The Lived Experiences Of Science Teachers: Insights Into Philosophy, Practice, And Professional Growth

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***Abstract*—Science education plays a crucial role in developing students' critical thinking and inquiry skills, yet teachers in resource-constrained and culturally diverse areas face unique challenges. In Marawi City, the lived experiences of elementary science teachers provide valuable insights into both the difficulties and opportunities of teaching in such contexts. This study aimed to explore the philosophies, practices, challenges, and recommendations of elementary science teachers in Marawi City. A qualitative phenomenological design was employed, involving ten teachers from public and private schools. Data was gathered through semi-structured interviews and analyzed thematically to capture recurring themes related to motivations, instructional strategies, and professional experiences. Findings revealed that teachers' motivations stemmed from personal passion, inspiring mentors, and circumstantial factors such as financial needs. Despite limited resources, inadequate laboratories, and linguistic diversity, teachers showed resilience by using learner-centered and inquiry-based strategies, incorporating multimedia, hands-on activities, and contextualized examples. They also connected science to real-life experiences and cultural values, which enhanced student engagement and learning. However, challenges in classroom management, resource scarcity, and space limitations remained significant. In conclusion, the study highlights the creativity, adaptability, and dedication of science teachers who continue to innovate despite systemic constraints. Their experiences affirm the importance of teacher resilience and context-based strategies in delivering meaningful science instruction. This study recommends that education stakeholders provide stronger institutional support, professional development, and adequate resources for science teachers. Additionally, aspiring educators are encouraged to cultivate patience, passion, and adaptability to meet the diverse needs of learners.**

Keywords — Science Education, phenomenology, teaching strategies, professional growth, and Marawi City.

I. INTRODUCTION

Science education plays a vital role in developing students' critical thinking, problem-solving, and inquiry skills. In the Philippines, it is considered a cornerstone of the K–12 curriculum, equipping learners to thrive in a knowledge-based society (Department of Education [DepEd], 2012. K to 12 Curriculum Guide). Teachers serve as the central figures in this process, shaping the way young learners experience and appreciate science. In Marawi City, a culturally vibrant and historically significant community, science teachers face both opportunities and challenges that influence their professional practice. Alonto (2023. Resilient Pedagogies in Post-Conflict Marawi) reported that teachers in post-conflict Marawi have demonstrated resilience and innovation by adapting their classroom strategies despite resource constraints. Benito (2022. Creative Approaches to Science Teaching in Mindanao) emphasized that science teachers in Mindanao often compensate for limited facilities by employing creative, student-centered teaching methods.

Limbona and Mambuay (2023. Community-Integrated Science Instruction in Marawi) highlighted how teachers sustain meaningful instruction by connecting lessons to students lived experiences, integrated mother tongue-based instruction, and leveraging community resources. These findings indicate that, far from being hindered solely by material limitations, teachers in Marawi actively develop approaches that align science education with cultural and community contexts. Cruz and Albis (2021. Teacher Quality and Student Achievement in Philippine Basic Education) stressed that teacher quality and preparation remain central determinants of student achievement in Philippine basic education. Building on this perspective, the present study explores how the experiences of elementary science

teachers in Marawi reflect personal passion, professional commitment, and contextual realities.

Specifically, it seeks to examine: (1) the backgrounds and motivations that led them to pursue science teaching; (2) their teaching philosophies, strategies, and use of technology or hands-on methods in the classroom; (3) the challenges and significant experiences that shape their professional journeys; and (4) their recommendations for future science teachers and perspectives on the future of science education.

Using a phenomenological approach, this research investigates how these teachers navigate curriculum demands, resource limitations, and diverse student needs while also highlighting their creativity, resilience, and contributions to educational transformation. By capturing these experiences, the study positions Marawi's science educators not as passive recipients of systemic challenges but as active contributors to innovation in teaching and learning. Their narratives provide insights for strengthening science instruction across the Philippines, particularly in communities where resilience and cultural identity serve as foundations for quality education.

II. LITERATURE REVIEW

Science education is central to developing learners' curiosity, problem-solving skills, and critical thinking abilities. At the elementary level, it serves as the foundation for fostering creativity and helping students make sense of the world around them. Bybee (2013) emphasized that science instruction must go beyond memorization and be designed to spark inquiry, encouraging students to ask questions, explore, and make discoveries. This perspective underscores the importance of empowering teachers to create meaningful and engaging learning experiences, particularly in contexts where students' exposure to scientific concepts may be limited. Despite its importance, the delivery of science education presents many challenges, especially in developing nations such as the Philippines. Lucenario et al. (2016) noted that many elementary teachers, though not science specialists, are tasked with teaching the subject alongside other disciplines. This lack of specialization often results in difficulties in lesson design, classroom management, and confidence in presenting scientific concepts. Such realities are even more pronounced in resource-constrained settings like Marawi City, where teachers must navigate not only systemic limitations but also the challenges posed by multilingual classrooms and the effects of post-conflict conditions. These difficulties highlight the need to explore how teachers adapt their practice and maintain their commitment to science teaching despite these barriers.

To address learner diversity, differentiated instruction has been highlighted as a key approach. Tomlinson (2014) explained that by modifying content, processes, and assessments, teachers can ensure that all students whether advanced or struggling are able to access and engage with the curriculum. In science classrooms, where abstract concepts can be difficult to grasp, differentiation allows teachers to provide multiple pathways for understanding. This approach aligns with the purpose of the present study, as it sheds light on how teachers in Marawi employ adaptive strategies to respond to the varying needs of their students. Equally vital is the socio-emotional competence of teachers. Jennings and Greenberg (2009) emphasized that teacher flexibility, empathy, and emotional regulation are crucial in creating supportive and effective learning environments. In communities such as Marawi, where teachers and learners may carry the weight of conflict and limited resources, these socio-emotional skills become indispensable. Teachers who can manage stress and show genuine care for students help create classrooms where learners feel valued and motivated to engage with science. This directly connects to the present research, which seeks to highlight how teachers' personal philosophies and resilience shape their practice.

Taken together, these studies form the foundation for this research. Bybee (2013) stresses the importance of inquiry-driven learning, Lucenario et al. (2016) reveals the systemic challenges faced by generalist teachers, Tomlinson (2014) provides a framework for differentiated instruction, and Jennings and Greenberg (2009) highlight the role of socio-emotional competence. Collectively, they show that effective science teaching is not only about content knowledge but also about adaptability, emotional awareness, and a deep commitment to learners' growth. Examining the lived experiences of science teachers in Marawi is therefore vital, as it provides insights into how educators overcome challenges, sustain learner engagement, and continue to innovate in environments where teaching science is both demanding and transformative.

III. METHODOLOGY

This study employed a phenomenological research design to explore the lived experiences of ten elementary science teachers from selected public and private schools in Marawi City, focusing on their philosophies, practices, and professional growth in authentic teaching contexts. Following the approach used by Flores (2020) in examining first-year teachers' experiences, phenomenology was deemed appropriate as it captures the essence of participants' perspectives without imposing external frameworks. The participants were purposively selected, representing schools such as Sultan Conding Elementary School, Sikap Elementary School, Masiricampo Abantas Memorial Islamic and Science Academy (MAMISA), MSU-ILS-EMPC Childhood Learning Center, Dansalan Integrated School Inc.,

Datu Saber Elementary School, and Sultan Disomimba Elementary School. Data were gathered through validated semi-structured interviews guided by five parts: socio-demographic profile, motivations for teaching science, teaching strategies, challenges and experiences, and recommendations for future teachers. Ethical considerations were strictly observed, ensuring informed consent, voluntary participation, and anonymity. Interviews were audio-recorded with permission, and responses were analysed using thematic analysis, allowing recurring themes and ideas to emerge that reflected the teachers' insights and experiences.

IV. RESULTS AND DISCUSSION

This section presents findings of the study, gathered from the lived experiences of ten elementary science teachers in Marawi City. The researchers used thematic analysis to find recurrent themes and ideas that reflect both the challenges and opportunities encountered in science teaching. Direct quotations from participants are included to preserve the authenticity of their experiences and provide deeper understanding of their perspective. The discussion further integrates relevant literature to support the participants' experiences with broader educational theories and practices.

A. Motivations in Teaching Science

To understand teachers' perspective on their profession, it is essential to explore their motivations for teaching science. Motivation not only influences teachers' career choices, but it also shapes their teaching practices and long-term commitment to the profession.

Question 1 What inspired you to become a science teacher?

The themes that emerged from the participant's responses to the question "What inspired you to become a science teacher?" Three main themes emerged: Influence of Mentors, Teachers, and Trainings, Passion and Personal interest in science, and Circumstantial/Financial problems reflecting the different motivations behind their decision to pursue science teaching.

Table 1. Thematic Analysis of Factors Inspiring Teachers to Choose a Science Teaching Career

Themes	Participants' Responses
Theme 1: Influence of Mentors, Teachers, and Trainings	"When I attended a 40-day training for science courses and that was when I realized that science is more interesting for me than the other subject." (P1) "I was once a student who was deeply inspired by my science teacher." (P3) "I liked science ever since in my elementary days because of the specific teacher that I idolized because of how she teaches science." (P4) "So, the first person who inspired me was one of my mentors in teaching."
Theme 2: Passion and Personal Interest in Science	"...because of the exciting and interesting lessons…" (P8) "…I am very interested in science since science is part of our life." (P9) "…exploring the world of science together and experiencing the pure joy of learning." (P10)
Theme 3: Circumstantial/ Financial problems	"Originally, I didn't want to be a teacher. I wanted to be a doctor. During that time when I was studying, we had some financial problems…" (P6) "As a gen-ed or in the elementary field, we cannot choose what subject to teach…" (P9)

Theme 1: Influence of Mentors, Teachers, and Trainings

This highlights the important role of guidance, support and learning opportunities from professionals and educators, development plays in shaping the individuals, growth, skills and motivation. Participants revealed that inspiring mentors and impactful training experiences played a key role in shaping their path toward science teaching, "I was once a student who was deeply inspired by my science teacher." (P3). These individuals acted as role models, demonstrating effective pedagogy and igniting professional aspirations. This implies that supportive professional communities foster the development of teachers' identities and instructional competence rather than them developing in isolation.

According to Dogan, Pringle, and Mesa (2020), mentorship provides critical emotional and professional support that enhances teacher confidence and practice, especially in science education. Likewise, Beauchamp and Thomas (2020) highlight that mentorship and exposure to expert teaching during training contribute to the development of a reflective and resilient professional identity. The present study reinforces these insights by showing that early encounters with mentors and training experiences provided participants with a sense of direction and professional grounding.

Theme 2: Passion and Personal Interest in Science

This highlights the inner motivations and curiosity that drive the individuals to engage in, pursuing learning and exploring the field of science. Participants view science not just as a discipline, but as an integral part of life. One of the respondents' responses *"…I am very interested in science since science is part of our life." (P9)*. This finding is echoed in recent literature. Chowdhury and Kabir (2021) note that intrinsic motivation and subject-matter passion significantly contribute to teaching effectiveness and long-term engagement. Furthermore, Bartholomew et al. (2023) found that science teachers who enter the

profession out of genuine interest tend to adopt more innovative and student-centered teaching practices.

Theme 3: Circumstantial/ Financial problems

This highlights the influence of financial constraints and situational factors, such as limited career choices or institutional assignments, that initially shaped individuals' entry into the teaching profession, though many later learned to embrace and commit to their role. Some participants shared that becoming a science teacher was not their original career plan but was influenced by financial limitations or institutional assignments. Participants stress that *"As a gen-ed or in the elementary field, we cannot choose what subject to teach…" (P9).* While these decisions were circumstantial, many grew to embrace the role over time. This aligns with the study of Fessehatsion et al. (2021) observed that financial pressures and job availability remain common drivers for entering the teaching profession, especially in developing contexts. However, Tran and Hoang (2020) argue that even teachers who enter the profession by chance can develop professional identity and commitment through continuous support and reflective practice.

Question 2. Can you describe your overall teaching philosophy for science education?

The themes generated from responses of participants in the interview question, "Can you describe your overall teaching philosophy for science education?" Three main themes emerged that reflect the teachers' beliefs and approaches to science instruction.

Table 2. Thematic Analysis of Teachers' Overall Philosophy in Science Education

Themes	Participants' Responses
Theme 1: Learner-Centered and Inclusive Science Education	"One of my goals is to make sure that my learners are aware of themselves and their environment, and that they understand their purpose." (P1) "We cannot apply a one-size-fits-all curriculum. We need to use different strategies because students have different abilities. Some are low-level learners, so we must be flexible as teachers." (P2) "Although I am not a science major, my philosophy centers on fostering curiosity and critical thinking. I believe science should be inquiry-based and inclusive. I use differentiated instruction to meet diverse needs." (P7) "Science is part of our daily life, so we should always expose learners to its different aspects so they can appreciate its importance." (P8)
Theme 2: Interactive, Inquiry-Based, and Practical Learning	"I use real-life visual aids and interactive discussions to help students connect with lessons." (P3) "I don't really have a formal philosophy, but for me, just make science fun!" (P4) "After lecturing, I apply the lesson through experiments or activities. Science becomes boring if it's just theory, but it becomes fun and clear with hands-on application. (P5)
Theme 3: Connecting Science with Faith and Identity	"Based on my experience in the field, I realized that science is connected to Islam. Many scientific truths align with Islamic teachings." (P6)

Theme 1: Learner-Centered and Inclusive Science Education

This highlights the idea that science instruction should prioritize the needs, abilities, and interest of all students. Participants emphasized the need for a variety of teaching strategies to ensure that every learner, including those who face difficulties, can engage meaningfully with the subject. One of the participants states that *"We cannot apply a one-size-fits-all curriculum. We need to use different strategies because students have different abilities. Some are low-level learners, so we must be flexible as teachers." (P2)*. Science was also described as a tool for self-discovery, curiosity, and deeper thinking, not just as a collection of facts. By connecting science concepts to everyday life, students are more likely to see their relevance, which strengthens both understanding and appreciation.

Tomlinson (2014) emphasized the importance of differentiated instruction in addressing diverse learning needs within today's classrooms. This supports the participants' view that science education should not adopt a one-size-fits-all approach instead employs strategies that allow learners to access and connect with the content in ways that suit their individual strengths. This implies that science education must go beyond uniform teaching styles and instead embrace inclusivity and adaptability, ensuring that no learner is left behind in developing critical thinking and problem-solving skills.

Theme 2: Interactive, Inquiry-Based, and Practical Learning

This highlights that science education becomes more effective when it is engaging, hands-on, and connected to real-life contexts. Participants highlighted that when science lessons rely solely on theory, students tend to lose interest and struggle to grasp concepts deeply. One of the participants states that *"I use real-life visual aids and interactive discussions to help students connect with lessons." (P3)*. On the other hand, practical activities, visual materials, and interactive discussions make science more enjoyable and accessible, sparking curiosity and improving understanding.

Prince and Felder (2006) emphasized that active and inquiry-based learning approaches significantly enhance student engagement and retention of knowledge in science education. This implies that teachers must integrate more student-centered, activity driven strategies into science lessons to balance theory with practice. Prioritizing interactive and inquiry-based approaches ensures that

science learning is not only enjoyable but also meaningful and transformative for students.

Theme 3: Connecting Science with Faith and Identity

This highlights that science can be linked to faith and identity. Some participants believed that many scientific truths support Islamic teachings, making science more meaningful for learners. P6 shared that, in their experience, science and Islam support each other. It implies that faith and science can go together. A participant stresses that *"Based on my experience in the field, I realized that science is connected to Islam. Many scientific truths align with Islamic teachings." (P6).* The implication is that connecting science with faith helps students grow in knowledge while also strengthening their values and identity.

Hashim and Langgulung (2008) said that including Islamic values in modern subjects like science helps students develop both intellectually and spiritually. This supports the teachers' view that science and faith can work together. The implication is that integrating faith into science education makes learning both academic and values based.

B. Teaching Strategy

This section explores the different teaching strategies applied by science teachers. Teaching strategies are central to effective science instruction, as they shape how learners engage with content, develop scientific skills, and apply knowledge to real-life situations. A teacher's philosophy of teaching, planning, considerations, and approaches to addressing diverse learners all contribute to student success in science. Moreover, the integration of technology and the design of hands-on activities are essential in making lessons more interactive, meaningful, and safe for learners.

Question 1. When planning your science lessons, what are the key factors you consider ensuring student engagement and understanding?

The themes generated from responses of participants in the interview question, "*When planning your science lessons, what are the key factors you consider ensuring student engagement and understanding?"* Three main themes emerge from the question.

Table 3. Thematic Analysis of Key Factors Considered in Planning Science Lessons for Student Engagement and Understanding

Themes	Participants' Responses
Theme 1: Playing videos and showing pictures	"I always make sure to introduce things that are confuse at. Such as videos. I noticed that when I play videos about science instead of lecturing, they focus their attention on the lesson." (P1) "…show them some pictures and videos. Para to make sure na they can really understand my lesson." (P2)
	"Using hands-on activities to boost engagement. "(P7)
Theme 2: Using hands-on learning	"I make my science lessons meaningful and engaging by using real-life applications and hands-on learning. "(P3) "So, to make my lecture more engaging, hands-on learning is needed." (P5)
Theme 3: Instructional materials	"…I considered factors such as the materials needed to make the lesson more interested and clearer to the understanding of the learners." (P8

This shows the generated themes on the interview questions, "When planning your science lessons, what are the key factors you consider ensuring student engagement and understanding?" As shown, the generated themes state "Playing videos and showing pictures", "Using hands-on learning", "Instructional materials". This indicates that the teachers have various opinions and experiences on how to ensure student engagement and understanding.

Theme 1: Using videos and showing pictures

This theme emphasizes the role of multimedia in enhancing student engagement and comprehension during science lessons. From the teacher's experiences, playing videos and showing pictures to their lectures ensure students' engagement and understanding. One of the participants states that *"I always make sure to introduce things that are confuse at. Such as videos. I noticed that when I play videos about science instead of lecturing, they focus their attention on the lesson." (P1)*. Visuals help simplify abstract scientific concepts, making them more relatable and easier to grasp.

A study conducted by Ercan (2014) showed that multimedia has an important role for student's achievement. The researcher examined the effect of multimedia learning material on 5th grade students' academic achievement and attitudes toward science. This implies that integrating multimedia tools such as videos and images in science classrooms not only fosters better comprehension but also sustains student motivation and curiosity.

Theme 2: Using hand-on learning

This theme highlights the importance of experiential and practical approaches in teaching science. Several participants shared that using hand-on activities during lectures helps to ensure students engagement and understanding. One of the participants states that *"I make my science lessons meaningful and engaging by using real-life applications and hands-on learning. "(P3).* By actively involving learners in experiments and demonstrations, teachers provide opportunities for students to directly interact with scientific concepts, rather than just hearing or reading about them.

According to Maffea (2020), A majority of students learn better with hands-on experience in classrooms. However, more resources can help the students experience hands-on learning; therefore, this can be one of the considerations for the respondents who did not experience hands-on learning. This implies that hands-on learning is one of the important strategies for science instructions, as it increases student engagement and promotes critical thinking.

Theme 3: Instructional materials

This highlights the use of appropriate teaching resources such as models, charts, visuals, and manipulatives that make abstract science concepts more concrete, engaging, and easier for students to understand. As one participant shared, *"…I considered factors such as the materials needed to make the lesson more interested and clearer to the understanding of the learners." (P8).* Instructional resources help simplify abstract concepts and make them more relatable for learners. By integrating these tools, teachers are able to capture students' attention and sustain their interest throughout the lesson. This implies that the thoughtful selection and use of instructional materials play a vital role in improving students' comprehension and overall learning experience in science.

As Gomez (2018) confirms, instructional materials motivate and induce a student's involvement, making the lesson more interactive and engaging. This implies that careful use of instructional materials not only helps in clarifying difficult concepts but also improves students' comprehension, participation, and retention knowledge. Hence, instructional materials serve as valuable tools in bridging the gap between theoretical ideas and real-life applications of science education.

Question 2. How do you differentiate your instruction to meet the diverse learning needs of your learners, particularly in a science classroom?

The themes generated from responses of participants in the interview question, "*How do you differentiate your instruction to meet the diverse learning needs of your learners, particularly in a science classroom?"* Three main themes emerge as follows;

Table 4. Thematic Analysis of Differentiated Instruction Strategies in Science Classrooms

Themes	Participants' Responses
Theme 1: Differentiated Instruction & Strategies in Science	"Our classroom is congested and for the past years our classroom is hetero. What I do is to find ways just like I said earlier that I use videos and experimentation so that all learners get engaged. I also use activities such as puzzles, and it helps a lot". (P1) "So, we really look at the objective of our lesson, and we see that some students are below level. That's why we should use Bloom's Taxonomy, starting from the most basic level up to the highest, so we can cater to the needs of all our learners." "I use a variety of strategies like visual aids, oral reading, group work to address different learning styles." (P3) "I differentiate instruction by using varied teaching methods like visuals, hands-on experiments, group work, and guided notes. I also adjust tasks and provide support based on students' learning styles, readiness, and abilities to ensure everyone can engage and succeed." (P7) "My approach in the classroom is like I said engagement is really the main strategy I use. When it comes to giving assessments, I use simple, medium, and hard levels. I mix them. What I mean is, I can see up to what level the advanced students can handle. Then for the fast learners, I sometimes give them activities where they lead, so there's scaffolding. Right? They're the ones teaching or guiding their classmates who are a bit behind."
Theme 2: Language & Cultural Considerations	"What I encountered was the dialect. My first teaching experience is my first real teaching, was as a volunteer during the pandemic in a municipality where the children couldn't understand English or even Tagalog. So, I became the student. I had to learn Bisaya in order to teach them using the Bisaya language." (P6) "Use Filipino and Maranao language to meet the diverse learning of the students; I used pictures and relate the lessons to the daily life of the learners; and short videos played sometimes to make them more aware of lessons." (P8) "To support diverse learners, I used multilingual strategy using tagalog, bisaya, and maranao. It secures clearer understanding and builds confidence." (P10)
Theme 3: Learner Grouping and Classroom Experience	"Not really, because honestly, I haven't experienced that yet. Most of my students are on the same level. They're all first-timers in the lab. In lectures, there are a few smart ones, but it's their confidence that stands out more than their actual knowledge on the topic. That's why we really start with the basics, because that's their foundation. So, for me, I haven't experienced any grouping. They all receive the same instructions." (P5)

Theme 1: Differentiated Instruction Strategies in Science

The theme highlights how teachers employ varied strategies to address the diverse learning needs of their students. Participants emphasized the importance of modifying lessons, activities, and assessments to cater learners' different levels of readiness, abilities, and learning styles. According to participant 3 *"I use a variety of strategies like visual aids, oral reading, group work to address different learning styles."*. By tailoring assignments and support

to each student's learning style, aptitude, and readiness. This strategy enables the teacher to address the diverse requirements of pupils while also ensuring that all students can understand and profit from the session.

According to Tomlinson (2014), differentiated instruction model, which promotes changing instructional materials, procedures, and evaluations to account for individual student differences. It guarantees that every student can successfully access the curriculum and is challenged at their own level. This implies that differentiated instruction in science does more than accommodate diversity, it also encourages students to take active roles in the learning process, builds peer collaboration, and enhances student engagement, ensuring that no learner is left behind.

Theme 2: Language & Cultural Considerations

The participants underlined how crucial it is to employ multilingual approaches to accommodate their learners varied linguistic origins. According to participants 8 *"Use Filipino and Maranao language to meet the diverse learning of the students; I used pictures and relate the lessons to the daily life of the learners; and short videos played sometimes to make them more aware of lessons."* These encounters demonstrate how important language is to inclusive education.

According to Cummins (2001), letting pupils learn in their native tongue improves their understanding and sense of self. Similarly, mother tongue-based multilingual education is supported by UNESCO (2003), which claims that it promotes more effective and meaningful learning, particularly in multilingual cultures like the Philippines.

Theme 3: Learner Grouping and Classroom Experience

P5 said that all of students were at the same level because it was their first time doing lab work and they were all at the same level in lectures. Even though some of them seemed assured, they still knew very little about the subject. According to participants *3 They're all first-timers in the lab. In lectures, there are a few smart ones, but it's their confidence that stands out more than their actual knowledge on the topic.* For this reason, the teacher begins with the fundamentals and taught every student the identical material without categorizing them.

Borich (2017) asserts that when students are at comparable readiness levels, whole-class education works well because it enables the teacher to concentrate on key ideas quickly. Slavin (2009) encourages the use of direct instruction in these situations as well, stressing that when students are starting from the same place, it is best to teach foundational skills in a clear, consistent manner.

Question 3: Technology plays an increasingly important role in education. How do you integrate technology into your science lessons to enhance learning?

The themes generated from responses of participants in the interview question, "*How do you integrate technology into your science lessons to enhance learning?"* One main theme emerge as follows;

Table 5. Thematic Analysis of Technology Integration in Science Lessons to Enhance Learning

Themes	Participants' Responses
Theme 1: Multimedia for Engagement	"I sometimes use projector in my science class… playing videos about science using projector."(P1) P2: "…as a science teacher, we need to be resourceful. We should show them some videos using YouTube, and aside from that, we should localize the materials found in the book. This is because here in our school, we do both have test tubes, so we need to localize it, even if it is just disposable cups or other materials for the experiment." (P2) "…I use multimedia tools like ready-made interactive video lessons from YouTube. I create PPT to deliver lessons in a more interactive and engaging way." (P3) "By playing videos or clips through laptops, projector and televisions." (P4) "I usually use technology lalo na sa presentation of the hard lessons. Kailangan ko talaga ng DLP. Pinaka-video or powerpoint presentation."(P6) "By using printed materials like pictures, handouts…Downloading videos related to my specific lesson" (P8) "I integrate technology by using interactive simulations, videos, and digital tools like quizzes to make complex science concepts easier to understand. I also use presentations and online platforms to support collaboration and engagement." (P7) "Presentations and online platforms to support collaboration and engagement." (P10) "Since we are already in the technology era, we have different materials. We should provide pictures. Because young learners need visual learning. For audio learners much better to provide videos. We have visual learners, and we have kinesthetic learners. so, you need to use all three (learning styles) so that, as you said, the students' learning will be diverse." (P9)

Theme 1: Multimedia for Engagement

The participants emphasized the use of multimedia tools as a key strategy to engage students in science classes. According to participant 3*"…I use multimedia tools like ready-made interactive video lessons from YouTube. I create PPT to deliver lessons in a more interactive and engaging way."* Their responses revealed that videos, PowerPoint presentations, projectors, interactive simulations, and online platforms are commonly used to simplify science concepts and make lessons more appealing to learners.

According to Rutten et al. (2012), simulations help students learn better because they can explore and experiment with the lesson. Similarly, these findings reflect Mayer's Cognitive Theory of Multimedia Learning (2014), which emphasizes that combining visual and auditory inputs enhances student comprehension and retention. By using multimedia tools, teachers bridge the gap between theoretical knowledge and real-life application, keeping learners actively engaged even in resource-limited environments.

Question 4: Science often involves hands-on activities and experiments. How do you design and manage practical work in your classroom to ensure both learning and safety?

The themes generated from responses of participants in the interview question, "*How do you design and manage practical work in your classroom to ensure both learning and safety?"* Four main themes emerge as follows;

Table 6. Thematic Analysis of Designing and Managing Practical Science Activities for Learning and Safety

Themes	Participants' Responses
Theme 1: Student Material Accessibility	"Sometimes we do experiments inside the classroom and require my students to bring materials that can be found in their house such as salt, vinegar and everything. I also make sure that when we do experiments, it is safe. Actually, we are not always doing experiments because in grade 5 and 6 more on discussing concepts unlike in elementary that more on experiments." (P1)
Theme 2: Safety Protocols Engagement	"All safety and laboratory etiquettes in the lab must be covered. We don't jump straight into experiments. That's because there are children who are not familiar with laboratory apparatus. They're not familiar with the names. They're also not familiar with their uses. So, we will have what we call 'Science 101' where we will cover all of that. Everything will be tackled lab etiquette, safety, and the like. There are a lot of safety rules. For example, no chatting inside the laboratory, no eating inside the lab, wear your proper lab gowns or lab coats, things like that proper safety protocols." (P5) "Before the beginning of any activity, I always explain the instructions on how to do a certain experiment at time or inside the classroom so that safety comes first." (P9)
Theme 3: Space Limitations	"Sad to say, we really don't have the capability to cater to hands-on activities because, as you've seen, the classrooms are very cramped. There's not enough space to conduct experiments that could help the students better understand the topics or lessons. We also can't use the gym because it might distract other classes or rooms. So, in the end, we rely more on visualization for now." (P4)
Theme 4: Teacher Creativity and Innovation	"Currently, we're not the ones handling that. Our science laboratory and lab classes are handled by a different teacher. We only handle the lectures; the lab is handled by someone else. So, for me, I just do practical work in the classroom to ensure both learning and safety. What I do are just basic activities those that aren't too risky to make sure the students are safe. And at the same time, they're still learning something. Because I don't really handle the laboratory sessions. Our hands-on activities are held every Sunday, and those are handled by another teacher. A different teacher." (P6)

Theme 1: Student Material Accessibility

This theme reflects how teachers make science experiments possible by using simple, everyday household items that students can easily bring from home. One participant shared, *"Sometimes we do experiments inside the classroom and require my students to bring materials that can be found in their house such as salt, vinegar and everything. I also make sure that when we do experiments, it is safe" (P1).* This shows that accessibility of materials plays an important role in ensuring practical work continues even when resources are limited. Teachers demonstrate resourcefulness by using household items to create meaningful activities, making science relatable and achievable without relying on costly laboratory equipment.

According to Ng's (2019) study on Everyday Materials for Science Education in Resource-Constrained Classrooms supports this practice, showing that students can achieve similar conceptual understanding when everyday objects are used in place of specialized lab tools. This implies that science education can remain hands-on and effective even in resource-limited environments when teachers creatively utilize accessible materials.

Theme 2: Safety Protocols Engagement

This theme emphasizes how teachers prioritize safety through structured orientations and clear rules before students conduct experiments. One participant stated, "All safety and laboratory etiquettes in the lab must be covered. We don't jump straight into experiments… we will have what we call 'Science 101' where we will cover all of that" (P5). This highlights that safety is treated not only as a precaution but also as a learning opportunity. By modeling proper procedures, teachers help students develop both safe practices and professional attitudes toward scientific work.

According to The National Research Council's Framework for K–12 Science Education (2012) stresses that safety instruction is an integral part of science education, aligning closely with teachers' practices of covering lab etiquette and rules before

experimentation. This implies that prioritizing safety in practical work both protects learners and prepares them for responsible engagement in science.

Theme 3: Space Limitations

This theme describes the difficulties teachers face when limited classroom space prevents them from conducting effective hands-on experiments. One teacher explained, “Sad to say we do not really have the capability to cater hands-on activities kasi nakita niyo naman na napaka sikip ng kada room, wala masyadong space to have an experiment” (P4). This underscores how the physical environment directly impacts pedagogy. When classrooms are cramped, teachers often rely on visualizations or video clips instead of actual experiments, which reduces opportunities for experiential learning.

According to Smith and Smith (2020), in their study Classroom Space and Student Engagement: The Impact of Physical Environment on Learning, found that inadequate classroom space often results in fewer interactive activities and limits student engagement, supporting this finding. This implies that improving physical learning spaces is necessary for science education to be more interactive and engaging.

Theme 4: Teacher Creativity and Innovation

This theme highlights teachers’ adaptability in creating safe and simple activities when they do not directly manage laboratory sessions. As one participant shared, “I just do practical work in the classroom to ensure both learning and safety. What I do are just basic activities that aren’t too risky to make sure the students are safe. And at the same time, they’re still learning something” (P6). This demonstrates that teacher creativity enables science instruction to remain meaningful despite constraints. By modifying experiments and designing safe activities, teachers sustain student engagement while addressing safety and resource challenges.

According to Craft’s (2011) work Creativity in the Classroom: The Role of the Teacher supports this finding, emphasizing that innovative teaching strategies are crucial in overcoming limitations and keeping learners motivated. This implies that teacher creativity is vital in sustaining practical science learning despite structural and resource limitations.

C. Challenges and Experiences

This section discusses the challenges and lived experiences of Science teachers in Elementary level. It explores the difficulties they encounter, such as time constraints, lack of resources, and classroom management concerns, as well as the strategies they employ to cope with these issues. These insights provide a deeper understanding of the realities teachers face in delivering science instruction.

Question 1: Reflecting on your teaching career, could you share a particularly memorable experience you've had in the science classroom? What made it so memorable?

The themes generated from responses of participants in the interview question, “*Reflecting on your teaching career, could you share a particularly memorable experience you've had in the science classroom? What made it so memorable?”* Four main themes emerge as follows;

Table 7. Thematic Analysis of Memorable Experiences in the Science Classroom

Themes	Participants’ Responses
Theme 1: Engagement through experiential learning	“Learners are very excited in waiting for the growing of the plants and they’re always curious” (P1) “…When there is an experiment, students are motivated…” (P2) “...A shy student confidently presented a group model of the water cycle...” (P8)
Theme 2: Student achievement and Recognition	“...One memorable experience was when a student I personally coached won 1st place in a science quiz bee…” (P3) "Never in history has this school become a champion... I was the one who became their coach."
Theme 3: Overcoming language barriers	“I have to learn their language so I can teach them… I don't know how to speak Bisaya… they live in the mountains…” (P6)
Theme 4: Emotional and Personal Connection with Students	"I'm not just teaching something shallow… I'm touching their lives… I can see their improvement." (P9)

Theme 1: Engagement through experiential learning

This theme captures how teachers find memorable experiences in science classrooms when students engage directly with hands-on activities that spark curiosity and motivation. One particpants shared, “Learners are very excited in waiting for the growing of the plants and they’re always curious” (P1). Similarly, others emphasized that students become more active and motivated during experiments or group presentations. These insights suggest that experiential learning fosters curiosity, participation, and confidence, especially when shy students begin to engage actively in classroom tasks. It demonstrates that hands-on approaches transform abstract

concepts into meaningful and enjoyable learning experiences.

This finding aligns with constructivist pedagogy, which emphasizes active, student-centered learning where learners build knowledge through authentic experiences (Bybee, 2009; Piaget, 1972). The implication is that teachers should continue to integrate experiments and projects as vital strategies to enhance engagement and long-term learning.

Theme 2: Student achievement and Recognition

This theme reflects how teachers' most memorable classroom moments often arise from their students' successes and recognition in academic competitions. One participant shared "One memorable experience was when a student I personally coached won 1st place in a science quiz bee" (P3). This demonstrates the pride teachers feel in their students' accomplishments. These accounts reveal that learners' academic triumphs are not only fulfilling for students but also for teachers who dedicate time and effort to mentoring them. Such experiences validate teachers' professional identity, competence, and purpose while inspiring them to continue guiding students toward excellence.

This findings aligns with Day and Kington (2008), who argue that teachers' sense of identity is reinforced through meaningful professional experiences. Teaching in linguistically and culturally diverse settings presents unique challenges. This reflects inclusive education practices and a commitment to equity (UNESCO, 2017). It also supports Hattie's (2009) finding that teacher-student relationships play a key role in fostering student success. The implication is that recognition of student achievement also serves as recognition of teachers' pivotal roles in shaping academic outcomes.

Theme 3: Overcoming language barriers

This theme emphasizes the challenges and adaptations teachers encounter when instructing linguistically diverse learners in science classrooms. One participant explained, "I have to learn their language so I can teach them… I don't know how to speak Bisaya… they live in the mountains" (P6). This statement highlights the struggles teachers face when linguistic gaps hinder effective teaching and learning. It also demonstrates teachers' willingness to adapt by learning local languages to reach their students more effectively.

This finding supports SEAMEO INNOTECH (2010), which underscores the importance of localizing instruction through Mother Tongue-Based Multilingual Education (MTB-MLE) in the Philippines. It also reflects inclusive education practices that prioritize equity and accessibility for all learners. The implication is that professional training in multilingual education should be strengthened to empower teachers to handle diverse linguistic contexts.

Theme 4: Emotional and Personal Connection with Students

This theme shows how teachers' memorable experiences extend beyond academics, centering on emotional bonds and holistic growth in their students. One participants expressed, "I'm not just teaching something shallow… I'm touching their lives… I can see their improvement" (P9). This statement reveals the teachers' deep sense of purpose in shaping not just academic performance but also personal and emotional development. Their reflections highlight the transformative role of teaching as a value-laden, holistic practice.

This aligns with Noddings' (2005) "ethic of care," which emphasizes that genuine concern for students' growth leads to deeper learning relationships. It also echoes Mezirow's (2000) idea of transformative teaching, where education shapes values and critical thinking. The implication is that science teaching should be approached as both intellectual and emotional work, where meaningful relationships enhance learning and long-term development.

Question 2: Every teacher faces challenges. Can you describe some of the most significant challenges you've encountered in your career as a science teacher?

The themes generated from responses of participants in the interview question, "*Can you describe some of the most significant challenges you've encountered in your career as a science teacher?"* Two main themes emerge as follows;

Table 8. Thematic Analysis of Significant Challenges Encountered by Science Teachers

Themes	Participants' Responses
Theme 1: Limited Resources and Laboratory Access	"One major challenge has been the lack of resources for experiments. We often have limited materials. Another challenge is classroom management in large classes where some students get bored and get easily distracted" (P1) "…before doing an experiment we can't avoid that there is a high possibility that not all the materials needed for the experiment is available." (P2) "Limited resources for experiments are a real challenge, so I adapt by using low-cost materials and even virtual labs when necessary." (P3) "Experiments are difficult to conduct without proper facilities, and it affects how well they grasp the lessons." (P4) **"…**lack of designated room for laboratory activities and incomplete tools and equipment for other laboratory activities." (P8)

Theme 2: Language and Cultural Barriers	"My biggest challenge was the language barrier. didn't know how to speak Bisaya when I started teaching in a rural area. I had to learn their language to teach effectively…" (P6)

Theme 1: Limited Resources and Laboratory Access

This theme highlights the persistent challenge teachers face in delivering effective science instruction due to inadequate laboratory facilities, tools, and materials. One participant explained, "One major challenge has been the lack of resources for experiments. We often have limited materials. Another challenge is classroom management in large classes where some students get bored and get easily distracted" (P1). This perspective underscores how the absence of proper laboratories and experimental tools weakens students' opportunities for authentic, hands-on learning. Teachers are often compelled to use improvised or digital alternatives, but these cannot fully replicate the richness of real laboratory experiences. This limitation impacts not only on student engagement but also the development of critical thinking and problem-solving skills.

This finding aligns with Saage-Maab and Mandinach (2018), who note that resource-constrained environments push teachers to innovate, often relying on improvised or virtual tools. However, while these methods may partially address the issue, they fall short of providing the full benefits of laboratory-based learning. The implication is that investment in proper laboratory infrastructure and resources is essential to strengthen science education outcomes.

Theme 2: Language and Cultural Barriers

This theme means that differences in language and This theme refers to the difficulties teachers encounter when linguistic and cultural differences disrupt effective instruction and classroom interaction. One participant shared, "My biggest challenge was the language barrier. I didn't know how to speak Bisaya when I started teaching in a rural area. I had to learn their language to teach effectively…" (P6). This statement highlights how unfamiliarity with students' local language initially limited communication and learning. Language and cultural barriers reduce participation, cause misunderstandings, and lower students' confidence in engaging with lessons. By adapting to local languages and cultural contexts, however, teachers can build stronger connections and make learning more accessible.

This finding aligns with Lucas and Bernardo (2013), who argue that language barriers are a major challenge in multilingual societies. They emphasize that linguistic adaptability and cultural competence are crucial for improving instructional outcomes in diverse classrooms. The implication is that professional development should prepare teachers with linguistic flexibility and cultural immersion strategies to effectively teach in diverse communities.

Question 3: On the flip side, could you describe your most challenging or "worst" experience as a science teacher? How did you handle that situation, and what was the ultimate outcome?

The themes generated from responses of participants in the interview question, "*On the flip side, could you describe your most challenging or "worst" experience as a science teacher? How did you handle that situation, and what was the ultimate outcome?"* Three main themes emerge as follows;

Table 9. Thematic Analysis of the Most Challenging Experiences of Science Teachers and How They Were Addressed

Themes	Participants' Responses
Theme 1: Student Engagement and Motivation	"Traditional lectures didn't work, so I shifted to videos, group work, and simple experiments. Slowly, the students became more involved. It taught me that engagement is key to classroom management…." (P1) "One challenge I often face is keeping my students motivated and disciplined in an age where gadgets and online distractions are constant." (P3) "Through playing videos they can manage to know how the lesson really works with application…." (P4) "One of the most challenging moments for me was when students weren't participating or responding. I asked them, "Do you not like how I teach?" I initiated an open forum and told them, "Even if I keep talking here, you won't learn anything unless we understand each other." I asked what was wrong—whether with my teaching or the lessons. Some admitted they hate science because it has too much to memorize… " (P9)
Theme 2: Classroom Management and Discipline	"...through playing videos they can manage to know how the lesson really works with application…." (P4) ".....The next challenging experience as a science teacher is when one of my male students say something bad about reproductive system, during my discussion he experienced sexual intercourse which irritated me a lot…" (P8)
Theme 3: Lack of Learning Resources	"There is no worst experience but a heart-breaking part for a teacher in science is when it comes to the lack of materials or not availability of materials…." (P2)

Theme 1: Student Engagement and Motivation

This theme highlights the strategies teachers use and the struggles they face in sustaining student interest and motivation, particularly in science where lessons can feel abstract and difficult. One participant shared, "Traditional lectures didn't work, so I shifted to videos, group work, and simple experiments. Slowly,

the students became more involved. It taught me that engagement is key to classroom management…" (P1). Another reflected on moments when students admitted that they disliked science because it had "too much to memorize," which pushed the teacher to initiate an open forum to better understand their perspectives (P9). These voices illustrate how student disengagement can be one of the most challenging aspects of science teaching, especially in today's context of digital distractions. Teachers found that shifting from lectures to interactive strategies, such as videos, group work, and experiments, helped foster participation and reduced passivity. Engagement was not only a matter of teaching style but also of building mutual understanding between teachers and learners.

This finding aligns with Fredricks, Blumenfeld, and Paris (2004) argue that fostering engagement requires strategies that address behavioral, emotional, and cognitive dimensions. Yet many teachers feel underprepared for this task, often due to limited training in interactive pedagogy. The implication is that teacher preparation programs and ongoing professional development must emphasize practical, student-centered strategies to sustain motivation and participation in science classrooms.

Theme 2: Classroom Management & Discipline

This theme emphasizes the complexities teachers face in maintaining discipline, particularly when classroom discussions touch on sensitive or culturally loaded topics. A participant shared, "The next challenging experience as a science teacher is when one of my male students said something bad about the reproductive system during my discussion… it irritated me a lot" (P8). This highlights how behavioral issues can emerge not only from general distractions but also from inappropriate or disruptive comments, especially when covering sensitive content. Classroom management, therefore, requires not only rules and consequences but also emotional resilience and the ability to address situations with cultural and developmental awareness.

Jones and Jones (2016) emphasize that clear expectations and proactive strategies help minimize behavioral issues, while Weinstein, Tomlinson-Clarke, and Curran (2004) note the importance of culturally responsive management. These approaches suggest that effective classroom discipline goes beyond punishment—it relies on respect, cultural awareness, and relational strategies. The implication is that teacher training should equip educators with culturally responsive and proactive classroom management strategies, especially when teaching sensitive science topics.

Theme 3: Lack of Learning Resources

This theme reflects how inadequate access to instructional materials limits the effectiveness of science teaching and learning. One participant shared "There is no worst experience but a heart-breaking part for a teacher in science is when it comes to the lack of materials or not availability of materials…" (P2). Such limitations restrict opportunities for hands-on, inquiry-based instruction, which is central to science education. Without proper tools, teachers are often forced to adapt using makeshift or theoretical alternatives, which can weaken student engagement and the depth of learning.

Similar to the findings of The National Research Council (1996) stresses that inquiry-based science learning requires sufficient materials to support exploration and experimentation, while UNESCO (2015) highlights how underfunded educational environments hinder STEM teaching. Thus, resource scarcity undermines not only teachers' instructional goals but also students' opportunities to experience science authentically. The implication is that equitable allocation of science resources is critical to ensuring meaningful and inquiry-driven learning experiences for all students.

D. Recommendation for Future Science Teachers

This part focuses on the insights and advice shared by the participants for future science educators. To better understand how science can be made more engaging, the participants were asked: 1) How can future teachers make Science more exciting and relatable to student? suggest examples of real-life applications they could use; 2) What qualities do you think are most important for a Science teacher to have and how can they develop these qualities; and 3) What advice would you give to aspiring Science teachers?

Question 1: How can future teachers make Science more exciting and relatable to students? Can you suggest examples of real-life applications they could use?

The themes generated from responses of participants in the interview question, "*How can future teachers make Science more exciting and relatable to students? Can you suggest examples of real-life applications they could use?"* One main themes emerge as follows;

Table 10. Thematic Analysis of Strategies to Make Science More Engaging and Relatable for Students

Themes	Participants' Responses
Theme 1: Contextual Learning through Real-life connection	"We really need to creative, especially for kids. The topics should be connected to their everyday life. For example, matter. Everything around us is a type of matter. We need to help them appreciate the importance of science." (P2) "Make it more fun, more hands-on activities for

	learners to be involved in their life long learning. It is because when they have an experience in a certain topics or lessons, they can look for other strategies and approaches. don't just focus on traditional method, because they are aware how complex science is. (P4) "So for me to make the lessons, the class more exciting more on activities, and the same time the activities should be relatable to the possible encounters of the learners in their everyday life" (P6) "future teachers can make science exciting by linking lesson to real-life and using hands-on activities. Like, digestion explained through eating habits. Chemical reactions using baking soda and vinegar. force and motion through playground games. Whether patters tied to local climate. waste segregation based on community practices." (P7) "For future teachers in science, we should make our everyday discussion more exciting and relatable though giving examples related to the lesson and the daily life of the learners. (P8) "Bring them in real-world the lessons apply it, like you make an example or let them tell a story that regarding to their experiences." (P9)

Theme 1: Contextual Learning through Real-life connection

This theme means that when it comes to teaching science you as a teacher need to connect your lessons, discussion in the real-life situation or scenarios in a way that most of the learners learned by experiencing things and accordingly learning by doing is very crucial to the learners. One of tge participants stated that "For future teachers in science, we should make our everyday discussion more exciting and relatable though giving examples related to the lesson and the daily life of the learners. (P8). Participants mostly suggest that when it comes to teaching science, the teacher need to relate it or apply it in the real-world scenarios because knowing science is a hard subject and hard to understand because of the terms.

A study of Ganira and Odundo (2023) presents a systematic review of how experiential learning models (ELM) are applied in implementing the pre-primary school social studies curriculum. ELM is described as a four-stages cycle, concrete experience, reflective observation, abstract conceptualization, and active experimentation. This model encourages learners to gain knowledge, skills, and values through direct, hand-on experiences. These experiences are then reflected upon and converted into conceptual understandings, which are tested and lead to new learning experiences. the study highlights how ELM supports a wide range of learning, from theoretical understanding to practical application (learning by doing) and emphasizes the importance of aligning learning styles with the ELM stages to enhance effective teaching and learning in early childhood education.

Question 2: What qualities do you think are most important for a science teacher to have? How can they develop these qualities?

The themes generated from responses of participants in the interview question, "*What qualities do you think are most important for a science teacher to have? How can they develop these qualities?"* Three main themes emerge as follows;

Table 11. Thematic Analysis of Essential Qualities of Science Teachers and Ways to Develop Them

Themes	Participants' Responses
Theme 1: Compassion, Passion, and Student Connection	"Creativity, adaptability, and basic technology skills are very important. But most of all, compassion. When students feel you care, they lean better. Teaching is not just about the subject it's about connection." (P1) "Qualities? I would say definitely passion and effort, because is already difficult, what more if the teacher does not put in any effort and has no passion or real intention to make the lesson understandable for the students? It would really be hard, not just for the teacher but also for the students." (P4) "For me, you really have to be engaging. You have to be… let's just say…yes, in general, you have to be patient. You need to build a connection." (P9)
Theme 2: Content Mastery and Preparedness	"Teacher should be an expert in the topic they are teaching to effectively guide students and prepared all the time." (P5)
Theme 3: Curiosity, creativity and adaptability	"…as science teachers, we really need to be explorative. Someone who loves to explore. Because in our field, it is hard to just imagine things. So, we need to learn and master how to explore." (P6) "A good science teacher should be curious, patient creative, and clear in explaining concepts. They should also be safety-conscious and adaptable. To develop these qualities, they can stay updated through reading, attend trainings, practice hands-on teaching, reflect on their lessons, and learn form experienced mentors." (P7) "I think the qualities that most important for a science teacher is to be always updated on the trending regarding science technology, always open minded to the responses of your learners during discussions and resourceful in making instructional materials." (P8)

Theme 1: Compassion, Passion, and Student Connection

This theme emphasizes that effective science teaching is not only about mastering content but also

about building strong relationships with students and maintaining passion for the profession. One participant shared, "Creativity, adaptability, and basic technology skills are very important. But most of all, compassion. When students feel you care, they learn better. Teaching is not just about the subject—it's about connection" (P1). Others echoed that passion and genuine effort are essential to make science lessons engaging and meaningful. These reflections suggest that compassion allows teachers to be patient and responsive to learners' needs, while passion ensures lessons are delivered with energy and commitment. Building such connections creates a safe and motivating learning environment where students feel valued.

This finding aligns with Ampofo et al. (2025) found that teachers who address students' emotional needs foster classrooms where learners feel supported and encouraged to participate actively. This shows that teaching is both an intellectual and emotional practice. The implication is that teacher preparation and professional development should highlight not only instructional strategies but also the socio-emotional aspects of teaching, as these are vital in making science education meaningful and student-centered.

Theme 2: Content Mastery and Preparedness

This theme highlights the importance of teachers having both a strong grasp of the subject matter and consistent preparedness in their teaching. One participant stressed, "Teacher should be an expert in the topic they are teaching to effectively guide students and prepared all the time" (P5). The responses suggest that mastery of content ensures lessons are accurate and trustworthy, while preparedness reflects a teacher's commitment to planning and organizing lessons that align with students' needs. These qualities not only boost teacher confidence but also make students more likely to trust and engage with classroom instruction.

This finding aligns with Baniqued and Bautista (2024) similarly found that gaps in both content knowledge and pedagogical readiness impair science teachers' instructional effectiveness. This reinforces the importance of content expertise paired with thorough preparation. The implication is that strengthening both content mastery and lesson preparedness can significantly improve teachers' ability to deliver accurate, engaging, and meaningful science lessons.

Theme 3: Curiosity, Creativity and Adaptability

This theme reflects the importance of being explorative, resourceful, and open to new ideas in science teaching. One participant explained, "…as science teachers, we really need to be explorative. Someone who loves to explore. Because in our field, it is hard to just imagine things. So, we need to learn and master how to explore" (P6). Others emphasized curiosity, creativity, and adaptability as qualities that help teachers respond to challenges and keep lessons engaging. The insights reveal that teachers who embody curiosity continuously seek knowledge, creativity allows them to design engaging materials, and adaptability equips them to handle unexpected challenges such as diverse student needs or lack of resources. These qualities not only enrich instruction but also model the spirit of scientific inquiry for students.

This finding aligns with Bybee (2010) stresses that inquiry-based teaching deepens students' understanding of science, while the National Research Council (2000) notes that hands-on and minds-on activities make learning more meaningful when guided by creative teachers. The implication is that when science teachers embrace curiosity, creativity, and adaptability, they not only model scientific thinking but also cultivate interactive learning environments that inspire students to explore and think critically.

Question 3: What advice would you give to aspiring Science teachers?

The themes generated from responses of participants in the interview question, "*What advice would you give to aspiring Science teachers?"* Three main themes emerge as follows;

Table 12. Thematic Analysis of Advice for Aspiring Science Teachers

Themes	Participants' Responses
Theme 1: Patience, flexibility, and Student-centered Teaching	"Be patient and flexible. Things won't always go as planned…Make learning relevant and fun." (P1) "Make everything relatable to the students." (P4) "Use real-life examples and hands-on activities to spark interest…Always be ready to adapt." (P7) "Always be patient with your learners." (P8) *"Build a connection with your students and of course, you really have to extend your patience." (P9)*
Theme 2: Resourcefulness, time investment, and lifelong learning	"Always keep learning science. It is always evolving." (P1) "You should be creative enough, flexible, and have lots of time…Science terms need to be simplified for learners." (P2)

	"Never stop learning." (P7)
Theme 3. Passion and Purpose in Teaching Science	"You have to be really in teaching. If it's not your passion now, then make it your passion…children need a strong foundation in science." (P5) "You have to love science…so that you'll also come to love the path you're headed for." (P6) "A passionate, prepared teacher makes all the difference." (P7) "Love what you teach and build connection to your students." (P9)

Theme 1: Patience, flexibility, and Student-centered Teaching

This theme highlights the importance of teachers demonstrating patience, adapting their methods, and placing learners at the center of instruction. Participants repeatedly stressed the need for patience and flexibility, as expressed bt participants 1 "Be patient and flexible. Things won't always go as planned… Make learning relevant and fun." Similarly, Other participants emphasized the need to make everything relatable to the students and the importance of building connections and extending patience.

These reflections suggest that student-centered strategies require teachers to be emotionally competent and willing to adjust their approaches based on learners' needs. This aligns with Tomlinson (2014) emphasizes differentiated instruction as a way to address diverse learners, while Jennings and Greenberg (2009) stress that teachers' emotional competence directly influences effective teaching. The implication is that patience, flexibility, and student-centered methods are not only essential for classroom management but also for creating an inclusive and supportive environment that nurtures meaningful learning.

Theme 2: Resourcefulness, time investment, and lifelong learning

This theme underscores the necessity for teachers to be resourceful, dedicate time, and embrace continuous professional growth. Participants noted the challenges of simplifying complex science concepts and adapting to limited resources, with P2 stating: "You should be creative enough, flexible, and have lots of time… Science terms need to be simplified for learners." Other participants emphasized the importance of lifelong learning by reminding, "Always keep learning science. It is always evolving" and "Never stop learning."

The responses show that effective science teaching requires both pedagogical innovation and a commitment to ongoing development. This aligns with Hoban (2002) points out that science teaching is uniquely demanding due to its abstract and evolving nature, while Lederman (2007) highlights the importance of pedagogical knowledge and continuous professional learning. The implication is that resourcefulness and lifelong learning empower teachers to navigate constraints while staying updated with scientific advances, ensuring students receive relevant and high-quality instruction.

Theme 3. Passion and Purpose in Teaching Science

This theme highlights the essential role of passion and purpose in motivating teachers and influencing their effectiveness. One participant explained, "You have to be really in teaching. If it's not your passion now, then make it your passion… children need a strong foundation in science" (P5). This response underscores how passion helps teachers overcome challenges and motivates them to provide quality instruction. It suggests that when educators are deeply invested in their profession, they inspire students to also value learning and remain engaged in science education.

This finding aligns with Day (2004) emphasized that passionate teachers display stronger commitment and resilience, while Friedrichsen et al. (2007) argued that passion influences how science concepts are delivered and appreciated by learners. These findings parallel the present study's results, reinforcing the idea that intrinsic motivation fuels effective teaching practices. The implication is that nurturing passion in teaching science is not only vital for teacher resilience but also instrumental in enhancing student outcomes and long-term interest in the subject.

A significant majority, 8 out of 10 teachers attributed their decision to teach science to personal passion or the influence of mentors and training, emphasizing the transformative impact of inspiring role models and professional development. This supports Kelchterman (2005) assertion that meaningful relationships and reflective experiences shape the professional identity of teachers, as well as Mezirow (2000) theory of transformative learning where critical reflection can redirect professional goals. In terns of pedagogy, 7 out of 10 teachers embraced learner-centered and inquiry-based strategies, aligning with Bybee (2010) 5E instructional model that emphasizes engagement, exploring, and student curiosity as cornerstones of science learning. Teachers also demonstrated responsiveness to the diverse needs of the learners by using differentiated instruction and incorporating mother tongue-based strategies.

Despite their dedication, 9 out of 10 respondents reported insufficient teaching resources and limited laboratory access, which forced them to use low-cost, localized materials or digital simulations-a common coping strategy in resource-challenged UNESCO (2015). Moreover, teachers described using technology such as interactive presentations to make abstract concepts more engaging and comprehensible. The integration of real-life

applications, multilingual instruction, and culturally relevant content also emerged as effective tools in maintaining student interest and bridging learning gaps (Gay, 2010).

In sum, the study highlights how teachers in under-resourced navigate systemic challenges through passion, innovation, and a strong learner focus, reinforcing the need for sustained institutional support, professional growth opportunities, and context awareness.

V. CONCLUSION AND RECOMMENDATIONS

Conclusion

This study explores the experiences of ten elementary science teachers in Marawi City, Philippines. It shows how their work lives are affected by their personal lives and the challenges of their jobs in a difficult place. The study shows that teachers came to their jobs for different reasons: some were inspired by others, some loved science, and others needed the work. This variety shows we need better ways to find and help teachers.

Even without many resources and problems from the past, the teachers worked hard to help each student learn. They used different teaching methods that worked for every kind of student, and they made sure science lessons were connected to students' lives and their different languages. The teachers showed they are creative and dedicated.

The study also shows the teachers' challenges such as not enough supplies, poor science labs, classroom problems, and problems with different languages. To solve these, we need to give them more money, better training, and more support. The teachers talked about good experiences, too, like students doing well in class, fun lessons, and close relationships with students. These show how rewarding, but also difficult, their job is. The study shows how strong and creative these teachers are and shows that we need to make big changes to help all students get a good science education in Marawi City and places like it.

Recommendations

This study may be beneficial to the following stakeholders involved in strengthening Science instruction at the elementary level, particularly in the context of both public and private schools in Marawi City. The Department of Education (DepEd) when developing and implementing programs to support elementary Science teachers, particularly those operating in areas with low resources, may take the study's findings into consideration. This can entail offering classroom assistance, educational resources, and teacher training that is more relevant and hands-on. School heads and administrators of elementary schools may use the results of the study to assess the specific needs of their Science teachers and identify areas for improvement. They may initiate capacity-building programs such as mentoring, in-service training, and collaborative lesson planning. Local Government Units (LGUs) and community stakeholders may be guided by the study in creating educational initiatives that directly support Science teaching in elementary schools, such as donating materials, organizing community-based Science activities, or providing incentives for teacher development. School principals and coordinators may also use the insights from this study to improve instructional supervision and provide tailored support to science teachers, which may involve closer monitoring, provision of relevant teaching tools, or scheduling regular coaching sessions. Elementary Science teachers themselves may reflect on their own teaching experiences in light of the study's findings, exploring new approaches, collaborating with fellow teachers, or making use of available resources to overcome instructional challenges and better engage their students. The study's results may likewise be considered by curriculum planners and learning resource developers in the development or revision of Science curricula and learning materials that are responsive to the needs and realities of elementary teachers, ensuring that content is appropriate and achievable in both public and private school settings. Finally, this study may serve as a foundation for future research focusing on elementary Science education and may encourage further studies that explore practical, teacher-centered solutions for effective Science teaching.

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