

# Linking Strategic Instructional Management and Science Teaching Approaches among Public Secondary School Teachers

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## ABSTRACT

This study examined the relationship between strategic instructional management and science teaching approaches among public secondary school teachers in the Wright Districts of Paranas, Samar, Philippines. Specifically, it determined the extent of implementation of strategic instructional management, identified the teaching approaches employed by science teachers, examined the relationship between these variables, and identified the challenges encountered in their implementation. A quantitative descriptive-correlational research design was employed involving 35 science teachers and 8 school heads through total enumeration. Data were gathered using a researcher-developed questionnaire that underwent expert validation (CVI = 1.00) and reliability testing (Cronbach's  $\alpha = 0.79$ ). Descriptive statistics and Kendall's Tau-b correlation were used to analyze the data. The findings revealed a very high level of implementation of strategic instructional management, with grand mean ratings of 4.49 among teachers and 4.81 among school heads. Science teachers consistently employed diverse teaching approaches, yielding an overall mean of 4.63, with the Science–Technology–Society (STS) approach obtaining the highest rating (M = 4.71). Significant positive relationships were found between strategic instructional management and teaching approaches, particularly between instructional support systems and inquiry-based learning ( $\tau = .51, p < .001$ ), and instructional support systems and project-based learning ( $\tau = .50, p < .001$ ). Challenges in implementing strategic instructional management (M = 2.93) and teaching approaches (M = 2.98) were encountered only sometimes. The study concludes that strategic instructional management serves as an enabling mechanism for adopting diverse, learner-centered teaching approaches in science education. Strengthening instructional support systems, resource provision, and teacher development initiatives may further enhance the quality of science instruction.

**Keywords:** instructional management, science education, science teaching approaches, strategic instructional management

## INTRODUCTION

Science education is a fundamental component of secondary education because it equips learners with the knowledge, skills, and dispositions necessary to understand natural phenomena and address real-world problems. It serves as a foundation for innovation, economic competitiveness, and sustainable development by developing learners' scientific literacy, critical thinking, analytical reasoning, and informed decision-making skills (OECD, 2023). These competencies are essential for academic success, lifelong learning, and meaningful participation in societal, environmental, and technological contexts.

Globally, science education is recognized as a key determinant of educational quality and national development. International educational frameworks emphasize instructional practices that promote scientific inquiry, conceptual understanding, and the application of knowledge to authentic situations (Morris, 2025). Empirical evidence likewise demonstrates that effective science instruction enhances learner engagement and preparedness for post-secondary education and science-related careers (Mikeska et al., 2017). In the

Philippines, Science remains a core learning area within the K to 12 curriculum, reflecting the Department of Education's commitment to developing scientifically literate citizens who can contribute to national development (DepEd, 2016).

Despite these efforts, science achievement among Filipino learners remains a major concern. Results from the Programme for International Student Assessment (PISA) 2022 revealed that Filipino learners performed below international benchmarks in science, particularly in scientific reasoning and the application of scientific concepts (OECD, 2023). Similarly, national reports have consistently shown that the mean percentage score in Science remains below the mastery level expected by the curriculum. Cabural et al. (2024) further noted that science achievement among Filipino students is influenced by interconnected factors such as socioeconomic conditions, teacher quality, and systemic educational challenges, suggesting that science learning outcomes are shaped by instructional and organizational conditions rather than individual learner characteristics alone.

Among the school-related factors that influence instructional quality, strategic instructional management has gained increasing attention. Strategic instructional management refers to the systematic planning, implementation, supervision, monitoring, assessment, instructional support, and teacher development processes that guide instructional improvement. In science education, strategic instructional management ensures that classroom practices align with curriculum standards and learning goals while providing teachers with the support needed to improve teaching effectiveness. Meng (2023) reported that aligning instructional practices with educational quality standards contributes to the development of effective learning environments, while Covitt et al. (2024) emphasized that strategic instructional practices support three-dimensional science learning by engaging students in scientific sense-making processes.

Instructional leadership serves as a central component of strategic instructional management. Ulit (2025) found that instructional leadership practices, including establishing academic goals, providing instructional guidance, and supporting professional development, significantly influence teaching quality. Similarly, Makin, Abdullah, and Shafee (2018) described effective strategic instructional management as encompassing strong supervisory competencies, continuous capacity building, and sustained efforts to improve educational standards. These studies suggest that effective instructional management operates through coordinated leadership actions that support teachers and strengthen instructional quality.

The effectiveness of instructional management is often reflected in the teaching approaches employed in the classroom. Contemporary science education advocates learner-centered approaches such as inquiry-based learning, project-based learning, cooperative learning, experimentation, and Science–Technology–Society (STS) instruction. These approaches promote active learning, scientific reasoning, and deeper conceptual understanding among learners. In the Philippine context, Arceño and Mendaño (2026) reported that science teachers frequently employ inquiry-based and cooperative learning strategies, while Istiana et al. (2023) found that inquiry-oriented instruction enhances learners' critical thinking skills when supported by appropriate instructional guidance.

However, implementing innovative teaching approaches remains challenging. Teachers frequently encounter limitations related to instructional resources, time constraints, and varying levels of subject-matter expertise. Riga et al. (2017) emphasized that the sustained implementation of inquiry-based instruction depends largely on the availability of instructional support, supervision, and professional development opportunities. Such challenges may be more pronounced in rural public secondary schools, where access to instructional resources and support systems is constrained.

Although previous studies have established the importance of instructional management and effective teaching practices, a gap remains in understanding how these variables interact within science education. Most studies have examined strategic instructional management and teaching approaches independently, with limited empirical evidence exploring their relationship in district-level public secondary school settings. Understanding this relationship is important because effective instructional management can create conditions enabling teachers to employ diverse, learner-centered teaching approaches that improve science learning outcomes.

Therefore, this study examined the relationship between strategic instructional management and science teaching approaches among public secondary school teachers in the Wright Districts of Paranas, Samar,

Philippines. Specifically, it determined the extent of implementation of strategic instructional management, identified the teaching approaches employed by science teachers, examined the relationship between these variables, and identified the challenges encountered in their implementation. The study's findings may provide evidence-based insights to strengthen instructional leadership, enhance teaching practices, and improve science education in public secondary schools.

## **METHODS**

### **Research Design**

This study employed a quantitative descriptive-correlational research design to examine the relationship between strategic instructional management and science teaching approaches among public secondary school teachers. The descriptive method was used to determine the extent of implementation of strategic instructional management and the teaching approaches employed in science instruction. In contrast, the correlational method was used to examine relationships among selected variables. This design was appropriate because it allowed the examination of naturally occurring relationships among variables without manipulation.

### **Research Locale and Participants**

The study was conducted in public secondary schools in the Wright Districts of Paranas, Samar, Philippines. These schools operate under the Department of Education and serve learners from diverse socioeconomic backgrounds, particularly in rural communities.

The respondents comprised 35 science teachers and 8 school heads, selected through total enumeration. All eligible science teachers and school heads within the district were included in the study to ensure comprehensive representation of the target population. Science teachers provided information regarding their teaching approaches and demographic characteristics, while both teachers and school heads assessed the extent of implementation of strategic instructional management.

### **Research Instruments**

Data were gathered using a researcher-developed structured questionnaire consisting of three parts: (1) strategic instructional management, (2) teaching approaches in science, and (3) challenges encountered in implementing strategic instructional management and teaching approaches.

The strategic instructional management component measured six dimensions: planning, implementation, supervision and monitoring, assessment, instructional support system, and capacity building/teacher development. The teaching approaches component assessed the utilization of traditional, inquiry-based, project-based, collaborative/cooperative, experimentation, and Science–Technology–Society (STS) approaches.

### **Validation and Reliability of Instruments**

The questionnaire underwent expert validation by three specialists in educational management and science education. Content validity was assessed using the Content Validity Index (CVI), which yielded an overall value of 1.00, indicating excellent content validity.

Pilot testing was conducted among science teachers from schools outside the study area. Reliability analysis using Cronbach's alpha yielded a coefficient of 0.79, indicating acceptable internal consistency and confirming the instrument's suitability for data collection.

### **Data Gathering Procedure**

Before data collection, ethical clearance and the necessary permissions were secured from the appropriate authorities. Respondents were informed of the study's objectives, procedures, voluntary nature of participation, and confidentiality measures. Written informed consent was obtained from all participants.

The researcher personally administered and retrieved the questionnaires from February 23 to March 4, 2026. Completed questionnaires were checked for completeness, coded, organized, and prepared for statistical analysis.

### Data Analysis

Descriptive statistics, including frequency counts, percentages, means, and weighted means, were used to describe the respondents' profile, the extent of implementation of strategic instructional management, and the teaching approaches employed by science teachers.

Kendall's Tau-b was used to determine the relationship between strategic instructional management and teaching approaches. At the same time, Cramer's V was employed to assess the association between demographic variables and teaching approaches. All hypotheses were tested at the 0.05 level of significance using the Statistical Package for the Social Sciences (SPSS).

### Ethical Considerations

The study was approved by the Institutional Ethics Review Committee (*HREC Code: 2026-0030-G*). Ethical principles of respect for persons, beneficence, and justice were observed throughout the research process. Participation was voluntary, and respondents were informed of their right to withdraw at any time without penalty. Confidentiality and anonymity were maintained by removing personal identifiers and reporting findings only in aggregate form. All collected data were securely stored and used exclusively for academic and research purposes.

### Limitations of the Study

The study was limited to public secondary schools in the Wright Districts of Paranas, Samar, Philippines. Consequently, the findings may not be generalizable to other educational settings with different contextual characteristics. Despite this limitation, the study provides useful insights into the relationship between strategic instructional management and science teaching approaches in rural public secondary schools.

## RESULTS AND DISCUSSION

### Extent of Implementation of Strategic Instructional Management in Science

Table 1 presents the extent of implementation of strategic instructional management in Science as assessed by teachers and school heads.

**Table 1. Extent of Implementation of Strategic Instructional Management in Science as Assessed by Teachers and School Heads**

Strategic Instructional Management Dimension	Teachers Mean	Interpretation	School Heads Mean	Interpretation
Planning	4.78	Strongly Agree	4.90	Strongly Agree
Implementation	4.60	Strongly Agree	4.73	Strongly Agree
Supervision and Monitoring	4.54	Strongly Agree	4.93	Strongly Agree
Assessment	4.40	Strongly Agree	4.83	Strongly Agree
Instructional Support System	4.32	Strongly Agree	4.65	Strongly Agree
Capacity Building/Teacher Development	4.28	Strongly Agree	4.83	Strongly Agree
<b>Grand Mean</b>	<b>4.49</b>	<b>Strongly Agree</b>	<b>4.81</b>	<b>Strongly Agree</b>

Legend: 4.21 – 5.00 Strongly Agree (SA)/The practice is always observed/Fully implemented  
 3.41 – 4.20 Agree (A)/ The practice is often observed/implemented  
 2.61 – 3.40 Neutral/ The practice is sometimes observed/Moderately implemented  
 1.81 – 2.60 Disagree (A)/ The practice is rarely observed/Poorly implemented  
 1.00 – 1.80 Strongly Disagree (SD)/The practice is never observed/Never implemented

The results yielded an overall grand mean of 4.49 among teachers and 4.81 among school heads, both interpreted as Strongly Agree. These findings indicate a very high level of implementation of strategic instructional management practices in the participating public secondary schools, suggesting that instructional planning, implementation, supervision and monitoring, assessment, instructional support systems, and teacher development practices are consistently observed in science instruction.

Among the six dimensions, planning obtained the highest mean rating among teachers ( $M = 4.78$ ), while supervision and monitoring received the highest rating among school heads ( $M = 4.93$ ). These findings suggest that schools place strong emphasis on establishing clear instructional goals, aligning lessons with curriculum standards, and monitoring classroom instruction to ensure instructional quality. Effective planning and supervision are critical components of instructional leadership, as they provide direction, accountability, and continuous support for teachers in delivering science instruction.

The findings further show that implementation, assessment, instructional support systems, and capacity building/teacher development were likewise rated positively by both groups of respondents. This indicates that science teachers are supported by instructional resources, assessment mechanisms, professional development activities, and administrative assistance, which contribute to the effective delivery of instruction. Such support systems are essential in promoting instructional consistency, improving teacher competence, and fostering a culture of continuous improvement within schools.

The consistently favorable ratings across all dimensions demonstrate that instructional management practices are embedded in the schools' operational and instructional processes. These findings support those of Meng (2023), who emphasized that aligning instructional practices with educational quality standards contributes to effective learning environments and improved educational outcomes. Similarly, strategic instructional practices facilitate meaningful science learning by promoting coherent planning, implementation, and instructional support. The results also corroborate the findings of Istikomah, Iswan, and Winata (2025), who reported that instructional leadership practices, including supervision, instructional guidance, and professional development support, significantly influence teaching effectiveness and instructional quality.

Although all dimensions received highly favorable ratings, instructional support systems and capacity building/teacher development obtained comparatively lower mean scores from teachers than the other dimensions. This may indicate areas where schools can further strengthen support mechanisms, particularly in expanding access to instructional resources, research opportunities, and professional learning initiatives. Enhancing these areas may further empower science teachers to implement innovative instructional strategies and respond effectively to emerging educational demands.

Overall, the findings demonstrate that strategic instructional management is consistently practiced and strongly supported by both teachers and school heads. The high level of implementation across all dimensions reflects schools' commitment to maintaining high-quality science instruction and creating learning environments that support teacher effectiveness and student learning.

### Teaching Approaches Employed by Science Teachers

Table 2 presents the teaching approaches employed by science teachers in delivering science instruction.

**Table 2 Teaching Approaches Employed by Science Teachers**

Teaching Approach	Mean	Interpretation
Science–Technology–Society (STS)	4.71	Always Used
Traditional Approach	4.70	Always Used
Inquiry-Based Learning	4.65	Always Used
Project-Based Learning	4.63	Always Used

Collaborative/Cooperative Learning	4.61	Always Used
Experimentation	4.47	Always Used
<b>Grand Mean</b>	<b>4.63</b>	<b>Always Used</b>

**Legend:** 4.21 – 5.00- Always Used (AU); 3.41 – 4.20-Often Used (OU); 2.61 – 3.40 - Sometimes Used (SU); 1.81 – 2.60- Rarely Used (RU); and 1.00 – 1.80 -Never Used (NU)

The results yielded an overall grand mean of 4.63, interpreted as Always Used, indicating that science teachers consistently employ diverse instructional approaches to facilitate learning and promote students’ understanding of scientific concepts.

The findings show that all teaching approaches were consistently utilized by science teachers, suggesting the adoption of both traditional and learner-centered instructional practices. Among the approaches, the Science–Technology–Society (STS) approach obtained the highest mean (M = 4.71), followed closely by the traditional approach (M = 4.70) and inquiry-based learning (M = 4.65). The high utilization of the STS approach indicates that teachers regularly connect scientific concepts to real-life situations, technological developments, and societal concerns, thereby making science learning more relevant and meaningful to students. This finding supports Chowdhury (2016), who emphasized that the STS approach promotes meaningful learning by linking science content to authentic contexts and societal issues. Similarly, Bybee (2015) noted that contextualized science instruction encourages students to think critically about the implications of scientific and technological developments for society.

The consistently high ratings for inquiry-based learning, project-based learning, and collaborative/cooperative learning suggest that teachers actively engage students in questioning, investigation, problem-solving, teamwork, and authentic learning experiences. These approaches encourage learners to construct knowledge through exploration and interaction rather than through passive reception of information. According to Aying and Mendaño (2024), inquiry-oriented and project-based instructional approaches promote deeper conceptual understanding, critical thinking, and learner engagement. Likewise, Slavin, Madden, and Ross (2025) highlighted the effectiveness of collaborative learning in enhancing academic achievement, communication skills, and positive interdependence among learners.

Although experimentation obtained the lowest mean (M = 4.47), it remained within the “Always Used” category, indicating that hands-on scientific activities continue to be an integral component of science instruction. The findings suggest that teachers provide opportunities for learners to formulate hypotheses, collect and analyze data, and interpret experimental results, thereby supporting the development of scientific inquiry skills. Pacala (2025) argued that laboratory and experimental activities are essential for developing conceptual understanding and scientific reasoning, as they enable learners to connect theoretical concepts with authentic scientific practice.

Interestingly, the traditional approach remained one of the most frequently used strategies. This finding indicates that science teachers continue to rely on lectures, demonstrations, recitations, and guided discussions to introduce concepts and provide structured learning experiences. Tursunov (2016) highlighted that direct instruction remains effective for teaching foundational knowledge and complex concepts when appropriately combined with student-centered learning opportunities. The coexistence of traditional and learner-centered approaches suggests that teachers adopt a balanced instructional repertoire to address diverse learning needs and instructional objectives.

Overall, the findings demonstrate that science teachers employ a comprehensive range of teaching approaches that support active learning, scientific inquiry, collaboration, contextualized learning, and knowledge acquisition. The consistent use of both traditional and learner-centered approaches reflects teachers’ commitment to creating engaging and meaningful learning experiences that promote scientific literacy and the development of essential 21st-century skills.

## Relationship Between Strategic Instructional Management and Science Teaching Approaches

Table 3 presents the relationship between strategic instructional management and the teaching approaches employed by science teachers.

**Table 3 Relationship Between Strategic Instructional Management and Science Teaching Approaches**

Strategic Instructional Management	Traditional		Inquiry-Based		Project-Based		Cooperative Learning		Experimentation		Science, Technology & Society	
	τ-value	p-value	τ-value	p-value	τ-value	p-value	τ-value	p-value	τ-value	p-value	τ-value	p-value
Planning	.29 <sup>S</sup>	.043	.30 <sup>S</sup>	.032	.40 <sup>S</sup>	.005	.31 <sup>S</sup>	.030	.07 <sup>NS</sup>	.579	.16 <sup>NS</sup>	.268
Implementation	.49 <sup>S</sup>	.000	.33 <sup>S</sup>	.014	.34 <sup>S</sup>	.012	.37 <sup>S</sup>	.007	.42 <sup>S</sup>	.001	.41 <sup>S</sup>	.003
Supervision & Monitoring	.11 <sup>NS</sup>	.445	.26 <sup>NS</sup>	.054	.26 <sup>NS</sup>	.057	.32 <sup>S</sup>	.017	.22 <sup>NS</sup>	.094	.03 <sup>NS</sup>	.842
Assessment	.28 <sup>S</sup>	.039	.29 <sup>S</sup>	.030	.42 <sup>S</sup>	.002	.50 <sup>S</sup>	.000	.49 <sup>S</sup>	.000	.31 <sup>S</sup>	.025
Support System	.41 <sup>S</sup>	.003	.51 <sup>S</sup>	.000	.50 <sup>S</sup>	.000	.46 <sup>S</sup>	.001	.47 <sup>S</sup>	.000	.19 <sup>NS</sup>	.155
Capacity Building	.34 <sup>S</sup>	.012	.46 <sup>S</sup>	.001	.39 <sup>S</sup>	.004	.34 <sup>S</sup>	.010	.27 <sup>S</sup>	.042	.09 <sup>NS</sup>	.532

*Significant at  $p < .05$ ; S = Significant; NS = Not Significant; Kendall's Tau-b correlation coefficient.*

The results revealed several significant positive relationships between the dimensions of strategic instructional management and the teaching approaches utilized in science instruction. These findings indicate that instructional management practices influence the extent to which teachers employ diverse instructional strategies in the teaching-learning process.

Among the dimensions of strategic instructional management, implementation exhibited significant relationships with all teaching approaches, including traditional, inquiry-based, project-based, cooperative learning, experimentation, and Science, Technology, and Society (STS) approaches. This finding suggests that the effective execution of instructional plans enables teachers to use a wider range of teaching strategies to address diverse learning needs and instructional objectives. When instructional activities are effectively carried out, teachers are more likely to create learning experiences that promote engagement, inquiry, collaboration, and the application of scientific knowledge.

Similarly, planning demonstrated significant relationships with traditional, inquiry-based, project-based, and cooperative learning approaches. The findings imply that systematic instructional planning facilitates the integration of diverse teaching strategies by ensuring that learning objectives, instructional activities, resources, and assessment procedures are carefully aligned. Effective planning provides teachers with a clear instructional framework that supports the implementation of both teacher-centered and learner-centered approaches.

The results further revealed that assessment was significantly associated with traditional, inquiry-based, project-based, experimentation, and STS approaches. This suggests that assessment practices play an important role in guiding instructional decisions and encouraging the use of teaching approaches that promote active participation, authentic learning, and scientific inquiry. Assessment-driven instruction enables teachers to monitor student learning, identify instructional needs, and adjust teaching strategies accordingly.

Notably, instructional support systems demonstrated some of the strongest relationships with teaching approaches, particularly inquiry-based learning ( $\tau = .51, p < .001$ ), project-based learning ( $\tau = .50, p < .001$ ), and experimentation ( $\tau = .47, p < .001$ ). These findings indicate that the availability of instructional resources, administrative support, learning materials, and technical assistance significantly influences teachers' capacity to implement learner-centered science instruction. Adequate support systems create favorable conditions that enable teachers to engage students in inquiry, investigation, and authentic learning experiences.

Likewise, capacity building showed significant relationships with traditional, inquiry-based, project-based, cooperative learning, and experimentation approaches. This finding highlights the importance of professional

development opportunities in enhancing teachers’ instructional competencies. Participation in training programs, seminars, workshops, and other professional learning activities equips teachers with the knowledge and skills necessary to implement innovative and effective teaching strategies.

The findings support Alvarez-Bell, Wirtz, and Bian (2017), who emphasized that effective instructional management and professional support enable teachers to adopt teaching practices that improve student engagement and learning outcomes. Similarly, Hattie (2018) argued that instructional processes such as planning, implementation, assessment, and feedback significantly influence the quality of classroom instruction. The results also corroborate the findings of McKeown et al. (2016), who reported that the successful implementation of inquiry-based and learner-centered approaches depends largely on instructional support, supervision, and professional development opportunities.

Overall, the findings suggest that stronger strategic instructional management is associated with greater utilization of diverse teaching approaches in science education. Schools that provide effective planning, implementation, assessment systems, instructional support, and professional development opportunities are more likely to foster innovative and learner-centered instructional practices. Consequently, strengthening strategic instructional management may improve the quality of science instruction and enhance students’ learning experiences.

### Challenges Encountered in the Implementation of Strategic Instructional Management

Despite the high level of implementation of strategic instructional management, science teachers continue to encounter challenges that may affect the effective delivery of instruction. Identifying these challenges is essential for understanding areas that require additional support and intervention. Table 4 presents the challenges encountered by teachers in implementing strategic instructional management in science.

**Table 4. Challenges Encountered by Teachers in the Implementation of Strategic Instructional Management in Science**

Indicator	Mean	SD	Interpretation
Lack of adequate instructional resources in science instruction	3.11	1.32	Sometimes a Challenge
Limited budget allocation for science programs	3.43	1.27	Often a Challenge
Insufficient time for instructional planning due to heavy teaching loads	2.89	1.39	Sometimes a Challenge
Weak supervision and monitoring	2.46	1.40	Rarely a Challenge
Inconsistent implementation of policies and curriculum guides	2.83	1.42	Sometimes a Challenge
Lack of continuous professional development for science teachers	3.20	1.23	Sometimes a Challenge
Minimal instructional support	3.03	1.20	Sometimes a Challenge
Overcrowded classroom	2.60	1.54	Rarely a Challenge
Low stakeholders’ involvement in supporting science education	2.89	1.23	Sometimes a Challenge
Vulnerability to disasters disrupting science instruction	2.89	1.21	Sometimes a Challenge
<b>Overall Mean</b>	<b>2.93</b>	<b>0.28</b>	<b>Sometimes a Challenge</b>

**Legend:** 4.21–5.00 = Always a Challenge; 3.41–4.20 = Often a Challenge; 2.61–3.40 = Sometimes a Challenge; 1.81–2.60 = Rarely a Challenge; 1.00–1.80 = Never a Challenge.

The findings yielded an overall mean of 2.93, interpreted as "Sometimes a Challenge," indicating that while teachers encounter difficulties implementing instructional management practices, these challenges occur only occasionally and are generally manageable.

Among the identified challenges, limited budget allocation for science programs obtained the highest mean (M = 3.43), interpreted as Often a Challenge. This finding suggests that financial constraints remain a significant concern affecting the acquisition of laboratory equipment, instructional materials, and other resources necessary for effective science instruction. Other commonly reported concerns included the lack of continuous professional development (M = 3.20), inadequate instructional resources (M = 3.11), and minimal instructional

support (M = 3.03), all of which were interpreted as Sometimes a Challenge. These findings indicate that resource availability and professional learning opportunities continue to influence the effective implementation of instructional management practices.

Conversely, weak supervision and monitoring (M = 2.46) and overcrowded classrooms (M = 2.60) were perceived as Rarely a Challenge, suggesting that teachers generally view instructional supervision and classroom conditions as manageable aspects of their work environment.

The findings underscore the importance of strengthening resource allocation, professional development opportunities, and instructional support mechanisms to sustain effective science instruction. Affandi (2025) emphasized that adequate instructional resources and institutional support are essential for the successful implementation of instructional innovations and improved learning outcomes. Similarly, OECD (2023) highlighted the importance of resource availability, professional development opportunities, and administrative support in enhancing instructional quality and school effectiveness.

Overall, the results suggest that although teachers encounter challenges in implementing strategic instructional management, these difficulties are generally occasional and can be mitigated through enhanced funding support, continuous professional development, and strengthened instructional support systems.

### Challenges Encountered by Teachers in Teaching Approaches Employed in Science Instruction

While science teachers consistently employ diverse teaching approaches, they also encounter challenges that may influence the effective implementation of these instructional strategies. Understanding these challenges is important for identifying areas where additional resources, training, and support may be needed.

Table 5 presents the challenges encountered by teachers in implementing teaching approaches in science instruction.

**Table 5. Challenges Encountered by Teachers in Teaching Approaches Employed in Science Instruction**

Indicator	Mean	SD	Interpretation
Difficulty in applying inquiry-based learning due to a lack of laboratory facilities and materials	2.83	1.36	Sometimes a Challenge
Limited internet connectivity in science lessons	3.31	1.23	Sometimes a Challenge
Time constraints in completing project-based activities	3.26	1.27	Sometimes a Challenge
Large class sizes affect the management of group work	2.71	1.43	Sometimes a Challenge
Low student engagement when lessons are not contextualized to real-life situations	3.17	1.12	Sometimes a Challenge
Limited training in innovative science teaching approaches	3.17	1.22	Sometimes a Challenge
Difficulty in localizing and contextualizing lessons	2.74	1.36	Sometimes a Challenge
Resistance to adopting new teaching approaches	2.71	1.18	Sometimes a Challenge
Difficulty in differentiating instruction for diverse learners	2.97	1.18	Sometimes a Challenge
Limited opportunities for collaboration with co-teachers to share best practices	2.97	1.25	Sometimes a Challenge
<b>Overall Mean</b>	<b>2.98</b>	<b>0.23</b>	<b>Sometimes a Challenge</b>

**Legend:** 4.21–5.00 = Always a Challenge; 3.41–4.20 = Often a Challenge; 2.61–3.40 = Sometimes a Challenge; 1.81–2.60 = Rarely a Challenge; 1.00–1.80 = Never a Challenge.

The results yielded an overall mean of 2.98, interpreted as “Sometimes a Challenge”, indicating that teachers occasionally experience difficulties in employing diverse teaching approaches. However, these challenges are generally manageable and do not substantially impede instructional delivery.

Among the identified challenges, limited internet connectivity in science lessons obtained the highest mean (M = 3.31), followed by time constraints in completing project-based activities (M = 3.26). These findings suggest

that technological limitations and time constraints remain notable concerns in implementing innovative, learner-centered teaching approaches. The increasing integration of technology and project-based learning in science instruction requires reliable internet access and sufficient instructional time to support meaningful student engagement and learning.

Teachers also reported that limited training in innovative science teaching approaches ( $M = 3.17$ ) and low student engagement when lessons are not contextualized to real-life situations ( $M = 3.17$ ) were sometimes experienced. Similarly, difficulties related to inquiry-based learning due to limited laboratory facilities and materials ( $M = 2.83$ ), localizing and contextualizing lessons ( $M = 2.74$ ), managing large classes during group activities ( $M = 2.71$ ), and resistance to adopting new teaching approaches ( $M = 2.71$ ) were identified as occasional concerns. These findings indicate that the successful implementation of diverse teaching approaches requires adequate resources, instructional support, and opportunities for professional growth.

Moreover, teachers reported challenges in differentiating instruction for diverse learners ( $M = 2.97$ ) and collaborating with colleagues to share best practices ( $M = 2.97$ ). These results highlight the importance of fostering collaborative professional learning communities and providing teachers with opportunities to exchange instructional experiences and effective classroom practices.

The findings support Stevenson et al. (2016), who emphasized that the effective implementation of innovative teaching approaches requires sufficient instructional resources, continuous professional development, and supportive school environments. Likewise, Koimah et al. (2024) argued that teachers need adequate training, instructional support, and access to resources to implement diverse teaching strategies that enhance student learning successfully. The importance of professional collaboration and continuous learning opportunities in improving instructional practices and addressing classroom challenges.

Overall, the findings suggest that although teachers encounter challenges in implementing diverse teaching approaches in science education, these difficulties occur only occasionally. Strengthening technological infrastructure, expanding professional development opportunities, enhancing access to instructional resources, and promoting collaborative learning among teachers may further support the effective implementation of innovative and learner-centered science instruction.

## CONCLUSION AND RECOMMENDATIONS

The study found that strategic instructional management is consistently practiced in public secondary schools in the Wright Districts of Paranas, Samar, as evidenced by the very high level of implementation across planning, implementation, supervision and monitoring, assessment, instructional support systems, and capacity building. Likewise, science teachers consistently employed a variety of teaching approaches, including traditional, inquiry-based, project-based, cooperative learning, experimentation, and Science–Technology–Society (STS) approaches, demonstrating the integration of both teacher-centered and learner-centered instructional strategies in science education.

The findings further revealed significant positive relationships between strategic instructional management and teaching approaches, indicating that effective instructional management supports the adoption of diverse and innovative teaching practices. Teachers who experience stronger instructional support, effective implementation processes, relevant assessment practices, and continuous professional development are more likely to utilize a wider range of teaching approaches that promote active learning and student engagement. These findings affirm that strategic instructional management serves as an enabling mechanism for adopting diverse, learner-centered teaching approaches in science education.

Although challenges related to funding, instructional resources, internet connectivity, and professional development were identified, these concerns were encountered only occasionally. Nevertheless, the findings highlight the need to strengthen instructional support systems, enhance access to science resources and technological infrastructure, and sustain professional development opportunities for science teachers. Such initiatives may further improve instructional practices and support the continued implementation of innovative and learner-centered approaches in science instruction. Given that the study was limited to public secondary

schools in the Wright Districts of Paranas, Samar, future research may involve larger and more diverse samples across multiple districts or regions to enhance the generalizability of the findings. Future studies may also employ mixed-methods approaches incorporating interviews, focus group discussions, and classroom observations to provide deeper insights into instructional management practices and their influence on teaching approaches. Furthermore, investigating the effects of strategic instructional management on student achievement, engagement, and scientific literacy may provide stronger evidence of its educational impact.

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