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EXPLORING THE LIVED EXPERIENCES OF ELEMENTARY TEACHERS IN EMPLOYING HANDS-ON STRATEGIES IN TEACHING SCIENCE

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ABSTRACT

The purpose of this qualitative phenomenon was to divulge the experiences, coping mechanisms, and insights of elementary teachers in employing hands-on strategies in teaching science. It comprised fourteen (14) public elementary teacher participants selected using a purposive sample technique, with seven (7) in-depth interviews and seven (7) in a focus group discussion. The data analysis employed data coding and thematic analysis. The elementary teachers employed hands-on strategies by promoting experiential learning and encouraging discovery, utilizing variety of materials and appropriate tools, conducting experiments and hands-on activities, and adapting activities to students' needs. There were issues that emerged from the problem namely: gaining benefits in using hands-on learning, developing hands-on learning, experiencing mixed emotions in doing hands-on activities, struggling with limitations of resources, experiencing challenges in students' engagement and participation, experiencing instructional challenges, having difficulty in classroom management, struggling with time management and preparation, and encountering challenges on communication and comprehension. To address the issues, teachers mentioned ways: establishing commitment to student success, having professional collaboration and resource management, employing instructional strategies for effective teaching, having effective resource utilization, imbibing creativity and having instructional support, and doing simplification of activities and engage enjoyment in learning. They also cited insights they could share to others, namely: gain support from educational authorities, prepare and plan the lesson to deepen understanding, employ teaching strategies and approaches, provide platforms for collaboration and share with others, doing continuous learning and professional development, ensure engagement and student-centered learning, and utilize resources. The findings are important for elementary teachers, parents, students, DepEd officials, administrators, and future researchers to raise awareness and create best practices employing hands-on strategies in teaching science to deliver high-quality education.

KEYWORDS: *Experience, Hands-On, Strategies, Qualitative-Phenomenological Approach, Davao Del Norte.*

INTRODUCTION

In this continuously changing education landscape, the role of science teachers in elementary schools is essential for shaping students' basic understanding of scientific concepts. Teachers must improve and provide interactive practices for students to be truly engaged and develop a genuine passion for science exploration.

In Bangladesh, according to the study by Musharrat (2020), science teachers may need to be more familiar with adopting hands-on activities in the classroom. Managing several classes, producing instructional materials, depending on tests for assessment, and requiring more teaching resources are all significant obstacles. Meanwhile, in Indonesia, according to Rustan et al. (2020), due to time limitations, science educators frequently do not maximize the learning process of their students.

Furthermore, in a study conducted by Desalegn (2022) in Ethiopia, science teachers have less experience involving students in hands-on activities during the learning process. Teachers face difficulties because the schools have insufficient room for laboratories and resources.

In the Philippines, according to the study conducted by Macasiab and Gayeta (2021), most teachers are not actively attending seminars and workshops. Concerns were raised about managing the time allotted for science instruction, and insufficient time hindered teachers from delivering a deeper explanation of the lessons.

In a school in Tagum City Division, based on my experiences and observations, only some were able to use hands-on strategies because of the limited availability of resources as teachers handled big classes. Some teachers used contextualized resources to support learning, but due to the demand for all the competencies to be covered for examination, teachers did not prioritize doing the hands-on strategies; instead, they lectured through the help of videos. This would hinder the students' positive attitude towards exploring the science concept interactively.

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PURPOSE OF THE STUDY

The purpose of this phenomenological inquiry was to explore and understand the lived experiences of teachers in employing hands-on strategies in teaching science in the elementary schools at Tagum City Division.

At this stage in the research, the experiences of elementary teachers employing hands-on strategies in teaching science were generally defined as the challenges, coping mechanisms, and unique set of insights teachers encounter to support students in exploring science concepts in elementary school.

Research Questions

1. What are the hands-on strategies employed by elementary teachers in teaching science to their students?
2. What are the experiences of elementary teachers in employing hands-on strategies in teaching science to their students?
3. How do elementary teachers cope with the challenges of employing hands-on strategies in teaching science to the students?
4. What are the insights of elementary teachers in employing hands-on strategies in teaching science to their students that can be shared to others?

METHODS

This study employed a qualitative research design using a phenomenological approach. Qualitative design, as stated by Creswell (2014) emphasizes giving value and power to the participants' freedom of expression to tell their stories without preconceived notions or bias from the researcher.

The study had 14 public school teacher participants, particularly elementary teachers working in the Division of Tagum City. The decision to have 14 participants was in line with Creswell's (1998) suggestion for a phenomenological study, which suggests a range of 5 to 25 participants. Therefore, in this study, I interviewed 14 selected participants, with seven (7) of them participating in in-depth interviews and the other seven (7) participating in focus group discussions.

REVIEW OF RELATED LITERATURE

Hands-On Strategies in Teaching Science

Hands-on learning is a dynamic and active method of instruction. It involves actively participating in tasks and activities rather than just passively taking in information, developing new abilities, and gaining real-world experience that includes experimentation, exploration, and discovery (Bloemendaal, 2023). Furthermore, as cited by Solé et al. (2020), they provide the practical application of explaining how science process skills can be taught to students by using video-worked examples.

Consequently, Kapici et al. (2022) added another layer by emphasizing the importance of inquiry-based learning, as they found that both hands-on and virtual laboratories effectively develop their inquiry skills and conceptual knowledge. Jones et al. (2019) further demonstrated the effectiveness of a hands-on science curriculum delivered through a mobile laboratory to improve and increase students' knowledge and engagement in science instruction.

Challenges in Using Hands-on Strategies in Science

The lack of school facilities, learning media, and how teachers understand the topic would be a challenge for teachers, which can influence the students to have a negative attitude toward learning science concepts, their interests, and their understanding (Syahputra et al., 2022).

Also, a study by Aliyo and Edin (2023) revealed that many teaching laboratories lack essential safety requirements and practices, leading to potential health and environmental hazards. In fact, according to Wenning and Vieyra (2020), teachers face a significant challenge in ensuring student safety during hands-on activities, particularly those involving hazardous materials or procedures.

Coping Strategies in the Conduct of Hands-on Strategies in Teaching Science

Studies by Marfilinda et al. (2020) have emphasized the significant role of teacher training in improving instructional practices and student learning outcomes. Roden et al. (2018) proposed innovative solutions, such as mobile laboratories, which can provide students with hands-on experiences without burdening school resources. Also, Yussif (2023) highlights that positive reinforcement, clear expectations, and consistent routines help regulate student behavior during these activities.

Teachers' Insights on Hands-On Strategies in Teaching Science

According to Docherty et al. (2020) teachers are more confident and interested in teaching science as they engage in hands-on experimentation and inquiry-based learning. Hands-on activities support students' development and deepening of comprehension of science concepts by including sensory experiences and appreciating students own experiences (Rhiannon et al., 2022). For instance, Rokhiyah et al. (2023) provided evidence that students in primary school who were taught through hands-on approaches exhibited strong understanding, performed well, and had positive attitudes toward science.

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RESULTS AND DISCUSSIONS

Table 1
Major Themes and Core Ideas of the Hands-on Strategies Employed by Elementary Teachers in Teaching Science to Students

MAJOR THEMES	CORE IDEAS
Promoting Experiential Learning and Encouraging Discovery	• allowing students to explore materials • incorporating observation of natural phenomena such as weather patterns and local ecosystems • exploring outdoor environments like observing plants and animals • allowing students to explore and discover concepts on their own • allowing students to apply theoretical concepts learned • dissecting a flower to get closer look of its part • allowing students to actively search for fame, translucent, and transparent materials fostering engagement • observing animals in various habitats living in water and in land • enabling students to arrive at their own conclusions
Utilizing Variety of Materials and Appropriate Tools	• giving appropriate tools like utilizing a timer presented through the TV and asking students to discuss results • providing handouts to guide students through experiments and enhance critical thinking • teaching students about homogenous mixtures through dissolving salt in water • combining hands-on activities with explicit teaching like "I do, you do, we do" to enhance comprehension • using readily available materials that connect concepts in daily lives • integrating activity sheets for students to answer • making use of safe materials like dry cells as alternatives for electric circuit • making use of realia in experiments • using simple apparatus to ignite participation
Conducting Experiments and Hands-on Activities	• using toy cars to measure motion and speed. • exploring cause and effect relationships through scenarios • doing experimentation to develop inquiry-based and independent learning • using project strategies that align educational goals and objectives • melting crayons and candles to demonstrate physical and chemical changes • performing basic experiments in separating of mixture • making and erupting miniature volcanoes
Adapting Activities to Students' Needs	• using differentiated instruction to acknowledge various learning styles • giving hands-on activities according to the level of intelligence of students • incorporating simplified experiments to match the readiness and level of different students

Promoting Experiential Learning and Encouraging Discovery

I've also tried outdoor activities where I let my students go outside the classroom for 30 minutes to explore within the school premises. They observe plants, animals like birds, or insects such as bees, butterflies, and ants, Then, they take notes or document what they observed. IDI-05

Science usually uses the discovery method. You let the students discover things on their own, then follow up to address concepts they haven't learned yet, especially if they don't have a background in the topic. You guide them to understand the key points they need to know. IDI-07

With hands-on activities, the students get excited and learn quickly. It is better when they discover and explore the answers themselves and come up with solutions to their own questions. FGD-06

Participants allow the students to explore the materials and arrive at their conclusions. Further, employing hands-on strategies in teaching science in elementary sparks students to discover, explore outdoors, and experience real-life situations. Building on this idea, Jirout (2020) emphasizes that sensory-rich experiences are vital for stimulating student curiosity; by actively engaging the five senses through direct exploration and

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experimentation, students develop a deeper, more intuitive grasp of scientific principles that lays the foundation for lifelong inquiry.

Furthermore, Mazlan et al. (2024) demonstrate that outdoor learning environments significantly boost student engagement by tapping into their natural curiosity and prompting them to ask questions and seek answers. Murniati (2023) adds that structured outdoor activities, which involve observing and documenting local flora and fauna, not only increase student motivation but also foster a sense of responsibility and connection to the natural world.

Utilizing Variety of Materials and Appropriate Tools

Aside from the experiments, they are given handouts or specific questions about the activities they must answer. We also engage them by encouraging critical thinking when answering the questions. IDI-04

It helps the students internalize the lessons more when we use indigenous materials for experimentation that are readily available in their surroundings, allowing them to relate better. IDI-07

For me, a specific hands-on activity I give to my learners is making a simple electric circuit because we only use dry cells, which are safe for the students. FGD-02

Participants define this practice as a means to bridge theoretical concepts with real-world applications, fostering critical thinking and independent inquiry. The findings of this study align with those of Antika et al. (2024), who assert that handouts serve as structured instructional tools that support students in analyzing complex scientific concepts, ultimately enhancing scientific literacy.

Similarly, Suratno et al. (2023) highlight that integrating familiar, readily available resources into lessons fosters a more engaging and stimulating classroom environment. Furthermore, Rahmat (2021) emphasizes that using common and safe materials in experiments helps students connect abstract scientific ideas to everyday life, simplifying complex concepts while deepening understanding

Conducting Experiments and Hands-on Activities

In the second quarter, we used a toy car to measure motion and calculate speed. That's what we used. IDI-01

For me, one of the hands-on activities that the students really enjoyed was when we explored physical and chemical changes. We melted crayons and candles, and even burned paper. FGD-03

I have also tried making a miniature volcano, and then they made it erupt. It is really basic, but effective. FGD-07

Participants emphasize transforming theoretical concepts into interactive learning experiences. Participants define this approach as essential for fostering independent inquiry, critical thinking, and problem-solving skills among students. Highlights the importance of engaging learners through experimentation to develop a scientific understanding. The findings of this study align with Chandran and Ricardo (2023), who assert that experiments, such as measuring motion with toy cars, transform abstract scientific concepts into concrete experiences, enhancing student comprehension and encouraging a deeper appreciation for scientific inquiry.

Furthermore, Sativa (2023) found that 94% of students achieved their learning objectives after participating in hands-on activities such as melting crayons and burning paper, reinforcing the effectiveness of experiential learning. Moreover, Yansen et al. (2023) reveal that engaging young learners in hands-on experiments, such as miniature volcano eruptions using vinegar and baking soda, significantly increases interest in science.

Adapting Activities to Students' Needs

They have different learning styles. Sometimes, we use differentiated instruction, especially since our class now is hetero. That's why we focus on differentiated teaching, separating the fast learners from those who need more support. IDI-02

You give them varied activities based on their level of intelligence to make it easier for you. For groupings, for example, you divide them into three groups. The first group gets tasks that match their intelligence and capacity. You simplify the lesson so they can understand it better within the day. IDI-06

I can provide a simple experiment activity for the students depending on their level. Sometimes it is differentiated because some learners can answer higher-level or more difficult guide questions. For low-level learners, I give them a simpler version of the activity. It is still experimental but easier for them to do. FGD-01

The participants revealed that they adapt activities to the students' needs. Furthermore, they use differentiated instruction to acknowledge and cater to the various learning styles while also giving hands-on strategies according to the level of their students, incorporating simplified experiments to match the students' readiness. The finding relates to the idea of Aysha (2023), that the use of differentiated instruction (DI) improved student achievement by increasing student involvement in the teaching and learning process.

Furthermore, research by Ivory (2023) suggests that when teachers adapt hands-on strategies to align with educational goals and individual learning profiles, the classroom becomes more inclusive and stimulating. Additionally, studies by Arif et al. (2024) emphasize that adjusting hands-on activities to match students' readiness levels significantly enhances overall scientific proficiency.

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Table 2
Major Themes and Core Ideas on the Experiences of Elementary Teachers in Employing Hands-On Strategies in Teaching Science to Students

Major Themes	Core Ideas
Gaining Benefits in Using Hands-On Learning	• finding science tools powerful in engaging students • influencing students' engagement • providing active, meaningful, and personalized learning experiences • enhancing knowledge and retention • Developing knowledge rather than a half-baked understanding • receiving positive feedback • creating lasting memories of students using hands-on activities
Developing Hands-On Learning	• identifying effective activities through advance preparation • providing initial instructions before monitoring the work of students • managing classroom noise with effective strategies • finding it easy for the students to engage in activities • observing increased student engagement and excitement in learning • providing hands-on learning fosters clear understanding and lifelong skills utilizing videos as instructional aids
Experiencing Mixed Emotions in Doing Hands-On Activities	• encountering frustration with the assessments of students • feeling of frustrations about student preparedness in bringing materials • finding it enjoyable but sometimes exhausting in preparing multiple materials • experiencing fun despite needing to adjust for diverse learners • feeling of tiredness in preparing materials but appreciating the positive outcomes • emphasizing the need to exert effort in teaching and preparing materials
Struggling with Limitations of Resources	• needing to borrow materials from other teacher • lacking sufficient resources • encountering issues with outdated and a lack of equipment • lack of facilities • lacking of equipment like TV
Experiencing Challenges in Students' Engagement and Participation	• noticing varying levels of cooperation among students • noticing uneven participation • dealing with diverse attitudes of students in adapting to new learning trends • noticing lack of attention during introductory portion of lesson
Experiencing Instructional Challenges	• balancing risks particularly when using potentially dangerous materials like use of fire • finding difficulty to impart concepts without the required materials • having difficulty to help students understand concepts in the current generation • noticing interrupted student excitement due to lesson breaks
Having Difficulty in Classroom Management	• struggling to manage classroom orders • experiencing chaos in the classroom • having difficulty in managing large class sizes with 35-40 students • dealing with conflicts among students
Struggling with Time Management and Preparation	• experiencing time constraints that prevent completing activities • engaging in auxiliary services beyond just teaching • believing an inadequate student learning due to limited time • struggling with time management due to the intensive preparation in searching for appropriate activities
Encountering Challenges on Communication and Comprehension	• dealing with difficulties in students' comprehension • switching to local language when struggling with language barriers requiring higher-order thinking skills (HOTS) • students struggle in understanding English

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Gaining Benefits in Using Hands-On Learning

It can influence the engagement of students, especially for those who are willing to participate. Higher engagement can really impact their overall learning. IDI-02

After the session, they are truly knowledgeable and they fully understand, not just half-baked learning, because they are engaged in real situations. When students are engaged in something beyond just concepts, it really stays in their minds. IDI-07

What I've seen is that you create memories for the students. Even when they move on to the next grade level, they will remember what they did. FGD-07

Hands-on learning in science education provides elementary students with dynamic and engaging experiences. The findings align with Kong (2021), who asserts that students who actively participate in hands-on science lessons develop a higher level of curiosity and sustained enthusiasm for learning.

Research published in the Proceedings of the National Academy of Sciences (Turla, 2023) found that students in active learning environments exhibited a 6% increase in test scores compared to those in traditional lecture-based classrooms. This finding underscores the effectiveness of hands-on strategies in reinforcing concept retention. Additionally, according to long (2021) teachers note that students often recall hands-on experiences as some of the most memorable aspects of their education.

Developing Hands-On Learning

Even in your preparation, you need to think first about the most effective activities to cater to your students. IDI-01

What I do is facilitate the students. First, I give instructions, and then after that, I just walk around the room. I observe what they are doing, and if I see that they are struggling with their work, I step in and help them again. IDI-02

Sometimes it is really hard to explain things to them, so I use videos to show them how to do it, and then they just follow and do it themselves. Sometimes, in instructing students on how to do it. FGD-06

Participants emphasize the necessity of thorough preparation, structured guidance, creative instructional, and techniques to ensure meaningful learning experiences.

With this in mind, Nageen et al. (2023) assert that meticulous lesson preparation improves student outcomes by ensuring a seamless learning experience. Dang et al. (2024) also emphasize that clear and step-by-step instructions provide students with confidence and direction during hands-on activities. Additionally, Fitria & Susanto (2022) demonstrate that interactive videos significantly improve student comprehension, making learning more engaging and accessible.

Experiencing Mixed Emotions in Doing Hands-On Activities

Sometimes I get frustrated with the assessment results of my students. IDI-01

It is tiring to prepare the materials, but the result is rewarding, especially when they really understand and get the answer. FGD-06

A teacher should exert effort in all aspects—planning, preparation, and managing the students during hands-on activities. You really need to put in effort. FGD-07

Participants face difficulties in terms of student assessments and preparedness, as well as the exhaustion that comes with preparing multiple materials. Despite the tiredness associated with preparation, participants appreciate the positive outcomes of hands-on teaching and highlights the importance of investing effort to create engaging and meaningful learning experiences. This sentiment is echoed by Si (2024), who emphasizes that assessing students' readiness for these activities and conducting assessments are frequently difficult tasks for teachers.

Lane (2024) further highlights that gaps in teacher preparation impact the overall quality of science instruction, underscoring the importance of structured planning and resource management. Moreover, Antipolo and Rogayan (2021) elaborate on the extensive effort required to plan and implement hands-on strategies, emphasizing their role in enriching science education.

Struggling with Limitations of Resources

One of the real challenges is the lack of science lab equipment, especially here in our rural area. Rural areas don't get as much attention compared to the cities, so our experiments are limited. For example, in lessons that require microscopes, we don't have any available or the ones we do have are obsolete. IDI-07

For me, the challenge I encounter in implementing hands-on activities is the lack of facilities and equipment needed for their tasks that day. FGD-02

There are also times when it is difficult to prepare ahead of time, especially if the materials are unavailable. It is even harder when not all classrooms have, for example, a television. FGD-06

Hands-on learning often faces significant limitations due to resource constraints. Participants identify inadequate materials, outdated equipment, and insufficient facilities as major barriers to effective science instruction.

The findings of this study align with Morris (2025), who asserts that providing teachers with adequate materials and equipment is crucial for fostering critical thinking and deeper conceptual understanding among students. Kamba et al. (2019) also highlight that insufficient science teaching

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facilities remain a prevalent issue in developing nations, significantly impacting instructional effectiveness.

Additionally, Rebunalan and Samala (2021) emphasize that the lack of laboratory equipment in public schools hinders hands-on learning, preventing students from fully engaging in scientific exploration.

Experiencing Challenges in Students' Engagement and Participation

Sometimes, it is the cooperation from the students. The brighter ones are the ones who take the lead, while the others who should be more involved just sit on the side, waiting for what happens next. IDI-02

The diversity of learners isn't just about their level of learning. You also have to deal with the diversity of their attitudes in accepting or adapting to new trends in learning that you introduce for the day. IDI-04

There are still a lot of introductory portions, then students don't listen. When it comes to the activity, the excitement is cut off in just five minutes. FGD-06

Participants recognize that while some students eagerly participate in activities, others remain passive observers, leading to imbalanced group dynamics. Unequal participation can disrupt the overall flow of lessons and make it challenging to achieve the intended learning outcomes. In relation to this, Shaby et al. (2023) state that facilitating cooperative learning during hands-on scientific exercises can be difficult, as some students struggle to actively collaborate in group settings.

Also, Yanishevskaya et al. (2021) explain that students with little prior exposure to scientific concepts may struggle with abstract ideas, making it difficult to sustain focus and participation. Zhang (2022) adds that balancing direct instruction with hands-on activities is crucial, as prolonged theoretical discussions can hinder student enthusiasm.

Experiencing Instructional Challenges

It is risky, which is why I carefully choose the hands-on activities we do. I especially avoid experiments involving fire because I'm afraid, but I still find ways for them to learn the concept. IDI-03

There are also challenges, especially when the materials needed for experimentation are unavailable. It is hard to teach the concept without the necessary materials are not there. IDI-07

Teachers are creative and can sometimes provide what's needed, but the time is always a problem. Once time is up, it is over. The next teacher comes in, and everything is left pending. FGD-05

Participants face multiple instructional challenges when implementing hands-on learning strategies, which require balancing safety, resources, and student engagement. These challenges stem from the need to create effective, interactive learning experiences while ensuring accessibility and safety. In fact, according to Ménard and Trant (2020) emphasize that strict safety measures are essential to prevent accidents, particularly when handling hazardous materials.

Geverola et al. (2022) also highlight that insufficient laboratory materials and equipment hinder teachers from conducting experiments effectively. Apart from this, frequent classroom interruptions and time constraints, as noted by Spaan et al. (2022), often disrupt the flow of hands-on activities, making it difficult to maintain student focus.

Having Difficulty in Classroom Management

The learners may put in a lot of effort, but there are some who don't perform well. This can be really frustrating for the teacher. IDI-01

We also lack the equipment and tools, so I can't accommodate all the students. There are 35 to 40 students from different sections. IDI-05

When they are doing their activities, sometimes some of them don't participate right away. You have to remind them again, whether as a group or individually. FGD-04

Participants encounter difficulties in maintaining order, addressing student conflicts, and sustaining focus, particularly in handling large classes. The findings of this study align with Pllana (2020), who emphasizes that students' attention spans last only 10 to 15 minutes, requiring teachers to use re-engagement techniques to sustain focus.

According to Baraquia (2022) large class sizes further complicate classroom management, as teachers must balance instruction and discipline for 35 to 40 students. Additionally, Nemadziva et al. (2023) argue that resource limitations hinder the effective implementation of inquiry-based learning, potentially reducing student interest and engagement in science.

Struggling with Time Management and Preparation

I often run short on time and can't finish within the 50 minutes allotted if we do an activity. IDI-03

There are other auxiliary services we do aside from straight teaching, so it is very challenging. The time for preparing materials is not something we can do quickly. We need at least one or two days to prepare for that. IDI-04

Challenges that we are facing is the availability of materials. For example, with different types of soils, you can't always find them right away, so it takes time and effort to gather the materials. FGD -05

The participants also face significant challenges related to time management and preparation. Time constraints frequently prevent them from completing hands-on strategies,

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limiting the scope of their lessons. In addition to teaching, teachers engage in various auxiliary services, which adds to their workload and reduces the time available for lesson planning. In relation to this, Siabo and Resuento (2023) argue that students engaged in hurried activities may struggle to comprehend and retain concepts due to the lack of sufficient processing time.

Moreover, Ramirez (2021) highlights that teachers face overwhelming workloads, including administrative duties, which reduce their capacity to plan interactive lessons. Efendi and Jayanti (2024) add that gathering materials for hands-on activities require additional time, making lesson preparation even more challenging.

Encountering Challenges on Communication and Comprehension

The most difficult thing to manage is sometimes their level of comprehension. They can't understand certain steps, so they can't follow the experiment or activities we do properly. IDI-02

Not all students can understand the instructions right away because English is the medium of instruction. It is really difficult, especially when doing activities that involve a series of questions, like answering HOTS (Higher Order Thinking Skills) questions. You have to translate them for the students. IDI-05

Sometimes it is also difficult for the students, especially when they are transitioning from MTB (Mother Tongue-Based) education. You really need to help them understand the words because when you first speak to them, instead of using English, they'll ask, 'Ma'am, can you speak in Bisaya?' because they don't understand. That's what makes it challenging FGD-01

Participants in the study reported that they often switch to the local language to improve clarity and engagement. However, despite these adjustments, students still struggle to comprehend procedural steps, leading to mistakes in task execution especially in the experimentation. In relation to this, Akhter et al. (2021) emphasize that communication barriers in science classrooms require teachers to modify their language to support student understanding.

Likewise, McComas (2022) highlights that students often struggle with inquiry-based tasks, such as designing experiments and analyzing results, due to difficulties in following instructions. Similarly, Schwichow et al. (2022) argue that misinterpretation of procedural elements can lead to errors in experimentation, requiring additional teacher interventions.

Table 3
Major Themes and Core Ideas on the Coping Mechanisms of Elementary Teachers with the Challenges Encountered in Employing Hands-on Strategies in Teaching Science to students

Major Themes	Core Ideas
Establishing Commitment to Student Success	• giving encouragement to students • prioritizing learners 'needs • emphasizing applicability of science in daily lives • feeling motivated with students' understanding and grasp of concepts through assessment • feeling motivated by students' smiles and engagement • feeling validated by positive feedback from former students
Having Professional Collaboration and Resource Management	• inquiring within a close-knit group of colleagues • consulting science coordinator and master teacher • asking co-teachers and brainstorming online • soliciting ideas from co-teachers teaching different grade levels • learning from seasoned professionals • engaging stakeholders to provide materials
Employing Instructional Strategies for Effective Teaching	• providing clear instructions and presenting rubrics • modeling the activity first as a teacher • preparing clear instructions in both English and Mother Tongue language • using real-life examples to enhance relatability • simplifying difficult topics
Having Effective Resource Utilization	• improvising available materials • utilizing available and Indigenous materials • using contextualized materials • planning ahead to find alternative for unavailable resources

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Imbibing Creativity and Having Instructional Support	• collaborating with other teachers for resources • researching videos to support learning objectives • reaching out to parents for available resources
Doing Simplification of Activities and Engage Enjoyment in Learning	• ensuring appropriateness of activities for the students' level • Capturing student eagerness drives teachers to use hands-on activities despite chaos. • simplifying and localizing activities

Establishing Commitment to Student Success

I would rather give encouragement to the students, especially if they make mistakes. You shouldn't give them something negative, as it will affect them. IDI-01

As teachers, we don't just base things on our feelings. We always consider who we are serving. We need to prioritize the learners over ourselves. IDI-04

What motivates me is probably the comments I hear from my previous students, like 'Ma'am, we really understood because we did that.' That's what motivates me. FGD-07

Participants define this commitment as prioritizing students' learning experiences and providing encouragement. To fulfill this role, they find strength in receiving feedback from former students, which reinforces their dedication to fostering student success. This commitment serves as a coping mechanism that enables teachers to navigate the challenges of implementing hands-on strategies. In line with this, Adu-Gyamfi (2020) explains that passion, enthusiasm, and good feelings are characteristics of a supportive environment for science education.

Furthermore, Sumathi (2022) asserts effective teaching needs to prioritize the student first and encourage the growth of new knowledge and innovative thinking. Moreover, Ye et al. (2024) report that teachers noted that favorable student feedback confirmed their instructional strategies and strengthened their dedication to implementing hands-on activities.

Having Professional Collaboration and Resource Management

As the science coordinator, we usually have a group chat. I have close friends there, and that's where I mostly inquire and ask questions. IDI-01

My co-teachers and I do not forget that most of the time, I ask questions and brainstorm on the internet. IDI-03

I also need to gather ideas from my co-teachers because some of them teach science, although in Grade 4 and Grade 3. I also need to consult with them and ask for help that could give me some enlightenmentents to be immersed. So, we need back up. FGD-03

Participants define collaboration as seeking assistance from co-teachers, science coordinators, and master teachers to address challenges such as resource limitations. This result aligns with Sari and Nayir (2020), who found that getting help from colleagues and constantly communicating using different communication tools are ways teachers can handle challenges in teaching science. Kittiravechote (2020) stated that science coordinators can help ensure relevance and alignment by integrating hands-on activities with curriculum standards. Shivolo and Neshila (2024) emphasized that master teachers can facilitate the execution of experiments that could otherwise be difficult for new teachers by giving them access to materials and resources.

Employing Instructional Strategies for Effective Teaching

As a teacher, you have to provide clear instructions, not only for their hands-on activities but also to remind them to focus, especially on their behavior. You have to remind them before doing the activity. We have to present the rubrics and the indicators so they can see what to pay attention to. IDI-01
I prepared simple and clear instructions in both English and Binisaya to make sure I could translate and ensure all students understood. IDI-05

It is easier for students to understand science lessons if the materials are contextualized. This means using materials that are found around them. Avoid injecting or using materials that are not relevant. It is much better if the materials you use are contextualized, as it makes it easier for them to understand. IDI-06

Participants employ various techniques to enhance student understanding and engagement. These strategies include providing clear instructions and rubrics, modeling activities, utilizing the local language, incorporating real-life examples for relatability, and simplifying difficult topics. For instance, according to Main (2023) explains that rubrics can be created to evaluate student performance based on predetermined standards and offer insightful criticism for development.

Apart from this, Adebayo (2024) found that when allowed to utilize both the local language and English in the classroom, students show greater enthusiasm and willingness to participate. Moreover, Donley (2024) stated that simpler teaching strategies may enhance students' self-esteem and contribute to advancing science concepts, underscoring the importance of concentrating on science nature and process rather than just its content.

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Having Effective Resource Utilization

I improvised with whatever materials were available. For example, when we didn't have enough plant pots for a planting experiment, it was really simple. What I did was use recycled plastic bottles as pots. IDI-05

As teachers, we just give and take, depending on the availability of materials around us, or what we call indigenous materials, and we use those. At least the students can still grasp the concepts they need to learn. IDI-07
For me, it is important to plan ahead so that you can find alternatives or substitutes if certain resources are not available. FGD-04

Participants emphasize using available and indigenous materials, improvising resources, contextualizing materials, and planning ahead to find alternatives for unavailable materials. Expanding on this idea, Matope (2021) stated that teachers can make science more accessible and meaningful by connecting lessons to students' own experiences and local contexts, fostering a sense of ownership in learning.

Furthermore, Picardal and Sanchez (2022) found that contextualizing hands-on strategies in science enhances student learning and engagement by bridging the gap between abstract ideas and practical experiences. Oludipe et al. (2020) stated that effective instructional planning, integrating both hands-on and mind-on strategies, is necessary for impactful teaching.

Imbibing Creativity and Having Instructional Support

I also collaborated with other teachers so I could borrow equipment and share resources. IDI-05

Of course, it is important to be a wide reader and use different reading materials. It is also important to be a good researcher of videos to support the learning objectives for that week or day. FGD-01

When we lack materials, we reach out to the parents to see if they have any available materials. We need for the experiment, so we can still proceed with it. IDI-07

Teachers use various tools, such as curricular guidelines, teacher collaborations, and professional development programs, to incorporate 21st-century abilities into scientific instruction (Haryani et al., 2021).

Studies show that using videos in scientific classes greatly improves students' understanding and learning outcomes, as shown by higher exam scores and better memory of concepts (Naimah, 2022). According to Asheela et al. (2020), parents can help schools overcome their resource shortages by supplying resources that are frequently easily found at home, like household goods for experiments.

Doing Simplification of Activities and Engaging Enjoyment in Learning

For me, make sure the activity is appropriate for their level and that they can easily understand it. Since you know your students, you shouldn't set expectations that are too high for them. FGD-03

Every time there are hands-on activities, it can be messy and chaotic, but there's really fun in the learning. Just seeing their eagerness, it motivates you to keep doing hands-on activities. FGD-04

I can cope by simplifying, and do the localization. We stick to whatever is available to us.). FGD-05

Participants emphasize the simplification of hands-on activities, overcoming the challenges to make sure the activity is appropriate to their level, eagerness to learn and simplify, and adapting what is available. Aligned with this idea, Ukaegbu et al. (2023) found that students are more likely to engage in simple, skill-level-appropriate hands-on experiments that promote active learning.

Research by Karabulut et al. (2023) supports this, showing that STEM-based hands-on activities significantly enhance motivation and learning experiences by creating an enjoyable classroom environment. Additionally, Dini and Rini (2024) highlight that integrating natural resources and local traditions into science instruction enhances students' critical thinking and problem-solving abilities.

Table 4
Major Themes and Core Ideas on the Insights of Elementary Teachers in Employing Hands-on Strategies in Teaching Science to Students that Can be Shared to Others

Major Themes	Core Ideas
Gain Support from Educational Authorities	• provides complete science equipment • request for 1:1 provision of materials for students • creates inventory of science learning competencies • allocates funds for materials and creates a centralized resource hub • acknowledge the role of DepEd in providing materials • requests for updated equipment • anticipates DepEd monitoring and feedback • encourages teachers' suggestions to be heard by DepEd

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	• provides training on new science equipment
Prepare and Plan the Lesson to Deepen Understanding	• research new trends to apply • prepare lessons thoroughly including the materials • align teaching with learning objectives • relate activities to daily living • anticipate unexpected questions from the students • ensure knowledge of subject matter for effective teaching • deepen students' knowledge and understanding of concepts • requires a well-prepared plan.
Employ Teaching Strategies and Approaches	• promotes learning by doing to ensure comprehension of concepts • adopt proactive and integrative teaching approaches • facilitates more effective learning compared to traditional methods • move beyond chalk talk to practical experimentations • be creative in formulating questions • unlocks difficult concepts to enhance understanding • partner activities with guided inquiry
Provide Platforms for Collaboration and Share with Others	• maintain constant communication among teachers • discuss improvement during learning action cell (LAC) sessions • bank hands-on activities for collaborative benefit • conduct session for brainstorming and sharing of ideas
Doing Continuous Learning and Professional Development	• attend seminars and training for professional development • engage in formal and informal collegial discussion to share common experiences • re-echo information from seminars to maximize learning • studying and exploring to broaden teaching knowledge • doing research on applicable methods
Ensure Engagement and Student-Centered Learning	• engage students to enhance enjoyment • facilitate student explanation of their activities • encourage learners to question the relevance of hands-on activities
Utilize Resources	• remind teachers to use tools and ensure to use log book for level monitoring • encourage co-teachers to utilize available resources • use available materials to enhance understanding

Gaining Support from Educational Authorities

For the department, although they provide for us, it is still not enough. For example, in my class of 40 students, we only have one body model. While it helps, it is not ideal because every student should have their own to hold. Essentially, the provision of materials should be such that, if possible, each student gets one. IDI-02

In implementing hands-on activities, providing funding for materials and creating a centralized resource hub with ideas and lesson plans would be very helpful for the students. IDI-05 Give teachers the latest training on how to use science equipment, because sometimes, even though you are a science teacher, the equipment provided is new to us, and we don't know how to use it. Provide training, materials, and a place to conduct hands-on activities if given the chance. FGD-05

Participants emphasized the importance of collaborating with authorities to request 1:1 student material, establish a centralized resource hub, and monitor the provision of updated equipment. Also, teachers stress the need for professional development programs to optimize the use of new equipment and enhance instructional delivery. With this, Cheng et al. (2022) emphasized that providing students with individual materials, rather than relying on teacher demonstrations, improves their inquiry experiences and engagement.

Also, Pownall et al. (2021) stressed that centralized resource hubs foster collaboration by providing access to lesson plans and instructional strategies. Additionally, Pane and Silaban (2021) emphasized that proper training in using modern science equipment enhances curriculum implementation and reinforces fundamental science concepts.

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Prepare and Plan the Lesson to Deepen Understanding

My recommendation for teachers is to plan and prepare in advance before doing hands-on activities, like researching on the internet for new trends that can be applied in their classes. IDI-01

I can recommend that you align with the learning objectives because it is really different when you teach without clear objectives. IDI-03

Then, you also need to be ready because sometimes there are students who ask questions that are out of the box. You should prepare for that so you won't be caught off guard in front of the class. IDI-05

Participants emphasized the importance of careful planning and aligning teaching objectives with learning goals to ensure structured instruction. Anticipating student questions, and relating activities to real-life situations enhance engagement and understanding. In support of this, Yacap (2022) stated that careful lesson planning, including the production of required materials, is crucial to good instruction.

Furthermore, Zhao et al. (2023) stated that matching learning objectives with evaluations in the classroom improves the efficacy of instruction and reveals significant facets of the student's learning process. Also, Wang et al. (2023) added that to improve their effectiveness as teachers and the learning outcomes of the students, teachers must be prepared to examine and respond to unexpected inquiries from students

Employ Teaching Strategies and Approaches

What I would recommend is, since it is science, we should conduct experiments with the students. The learning-by-doing approach is really effective because it helps them understand the concept more easily. IDI-02

In science teaching, it is very difficult because we are forming new concepts and ideas. We really need to go beyond just chalk talks or discussions. We should pursue experimentation or even science interactive skills. IDI-07

Hands-on activities should be partnered with guided inquiry, helping students relate these activities to their daily lives. FGD-05

Participants revealed the importance of learning by doing, moving beyond traditional "chalk talk" to hands-on strategies. To be creative in formulating questions, it must be partnered with the guided inquiry that applies proactive teaching to have a better understanding of the difficult concept. To support this, Murti (2021) stated that learning by doing enables students to actively participate in an activity, ensuring a deeper understanding of the concept.

Similarly, Kong (2021) asserted that students who are actively immersed in their studies demonstrate a higher level of interest in certain disciplines. Likewise, Thote and Gowri (2021) emphasized that experiential learning activities result in higher achievement in science compared to traditional teaching techniques. Correspondingly, Lower-Hoppe et al. (2021) emphasized that inquiry-based learning engages students through practical investigation and applications, motivating them to investigate, question, and develop their comprehension.

Provide Platforms for Collaboration and Share with Others

As teachers, of course, there should be constant communication, so sharing feedback with the utilization of those hands-on materials that we have. IDI-04

Based on my experience, we have what we call LAC sessions (Learning Action Cells) every month, and currently, we have them twice a month. During these LAC sessions, we discuss the improvements in the students, as well as the practices we implement to help the students cope better with the lessons we teach. IDI-06

Maybe teachers should have a session where there's brainstorming and sharing of ideas. It is really better when there's time for teachers to share their thoughts. This is something we should apply, as it helps us think more effectively, and we can gather many suggestions through that. FGD-07

The responses highlight the importance of collaboration and open communication among educators. Teachers emphasize that maintaining constant communication and engaging in regular LAC sessions are key to sharing feedback on hands-on materials and enhancing teaching practices. They also conduct brainstorming sessions to share ideas to continuously improve instructional methods. To support this, Cardenas et al., (2023) stated that maintaining open communication among teachers is crucial, particularly in exchanging ideas about the use of practical materials.

Similarly, they emphasized that LAC sessions provide a structured forum for discussing student progress and effective teaching strategies, leading to improved student understanding. Additionally, Khasawneh et al. (2023) asserted that brainstorming and collaborative sessions help generate innovative ideas and solutions in education.

Doing Continuous Learning and Professional Development

We discuss by grade level what are those common and applicable positive experiences that we can apply to other levels. Through that, we have both formal and informal collegial discussions, where we share ideas on how to cope with the challenges, because we have common goals. One of those challenges is teaching the students. That's also what we focus on, to address common challenges. At least, we try to resolve at least one each year. IDI-04

And we also re-echo any seminars conducted by DepEd. We make sure to share what we've learned and provide an output so that the seminar is not wasted. IDI-06

I think we should study first and explore so that we can teach our pupils more effectively and with a broader perspective. FGD-02

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Participants emphasized attending seminars and training sessions, engaging in formal and informal collegial discussions, and sharing acquired knowledge to maximize learning. To support this, Dorner and Belic (2021) highlighted that engaging in formal and informal collegial discussions fosters professional development, enhances shared learning, and strengthens collaboration among educators.

Moreover, Beena (2024) emphasized that attending seminars and training sessions equips teachers with useful tools to enhance student engagement and learning outcomes. Sieg and Dreesmann (2022) also added that exploring and implementing innovative strategies in science lessons enhances student engagement and improves learning outcomes.

Ensure Engagement and Student-Centered Learning

By engaging the students, we need to involve them. Through engagement, they can enjoy the hands-on activities. IDI-01

It is necessary to give this to the children because it is part of the lesson plan. It is a solid part of engaging and exploration, and it allows the students to explain their activities. FGD-01

Hands-on activities should be related to the learners' daily lives. FGD-07

Participants defined engagement as creating an environment where students take an active role in their learning rather than passively receiving information. With this, Yilmaz et al. (2024) found that preschoolers' enthusiasm for science was significantly enhanced through hands-on scientific experiments. Kibga et al. (2022) also stated that allowing students to create their learning materials increases their sense of ownership and relevance, improving their participation and enjoyment in learning.

Utilize Resources

Remind all the teachers to use the tools and make sure they sign in and sign out in our science log book. This is not only for the students, but it also helps us during division and regional-level monitoring. There's monitoring for science, and they will check how actively the tools are being used. IDI-01

As a science teacher and the one in charge of our science equipment laboratory, I really encourage my science co-teachers to use and borrow the materials they need for the students' learning. That's what I always tell my fellow teachers. IDI-02

Using the available materials helps them understand even better. They gain a lot of learning from what we teach them. FGD-02

Participants emphasized that tools such as science logbooks help monitor student progress and ensure structured, hands-on learning experiences. To support this, Kola et al. (2023) emphasize that resourceful teachers optimize available materials to enhance instructional methods tailored to 21st-century learners. Similarly, Staff (2023) highlights that collaboration among teachers in utilizing resources strengthens professional development, providing opportunities to refine instructional strategies and deepen subject knowledge. Additionally, Iyer (2024) tools in science classrooms serve as the foundation of a structured and supportive learning environment, encouraging student participation and comprehension of complex ideas.

IMPLICATION FOR TEACHING PRACTICE

The use of hands-on strategies in teaching science presents both advantages and challenges for elementary teachers. This study explored the experiences of teachers in employing hands-on strategies to make science learning more engaging and meaningful for students. It highlighted the various strategies teachers use, the obstacles they encounter, and the insights they have gained from integrating interactive learning into their instruction. The findings provide a deeper understanding of how hands-on strategies enhance student engagement, develop critical thinking skills, and enhance retention. Additionally, this research serves as a valuable resource for teachers, school administrators, and policymakers in refining instructional approaches to support active learning in science.

Based on the findings of this study, teachers may implement targeted strategies to overcome resource and time limitations in hands-on science instruction. Collaborating with colleagues, master teachers, and school administrators allows for the exchange of best practices, lesson materials, and innovative teaching approaches. Utilizing readily available materials and free online simulations can supplement physical experiments to maximize limited class time. Gathering feedback from students and parents helps refine instructional methods to better meet learning needs. Most importantly, fostering creativity and enthusiasm through themed projects and student-choice activities enhances engagement and deepens students' interest in scientific exploration.

CONCLUSION

This study on employing hands-on strategies in teaching science has been challenging yet rewarding to finish. It gave teachers important information what hands-on strategies to help students find science more interesting and relevant. It emphasizes how hands-on strategies improve students' comprehension of scientific ideas, spark their curiosity, and make classes more engaging. Even with all of its advantages, teachers still have difficulties, but they continually come up with innovative ways to make learning interesting and effective. The result of this study reveals the challenges and difficulties in employing hands-on strategies in teaching science to the student, as well as their coping mechanisms and insights into the phenomena.

Consequently, I decided to investigate the experiences of elementary teachers who employ hands-on strategies to teach science because this method has a significant influence on students and it serves as a foundation of young minds to prepare them in understanding more complex science copncept. Employing hands-on strategies and observing other teachers present several difficulties. Through reflection on the viewpoints and experiences of other teachers, this study helped

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me gain a greater understanding of the challenges and benefits of incorporating hands-on methods into science teaching.

Furthermore, In-depth interviews and focus groups were used to collect the opinions and perspectives of my participants. Their response transcripts served as my primary source data source. I appreciate the participants' cooperation and honesty in answering all of the questions, even if arranging the interviews was difficult because of their work obligations. The effective employing of hands-on strategies in teaching science requires cooperation and support from DepEd, school administrators, master instructors, coworkers, and parents. Their guidance, support, and resources contribute to the development of a productive learning environment for students.

However, I faced several difficulties when carrying out this study. Finding a balance between the demands of collecting and analyzing data and my professional obligations was one of the most challenging aspects. Due to their workload, teachers have limited availability, therefore scheduling with participants was another difficulty. To address these issues, I used digital communication in advance to organize well the interviews and maintain my flexibility to meet these problems. Additionally, the task of analyzing various kinds of responses and identifying major patterns was another difficulty I had to overcome. To get around this, I made sure my interpretations were unbiased and well-founded by getting input from the analyst and thesis adviser.

In the end, through this study, I realized that the dedication and cooperation of the whole school community determine how well students learn. Although there may be difficulties, when educators, parents, and administrators collaborate, they may offer students worthwhile educational experiences that help them have better futures.

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