Journal of Education, Learning, and Management (JELM)

ISSN: 3079-2541 (Online)

Volume 2 Issue 1, (2025)

https://doi.org/10.69739/jelm.v2i1.678

https://journals.stecab.com/jelm

Published by
Stecab Publishing

Research Article

Lived Experiences of Untrained-Beginning Multi-Grade Teachers in Teaching Science in Remote Schools in Burauen Leyte, Philippines

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About Article

Article History

Submission: May 19, 2025
Acceptance : June 23, 2025
Publication : June 30, 2025

Keywords

Challenges, Lived Experiences, Multi-Grade Classroom, Teaching Strategies

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ABSTRACT

This study explored the lived experiences of multi-grade teachers in teaching science, focusing on challenges, strategies, and sources of fulfilment in their professional journeys. Using a Husserlian phenomenological approach, this research gathered insight from teachers through in-depth interviews. Data were collected in the fourth quarter of the school year 2024-2025 through semi-structured, audio-recorded face-to-face interviews with 10 multi-grade teachers teaching science. Findings highlighted that while multi-grade science teaching is marked by significant challenges such as time constraints, diverse learners' need, lack of specialized training, and limited resources, multi-grade teachers remain resourceful, resilient, and deeply committed. Teachers employ hands-on activities, adaptive strategies, and differentiated instruction to ensure inclusive science education and maintain learner learning engagement. Despite of the professional and emotional demands, multi-grade teachers find fulfillment and joy in witnessing their learners' growth. The research concludes that multi-grade teachers play dynamic roles as mentors, community builders, and facilitators, underscoring the need for specialized training, policy recognition, and targeted support. It recommends context-based instructional support, professional development, and further research of localized strategies to enhance multi-grade science education.

Citation Style:

Posion, D. P. (2025). Lived Experiences of Untrained-Beginning Multi-Grade Teachers in Teaching Science in Remote Schools in Burauen Leyte, Philippines. *Journal of Education, Learning, and Management, 2*(1), 256-268. https://doi.org/10.69739/jelm.v2i1.678

1. INTRODUCTION

Multi-grade education is an instructional approach in multi-grade classrooms involving a single teacher teaching multiple grade levels simultaneously (Dy *et al.*, 2024). It supports universal and quality and universal access to education based on the Republic Act 9155 of 2001 (Brecio, 2023). Effective implementation requires classroom management and careful planning (Gray, 2023). Multi-grade teachers must adopt flexible teaching strategies addressing learners of different grade levels, abilities, and learning needs (Naparan & Alinsug, 2021), however, many face constraints limited resources, time, and diverse learning needs (Bajpai & Pandey, 2023), specifically beginning teachers who lack of formal or specialized training in teaching science.

On a global perspective, different countries such as South Africa, Turkey and Namibia have stressed the importance of implementation of multi-grade on activities in teaching to enhance the learners understanding and foster significant positive perspective on learning (Siririka, 2018; Kartal & Demir, 2022; Thobi, 2022; Yilmaz, 2024;). On the other hand, challenges and obstacles remain in implementing science activities efficiently and effectively (Krause, 2019; Raymundo, 2023). Multi-grade teachers face numerous difficulties and challenges in teaching inquiry-base science in multi-grade classrooms (Dantic *et al.*, 2023).

In the Philippines, multi-grade teachers teaching in far-flung barangays often work with limited teaching strategies due to lack of teaching resources, they tend to use their funds to provide needed learning resources for the implantation of their science lessons and activities that are perennial challenges in the Department of Education (de Borja *et al.*, 2020). In PISA 2022, the Philippines ranked 76th from the 81 participating countries in science literacy (Marcelo, 2025). Despites of the efforts of the Department of Education, challenges like limited parental involvement, lack of contextualized materials, and high dropout rates persist. In the school year 2022-2023, 5,884 out of 383, 515 or 1.53% learners dropped out (Amazona, 2023), and science achievement in Burauen East District only reached a classification of close mastery MPS with 87.87 (DepEd Region VIII, 2024). Most multi-grade teachers are lack of professional development (Donna & Roehrig, 2024). The study in the Philippines explores the challenges faced by multi-grade science teachers in far-flung areas, where limited resources, time, and appropriate teaching strategies obstruct the teaching strategies and methods in teaching science (Maffea, 2020).

Upland schools in Burauen Leyte aimed to improve access and reduce dropout rates (Meniano, 2018). The effectiveness of multi-grade teaching depends on dedication, school leadership, parental trust, and adequate teaching resources (Inghug, 2020). Collaboration and professional development help improve teaching strategies (Billingsley *et al.*, 2020; Abu, 2021).

Despite challenges and obstacles, multi-grade teachers remain resilient, using peer teaching, inquiry-based learning, and cooperative learning (Babayigit *et al.*, 2022). External and internal support is needed for science teaching and instruction in these contexts (Bajpai *et al.*, 2023). Effective teaching strategies include collaborative classroom management (van Wyk, 2019), scaffolding, and differentiated instruction (Syahrul, 2019; Kamrani *et al.*, 2023). Moreover, contextualized strategies boost learner motivation and performance (Saro *et al.*, 2023). Yet, issues like learner interpretation and readiness of instructional strategies persist (Tullis & Goldstone, 2022).

Furthermore, teachers' teaching practices, classroom strategies, and competence impact science learning results and outcomes (Cooper & Fry, 2020; McDaniel *et al.*, 2024; Lopez, 2024). Moreover, specialized training influences teaching strategies and classroom management in science education (Taz & Minaz, 2021). Adapting to varied learning needs of learners through differentiated instruction and project-based teaching enhances learners' critical thinking and performance (Sitabkhan *et al.*, 2022; Xu *et al.*, 2023).

This research explored the lived experiences of multi-grade teachers in teaching science in remote schools in Burauen Leyte Philippines. It focuses on multi-grade teachers lived experiences, the challenges they encountered, and how they conquer these obstacles in teaching science. It aimed to provide insights and recommendations to contribute support systems, improve teaching strategies, and fill research gaps on beginning teachers experiences in science instruction in multi-grade classrooms.

1.1. Statement of the problem

This study explored the lived experiences of beginning multi-grade teachers in teaching science in public elementary schools in Burauen East District, Burauen, Leyte. Since multi-grade teachers encountered challenges in teaching, by examining the lived experiences of these teachers, this study can contribute to the teaching-learning disparities and potential gaps in teaching science. Moreover, this research provided valuable insights in developing better teaching strategies for the teachers in the same field.

Specifically, this research worked on the question.

i. What are the lived experiences of multi-grade teachers in teaching science?

ii. What are the challenges encountered by multi-grade teachers in teaching science?

iii. How do the multi-grade teachers conquer the challenges encountered in teaching science?

2. LITERATURE REVIEW

The related literatures in this research highlight the background of multi-grade education and the significant effect of science teaching strategies and methods, such as inquiry-based learning, peer teaching, and differentiated instruction, in enhancing learners' understanding and engagement in multi-grade classes. Specifically, the literatures emphasize the significance of collaborative and self-directed learning in classroom management to address the needs of multi-grade learners. Furthermore, it recognizes the need for professional development support to improve science teaching strategies in multi-grade classrooms. Moreover, exploring the lived experiences of multi-grade teachers highlights the benefits of science teaching both in the Philippines and worldwide. Teaching strategies are important in developing learners' engagement and understanding of scientific concepts. For multi-grade teachers, these insights offer good opportunities to integrate

lessons to multi-grade learners in improving educational outcomes. By focusing on the lived experiences of multi-grade teachers teaching science in multi-grade classrooms, this study uncovered the valuable insights that suggested strategies to improve science teaching, address encountered challenges in teaching, and bridge the science teaching disparities and gaps in a multi-grade setting.

2.1. Multi-grade education: global and local context

Multi-grade classrooms were established because of the demands and needs of places with small populations for educational purposes. Multi-grade classes, with at least two grade levels combined in one classroom by one teacher (UNESCO, 2020). Multi-grade classrooms are typical in remote areas with low enrollment status, implemented to offer quality education through differentiated instruction tailored to learners' interests and needs. However, this approach supports varied learning styles, many multi-grade teachers lack confidence in managing classrooms despite of the increasing relevance in the contemporary educational landscape (Agbisiti, 2024).

In the Philippines, multi-grade teachers teaching in far-flung barangays often work with limited teaching strategies due to a lack of teaching resources; they tend to use their own funds to provide needed learning resources for the implementation of their science lessons and activities, which are perennial challenges in the Department of Education (SAMEO INNOTECH, 2023). These issues and challenges persist despite interventions form DepEd, highlighting the need for both external and internal support (Leyte Samar Daily News, 2018; Equitable Education Fund, 2023).

2.2. Science teaching in multi-grade classrooms

Multi-grade classroos require adaptive and flexible approaches in teaching science to cater learners at different grade levels and different developmental stages. Researches mentioned the importance of employing varied strategies in teaching such as differentiated instruction, peer teaching and inquiry-based learning to foster engagement and scaffold learners' understanding (Petersen, 2022; Guanzon, 2024).

2.2.1. Inquiry-based learning

Inquiry-based learning encourages learners to investigate, question, and explore scientific phenomena, promting critical thinking and deep learning. Inquiry-based learning has proven effective in both advance and early science education (Bansal & Ramnarain, 2023; Safkolam *et al.*, 2024). Despite of its effectiveness, its implementation can be challenging. Teachers and educators often revert to perennial teaching methods and strategies due to learners' lack of readiness and instutitional support (Kamath & White, 2023).

2.2.2. Contextualized and differentiated instruction

Contextualized and localized teaching strategies increase learners understanding and motivation (Dioneda, 2019). Moreover, differentiated instruction enables the teachers to tailor process, content, and outcomes based learning on learners' learning profiles, interest, and readiness, proving effective in teaching multi-grade classes (Shareefa, 2021).

2.2.3. Peer and self-directed teaching

Peer teaching complements science teaching by encouraging collaborative learning, enhancing both social development and academic performance (McMahon, 2024; Baltzersen, 2024). In addition, self-directed learning fosters autonomy by allowing learners to take accountability and responsibility for their own learning experiences and journey (Bailey *et al.*, 2021; Gerard *et al.*, 2021).

2.3. Classroom management and learning environment

Effective classroom management is essential in multi-grade teaching due to the difficulties of handling varied learning levels simultaneously. Classroom setting, both teacher-learner dynamics and physical set-up significantly impacts instructional effectiveness and learner engagement (Slifko, 2022; AnneCa, 2024). Teachers need to be adept at organizing physical space, materials, and time to maximize learning and maintain classroom order. Peer tutoring, collaborative learning, and group work have been shown to enhance learners' engagement, confidence, and accuracy that help to maintain positive learning environment (Mortazavizadeh *et al.*, 2017; Fisher & Frey, 2023). However, these teaching strategies require thoughtful support and implementation.

2.4. Professional development and systemic challenges

The lack of institutional support and professional development for multi-grade teachers in teaching science brought challenges and obstacles, including administrative burdens, inadequate training, and lack of instructional materials (Teixera, 2023; Lowell & Lowenhaupt, 2024). The teachers also encountered contextual issues such as dialect diversity, isolation, and absenteeism, which hinder teaching. (Tayoni & Abocejo, 2023). Despite these challenges, teaches express a need for continuous professional development and employ innovative strategies (CPD Certification Service, 2024). On the other hand, studies reveal a gap between the support provided by educational systems and teachers' instructional needs (Dorsah *et al.*, 2024; Reyes & Cheng, 2024).

2.5. Teacher insights and instructional decision-making

The insights of teachers play an essential role in shaping science teaching strategies. Studies reveal that teachers struggle with selecting appropriate teaching strategies and have limited understanding of science education (Chuene & Singh, 2024; Yildiz, 2024). Teachers' collaboration between other disciplines and science enhances pedagogical decision-making and fosters professional development. Moreover, teacher who ate well supported and reflective are better equipped to overcome teaching challenges and tailor strategies to meet diverse learning needs, thereby improving academic outcomes and engagement.

3. METHODOLOGY

3.1. Research design

This research employed descriptive phenomenological research design that explored the lived experiences of multi-grade science teachers in teaching science. Husserlian descriptive phenomenology was well-suited for the research as it focuses

on capturing the core of the multi-grade teachers lived experiences as it facilitates the identification of common themes and understanding the multi-grade teachers experiences and the importance of multi-grade science teaching (Cudjoe, 2023). Grounded in the Husserlian phenomenology, the research design was significant in capturing and exploring the multi-grade teachers' experiences as they faced with the obstacles and challenges of teaching science in a multi-grade classroom (Shorey & Ng, 2022). Through this design, the study sought to understand how multi-grade teachers makes sense and perceive of their roles, challenges, and strategies in teaching science to multi-grade learners. science, focusing on their strategies and challenges that enhance and shape their teaching strategies.

3.2. Sampling procedure

The researcher employed purposive sampling to all identified multi-grade teachers who meet the predefined criteria to ensure the qualification of the participants ensuring rich and diverse insights through semi-structured interviews and the data saturation was reached.

3.3. Participants of the study

Ten multi-grade teachers from the seventeen multi-grade teachers from the Burauen East District in the Leyte of Division who met the predefined criteria with 0-3 years of experience and who are teaching multi-grade science in Grades 3-6, and no specialized training received, were purposively selected to the districts high concentration of rural schools with multi-grade schools, making ideal setting for exploring the lived experiences of beginning multi-grade teachers in science teaching, consistent with the phenomenological research standards recommending 5-25 participants (Creswell, 2013; Hennik & Kaiser, 2022).

3.4. Data collection

Data were collected during the fourth quarter of the school year 2024-2025 through expert-validated in-depth semi-structured audio-recorded face-to-face interviews with multi-grade teachers who are teaching science, interviews were scheduled considering the availability of participants. The transcription of the responses was completed within 48 hours that ensured data preservation accuracy while fresh in the memory and for timely analysis of emerging themes.

3.5. Data analysis

Data were analyzed through Collaizi's phenomenological analysis and thematic analysis with descriptive coding to rigorously present and interpret the lived experiences of multi-grade teachers in teaching science through rich validated themes based on the perspective of the participants.

3.6. Ethical considerations

The researcher acknowledged ethical considerations to ensure the confidentiality of the participant's personal information and provided data. Through informed consent provided for the respondents, it provided details regarding the purpose of the study, research procedure, benefits, and risks of participating in the data collection, and the rights of the participants with regards to data protection and confidentiality. The respondents who signed the consent form were provided with additional details regarding the interview process and procedure.

4. RESULTS AND DISCUSSION

4.1. Lived experiences of multi-grade teachers in teaching science

When the participants were asked how they described teaching science to multi-grade learners, the lived experiences of the multi-grade teacher revealed that teaching science in a multi-grade classroom requires effective engagement and differentiation strategies to cater to the diversified learning needs of the learners in multi-grade classes.

Teaching science to multi-grade learners presents unique opportunities for differentiation and engagement. Multiple multi-grade teachers highlighted the importance of tailoring teaching strategies to the varied developmental needs of learners in multi-grade classrooms.

4.1.1. Fulfillment and joy in teaching science

It is evident that despite the struggles and challenges of teaching science to multi-grade classes, the experience brought fulfillment and joy for multi-grade teachers. Teachers expressed a sense of accomplishment and emotional satisfaction from seeing their learners progress in understanding and appreciating science concepts. The multi-grade teachers reflect the hidden joy and fulfilment of multi-grade science teaching, revealing unexpected emotional rewards in overcoming the struggles in multi-grade teaching. One teacher stated,

It is fulfilling na makita nimo na naka share ka ha era hin damo nga knowledge parte science ngan hin nahitutdo mo ha era hin effective ngan nkag share ka era ngan nakikit an mo hira nga nahibaro hira han imo igin tutdo. (It is fulfilling to see that you were able to share a lot of knowledge about science with them, that you taught them effectively, and that you can see they have learned from what you taught.) (P2)

Despite initial challenges in teaching science to multi-grade classes, the multi-grade teachers still show commitment to continuous learning.

According to another teacher,

I'm satisfied but I think I need to learn more. I think I have to study, diba mayda naton baga kuan, in teaching nga "Teaching is a lifelong process" so I think I need to learn more so that I can give more to my pupils, especially in teaching science. (P4)

and one added,

My experience so far in teaching learners in a multigrade classroom is now more about enjoying and being in the moment while teaching learners in a multigrade classroom. (P7)

These experiences reveal the fulfillment and joy of multi-grade teachers in teaching science to multi-grade learners, not only does it challenge them to grow, teaching science also presents them with emotional rewards as they witness their learners engage to learning science. Despite the struggles and challenges, teaching brings fulfillment as teachers see learners learn, linking teacher satisfaction to learners' meaningful engagement and progress (Toropova *et al.*, 2020). Moreover, emotional rewards such as fulfilment have a positive impact on teachers' experience when engaging the learner's progress,

similar to the hidden rewards that multi-grade teachers in teaching science (Gualatee *et al*., 2021; Xu *et al*, 2023).

4.1.2. The reality of teaching multi-grade science

Teaching science in a multi-grade setting highlights the stark contrast between the teachers' idealized views of science teaching and the complex realities they encountered in multi-grade classrooms. Teachers revealed instructional and emotional troubles that emerged as they explored the demanding context of multi-grade instruction.

Teachers entered the teaching profession with a high sense of hope and inspiration to help children, but they found it more difficult than expected, particularly multi-grade science teaching.

Love ko talaga it pagtutdo pero sering paman baga makurihay ngayan it teaching labi na ha multi-grade ngan science subject. (I truly love teaching, but as they say, teaching is challenging, especially in multi-grade settings and in science subjects.) (P8)

Similarly, one participant recounted,

I thought that was easy and I imagine myself doing that and I thought it is not so stressful but as I experience it right know it is so very stressful. (P1)

However, the reality turned out to be more complex and demanding as it magnifies the struggles in instructional and planning context as multi-grade teachers confessed.

Stressful pagplano pala hin activities stressful talaga hiya masisiring nim danay sana mas masayon la ini kuno mono grade la it akon gin handle. I always thought that teaching is easy but it is not. (Planning activities alone is already stressful, it really is. Sometimes, you can't help but say, if only I were handling mono-grade class, this would be easier. I always thought that teaching was easy, but it is not.) (P2)

Also, na-discover ko nga makuri talaga it multi-grade teaching labi na science na subject, deri la harumamay ngayan maging teacher kay kuno nagtututdo la. (I also discovered that multi-grade teaching, especially in science, is truly challenging. Being a teacher is not as easy as some people think, it's not just about teaching.) (P7)

Another participant emphasized the need for professional and systemic support in multi-grade science teaching, suggesting,

Kahuna ko man adto masayon la pagiging teacher. I think dire la ak sure pero siguro ha BEED mayda iton hiya topic about multigrade so sana gihapon it DepEd mag seminars teaching multi grade na deri it hiya sugad kadamo it participants para baga ba hin tunga-tungaon ini na participants in order for the new multigrade teachers to better have a great of what really is multigrade teaching specially in science." (I used to think that being a teacher was easy. I'm not entirely sure, but maybe the BEED program includes a topic about multi-grade teaching. I hope that DepEd would conduct more seminars specially focused on teaching in a multi-grade setup, with fewer participants per session so the learning can be more focused.) (P4)

According to one teacher, despite of the complexities there was a collective purpose to keep every learner engage, multi-grade teachers should just make sure that no learner is left behind.

The multi-grade teaching is a great challenge since you really have to handle 2 classes and in that classes you to make sure that they learn something from you and in your lesson. You must ensure also that nobody is left behind." (P9)

The lack of science facilities and technology makes it harder to conduct experiments and provide interactive learning experiences. To deal with this, I use low-cost or improvised materials, integrate outdoor activities, and encourage creativity and observation. I also maximize available resources and focus on developing critical thinking through discussion and exploration. (P10)

These complexities in multi-grade science teaching underscore the need for resource allocation and stronger support systems to navigate the multiple demands of multi-grade science teaching. These reflections are a clear gap between the complex realities and idealistic expectations of teachers teaching science in a multi-grade classroom. There is a clear need for specialized training on both emotional and instructional challenges that multi-grade teachers encountered to better prepare them for the demand of teaching profession. Moreover, the quality of multi-grade education depends on the professional attitude and skills of the teachers (Magpatoc, 2021; Autor, 2024). In addition, multi-grade teaching requires not only specialized and adequate resources, but also support systems that enhance the initiatives and adaptability of the teachers (Msimanga, 2019).

4.1.3. Passion for multi-grade science teaching

The passion for teaching science in multi-grade classrooms lies in its value, where multi-grade teacher's emotional resilience, flexibility, and dedication in despite the challenges of multi-grade science teaching. Moreover, the lived experiences of multi-grade teachers affirm that their role goes beyond instruction, wherein, it embodies a sacred passion in overcoming the overwhelming challenges of multi-grade science teaching and nurturing both minds and futures of the learners.

Participants expressed that navigating the struggles and complexities of teaching science to multi-grade learners is demanding and overwhelming, where passion for teaching is essential in overcoming the challenges of multi-grade science teaching. As teachers shared,

The experience is overwhelming because monograde teaching is so different from multi-grade teaching. (P1)

I experience a lot of scenarios, for example how I will be going to manage two different classes, to apply classroom management at the same time, what approaches I will need to use inside the classroom. Strategies which to apply, so that both classes maka focus haim topic ha science. (I experience a lot of scenarios, for example how I will be going to manage two different classes, to apply classroom management at the same time, what approaches I will need to use inside the classroom. Strategies should be applied so that both classes can focus on the science topic.) (P5)

Despite of the challenges, the teachers find deep sense of purpose that enhances and fuels their perseverance and love for teaching science. For some, this vocation started early,

Gusto ko la gud mag tutdo hin science, mag share ngan mahilig man gud ak hin bata, tak mga ka umangkunan so passion ko na talaga mag tutdo ngan maging teacher. (I genuinely want to teach science and share what I know. I also really love being around children maybe because of my younger nieces and nephews, so teachin has truly become my passion.) (P3)

Even multi-grade teachers who initially lack of aspiration to teach eventually recognized teaching as passion or vocation,

At first, waray talaga iton hiya ha akon ha heart an pagtutdo labi na it science."(At first, teaching, especially science, was not really in my hearts). (P7)

Other felt chosen by the profession and embraced it, especially as a way to teach science,

Actually, I did not choose teaching maybe teaching choose me, gin pili ako han teaching, this is me. Kay before, I think this is my 5th, what do you call this course taken in college or program taken in college, so I think teaching an pumili ha akon. (Actually, I did not choose teaching, maybe teaching chose me. It's like teaching picked me, and this is who I am now. Before this, I think this is already my fifth course or college program. That is why I believe it was teaching that chose me.) (P4)

This illuminates how teaching science in multi-grade context demands more than skill, it requires patience, purpose, and heart. Moreover, recognizing multi-grade science teaching as passion can shape teacher preparation and educational policy by fostering environments that affirm, equip, and support teachers in their critical role of shaping and nurturing the learners (Thephavongsa, 2018; Martinez, *et al.*, 2021; Culduz, 2023).

4.2. Challenges encountered by multi-grade teachers in teaching science

When multi-grade teachers describe their experiences in teaching multi-grade science, they reveal significant challenges. These are essential to addressing the varying levels of understanding among learners and diverse learning needs in multi-grade classrooms, making teaching science more complex and demanding. Teaching science in multi-grade classes introduces notable challenges, including time constraints, a lack of science teaching materials, and managing the classroom.

4.2.1. Time constraints in multi-grade science teaching

Multi-grade teachers also encountered difficulties in time management. With multiple tasks and multi-grade learners to address, it was challenging to allocate time to each learner's needs.

Teaching science in multi-grade classrooms captures the core challenges of multi-grade teachers in effectively managing limited instructional time while ensuring the quality of science education. Teachers express that the time allotment for science instruction is insufficient, leading to teachers extending lessons to ensure learners' learning.

Actually 40 minutes is not enough, we are given 40 minutes, it is not for a lesson in science, because bitin talaga hya sir nga time. An akon tun ginhihimo wherein discretion of a teacher, gineextend ko etun hya nga time and I think it's not bad because we are after on the learning of the pupils. (Actually, 40 minutes is not enough. We are given 40 minutes, but it is not sufficient for a science lesson because the time really feels lacking, sir. What I usually do, under the teacher's discretion is extend that time, and I think it is not a bad thing, because what matters most is the learning of the pupils.) (P1).

Another multi-grade teacher echoed stating,

with multi-grade learners, it can be difficult to allocate time to each group. (P10)

The challenge become more complex in multi-grade classrooms where the multi-grade teachers divide their instructional time and attention among multi-grade learners.

"Balancing the attention and time needed for my multi-grade learners and ensuring that understanding of my lesson is difficult." (P3)

Time constraints are a challenge for multi-grade teachers, as the needs of the multi-grade learners were addressed. Balancing various groups and tasks makes it difficult to allocate sufficient time for each of the learners (Dacoylo *et al.*, 2024). There is a need for time-efficient training to prevent compromised science teaching and learning in multi-grade classes (Naparan & Castañada, 2021).

4.2.2. Lack of science teaching materials

Lack of science materials, such as technology and science equipment, are a significant challenge for multi-grade teachers. The inadequacy of materials makes it difficult to effectively deliver science teaching to learners in multi-grade classrooms. Teachers reveal deeply and persistent felt challenge and gaps in teaching science in multi-grade classrooms due to under-sourced learning resources such as microscopes and beaker that hinder and affect effective instruction and learner understanding. Teachers emphasized,

One of the most challenging things in teaching science for me is the lack of science materials, science equipment that can be used. For example, microscopes, beakers, those things needed in performing science experiments (P4)

I also find it hard to integrate technology in my classroom because of limited internet connection. Kay anhi man kita sir ha bukid, makuri an signal asya baga limitado la kita. (I also find it hard to integrate teachnology in my classroom because of limited internet connection. Here in upland, the signal is very limited.) (P5)

Others encountered limited technology and poor internet connection that restricts their teaching abilities to use online resources in teaching science.

Dinhi sir ha bukid makuri ghap it internet asya na bisan karuyag ko kumita hira hin mga science related (han) video deri ak nakahigayon. Pero maupay liwat kay mayda na kami TV asya kun mayda powerpoint nakakaproject an akon hit TV. (Sir, here in the mountains, the internet connection is really difficult. That is why even though I want my learners to watch science related videos, I am not always able to do so. But it is a good thing we now have a TV, so when I have a PowerPoint presentation, I can project it on the screen.) (P3)

Lack of facilities and technology really affect my teaching, kasi sa science talaga it's a big impact to the learners to learn using with the actual equipment. Kasi minsan pag pinapanood mo lang sila ng mga videos, nakikita lang nila pero hindi nila na experience yung mga science laboratories and experiments. (The lack of facilities and technology really affects my teaching, especially, where it has a big impact on learners. Watching videos can help, but sometimes students only get only get to see the experiments, they don't get to actually experience science laboratories and hand-on activities, which are essential for deeper learning.) (P7)

A lack of science materials makes science teaching difficult and

challenging due to encountered difficulties for their science lessons (Pareek, 2019). On the other hand, teaching strategies such as technology integration support understanding especially for slower pupils (Ahmed & Opoku, 2022; Emma, 2024). This is a clear implication that these inadequate learning resources is a pedagogical imperative that empower teachers to foster meaningful science teaching (Pacadaljen, 2024).

4.2.3. Management of diverse learning needs

Addressing varied learning needs is challenging due to the different learning needs and the diversity of behavior of the multi-grade learners. Managing pedagogical diversity particularly in balancing instructional strategies, behavioral dynamics, and lear support. Moreover, the challenges the multi-grade teachers face are multi-faceted, as they explore the compounded dynamics of multi-grade learners need particularly in science. Multi-grade teachers highlight significant challenges in addressing varied learners' learning need which complicates both assessment and instruction.

Nakukurian ghapon ako han pagpili hin strategy pagtutdo mahintungod han pagkaiba-iba han hibaro han mga bata. (I still find it difficult to choose the right teaching strategy because of the varying levels of understanding among the learners.) (P5)

Sometimes, managing the different learning needs of my learners and keeping them engaged in class can be tricky. (P2)

Managing classroom dynamics emerges as core challenge as there must be an active participation of all learners inside the classroom and the aligning of learning needs and science content across the curriculum of different grade levels, with multi-grade teachers stating,

Managing the classroom and ensuring that all learners are actively participating can be a challenged or as one of many required supports as than others. (P9)

The specific challenge is the curriculum alignment for grade 3 and Grade 4, diba an grade 4 is MATATAG na hira tapos an grade 3 is K-12 pa hira, asya amo gud etun akon challenge in teaching science in a multi-grade classroom. (A specific challenge I face is aligning the curriculum for grade 3 and 4. Grade 4 follows the MATATAG curriculum and Grade 3 is still under K-12. This difference is exactly what makes teaching science in a multi-grade classroom challenging for me.) (P6)

The selection of appropriate teaching materials and manipulatives amplify the situation in handling dynamics inside the classroom as one participant emphasized,

Siguro ha pagkayana it challenges gud kun panu ig handle it pagkaiba-iba nga behavior bata ngan kakulangan ha manipulatives and resources para science teaching. (For now, the challenges are really about how to handle the different behaviors of the learners and the lack of manipulatives and resources for teaching science.) (P3)

These encountered challenges are compounded during science assessment with one multi-grade teacher pointing out the struggles in managing classroom dynamics,

Also, managing classroom dynamics can be tricky, as some learner need more support than others, leading to varying levels of participation. Lastly, assessing learner, understanding can be complex as I need to track progress across different grade levels while ensuring that each of my learners understand the lesson. (P8)

Managing a classroom involve understanding that some learners need more support than others and assessing learner understanding can be complex. Teachers in multi-grade classes, along with institutional support to provide appropriate science teaching and learning materials to achieve engagement and equity across diverse learners (Taole, 2020; Yengkopiong, 2023). However, contributing factors to such challenges in science teaching include classroom management and insufficient support (Erden, 2020). This highlights the need for tailored assistance to meet the varied learning needs of the learners (Cardino, Jr. & Ortega-Dela Cruz, 2020). This also highlights that the difficulties in adressing diverse learning styles require adaptive and engaging teaching strategies that support the varied styles in a classroom (Daniel, 2022; Potane & Recla, 2024; Thiri *et al.*, 2024).

4.3. Strategies multi-grade teachers use to overcome the challenges in teaching science

In multi-grade setting, teachers teaching science use structure differentiated instruction with level-appropriate materials, differentiated task, and ability-based groupings to cater the varied learning need, meaningful participation, and ensuring engagement despite of the struggle and challenge of teaching science in multi-grade classrooms.

4.3.1. Differentiated instruction and tailored learning activities

Multi-grade teachers find ways to ensure all the learners receive the attention they need and participate in the discussions. Teachers resort to multi-level instruction or differentiated instruction to address the learning abilities of multi-grade learners. Moreover, the absence of specialized training in multi-grade science teaching left multi-grade teachers underprepared and overextended, directly affect their instructional strategies, confidence, and ability to meet diverse learners needs as multi-grade teachers mentioned sequencing activities, selecting appropriate materials, and differentiated instruction to cater the different learning needs of learners.

One example of approach is that once I teach multi-grade, so I gave first the lower grade an activity so that I can discuss the topic for my grade 6 and at the same time after the grade 5 finish their work that's the time that I will discuss their topic. (P5)

I use different activity that help my grade 3 and grade 4 students stay focused in my science lesson. So, mahatag lako hin, suited activity for the grade three and suited activity for the grade four. But the lesson is same, but the different activity. (I use different activities that help my Grade 3 and Grade 4 students stay focused during my science leassons. I provide activities suited to Grade 3 and others suited to grade 4, although the lesson topic remains the same.) (P9)

Teachers also emphasized the importance of differentiated instruction based on learner's abilities, allowing them to maintain, support learner engagement, help them learn at their own pace in science instruction as some teachers stated,

I help my multi-grade learners learn in their own pace by giving them activities, giving them examinations that is in line with their level of skills, in line with those. For example, if a pupil is performing well, I give him or her, harder or, challenging

activities, but if a pupil is a slow learner, I give him activities or what do you call these activities or worksheets that is on his level. (P4)

Moreover, the use of diffentiated and tailored learning activities, such as hands-on activities and visual aids, and varied exercises for reinforcement caters the diverse learning needs without compromising the science content delivery as mentioned by one participant,

Nahatag ghap ako hin mga hands-on activities like worksheets with visuals para maintindihan tak mga bata. Siyempre, gintatagan ko ghap hin focus and akon mga bata nga maghinay ha klasi ngan hawa la liwat hadtun magkarit na para deri ma distorbo tak klasi. (I also provide hands-on activities, such as worksheets with visuals, to hel my learners better understand the lesson. At the same time, I give attention to those slow learners and with different activities for those advanced learners so the lesson won't be disrupted.) (P8)

However, without specialized training, multi-grade teachers not only struggle to maintain tailored learning activities and differentiated instructions, keep pace with changes in science content but also with pedagogical demand of multi-grade classrooms. The absence of consistent and formal professional development leaves multi-grade teachers feeling inadequately prepared to deliver effective science instruction. As many participants stated,

The lack of specialized training in teaching multi-grade science makes it difficult to effectively differentiate instruction for students at varying grade levels. Classroom management becomes challenging as teachers must engage multiple age groups simultaneously. Additionally, without proper training, I struggle to utilize available resources efficiently or integrate lessons across grades. (P10)

Teachers who did not received proper specialized training used differentiated instruction and tailored learning activities by assigning different task to learners with different learning need. Adopting structured differentiated instructions in teaching minimizes distractions, support learners' pacing, promotes equitable learning, and create classroom environment where learners can thrive (Aysha, 2023). This strategy helps cater the varied levels and needs of the learners (Yunaini, *et al.*, 2024; Shareefa *et al.*, 2025). Morever, Multi-grade teachers consistently expressed that specialized training would enhance their ability to tailor different activities, implement strategies, plan lessons, and adapt to changing demands of multi-grade science teaching (Pasha, *et al.*, 2020).

4.3.2. Hands-on learning and real-life application

Multi-grade teachers underscore the positive impact of hands-on learning and real-life application in teaching science, particularly group collaboration, peer learning, and differentiated instruction on learners understanding and engagement in science lessons. Teachers also use collaborative learning strategies. These methods encourage the learners to work and learn from each other.

Multi-grade teachers also observed when multi-grade learners are encouraged to actively participate through science experiments allow the learners engage and understand the concepts, as one teacher mentioned,

I use science experiment where my learners actively participate, helping them digest the concepts through experience. I also create learning stations that allow learners to work their own, ensuring that revisit difficult topics if needed. (P3)

Discovery approach through experiences were also seen essential, with teachers highlight,

I actually use discovery approach." "You just have to let the, learners rediscover what is the topic or learn from their own, experiences or what they saw" (P7)

Moreover, the significance of practical relevance of science was mentioned and underscored by one teacher, Science for them will be of great help in their daily lives, and science for them is one of the most important thing/s we should learn at school. (P4)

Furthermore, integration in multi-grade classes and a focus inquiry based learning and hands-on activities are key to engage learners of different levels and manage time effectively. Multi-grade teachers highlighted the need for careful selection of activities and early lesson preparation to ensure that the learners accomplish particular task within the allotted time. One teacher mentioned,

To manage time effectively in a multi-grade schedule, I prioritize key science concepts and integrate lessons across grade levels whenever possible. I use a mix of whole-group instruction and independent or group work, allowing students to engage at their own level. I also focus on hands-on, inquiry-based activities that can be adapted for different grades, ensuring all students are actively involved. (P10)

These hands-on and real-life application approaches help support science education in teaching learners about science concepts (Kong, 2021: Fung, 2022). Hands-on and real-life strategies fosters supportive learning environment and a big help for learners, as it encourages and enhances understanding (Amalia, 2018; Ruijuan, *et al.*, 2023). Promoting these hands-on and real-life to science teaching fosters more engaging, effective, and inclusive classroom, suggesting that teachers should refine and continue implementing these strategies to cater varied learner needs (Kibga, *et al.*, 2021; Kotsis, 2024). On the other hand, science teaching depends on teachers planning and adaptability with strong commitment that can be enhanced trought time management training in hands-on learning application (Sainz *et al.*, 2019; Padillo *et al.*, 2021; Mora & Bueno, 2024; Leek *et al.*, 2024).

4.3.3. Resourcefulness and use of alternative materials

In resource constraint multi-grade classrooms, teachers are often challenged to implement meaningful science instruction without adequate equipment or materials. Despite of these inadequacies, many teachers demonstrate resourcefulness and use alterative materials to ensure engaging and effective science teaching and learning. Multi-grade teachers demonstrated initiative and seek alternative science teaching strategies emphasizing the need for visual resources to aid learner comprehension, as one teacher said,

I offer variety of materials and activities that tailored to different abilities and often constructive feedback that helps use of visual aids and technology. And, also, I use interactive tools and diagrams and video that can simplify complex and complex concept and make learning exciting. I design work stations in

the four corners of my classroom provided with manipulatives to effective teach science concepts and to make it engaging for all the age of my learners. (P10)

Teachers highlights the crafting of lesson plans and choosing the right activities in teaching science to multi-grade learners,

I make sure to plan my lessons well. I also choose the right activities that the learners will be able to accomplish it within a lot of time. (P2)

Other multi-grade teacher mentioned this sentiment by making DIY models, as a teacher shared,

I deal with this problem, by using alternatives na equipment yung mga gawa-gawa mo lang na pwedi siya ma incorporate sa pagtuturo at ngayon naman so far in my 3 years of teaching, may dumadating na mga Science and Math equipment sa aming paaralan na nakakatulong din sa pagtuturo ng science sa multigrade. (I deal with this proble by using alternative equipment, those improvised or homemade materials that can be incorporated into my teaching. So far, in my three years of teaching, science and math equipment has also started to arruive at our school, which has been helpful in teaching science in multi-grade setting.) (P7)

Multi-grade teachers also use age appropriate explanations, differentiation, technology, and adaptive learner centered approaches including tailored activities and setting clear objectives in making their alternative materials, highlighting

The strategies that I use to overcome these challenges in teaching my multi-grade learners, one is giving activities that tailored to the lessons to meet the need of my diverse learners and through technology integration, and establishing fair learning where learners can teach or learn from each other" (P6)

Teachers compensate for lack of science resources with resourcefulness such as crafting visuals, using home-made science materials, and printing activity sheets and adapt flexibility and access to technology to enhance science teaching. Resourcefulness in teaching science to learner varied needs underscore creativity pointing toward the significance of equipping teachers in improvisation and access to basic digital facilities (Bonney, *et al*., 2022). These resourceful approaches support learner curiosity in science and support conceptual understanding in under-sourced classroom (Okori & Jerry, 2017). Furthermore, resourcefulness, adaptive teaching approach and resourcefulness can better address the diverse developmental and academic needs of learners to improve education outcomes (Yang, 2025).

5. CONCLUSION

The lived experiences of multi-grade teachers in teaching science revealed that they are more than just subject educators because they are deeply committed, creative, and adaptive teachers who go beyond the traditional teaching roles. The journey of multi-grade teachers is marked by significant challenges, such as a lack of resources, time limitations, and the need to manage varied learning needs within a multi-grade classroom. Moreover, the unwavering resourcefulness, resilience, and passion for teaching set multi-grade teachers apart. From these lived experiences, teachers emerge as facilitators of science concepts, community builders, problem solvers, and mentors who embody a strong sense of vocation. Becoming a multi-grade teacher would require flexibility, differentiated instruction skills, patience, and the ability to design meaningful learning even with limited teaching resources. This research affirms that multi-grade teachers are compassionate and dynamic educators who make science teaching come alive despite of systemic constraints. With proper training, resources, and support, multi-grade teachers can turn science education into an enriching, engaging, and powerful experience for their learners and themselves.

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