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Instructional Best Practices in Teaching Science 6: An Analysis of Resources, Assessment Strategies, and Lesson Delivery in Nasipit District

Janice S Abueme [1*], Maris T Lasco [2]
[1] Cubi- Cubi Elementary School, Nasipit, Agusan del Norte, Philippines
[2] Caraga State University., Butuan City, Philippines

* Corresponding Author: **Janice S Abueme**

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Abstract
This study determined the instructional best practices employed by Grade 6 Science teachers in Nasipit District, Division of Agusan del Norte, with particular focus on resources and tools, assessment strategies, and lesson delivery. The study employed a qualitative descriptive phenomenological design to explore the lived experiences and perspectives of Grade 6 Science teachers. Ten teachers, purposively selected from high-performing elementary schools, participated in the research. All participants had at least five years of teaching experience and were recognized as outstanding teachers. Data were gathered through semi-structured interviews, validated by experts in science education and research methodology, and refined through pilot testing to ensure reliability. Interviews were audio-recorded, supplemented with field notes, and analyzed using thematic analysis. The process involved transcription, coding, theme identification, and refinement to capture the essence of teachers' practices, challenges, and success factors. Findings revealed that teachers combined traditional resources such as science journals, real objects, and laboratory facilities with modern digital innovations, including PowerPoint, YouTube, Nearpod, Quizalize, and AI tools. DepEd-provided materials supported instruction, while teachers also demonstrated initiative by acquiring personal references. Assessment practices included varied strategies such as quizzes, formative and summative tests, performance tasks, peer/self-assessment, and rubric-guided evaluations, which enhanced student accountability and reinforced teacher self-efficacy. Lesson delivery emphasized experimentation, discovery learning, creativity, and technology integration, fostering critical thinking, collaboration, and scientific literacy, though challenges in time management were noted. Overall, the study demonstrated that hybrid instructional practices integrating traditional, digital, institutional, and localized resources create meaningful, participatory, and effective science learning experiences, strengthening both learner engagement and teacher competence.

Keywords: Assessment, Lesson Delivery, Resources

1. Introduction
Science, as a core discipline in the basic education curriculum, plays a vital role in cultivating these cognitive and analytical skills, equipping learners to thrive in an increasingly complex and technology-driven world. Instructional practices, assessment strategies, and lesson delivery are therefore central to ensuring that learners develop scientific literacy and the ability to apply knowledge in real-world contexts. National and international frameworks, such as the United Nations Sustainable Development Goal 4, emphasize inclusive and equitable quality education, highlighting Science, Technology, Engineering, and Mathematics (STEM) as enablers of sustainable development (United Nations, 2023).

The importance of effective science teaching practices that go beyond the mere transmission of knowledge. Lu (2024) emphasized that fostering a strong grounding in science is not only a pedagogical priority but also a national imperative. The OECD (2023) reported that while science performance remained stable in the PISA 2022 results, disparities in achievement persisted, particularly among socio-economically disadvantaged learners. Studies by Francisco and Celon (2020) [6], Santos (2023) [12], and Ahmed (2024) [1] further affirmed that combining traditional hands-on resources with digital innovations enhances student engagement, comprehension, and retention. These findings highlight the need for instructional approaches that integrate inquiry-based learning, varied assessments, and innovative lesson delivery methods to strengthen science education.

Despite these mandates and scholarly recommendations, challenges remain in the effective implementation of science instruction. Guerrero and Bautista (2023) [7] revealed that only 40% of teachers regularly employ inquiry-based learning, while 50% struggle to integrate digital tools due to limited training and resources. Student engagement in authentic problem-solving remains low, with many learners unable to apply scientific concepts to real-life scenarios. Assessment practices also show inconsistencies, with significant variations in student outcomes across schools, and interdisciplinary collaboration among teachers remains limited. In the local context of Grade 6 education in Nasipit District, Division of Agusan del Norte, these challenges are particularly critical. Teachers face difficulties in conducting hands-on experiments due to limited laboratory equipment, while some classrooms lack digital tools to support visual and interactive learning. These constraints contribute to low learner participation and mastery of performance tasks, reflecting a gap between curriculum goals and actual learning outcomes.

This study seeks to address these gaps by systematically analyzing the best practices currently employed by Grade 6 teachers in Nasipit District in terms of resources and tools, assessment strategies, and lesson delivery. By documenting and synthesizing effective instructional approaches, the research aims to empower educators with practical, research-based strategies that can be implemented in diverse classroom settings. The study contributes to the enhancement of instructional quality in science, aligning with broader educational goals of equity, quality, and lifelong learning. Ultimately, it provides insights into how hybrid approaches—combining traditional, digital, and localized resources can foster learner engagement, strengthen scientific literacy, and reinforce teacher self-efficacy, thereby preparing students to succeed in the 21st century and beyond.

2. Theoretical Framework

This study is grounded in Self-Efficacy Theory, developed by Albert Bandura (1977) [2], which underscores the importance of individuals' belief in their capacity to accomplish specific tasks. Self-efficacy shapes motivation, persistence, and overall performance, influencing how learners and educators approach challenges and learning experiences. In the context of Grade 6 Science instruction, self-efficacy is particularly relevant, as it affects both teachers' instructional practices and students' engagement with scientific concepts. Teachers with strong self-efficacy are more likely to adopt innovative strategies, integrate diverse resources, and create supportive learning environments. Likewise, students who believe in their ability to understand and apply science concepts are more inclined to participate actively, conduct experiments confidently, and develop sustained interest in the subject.

Within this theoretical lens, the study highlights how teachers in Nasipit District foster students' confidence and motivation through best practices in science instruction. Strategies such as inquiry-based learning, hands-on experimentation, and real-world applications make science more engaging and relatable, thereby strengthening learners' belief in their ability to succeed. Constructive feedback, collaborative activities, and recognition of student achievements further reinforce self-efficacy by validating learners' progress and encouraging continued effort. Differentiated instruction and scaffolding techniques provide structured support, enabling students to gradually build independence in problem-solving and critical thinking. Moreover, teachers' enthusiasm and resilience in overcoming instructional challenges serve as powerful models, inspiring students to adopt similar attitudes toward scientific exploration.

Anchoring this study on Self-Efficacy Theory supports its focus on instructional best practices in terms of resources, assessment strategies, and lesson delivery. The integration of traditional and digital tools, varied assessment methods, and interactive lesson approaches directly contributes to enhancing both teacher and student self-efficacy. Teachers' confidence in their instructional competence is reinforced when they successfully implement diverse strategies, while students' belief in their scientific abilities grows through meaningful engagement and mastery experiences. Thus, the theory provides a strong foundation for analyzing how instructional practices in Nasipit District not only improve science learning outcomes but also cultivate the confidence, motivation, and resilience necessary for learners and educators to thrive in the 21st-century educational landscape.

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3. Problem Formulation

This determined the best instructional practices in terms of resources, assessment, and lesson delivery to address these challenges and enhance the quality of Science 6 education.

4. Significance of the Study

This study provides valuable insights into the instructional best practices that Grade 6 Science teachers in Nasipit District employ. It examines how teachers use resources and tools, apply assessment strategies, and deliver lessons to enhance science instruction. The findings guide teachers in improving classroom practices and adopting evidence-based strategies that foster learner engagement, critical thinking, and scientific literacy. Learners benefit from more meaningful and participatory experiences that strengthen confidence and motivation in science. School administrators and policymakers gain a basis for designing professional development programs, allocating resources, and formulating policies that support innovative and equitable science education. Future researchers can use this study as a reference for exploring instructional practices in similar resource-constrained contexts. By aligning with national and international educational goals of equity, quality, and lifelong learning, this study contributes to the broader effort to improve science education in the Philippines.

5. Scope and Limitations

This study focused on the best practices that Grade 6 Science teachers in Nasipit District employ in terms of resources and

tools, assessment strategies, and lesson delivery. It includes only teachers handling Science 6 during the school year under investigation and gathers data through thematic analysis of instructional practices. The study anchors its analysis on Bandura's Self-Efficacy Theory to explain how instructional practices influence teacher and learner confidence. It does not cover other subject areas or grade levels and limits its scope to Nasipit District, which may not represent practices in other divisions. The analysis relies on teacher-reported practices and classroom observations, excluding external factors such as parental involvement or broader systemic issues. By narrowing its focus, the study ensures depth of analysis within the chosen context while acknowledging that findings may not be universally generalizable but remain highly relevant to similar educational settings.

6. Methodology

This study employed a qualitative descriptive phenomenological design to explore the lived experiences and perspectives of Grade 6 Science teachers regarding their best instructional practices. Conducted in high-performing elementary schools in Nasipit District, Division of Agusan del Norte, the research purposively selected ten Grade 6 Science teachers who had at least five years of teaching experience and were recognized as outstanding teachers.

Using purposive sampling, the study ensured that participants possessed the necessary expertise to provide meaningful insights. A semi-structured interview guide served as the primary instrument, designed around the research questions and validated by experts in science education and research methodology. The instrument underwent expert review and pilot testing to establish validity and reliability, with refinements made based on feedback.

Data collection involved individual interviews conducted in comfortable settings, with informed consent obtained from participants. Interviews were audio-recorded and supplemented with field notes to capture contextual details.

The data were analyzed through thematic analysis, following systematic steps: transcription of interviews, familiarization with the data, inductive coding, grouping codes into themes, reviewing and refining themes, and defining and naming them. The final report presented these themes with supporting quotations, providing a comprehensive account of teachers' best practices, challenges, and success factors in teaching Science 6.

7. Results and Discussion

Table 1 indicates that participant 7 did not participate, but the data are still able to generally present the thematic analysis of the resources or tools utilized to implement best practices in teaching Science 6

Table 1: The thematic analysis of the best practices currently employed by Grade 6 teachers in Nasipit District in teaching the Science subject in terms of resources and tools

Participant	Codes	Category	Theme
P1 P2 P3 P4	Multimedia, interactive notebooks, netbook, science journal, real objects, TV, science equipment	Digital and traditional tools	Integration of Technology
P2 P1 P3 P4	Multimedia, PowerPoint, science journal, TV, science equipment, real objects, DepEd-provided materials	Digital + physical resources	
P3 P1 P2 P3 P4	Interactive notebooks, science journals, TV, multimedia, internet, science equipment/tools (DepEd)	Traditional + digital + institutional support	
P4 P1 P2 P3 P4	TV, multimedia, internet connection, real objects, science lab	Technological and laboratory resources	
P6 P2 P3 P4	Journal notebook, PowerPoint, science laboratory, Wi-Fi, Google, AI, YouTube, personal books/references	Digital + laboratory + personal initiative	
P5 P2 P3	Locally available materials, visual aids (charts, models, videos), interactive simulations, digital tools (Nearpod, Quizalize), science notebook	Locally sourced + digital innovations	Utilization of Localized Materials

Discussion

The findings reveal that teachers utilized a variety of resources and tools to enhance science instruction, combining traditional materials with modern technological innovations. One of the most frequently mentioned resources is the use of multimedia and digital tools such as PowerPoint, videos, and internet-based applications. As P2 noted, "I use multimedia, PowerPoint… and science equipment provided by DepEd," while P6 emphasized the role of digital platforms, sharing, "Wi-Fi connection, Google, A.I., naa pay mga YouTube presentations. So, diha na lang gyod ka." Similarly, P5 highlighted the integration of interactive platforms like Nearpod and Quizalize, which make discussions more engaging for learners.

Another commonly reported resource is the science journal, which serves as a tool for recording observations, reflections, and experiments. Several participants (P1, P2, P3, P5, P6) consider this practice essential in developing learners' scientific thinking. As indicated in the data, P1 mentioned the use of "interactive notebooks, netbook, and science journal," likewise, P3 states that learners rely on "interactive notebooks of science or experiment notebooks."

It is to be noted that side by side with modern technology, teachers also considered the importance of real objects and the things around the environment. These resources allowed learners to conduct experiments and engage in guided discovery.

The findings further highlighted both institutional support and teacher resourcefulness. Some participants acknowledged that DepEd provided tools and materials (P2, P3), which greatly supported their instructional practices. At the same time, teachers also demonstrated initiative by supplementing with personally acquired references. P6 shared, "I also buy books, reference books," reflecting how educators take extra steps to ensure the availability of quality resources. In addition, P5 integrated "locally available materials" along with visual aids and digital tools, showing how teachers maximize both community and technological resources.

The result implies that the best practices in science teaching

are supported by a hybrid use of traditional tools (journals, realia, laboratory facilities) and modern innovations (multimedia, digital platforms, and internet resources). Such integration ensures that learners are provided with meaningful, practical, and engaging learning. This demonstrates that the best practices in teaching science are shaped by the interplay between effective instructional approaches and the availability of appropriate resources and tools.

In summary, the findings show six (6) emerging themes, namely: (1) Integration of multimedia and interactive notebooks, (2) Availability of DepEd-provided tools and multimedia supports instruction, (3) A combination of journals, multimedia, and DepEd resources. (4) access to labs and the internet, (5) innovative use of local and digital tools and (6.) combination of traditional, digital and self-provided tools.

The evidence illustrates that sixth grade Science teachers' combination of traditional resources, such as science journals, authentic objects, and materials that can be manipulated in a lab setting, along with digital tools that have become popular (e.g., PowerPoint and YouTube), and resources provided through the support of the Department of Education, that provide materials and equipment are important to create participatory learning opportunities. The findings correspond with DepEd (2022, 2025) that indicated effective science instruction highlights structures that utilize essential resources - teacher guides, laboratory materials, and digitally contextual tools - as part of conventional instruction. Relatedly, Francisco and Celon (2020) [6] found that when traditional hands-on resources are combined with technological resources, student understanding and retention of skills in Science is significantly increased. In addition, Ahmed (2024) [1] indicated that provided with traditional instructional materials and laboratory-based activity, digital tools can be effectively used for student engagement in the classroom. This shows that the present study confirms earlier research and indicates the continued use of a hybrid approach of traditional, digital, and locally available instructional resources not only implies student interest but also creates innovative, engaged, interactive, and accessible Science-based instruction contextualized to real-world scenarios.

Teachers maximized both traditional and digital resources, including locally available materials, in enhancing their science lessons. This aligns with the self-efficacy framework, since providing accessible tools and resources reduces barriers to learning and creates opportunities for students to experience success in various contexts. The effective use of resources strengthened learners' confidence in engaging with science concepts while simultaneously increasing teachers' belief in their instructional competence, especially in resource-constrained settings.

Table 2: The thematic analysis of the best practices currently employed by Grade 6 teachers in Nasipit District in teaching the Science subject in terms of assessment

Participant	Codes	Category	Themes
P1 P2 P3 P4 P5 P6	Learners' assessment data, quizzes, performance tasks, formative assessment, peer and self-assessment	Multiple assessment strategies	Written Performance
P2 P1P3 P4 P5 P6	Learners' assessment data, formative tests every lesson, summative tests every two weeks, student work output, science activity notebooks	Formative + summative + output-based evaluation	
P3 P1 P2 P4 P5 P6	Learners' assessment data, formative assessment after lessons, evaluation of science activities and notebooks	Lesson-based formative + activity evaluation	
P4 P1 P2 P3 P5 P6 P7	Learners' assessment data, quizzes, performance tasks, formative assessment every lesson	Formative + performance-based evaluation	
P7	Learners' scores meeting expectations from activities	Outcome-based assessment	
P5 P1 P2 P3 P4 P6	Formative assessments, performance tasks with rubrics, peer and self-assessment	Performance reflective assessments	Use of Rubrics

It can be gleaned that the participants applied a range of best practices in assessment that combine traditional, performance-based, and reflective strategies. Data reveal that P1, P4, and P6 emphasized the use of quizzes, performance tasks, and formative assessments as consistent tools in monitoring learners' progress. On the other hand, P2 and P3 stressed the importance of regular formative tests after every lesson, supplemented by summative tests and the evaluation of science notebooks and activity outputs. Forward on are P5 and P6, incorporating peer and self-assessment guided by rubrics, promoting learner reflection and accountability.

Singularly, P7 focused on the outcome-oriented aspect of assessment, noting that learners' scores and performance in activities reflect whether expectations are met or not. Collectively, these assessment practices imply that teachers employed a balanced assessment approach, integrating continuous monitoring, performance tasks, reflective practices, and outcome-based measures to ensure meaningful evaluation of student learning.

In summary, four (4) emerging themes are seen, namely: (1.) the use of varied assessments, (2.) combination of quizzes, tasks and formative tests, (3.) rubric-guided tasks and self/peer assessments, and (4) output-based evaluation.

The data indicate that the 6th Grade Science teachers used a variety of assessments consisting of quizzes, formative and summative assessments, performance tasks, peer and self-assessments, and assessments based on a rubric. These results corroborate Reyes and Cruz (2025) [11] who affirmed that formative assessments are based on professional practice and performance tasks provide extremely useful feedback to teachers that supports the adjustment of ensuing instruction to more effectively achieve the desired science learning outcomes for learners. Similarly, Santos (2023) [12] asserted that peer and self-assessment support learner accountability and the self-reflection needed in developing scientific thinking. Furthermore, Francisco and Celon (2020) [6] demonstrated that through a combination of traditional assessments, activity outputs, and reflections in assessments, there can be stronger comprehension and sustainability of understanding of scientific concepts. Thus, these findings suggest that using multiple and diversified assessments of learning does not just provide evidence of progress towards learning outcomes in science learning but it serves the additional function of enhancing the level and quality of

student engagement as well as promoting critical thinking and responsibility in science learning.

The findings revealed that teachers used varied assessments formative, summative, and performance-based tasks to measure learning. Within the lens of self-efficacy theory, these assessments acted as sources of feedback that helped students recognize their progress and abilities, thereby enhancing their confidence and motivation. At the same time, assessments informed teachers of their instructional effectiveness, reinforcing their self-efficacy and guiding reflective practices for continuous improvement.

Table 3 presents the thematic analysis of the best practices in teaching Science 6 in terms of lesson delivery. The data show that teachers consistently highlight experimentation and hands-on learning as effective approaches in science lessons.

Table 3: The thematic analysis of the best practices currently employed by Grade 6 teachers in Nasipit District in teaching the Science subject in terms of lesson delivery

Participant	Code	Category	Theme
P1	Lesson: Examples of mixtures	Concept Identification	Guided explanation of concepts
P6	Group dynamics observation	Group Work & Guided Learning	
P3	Reporting outputs after experimentation	Discovery & Peer Sharing	Interactive, learner-centered discovery
P4	Application of current activities from media	Technology Integration	Digitalization
P5	Hands -on activities, Observation	Critical Thinking & Problem Solving	Experimentation and hands-on learning
P2	Hands on activity that Eats up time	Experimentation & Time Management	
P7	Learning by doing discovery	Creativity & Discovery	Learning through creative exploration

These strategies make learning more engaging and meaningful, allowing students to discover concepts on their own rather than relying solely on lectures. Several participants emphasize that experiments foster critical thinking, collaboration, and creativity.

As shared by:

Experiment dayon ma'am; usahay taas ang oras, kinahanglan follow-up sa discussion. Usahay ang review, nahimo na hinuon lesson. (P2)

"Experiment right away, ma'am; sometimes it takes a long time, so a follow-up discussion is needed. Sometimes the review ends up becoming the lesson itself. "(P2)

Pagkahuman sa experiment, ipashare ug ipareport ang observation. Mas maayo sila mismo ang maka-discover kaysa sige yawyaw. Example: gitanom ang mongos sa lain-laing klase sa yuta, gi-observe hangtod day five. (P3)

"After the experiment, I let them share and report their observations. It's better if they discover things on their own rather than me talking all the time. For example: they planted mung beans in different types of soil and observed them until day five." (P3)

Hands-on activities para ma-develop ang critical thinking. Example: paghulog ug lain-laing butang gikan sa parehas nga height para makita nga pareho ra ang hulog. (P5)

"Hands-on activities help develop critical thinking. For example: dropping different objects from the same height to see that they fall at the same rate." (P5)

Sa separating mixture, ginagrupo ang mga bata para mag-experiment ug mag-record sa observation, naa pud guided questions. (P6)

"In the topic on separating mixtures, the pupils are grouped to conduct an experiment and record their observations, and there are also guided questions." (P6)

Una nga topic sa Science (mixtures) makapakita sa creativity sa bata ug makakat-on base sa resulta sa activity. (P7)

"The first topic in Science (mixtures) allows the pupils to show their creativity and learn based on the results of the activity." (P7)

Additionally, the use of technology and social media platforms (e.g., TikTok) as a way to capture learners' attention and bring fresh, engaging ideas into the classroom is noted by:

Mag-search ko sa TikTok ug engaging nga activities para dili mabored ang bata. (P4)

"I search on TikTok for engaging activities so that the pupils won't get bored." (P4)

However, some challenges emerged, particularly time management issues (P2), where extended activities or reviews sometimes disrupt lesson flow.

The findings imply that effective science lesson delivery combines experiential learning, creativity, and guided support, while also requiring teachers to balance innovation with practical classroom constraints, leading to the emergence of five (5) themes namely: (1) guided explanation of concepts, (2) interactive, learner-centered discovery, (3.) digitalization, (4.) experimentation and hands -on learning and (5.) learning through creative exploration. The intermingling of diverse teaching methods, instructional strategies, and appropriate resources creates a dynamic and engaging learning environment, ensuring that science concepts are not only delivered effectively but are also meaningfully understood and retained by the learners.

The results highlighted the importance of experimentation, hands-on learning, discovery activities, and utilizing technology when teaching Science 6. All of these strategies engage learners in active knowledge construction and promote higher-order thinking skills and the application of concepts to real life. These findings concur with the work of David and Garcia (2022) [3], which showed Grade 6 students engage in inquiry-based, hands-on approaches where they both comprehend the material better and demonstrate more engagement and agency in their learning. Similarly, Thompson and Clark (2024) [13] stated that "the inquiry-focused lesson delivery approach builds scientific literacy as students get to explore and test ideas themselves" (p. 42). The use of technology in lesson delivery also parallels findings from Lopez and Bautista (2024) [8], where they described how interactive learning experiences, including the use of multimedia and digital tools, positively engaged learners and sustained motivation to participate in their learning experiences. Thus, the findings of the study show that the lesson delivery tied to experimentation, creativity and interactive learning is a best practice in science education because it sees classrooms become active places for students to cognitively engage with scientific concepts and create meaning.

Experimentation, creativity, discovery learning, and technology integration emerged as the core practices in lesson delivery. These methods directly relate to Bandura's

assertion that efficacy grows when individuals experience success through active participation. Students' engagement in such interactive practices provided authentic mastery experiences that increased their belief in their own scientific capabilities, while teachers' ability to facilitate successful outcomes boosted their instructional confidence.

8. Conclusion

The best practices in teaching Science 6 in Nasipit District are anchored on a hybrid instructional approach that integrates traditional resources, digital innovations, institutional support, and localized materials. Teachers demonstrated versatility by combining science journals, authentic objects, and laboratory activities with multimedia tools, internet platforms, and DepEd-provided equipment, ensuring that instruction remained both contextualized and engaging.

In terms of assessment, the findings reveal that teachers employed a balanced mix of formative, summative, performance-based, and reflective strategies, including rubric-guided peer and self-assessment. This diversified assessment framework not only measured learning outcomes but also enhanced student accountability, critical thinking, and confidence, while reinforcing teachers' instructional self-efficacy.

For lesson delivery, experimentation, discovery learning, creativity, and technology integration emerged as core practices. These strategies transformed classrooms into active learning environments where students engaged in inquiry, collaboration, and real-world application of scientific concepts. Despite challenges such as time management, the emphasis on experiential learning and digitalization strengthened scientific literacy and sustained learner motivation.

Overall, the study affirms that effective science instruction is achieved through the interplay of accessible resources, varied assessments, and interactive lesson delivery methods. Grounded in the lens of self-efficacy theory, these practices fostered both learner confidence and teacher competence. The findings confirm earlier research that hybrid approaches blending traditional, digital, and localized tools create innovative, participatory, and meaningful science learning experiences contextualized to students' realities.

9. Thank-You Note

Thank you for generously sharing your time, experiences, and insights in this study. Your contributions have been invaluable in highlighting best practices in Science 6 teaching and will help improve instructional strategies for learners. We deeply appreciate your cooperation and commitment.

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