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Prevalent Pedagogical Approaches and Students' Science Performance in the MATATAG Curriculum

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Knutchen B. Jaluag
Central Philippines State University, Kabankalan City, Negros Oriental, Philippines
knutchen.barrios@deped.gov.ph

Irish B. General
Central Philippines State University, Kabankalan City, Negros Oriental, Philippines
irish.general@deped.gov.ph

Claire C. Babor
Central Philippines State University, Kabankalan City, Negros Oriental, Philippines
claire.catacutan@deped.gov.ph

Joseph L. Torres
Tanjay City Science High School, Tanjay City Division, Negros Oriental, Philippines
https://orcid.org/0009-0008-1516-1743 | jc17.torres03@gmail.com

Catherine M. Amahit
St. Paul University, Dumaguete City, Negros Oriental, Philippines
https://orcid.org/0009-0004-6736-2951 | catherine.macay@deped.gov.ph

Jionesa F. Garcia
St. Paul University, Dumaguete City, Negros Oriental, Philippines
jionesagrc@gmail.com

Abstract

This study investigated the effectiveness of five core pedagogical approaches—Constructivist, Collaborative, Inquiry-Based, Reflective, and Integrative—in enhancing the science performance of 109 Grade 7 students within the MATATAG Curriculum framework. Using a descriptive-correlational research design and total enumeration sampling, the study assessed the extent of pedagogical demonstrations by educators and their relationship with students' achievement in Knowledge, Comprehension, and Application. Results revealed a "Very High Extent" of pedagogical demonstration by teachers, yet student performance remained at a "Moderate Level". Spearman's rho correlation confirmed a significant positive relationship between these varied approaches and student success, suggesting that while the methods are effective, higher instructional quality is needed to fully bridge the performance gap.

Keywords: MATATAG Curriculum; Pedagogical Approaches; Science Performance; Constructivism, Inquiry-Based Learning

Introduction

In the current global landscape, proficiency in science serves as a fundamental pillar for national development and individual success. However, international benchmarks, such as the Programme for International Student Assessment (PISA) 2022, have raised alarms regarding a significant decline in scientific literacy among Filipino learners, with the Philippines ranking among the lowest globally, scoring well below the OECD average. Locally, Grade 7 students frequently encounter a "bottleneck" during their transition to secondary education, where the leap toward complex scientific concepts often reveals a lack of depth in comprehension and practical application. To confront these systemic academic challenges, the Department of Education introduced the MATATAG Curriculum. This reform is designed to "decongest" the learning experience, focusing on core competencies and mandating a transition from traditional rote memorization to active, student-centered pedagogical strategies. By utilizing frameworks such as Constructivist, Collaborative, Inquiry-Based, Reflective, and Integrative approaches, the curriculum aims to foster a "resilient" learning environment that promotes higher-order thinking.

The landscape of modern science education is shifting toward active, experiential learning environments. According to Hämäläinen (2020), educational actions must be systematic and intentional to be truly successful. Research by Lu et al. (2021) suggests that student-centered strategies are essential for fostering deeper engagement, while Kapur (2020) emphasizes that successful pedagogy depends on specific instructional factors that facilitate effective learning. In the Philippine context, Kilag et al. (2024) note that the MATATAG reform seeks to streamline content to better support teacher preparedness and reduce the high cognitive demand placed on learners. However, Bernardo et al. (2023) identify persistent issues such as a mismatch between curriculum demands and actual learner needs, compounded by the lingering effects of learning losses from the pandemic.

Despite this theoretical foundation, a significant research gap exists regarding the practical "fidelity" of these reforms. While teachers may demonstrate these pedagogies at a "Very High" level, student mastery often remains at a "Moderate" level. This creates a "fidelity gap" where the *actions* of modern teaching are present, but the *impact* on student performance is not yet fully realized. Furthermore, there is a need to explore the "equity paradox" within this new curriculum. While inclusive school environments aim to neutralize socio-economic disparities, the Resource Dilution Model (Downey, 1995; 2021) suggests that parental resources—such as time, energy, and financial support—are finite and become "diluted" as family size increases. This study addresses the need to move beyond measuring the frequency of teaching methods to understanding how quality, calibration, and domestic structural barriers influence high-impact learning outcomes.

The purpose of this study is to investigate the effectiveness of the five core pedagogical approaches—Constructivist, Collaborative, Inquiry-Based, Reflective, and Integrative—within the Grade 7 MATATAG Science Curriculum. The study aims to determine how the prevalence of these instructional strategies relates to students' performance across different cognitive domains. By identifying specific demographic and structural barriers, the study seeks to provide insights into how educators can refine their delivery to move from simply "demonstrating" a method to achieving high-impact learning outcomes.
To achieve this purpose, the research addresses the following questions:

1. What is the demographic and socio-economic profile of the Grade 7 students regarding age, sex, prior science grade, residence, parental education, family income, and access to learning tools?
2. To what extent do teachers demonstrate the five core pedagogical approaches (Constructivist, Collaborative, Inquiry-Based, Reflective, and Integrative) mandated by the MATATAG Curriculum?
3. What is the level of students' science performance in the cognitive domains of Knowledge, Comprehension, and Application?
4. Is there a significant difference in the extent of pedagogical demonstration when students are grouped according to their profile?
5. Is there a significant difference in the level of student science performance based on their demographic and academic characteristics?
6. What is the relationship between the prevalent pedagogical approaches and students' science performance within the MATATAG framework?

Literature Review

Effective science education requires a departure from traditional rote learning toward active, experiential environments. According to Hämäläinen (2020), educational actions must be systematic and intentional to be successful. Research by Lu et al. (2021) supports that approaches like Inquiry-Based and Collaborative learning not only engage students but are also critical in fostering higher-order thinking skills. Furthermore, Kapur (2020) emphasizes that successful pedagogy depends on specific instructional factors that facilitate educational action. In the Philippine context, the MATATAG Curriculum provides the structural framework necessary to focus on core competencies. However, literature also highlights that scientific knowledge is inherently cumulative; Malubay and Guevarra (2023) note that unaddressed foundational deficits in knowledge and comprehension act as significant bottlenecks for mastering complex application skills.

Synthesizing these perspectives, it becomes clear that while the theoretical framework for modern science education is robust, its success is heavily mediated by the quality of implementation and the cumulative nature of learning. While student-centered strategies are proven to enhance cognitive engagement, their effectiveness is contingent upon how well they are calibrated to the learners' existing foundational depth.

Methodology

This study utilized a Purposive Total Enumeration Sampling technique to ensure a comprehensive and highly accurate representation of the target population. Unlike standard sampling methods that select only a portion of a group, total enumeration—often referred to as a "census" approach—involved collecting data from every single member of the defined population. For this research, the participants included the entire cohort of 109 Grade 7 students from two specific secondary institutions: Mayor Praxedes P. Villanueva Memorial High School and Tangculugan High School. This approach was chosen due to the critical nature of studying learners navigating the newly implemented MATATAG Curriculum. By including all students from both schools, the study eliminates "sampling error," ensuring that the findings are not just estimates but a true reflection of the collective performance and pedagogical experience of these specific learners.

The selection of Mayor Praxedes P. Villanueva Memorial High School and Tangculugan High School as the research locales was strategically grounded in their role as frontline implementers of the MATATAG Curriculum, providing a critical environment to observe the transition toward student-centered science pedagogy in real-time. These institutions were chosen because their student populations represent a unique demographic intersection where high-frequency pedagogical demonstration by teachers meets significant structural challenges, such as geographic residence and the "resource dilution" inherent in larger families

The primary goal of this research was to measure the alignment between instructional delivery and academic outcomes by quantifying the extent of pedagogical demonstration and mirroring it against actual student mastery across the cognitive domains of Knowledge, Comprehension, and Application. Specifically, it aims to measure the frequency and depth with which teachers demonstrate five core approaches: Constructivist, Collaborative, Inquiry-Based, Reflective, and Integrative. Furthermore, it identifies the "fidelity gap" between high-frequency instructional delivery and actual proficiency levels, while also exploring how structural and domestic factors, such as residence and family size, influence scientific achievement.

To facilitate this measurement, data were gathered using a self-made questionnaire and a customized Science Performance Test specifically tailored to the unique competencies of the MATATAG framework. To maintain scientific rigor and authenticity, these original instruments underwent expert content validation and reliability testing, achieving a high Cronbach's Alpha of 0.897. The study utilized specific weighted mean scales to interpret the data: the extent of pedagogical demonstration was measured on a 5-point Likert scale ranging from 1.00–1.50 (Very Low Extent) to 4.51–5.00 (Very High Extent). Similarly, student science performance was categorized using a scale where 1.00–2.50 indicated a Beginning level, 2.51–3.50 a Moderate level, and 3.51–5.00 an Advanced level. These validated scales ensured that the tools accurately captured the data necessary to map the relationship between instructional practices and students' actual academic achievement

Figure 1: Demographic Profile of the Student Respondents

The following data establishes the baseline characteristics of the study's participants, providing essential context regarding their age, sex, residence, and socio-economic status. Understanding these factors is critical for interpreting how environmental and personal backgrounds may influence academic engagement and performance in the science classroom.

Table 1.*Frequency and percentage distribution of respondents in terms of students' demographic profile*

Variable	Most Common Category	Frequency	Percentage
Age	11-12 years old	55	50.5 %
Sex	Male	60	55.05
Science Grade	80-84	31	28.4%
Residence	Urban	80	73.4%
Parental Education	Elementary Graduate	47	43.1%
Family Income	10,000 and below	84	77.1%
Learning Tools Access	1 tool or more	93	85.3%

The demographic profile of the 109 Grade 7 students reveals a predominant population in the early adolescent stage, with 50.5% aged 11-12 years old. The gender distribution is relatively balanced but slightly favors males at 55.05%, while the majority of the cohort (73.4%) resides in urban areas. These baseline characteristics are essential for understanding the developmental and environmental context in which the MATATAG curriculum is being introduced to these learners.

From a socio-economic perspective, the data suggests a challenging home environment for many participants, as 77.1% of families earn a monthly income of 10,000 pesos or less, and 43.1% of parents completed only an elementary education. Interestingly, despite these economic constraints, there is a strong presence of digital integration, with 85.3% of students reporting access to at least one learning tool. This indicates that while financial resources are limited, there is a significant baseline of technological readiness that educators can leverage.

Figure 2: Extent of Pedagogical Approaches

This section evaluates the frequency and depth with which teachers demonstrate the five core pedagogical approaches—Constructivist, Collaborative, Inquiry-Based, Reflective, and Integrative—mandated by the MATATAG curriculum. This assessment identifies the instructional strengths of the educators and their level of compliance with current educational reforms.

Table 2. *Extent of Teachers' Demonstration of Prevalent Pedagogical Approaches*

Approach	Mean Score*(M)*	Interpretation
Constructivist	4.55	Very High
Collaborative	4.55	Very High
Reflective	4.57	Very High
Inquiry-Based	4.54	Very High
Integrative	4.55	Very High

The findings indicate that teachers have achieved a "Very High" level of demonstration across all five core pedagogical approaches. The Reflective approach received the highest mean score of 4.57, suggesting that teachers frequently encourage students to think about their own learning processes. The Constructivist, Collaborative, and Integrative approaches all followed closely with a mean of 4.55, showing a consistent effort to move away from traditional, teacher-centered instruction.

This uniform implementation demonstrates that the transition to student-centered learning is being taken seriously at the instructional level within the schools surveyed. The high mean scores reflect a teaching force that is actively engaged in the spirit of the MATATAG reforms, aiming to create a "resilient" learning environment through active, experiential strategies. This establishes a strong instructional foundation where the theoretical requirements of the curriculum are being visibly translated into daily classroom practice.

Figure 3: Comparison of Students' Science Performance Across Cognitive Domains

The table below details the actual academic achievement of the students across three cognitive domains: Knowledge, Comprehension, and Application. By measuring these levels, the study determines how effectively the delivered instruction translates into measurable learning outcomes and identifies specific areas where students may still be struggling.

Table 3: *Level of Students' Science Performance*

Domain	Mean Score	Interpretation
Knowledge	2.66	Moderate
Comprehension	2.60	Moderate
Application	2.81	Moderate

In contrast to the high level of pedagogical delivery, the students' science performance currently sits at a "Moderate" level across all tested domains. The highest performance was observed in the Application domain with a mean of 2.81, while Knowledge (2.66) and Comprehension (2.60) were slightly lower. These results indicate that while students can apply certain concepts, they may still struggle with the foundational depth of understanding required by more complex scientific topics.

The disconnect between "Very High" teaching demonstration and "Moderate" student performance reveals a "fidelity gap" in the educational process. It suggests that while teachers are performing the actions of these pedagogies, the depth or quality of the execution may not yet be sufficient to overcome existing learning deficits or the transition to a more complex curriculum. This highlights the need for instructional interventions that focus not just on the frequency of these methods, but on the rigor and effectiveness of their delivery.

Figure 4: Demographic Profile vs Pedagogical Approaches

This section explores whether the frequency and manner in which teachers implement the MATATAG pedagogical approaches are perceived differently by students based on their personal and socio-economic backgrounds. Identifying these differences allows for a better understanding of how instructional delivery may be adapted to meet the diverse needs of the student body.

Table 4: *Significant difference in the Extent Demonstration of Prevalent Pedagogical Approaches when Grouped According to Student Profile*

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Age	Constructivist Approach[a]	Reflective Approach[b]	Collaborative Approach[c]	Integrative Approach[d]	Inquiry –Based Approach[e]
11-12	4.50	4.55	4.53	4.54	4.54
13-14	4.60	4.61	4.53	4.59	4.60
15 and above	4.65	4.61	4.59	4.67	4.64
F-test	1.27	0.34	0.13	0.88	0.88
p-value	0.29	0.71	0.88	0.88	0.62
Conclusion	Not Sig.	Not Sig.	Not Sig.	Not Sig.	Not. Sig.
Sex					
Male	56.03	56.03	57.37	58.68	55.55
Female	53.74	53.74	52.10	50.50	54.33
U-Test	1451.000	1408.500	1328.000	1249.500	1437.000
p-value	0.286	.906	0.703	0.379	0.172
Conclusion	Not. Sig	Not. Sig	Not. Sig	Not.Sig.	Not. Sig
Science Grade					
90-100	4.25	4.34	4.32	4.34	4.38
85-89	4.54	4.56	4.46	4.55	4.47
80-84	4.57	4.57	4.56	4.59	4.61
below 84	4.78	4.80	4.79	4.80	4.79
F-test	8.20	7.01	6.77	5.81	5.140
p-value	0.000	0.000	0.000	0.001	0.002
Conclusion	Sig.	Sig.	Sig.	Sig.	Sig.
Family Economic Status					
10,000 and below	53.20	53.95	53.91	52.15	53.82
more than 10,000 to 15,000	57.97	54.17	54.78	62.47	54.50
more than 15,000 to 20,000	17.50	19.33	16.83	20.00	21.00
H-test	4.74	3.91	4.53	5.53	3.58
p-value	.093	.142	.104	.063	.167
Parents Highest Educational Attainment					
Elementary	63.96	64.98	61.02	61.73	64.22
High school	48.55	49.57	49.68	53.14	48.51
College	39.79	35.43	44.33	36.88	39.26
Post graduate	33.00	39.00	34.00	29.00	33.00
H-test	11.42	15.119	5.847	10.504	12.127
p-value	0.010	0.002	0.119	0.015	0.007
Conclusion	Sig.	Sig.	Not Sig.	Sig.	Sig.
LOCATION of Residence					
Urban	49.31	48.98	49.99	48.99	50.58
Rural	70.69	71.60	68.81	71.57	67.19

U-test	705.000	678.500	759.500	679.500	806.500
p-value	.001	.001	.005	.001	.013
Conclusion	Sig.	Sig.	Sig.	Sig.	Sig.
Number of Siblings					
1-2	45.98	40.47	40.02	44.47	37.92
3-4-siblings	46.94b	49.64b	53.00b	48.44	56.13
more than 4	69.63a	71.13a	68.19a	69.30	66.71
H-test	14.03	18.47	14.34	13.66	14.90
p-value	.001	.000	.001	.001	.001
Conclusion	Sig.	Sig.	Not Sig.	Sig.	Sig.
Access to learning Tools					
None	55.48	55.51	55.56	56.22	55.20
Yes	45.10	44.30	43.30	29.70	50.90
U-test	210.500	206.500	201.500	133.500	239.500
p-value	.466	.431	.389	.062	.762
Conclusion	Not Sig.	Not Sig.	Not Sig.	Not Sig.	Not Sig.

The tables examining the significant difference in Grade 7 students' Science Performance (Knowledge, Comprehension, and Application) based on their profile under the MATATAG Curriculum revealed a critical dual-status of equity. The analysis found no significant difference in performance based on typical demographic and general socio-economic variables, specifically Age, Sex, Family Economic Status, Parents' Educational Status, and Access to Learning Tools. This is a powerful, positive finding, suggesting the school's high-frequency implementation of student-centered pedagogies and its strong Supportive and Inclusive Learning Environment are effectively neutralizing the achievement gaps usually driven by these general socio-economic disadvantages. Conversely, the analysis found significant differences based on Prior Science Grade, Location of Residence, and Number of Siblings, indicating that deeper structural and academic factors remain potent barriers to high achievement and must be addressed.

The most crucial implication stems from the significant influence of the number of Siblings and the location of Residence. The data show that students from smaller families (e.g., 1-2 siblings) achieved a significantly higher mean science performance compared to those from larger families (e.g., more than 4 siblings) strongly supports the Resource Dilution Theory (OECD, 2017). This indicates that the core problem is not the family's general financial status (which was non-significant), but the scarcity of non-financial, academic resources—such as focused parental time and home-based support—that is diluted among numerous children. Coupled with the significance of Location of Residence (suggesting geographic isolation from support systems), the overall implication is that the school's equity challenge lies in overcoming these structural and domestic disadvantages. Furthermore, the robust significance of Prior Science Grade confirms the cumulative nature of scientific knowledge: unaddressed foundational deficits in Knowledge and Comprehension are the main academic bottleneck preventing students from mastering the complex Application skills demanded by the MATATAG curriculum.

Figure 5: Significant Differences in Science Performance by Student Profile

This section examines whether academic outcomes in science vary significantly across different student subgroups. By isolating these variables, the study identifies which student populations are excelling and which are facing systemic barriers to achieving the performance levels required by the current curriculum.

Table 5. *Significant Difference in the Level of Student Science Performance in the MATATAG Curriculum*

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When Grouped According to Student Demographic Profile

Age	Knowledge[a]	Comprehension[b]	Application[c]	As A Whole[d]
11-12	52.81	50.92	53.76	52.34
13-14	53.35	54.45	52.24	53.35
15 and above	67.33	71.40	66.70	69.07
H-test	2.751	5.149	2.541	3.506
p-value	.253	.076	.281	.173
Sex				
Male	49.66	50.80	48.75	48.95
Female	61.54	60.14	62.65	62.41
U-test	1451.000	1408.500	1328.000	1249.500
p-value	.047	.118	.020	.026
Conclusion	Sig.	Not Sig.	Sig.	Sig.
Science Grade				
90-100	70.22a	71.26	74.37	73.80
85-89	65.41ab	63.65	62.35	64.20
80-84	51.29b	49.95	50.21	49.77
below 84	31.04c	33.54	31.83	30.92
H-test	25.298	22.338	26.725	27.528
p-value	.000	.000	.000	.000
Conclusion	Sig.	Sig.	Sig.	Sig.
Family Economic Status				
10,000 and below	50.46	50.78	49.70	50.43
more than 10,000 to 15,000	65.89	66.03	69.92	67.11
more than 15,000 to 20,000	46.83	37.00	43.83a	40.33
H-test	4.077	4.738	7.104	5.042
Parents Highest Educational Attainment				
Elementary	48.53	46.60	48.63	47.77
High school	57.77	59.73	56.20	57.80
College	59.05	58.62	60.45	60.14
Postgraduate	12.50	40.00	36.50	24.50
H-test	4.564	4.844	2.968	4.276
p-value	.207	.184	.397	.233
Conclusion	Not Sig.	Not Sig.	Not Sig.	Not Sig.
Elementary	48.53	46.60	48.63	47.77
High school	57.77	59.73	56.20	57.80
College	59.05	58.62	60.45	60.14
Postgraduate	12.50	40.00	36.50	24.50
H-test	4.564	4.844	2.968	4.276
p-value	.207	.184	.397	.233

Conclusion	Not Sig.	Not Sig.	Not Sig.	Not Sig.
Location				
Urban	61.41	63.36	62.58	63.04
Rural	37.33	31.93	34.09	32.83
U-test	647.500	491.000	553.500	517.000
p-value	.000	.000	.000	.000
Conclusion	Sig.	Sig.	Sig.	Sig.
Number of Siblings				
1-2	65.35a	65.93a	66.58a	66.87a
3-4	56.63ab	56.69ab	56.28ab	56.47ab
more than 4	45.65b	45.15b	45.	44.66b
H-test	7.067	7.864	8.392	8.687
p-value	.029	.020	.015	.013
Conclusion	Sig.	Sig.	Sig.	Sig.
Access to				
None	54.29	54.78	54.24	54.33
Yes	69.70	59.60	70.80	68.90
U-test	186.500	237.000	181.000	190.500
p-value	.279	.734	.243	.311
Conclusion	Not Sig.	Not Sig.	Not Sig.	Not Sig.

The results show that age does not significantly influence students' knowledge, comprehension, and application skills, as all p-values are greater than 0.05. Although older students (15 and above) obtained higher mean scores, these differences are not statistically meaningful. In contrast, sex shows significant differences in knowledge, application, and overall performance, with female students generally obtaining higher scores than males, suggesting better performance in these areas.

Furthermore, students' science grades have a strong and significant effect on all learning domains. Learners with higher grades (90–100) consistently demonstrate better knowledge, comprehension, and application skills compared to those with lower grades, indicating a clear link between academic achievement and learning competencies. On the other hand, family economic status and parents' educational attainment do not show significant differences, implying that these factors may not strongly influence students' learning outcomes in this context.

However, location and number of siblings significantly affect students' performance. Students from urban areas perform better across all domains compared to those from rural areas, while those with fewer siblings tend to have higher scores than those with larger families. Lastly, access to resources does not show a significant difference, even if students with access appear to have slightly higher mean scores, suggesting that the variation is not strong enough to be statistically conclusive.

Figure 6: Correlation Between Pedagogical Approaches and Student Science Performance

This table presents the relationship between selected pedagogical approaches and students' learning outcomes in terms of knowledge, comprehension, and application. It aims to determine whether the way these teaching strategies are implemented is associated with how well students understand and apply the lessons. By examining both the strength and significance of the relationships, the table provides a clearer picture of how instructional practices may influence students' overall academic performance.

Table 6. *Relationship Analysis that Exists Between the Prevalent Pedagogical Approaches and Students' Science Performance*

Indicators	Statistics	Constructivist	Reflective	Collaborative	Integrative	Inquiry-Based
Knowledge	Corr. Coeff.	-.27	-.24	-.19	-.19	-.24
	P-value	.005	.012	.044	.048	.011
	Conclusion	Significant	Significant	Significant	Significant	Significant
Comprehension	Corr. Coeff.	-.32	-.33	1.31	-.27	-.38
	P-value	.001	.000	.001	.005	.000
	Conclusion	Significant	Significant	Significant	Significant	Significant
Application	Corr. Coeff.	-.34	-.33	-.29	-.301	-.35
	P-value	.000	.000	.002	.001	.000
	Conclusion	Significant	Significant	Significant	Significant	Significant

The findings indicate that there is a statistically significant relationship between the different pedagogical approaches and students' knowledge, comprehension, and application skills, since all p-values are below 0.05. However, the correlation coefficients are generally negative, which means that as the use or demonstration of these teaching approaches increases, students' learning outcomes tend to decrease slightly. This relationship is present across all domains, although the strength of the correlation ranges from weak to moderate.

Among the areas, comprehension and application show somewhat stronger relationships compared to knowledge, suggesting that these aspects of learning are more affected by how the teaching approaches are carried out. When considered overall, the same pattern remains consistent, showing a significant but inverse relationship. These results suggest that while the teaching approaches are clearly connected to student performance, how they are implemented in the classroom may need to be reviewed to better support positive learning outcomes.

Discussion

The results of this study reveal a compelling "fidelity gap" in the early implementation of the MATATAG K-10 Curriculum. While teachers demonstrated a "Very High Extent" of pedagogical engagement across all five core approaches (Table 2), Grade 7 student performance remained at a "Moderate Level" (Table 3). This disconnect aligns with recent 2024–2026 assessments of the Philippine education system, which suggest that while the "decongested" MATATAG framework reduces workload and clarifies learning exemplars, the transition from teaching frequency to student mastery is hindered by "student difficulties in comprehension and readiness" (Capulong, et al., 2026). The paradoxical negative correlation observed between these modern approaches and actual achievement (Table 6) suggests that high-energy, student-centered methods may inadvertently lead to cognitive overload if the instructional scaffolding is not precisely calibrated to the learners' current cognitive capacity (Silva & Araujo, 2024).

The demographic and socioeconomic barriers identified in Tables 1, 4, and 5 further clarify why high-frequency teaching does not always yield high-level outcomes. The superior performance of female students in Knowledge and Application (Table 5) is consistent with 2026 research showing that female learners in the Philippines often exhibit higher participation rates and stronger interest in science subjects compared to their male counterparts (Demalata et al., 2024). Furthermore, the significant influence of family size on performance (Table 5) provides critical empirical weight to the Resource Dilution Model. Recent findings from the PISA 2022 (OECD, 2023) emphasize that students from resource-strained households often lack the "parental time" and "intellectual resources" necessary to support the rigorous inquiry-based tasks required by the new curriculum, creating a domestic bottleneck that classroom instruction alone cannot easily bridge.

Finally, the geographic and academic variables (Tables 5 and 6) underscore the cumulative nature of science education. The significant advantage of urban students over rural ones (Table 5) mirrors broader 2024 trends where urban learners benefit from better access to contextualized learning materials and digital infrastructure (Lagbao, 2024). Most critically, the robust significance of prior science grades (Table 6) confirms that scientific proficiency is a "building-block" process. Recent 2025 policy evaluations (EDCOM 2) suggest that foundational deficits from earlier grades act as a permanent barrier to the "Application" domain of the MATATAG curriculum. Consequently, for these pedagogical approaches to be effective, professional development must move beyond simply "demonstrating" a method and instead focus on pedagogical precision—remediating foundational gaps before advancing to the complex, integrated tasks the new curriculum demands.

Conclusion

This research confirms that the pedagogical shift envisioned by the MATATAG Curriculum is well underway at the instructional level, with teachers showing a strong commitment to moving beyond traditional rote learning.

However, the transition from "demonstrating" a method to "achieving" high student performance is still in progress. The "Moderate" performance levels recorded here indicate that we are in a middle phase where the teaching is active, but the mastery is not yet deep.

The study concludes that achieving academic excellence requires more than just high-frequency pedagogical demonstration; it requires addressing the domestic "resource dilution" faced by students in large families and rural locations. Furthermore, because scientific knowledge is cumulative, the "Moderate" scores in basic Knowledge and Comprehension act as a bottleneck for higher-order Application skills. To move forward, it is recommended that professional development for teachers shift toward pedagogical refinement—teaching educators not just *how* to use these five approaches, but how to calibrate them for maximum impact. Ultimately, the success of the MATATAG reform will depend on our ability to turn these high-energy teaching strategies into high-impact learning outcomes

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