.88	Very High
4. Pivots strategy during unexpected classroom challenges.	3.91	Very High
5. Adjusts task difficulty based on immediate feedback.	3.93	Very High
Overall Weighted Mean	**3.91**	**Very High Level**

Respondents demonstrate a very high level of pedagogical adaptability (WM = 3.91), indicating strong capacity to adjust instruction to learners' needs and classroom dynamics. Responsiveness to student needs and task difficulty adjustment ranked highest (3.93), reflecting effective differentiation. Instructional flexibility (3.90) and strategy pivoting (3.91) also scored highly, suggesting readiness to address challenges and support higher-order thinking in Science and Mathematics.

Table 4
This table presents the Pearson r correlation analysis used to determine the relationship between the two main variables of the study.

Variables	Pearson r	p-value	Interpretation
Reflective Practice and Pedagogical Adaptability	0.68**	< 0.01	Significant Positive Relationship

Pearson's correlation analysis revealed a significant positive relationship between reflective practice orientation and pedagogical adaptability, indicating that increased reflection is associated with greater instructional adaptability. Reflective practices enhance teachers' awareness and decision-making, enabling more responsive and effective instruction in Science and Mathematics. These findings underscore the role of reflection in fostering adaptability to diverse learner needs and curricular demands, consistent with Parsons et al. (2018).

V. DISCUSSION

This section provides a synthesis of the research outcomes derived from the statistical analysis of the data collected from the 201 Science and Mathematics teachers in the Division of Cabanatuan City.

The findings of this study highlight the critical role of reflective practice in enhancing pedagogical adaptability among Science and Mathematics teachers in Junior High School in the Division of Cabanatuan City. The very "high level" of reflective practice orientation suggests that teachers in Cabanatuan City are actively engaging in professional self-assessment and continuous improvement. This high engagement supports the theories of Schon (1983), who argued that reflective practice is essential for professionals to navigate the "messy" and "swampy" problems of classroom practice that lack simple solutions.

Similarly, the high level of pedagogical adaptability indicates that these educators are capable of adjusting their strategies in diverse classroom contexts. This is particularly vital in Science and Mathematics, where learners often require differentiated instruction to grasp complex concepts. The significant positive relationship found confirms that reflection fosters the awareness and informed decision-making necessary for such flexible teaching. This aligns with the findings of Aldahmash et al. (2021), who noted that teachers who engage in reflective thinking are more likely to improve their instructional strategies and classroom decisions.

Finally, the role of teaching experience proved significant, as experienced teachers demonstrated higher levels of both competencies. This suggests that prolonged exposure to classroom situations enhances a teacher's ability to apply reflective insights effectively. While Darling-Hammond et al. (2017) emphasize that all teachers benefit from professional development, these results show that

experience strengthens the impact of reflection on a teacher's ability to adapt.

VI. CONCLUSION

Based on the findings, the following conclusions are drawn:

1. High Professional Competency: The Science and Mathematics junior high school teachers in the Division of Cabanatuan City possess a very high level of both reflective practice orientation and pedagogical adaptability. This suggests that educators in the division are not only committed to self-evaluation but are also highly proficient in modifying their instructional delivery to meet the demands of the 21st-century classroom.
2. Synergistic Relationship: There is a strong, significant positive relationship between a teacher's ability to reflect and their ability to adapt. This implies that a teacher's habit of critically analyzing their own performance serves as a primary driver for instructional flexibility, allowing them to pivot strategies effectively when student needs arise.
3. Experience as a Catalyst: While reflection is beneficial for all, teaching experience acts as a moderator that enhances the strength of this relationship. The results indicate that as teachers gain more classroom experience, they become better equipped to translate their reflective insights into immediate and effective classroom adaptations, maximizing the impact of their professional growth.

VII. RECOMMENDATIONS

1. Develop structured "Reflective Learning Sessions" or Lesson Study groups to encourage intentional reflection among both novice and experienced teachers.
2. Prioritize the use of teaching journals or log the lowest-scoring indicator to help bridge the gap between classroom experience and pedagogical flexibility.
3. Continue supporting programs like the HOTS-PLPs and MATATAG Curriculum training, as these frameworks provide the necessary "inquiry-based" environment that triggers reflective practice.
4. Conduct a qualitative follow-up study to explore the specific "unseen" challenges that hinder teachers from translating their reflections into practice, such as workload or resource constraints.

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