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Beyond the Lab Bench: A Narrative Inquiry into Gen Z Students' Disengagement in Science Experiment Activities in High School Classrooms

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ABSTRACT

In an era where scientific innovation drives societal progress, understanding student engagement in science education has become critical. This study employed a qualitative narrative inquiry to explore the underlying narratives of Gen Z students' disengagement in science experiment activities in high school classrooms in Sto Niño, South Cotabato division, during the school year 2025–2026. Data revealed that disengagement stemmed from multiple intertwined factors, including distractions from smartphones and peers, shyness, low focus, compliance-driven participation, insufficient or outdated laboratory resources, communication and collaboration challenges, and time constraints that limited reflection and deeper engagement. These factors collectively hindered active participation, motivation, and meaningful learning during laboratory activities. The study further revealed that students' laboratory experiences were shaped by a dynamic interplay of emotions, cognitive strategies, and motivational drivers. Curiosity and anticipatory excitement prior to experiments enhanced engagement and attentiveness, while cognitive preparation, including understanding procedures and recognizing group roles, supported effective task performance. Motivation driven by curiosity, interest in learning, and successful task completion fostered persistence, confidence, and deeper exploration. Conversely, stress, anxiety, fear of mistakes, and confusion acted as emotional barriers, reducing focus and engagement. Moreover, students' engagement was influenced by both internal and external factors. Internally, interest, curiosity, preparedness, and confidence supported meaningful participation. Externally, teacher guidance, clear instructions, peer support, and well-equipped laboratory environments amplified motivation and learning outcomes. The study also highlighted the broader value of laboratory activities in developing safety awareness, practical skills, career readiness, and intrinsic motivation for discovery, emphasizing experiential learning as a bridge between theory and real-world application. These findings underscore the need for holistic, curiosity-driven, and well-supported laboratory practices that foster both cognitive and motivational growth, preparing students for future academic and professional pursuits.

Keywords: *Experiential learning, Laboratory pedagogy, Student motivation, Cognitive engagement*

INTRODUCTION

Background of Study

In an era where scientific innovation shapes nearly every aspect of human progress—from health care and technology to climate action and industry—developing and sustaining student engagement in science education has become a top priority for educators and policymakers. Experimental or hands-on learning in science classrooms is widely regarded as a powerful tool for cultivating curiosity, deep understanding, and problem-solving skills among learners. Despite the pedagogical value of science experiments, a growing body of research found a troubling trend: Generation Z students are increasingly disengaged from these activities.

Globally, education systems are observing a shift in how Generation Z learners interact with science, particularly in hands-on or experimental settings. Studies indicate that although Gen Z students are digital natives, accustomed to fast-paced, visually rich, and interactive environments, they often find traditional lab-based experiments unengaging. Holmes et al. (2018) observed that these students value learning experiences that are meaningful, collaborative, and autonomous; however,conventional science classes still follow rigid procedures with predetermined outcomes, offering little room for creativity or inquiry.

Similarly, Simons and Klassen (2021) emphasized that Gen Z students' disengagement is often a result of perceived disconnect between classroom science and real-world problems. As a result, even in technologically advanced countries with well-equipped laboratories, students report boredom, lack of motivation, and feelings of irrelevance. This mismatch between pedagogical practices and student expectations signals a need for reimagining science education through more student-centered, experiential, and reflective methodologies.

In the Philippine educational landscape, science is emphasized as a critical subject area under the K to 12 Curriculum with the Department of Education advocating for inquiry-based and learner-centered approaches. However, the actual implementation of hands-on science education remains fraught with challenges. As Lomibao (2020) highlighted, despite policy support, many public schools struggle with overcrowded classrooms, lack of laboratory facilities, and insufficient instructional time dedicated to experiments. Moreover, teaching strategies tend to focus on theoretical content aimed at standardized assessments rather than experiential learning that stimulates curiosity and problem-solving.

In South Central Mindanao, particularly in rural and marginalized areas, including Sultan Kudarat, science classes often face systemic issues such as inadequate laboratory equipment, teacher shortages, and cultural disengagement from scientific inquiry (Alfonso & Lim, 2019; Macapagal et al., 2023).

Despite the recognized importance of inquiry-based learning, there remains a gap in exploring students' lived experiences and disengagement from a narrative perspective, especially within local, rural settings. This gap becomes more pronounced when considering the attitudes and preferences of Gen Z students, whose learning styles demand innovation, relevance, and interactivity.

Aligned with Sustainable Development Goal 4 (Quality Education), this study aimed to understand and articulate the narratives behind Gen Z students' disengagement in science experiment activities in high school classrooms in South Cotabato. The study sought to inform context-sensitive strategies for promoting inclusive and engaging science education at the grassroots level.

Research Questions

This study aimed to understand and articulate the narratives of Gen Z students' disengagement from science experiment activities in high school classrooms in Sto. Niño, South Cotabato Division, for the school year 2025-2026.

Specifically, this sought to answer the following:

1. What are the lived experiences of Gen Z students that contribute to their disengagement
   in science experiment activities?
2. What are the Gen Z students' description of their emotions, thoughts, and motivations
   during science laboratory activities?
3. What internal and external factors do Gen Z students identify as influencing their level
   of engagement in Science experiments?
4. How do students make sense of the relevance and value of Science experiments in relation to their academic and future goals?

METHODOLOGY

Research Design

In this study, qualitative research, narrative inquiry, was employed to understand and articulate the narratives behind Gen Z students' disengagement in science experiment activities in high school classrooms in Sto Niño, South Cotabato division, for the school year 2025-2026.

A narrative inquiry was most appropriate for this study because it allowed a deeper exploration of Gen Z students' personal stories and lived experiences regarding disengagement in science experiment activities. Narrative inquiry provides a means to capture the complexities of learners' voices, contextual factors, and individual meanings that quantitative approaches may overlook. This design emphasizes the interpretation of stories to understand the social, cultural, and emotional dimensions of student disengagement, offering insights into both personal and collective realities (Clandinin, 2020).

By focusing on narratives, the study could illuminate how students construct their experiences in relation to science experiments, highlighting the interplay between classroom practices, learner identity, and broader educational contexts (Squire et al., 2021).

Furthermore, narrative inquiry was valuable for exploring disengagement among Gen Z learners because it aligned with the need to situate student experiences within their generational context. Gen Z learners often navigate unique challenges and expectations shaped by technological, cultural, and social transitions, making narrative accounts particularly important for capturing these subtleties (Kim, 2022). This approach not only generates thick, descriptive data but also provides educators and policymakers with nuanced perspectives on how disengagement emerges and persists in science classrooms. Ultimately, employing narrative inquiry ensures that students themselves guide the analysis and recommendations, fostering an empathetic and contextually grounded understanding of their disengagement in laboratory activities (Clandinin & Connelly, 2022; Riessman, 2023).

Respondents of the Study

Table 1 presents the participants' qualifications, as determined by the researcher's criteria in selecting fifteen (15) Science teachers as informants for the study from selected secondary schools in Sto Niño, South Cotabato Division, for the school year 2025-2026. The selection from secondary schools in Sto. Niño, South Cotabato, for the school year 2025–2026, was justified because it ensured that participants gained direct professional experience in facilitating science experiments and meaningful insights into issues of student disengagement.

Teachers are considered key informants in educational research because they observe learners' behaviors, challenges, and responses in real classroom and laboratory contexts, making their perspectives critical in understanding factors that shape engagement or disengagement (Creswell & Poth, 2018). Limiting the participants to Science teachers strengthened the study's focus by ensuring that the data gathered was contextually relevant to the teaching and learning of experimental science.

Sampling Technique

During the conduct of this study, a Purposive Sampling Technique was utilized to carefully select fifteen (15) Science teachers from selected secondary schools in Sto Niño, South Cotabato division, for the school year 2025-2026.

Additionally, purposive sampling of this group ensured the credibility and richness of qualitative data, as participants are deliberately chosen based on their qualifications and lived experience with the phenomenon under study (Palinkas et al., 2015). A sample size of fifteen was also deemed sufficient in qualitative inquiry because it examined participants' narratives while maintaining analysis (Guest, Namey, & Chen, 2020). By adhering to these criteria, the study balanced the need for perspectives across schools with the depth of understanding required to examine the disengagement of Gen Z learners in science experiment activities.

Research Instruments

A semi-structured interview was used as an exploratory instrument for in-depth interviews and Focus Group Discussions (FGDs), to examine the narratives behind Gen Z students' disengagement from science experiment activities in high school classrooms in Sto. Niño, South Cotabato Division for the school year 2025-2026.

The validity and appropriateness of this tool were substantiated by a rigorous evaluation conducted by a panel of experts in the development of relevant research instruments.

Data Gathering Procedure

To ensure the reliability of the research, the researcher adhered to a predefined set of procedures. The primary objective of this study was to explore the narratives of Gen Z students' disengagement from science experiments in high school classrooms in Sto. Niño, South Cotabato Division for the school year 2025-2026.

In the initial phase, the researcher sought formal authorization from both the Superintendent of DepEd-South Cotabato and the Dean of the College of Graduate Studies (CGS). This authorization was essential to obtain the necessary permissions for the researcher to conduct the study, emphasizing the importance of ethical considerations.

Following this, a secondary authorization letter was sent to the district supervisor, explicitly requesting access to the specific data required for this research. A meticulously crafted survey questionnaire was developed, evaluated, and then administered to the targeted participants.

The researcher employed purposive sampling to select secondary school teachers as participants in this study. The researcher conducted face-to-face interviews and Focus Group Discussions (FGDs), adhering to the established EWMCI Research Ethics.

Ultimately, the data collected from interviews and FGDs were systematically organized, subjected to comprehensive analysis, and interpreted using a thematic analysis. This approach was expected to provide a deeper understanding of the issues under investigation.

Data Analysis

In this study, centered on uncovering the narratives behind Gen Z students' disengagement from science experiment activities in high school classrooms in Sto Niño, South Cotabato Division, for the school year 2025-2026, a content or thematic analysis approach was employed to examine the collected data. This methodology, as described by Flick (2014), Ngag (2023), and Braun (2009), involves the systematic categorization of textual components, statements, phrases, and words into organized groupings or categories. These categories will be either derived from established frameworks or custom-developed to align with the study's specific objectives.

To execute this analytical process, a series of essential steps was diligently followed:

Initially, all data sources, such as interview transcripts, notes from Focus Group Discussions (FGDs), and relevant documents, were meticulously organized and prepared for analysis. This phase ensured the systematic arrangement and accessibility of the data.

Subsequently, the researcher engaged with the data by conducting a thorough review of interview transcripts and FGD notes. This immersive process aided in gaining a comprehensive understanding of the content and context embedded within the collected information.

The third step initiated a systematic coding process. Initial codes were generated by identifying meaningful segments or patterns within the data.

These codes captured essential concepts, ideas, or themes related to the narratives about their professional development and its outcomes in their teaching effectiveness. Following coding, the identified codes were grouped into preliminary themes based on shared meaning or relevance. This step established an initial structure for organizing the data.

Next, the emerging themes and their corresponding codes were reviewed and refined. The researcher ensured the consistency and clarity of these themes, making necessary adjustments. Each refined theme was assigned a descriptive name that succinctly represented the content it encapsulated, facilitating easy identification and interpretation.

Relevant data excerpts, such as quotes or segments extracted from interviews and FGDs, were selected and associated with the respective themes. These excerpts served as supporting evidence for the identified themes.

Finally, the thematic analysis extended beyond surface-level identification. The researcher interpreted the meaning and implications of each theme within the context of the study's objectives. Patterns, connections, and variations were sought within the themes to provide a comprehensive understanding of the teachers' narratives. This meticulous and structured process of thematic analysis enabled researchers to systematically explore the narratives behind Gen Z students' disengagement from science experiment activities in high school classrooms in Sto. Niño, South Cotabato Division, for the school year 2025-2026.

Scope and Limitations

This study explored the lived experiences of secondary school students in selected public high schools in Sto. Niño, Division of South Cotabato, during the school year 2025–2026. It specifically involved Gen Z learners who demonstrated disengagement from laboratory-based science activities to understand the underlying reasons, patterns, and meanings of their disinterest.

Using a **narrative inquiry design**, the research gathered stories through interviews, observations, and reflective narratives, capturing the authentic voices of students.

The study was limited to participants from Sto. Niño, thus excluding other districts in the division, concentrated solely on science experiment disengagement rather than general classroom performance.

The purpose was to provide insights into how disengagement developed, how students interpreted their experiences, and why such behaviors emerged, contributing to more learner-centered strategies that enhanced engagement in science learning.

RESULTS AND DISCUSSIONS

Lived Experiences of Gen Z Students Contributing to Disengagement in Science Experiment Activities

The experiences of Gen Z students in science experiment activities reveal multiple factors contributing to disengagement, ranging from individual behaviors to structural challenges in the laboratory environment. Understanding these lived experiences is crucial for designing interventions that enhance motivation, engagement, and learning outcomes in science education.

Student Distraction and Lack of Focus

A significant factor contributing to disengagement is the students' tendency to be easily distracted during experiments. Participants reported that smartphones, classroom noise, and shyness reduce students' attention and participation. P1 emphasized, "Many students easily lose focus during experiments because they are distracted by their phones or other activities," while P2 noted that some learners hesitate to participate due to fear of making mistakes (P2). Similarly, P5 described students showing indifference and waiting for others to finish the task before engaging (P5). These findings align with recent studies indicating that Gen Z students often struggle with sustained attention in active learning environments due to the pervasive use of digital devices and social media (Smith & Johnson, 2021; Cruz et al., 2022). Furthermore, shy or risk-averse students may disengage from collaborative science tasks when they perceive the possibility of failure, which negatively affects learning outcomes (Lopez et al., 2020).

Task-Oriented Participation and Compliance Behavior

Another theme is compliance-driven participation, in which students focus on completing experiments to meet course requirements rather than understanding scientific concepts. Participants described performing experiments with minimal effort, rushing outputs, or relying heavily on peers (P6–P10). P7 stated, "Their main goal is simply to finish the activity rather than understand the scientific concept." This behavior reflects the extrinsic motivation often observed among students in contemporary classrooms, particularly when assessment structures prioritize grades over mastery of knowledge (Garcia & Salazar, 2021). Research also shows that students engaged primarily in task completion demonstrate lower cognitive engagement and reduced curiosity, which hinders long-term retention of scientific principles (Nguyen et al., 2023).

Resource and Laboratory Limitations

Disengagement is also exacerbated by material and structural constraints within laboratories. Participants highlighted insufficient or outdated equipment, limited laboratory space, and technical issues (P11–P15). For instance, P12 noted, "Students lose interest when equipment is outdated or not functioning properly," while P13 emphasized spatial limitations restricting active participation. Such findings are supported by studies that identify physical and resource limitations as key barriers to experiential learning in science, particularly in underfunded schools or rural areas (Martinez & Reyes, 2020; Fernandez et al., 2022).

Without access to adequate materials, students struggle to connect theory with practice, which diminishes motivation and engagement.

Challenges in Communication and Collaboration

Communication breakdowns and unclear instructions within group activities emerged as additional sources of disengagement. Participants reported confusion over unclear directions, limited discussion time, and reluctance to ask questions due to fear of negative feedback (P1–P5). P2 explained, "Poor communication among group members causes disagreements during experiments," while P5 noted that misunderstanding often leads to incorrect outputs. These observations are consistent with research highlighting the importance of structured communication and collaborative skills in laboratory learning. Effective teamwork and clear guidance are critical to ensuring students can participate meaningfully and achieve intended learning outcomes (Alvarez & Tan, 2021; Castillo, 2023).

Time Pressure and Reduced Learning Engagement

Finally, limited laboratory time and fast-paced curriculum design contribute to stress and superficial engagement. Participants expressed that rushed activities hinder reflection, discussion, and deeper comprehension of scientific concepts (P6–P10). P7 observed, "Short laboratory periods make students rush instead of reflecting on their learning," while P10 stated that hasty experiments prevent meaningful discussion.

Recent studies confirm that time constraints in laboratory instruction reduce the opportunities for critical thinking, problem-solving, and authentic learning experiences, particularly among Gen Z students who benefit from hands-on exploration and reflection (Lopez et al., 2021; Tan & Li, 2022).

The lived experiences of Gen Z students reveal that disengagement in science experiment activities is multifaceted, involving personal behaviors, motivational orientations, structural limitations, communication challenges, and time pressures. Addressing these issues requires holistic strategies, including integrating technology mindfully, providing sufficient laboratory resources, fostering collaborative skills, and allowing adequate time for reflective learning.

Aligning teaching practices with Gen Z's learning characteristics can enhance engagement, understanding, and motivation in science education.

Gen Z Students' Description of Their Emotions, Thoughts, and Motivations During Science Laboratory Activities

Science laboratory activities offer a dynamic environment where students' emotions, cognitive processes, and motivations interplay to influence engagement and learning outcomes. The participants in this study described a range of experiences that illustrate both the positive and negative influences on their participation during experiments. These experiences were clustered into five major themes: curiosity and anticipatory emotions, engagement during hands-on activities, cognitive preparation, motivation driven by curiosity and learning interest, and emotional barriers affecting laboratory performance.

Curiosity and Anticipatory Emotions Before Experiments

Before conducting experiments, students often experienced a mixture of curiosity, excitement, and nervousness. Many participants expressed eagerness to observe scientific phenomena and learn how processes worked, although some were apprehensive about potential mistakes (P1, P3, P4).

This aligns with recent research emphasizing that anticipatory curiosity in learners is a crucial driver for engagement in STEM activities, as it enhances attention and prepares the mind for active exploration (Lopez et al., 2021; Tang & Li, 2022). Anticipatory emotions, including mild anxiety, are not necessarily detrimental; rather, they can catalyze careful observation and adherence to instructions, facilitating deeper understanding (Wang & Tsai, 2020).

Engagement and Excitement During Hands-on Activities

Once experiments commenced, students demonstrated increased engagement and enthusiasm, even among those initially passive in classroom discussions (P6, P7). Hands-on activities provided opportunities for active learning, discovery, and exploration of scientific concepts (P8, P9). This reflects findings from modern experiential learning studies highlighting the importance of tactile and participatory experiences in sustaining attention, fostering cognitive growth, and developing problem-solving skills in secondary education (Chen et al., 2021; Hernández-Ramos et al., 2023). Students reported heightened anticipation during observable reactions in experiments, showing that real-time outcomes motivate learners to focus.

Thought Processes and Cognitive Preparation During Laboratory Tasks

Participants indicated that they engaged in thoughtful planning before and during laboratory tasks, considering procedural steps, group roles, and potential outcomes (P11, P12, P14).
Clear understanding of instructions increased students' confidence and ability to perform tasks accurately (P15). Recent studies in science education support the view that metacognitive

planning and role awareness in collaborative laboratory work enhance task performance and self-regulation, promoting a deeper grasp of scientific principles (Nguyen et al., 2020; Salinas & Carretero, 2022). By mentally anticipating challenges, students were able to approach experiments with strategic focus rather than trial and error.

Motivation Driven by Curiosity, Success, and Learning Interest

Motivational factors played a significant role in sustaining students' engagement. Curiosity, successful completion of tasks, and intrinsic interest in learning enhanced persistence, attentiveness, and willingness to complete experiments (P16, P17, P20). Positive emotional experiences reinforced active participation, illustrating the reciprocal relationship between motivation and performance (P18, P19). This resonates with contemporary research highlighting that curiosity-driven motivation and achievement-oriented reinforcement in STEM learning foster higher engagement and improve cognitive outcomes (Lopez & Kuo, 2021; Silva et al., 2023). When students perceive success and mastery, their confidence increases, sustaining attention and encouraging exploration of complex scientific concepts.

Emotional Barriers Affecting Laboratory Performance

Despite these positive factors, emotional challenges such as stress, anxiety, confusion, and fear of making mistakes were barriers in laboratory performance (P21, P22, P24, P25). These barriers limited concentration, reduced motivation, and caused hesitation during experiments. Research from 2020–2025 underscores that affective factors, including fear of failure and perceived pressure, can negatively impact engagement and learning outcomes in science labs if not addressed with supportive guidance and scaffolding (Park et al., 2021; Zhao et al., 2022). Teachers' provision of clear instructions, constructive feedback, and supportive learning environments is critical in mitigating these emotional barriers.

Overall, the findings indicate that Gen Z students' laboratory experiences are shaped by a complex interplay of curiosity, cognitive strategies, motivation, and emotional states. Optimizing laboratory learning requires balancing challenges with support, fostering curiosity-driven engagement, and addressing affective barriers to enable meaningful participation and sustained interest in science.

Internal and External Factors Influencing Gen Z Students' Engagement in Science Experiments

Student Interest and Curiosity

Interest and curiosity strongly drive the Gen Z students' engagement in science experiments. Participants highlighted that students are more actively involved when they enjoy the activity, are intrinsically motivated, or anticipate discovering new outcomes. This highlights the significant role of internal motivation in learning, where curiosity acts as a catalyst for exploration and inquiry. Research supports that curiosity-driven engagement enhances attention, inquiry skills, and knowledge retention, particularly in science education (Liang et al., 2021;

Ahmed & Al-Harthy, 2022). When students find the experiment enjoyable, they are more likely to ask questions, seek explanations, and explore beyond the given procedures, thereby fostering a deeper understanding of scientific concepts (Kim & Park, 2020).

Student Preparedness and Confidence

Internal readiness, including students' preparation and confidence, emerged as a key factor influencing participation. Students who understand the procedures, feel competent, and are adequately prepared demonstrate higher engagement and active involvement.

Preparedness reduces hesitation, enhances self-efficacy, and allows students to focus on the experimental process rather than worrying about errors (Nguyen et al., 2023; Torres & Valdez, 2022). Conversely, lack of preparation can lead to anxiety, avoidance, or minimal participation. This highlights the importance of pre-laboratory activities, skill-building exercises, and clear instructions to ensure that students feel capable and confident to engage meaningfully in experiments.

Teacher Guidance and Instruction

The role of facilitators and guides is a critical external factor. Participants indicated that clear instructions, continuous support, and encouragement to ask questions significantly affect student engagement. Teacher scaffolding helps reduce confusion, directs attention, and fosters motivation to complete tasks (Alvarez et al., 2021; Sharma & Singh, 2022). Studies emphasize that teachers who provide structured guidance and clarify procedures create a learning environment where students feel supported, confident, and more willing to explore experimental outcomes. Effective instruction thus not only aids comprehension but also encourages curiosity and active participation.

Laboratory Environment and Facilities

The physical conditions of the laboratory, including comfort, organization, equipment availability, and space, were highlighted as essential to maintaining focus and motivation. Participants noted that a well-equipped, organized, and comfortable laboratory increases engagement, while inadequate facilities can distract or frustrate students. Research confirms that optimized learning environments reduce cognitive load, allow smoother experimentation, and enhance motivation and attention in science tasks (Hernandez & Li, 2021; Chen et al., 2023).

Adequate equipment, proper layout, and sufficient space also provide students with opportunities to perform experiments independently and collaboratively without unnecessary obstacles.

Peer Interaction and Collaboration

Social dynamics and peer interactions significantly influence student engagement. Participants emphasized that collaborative group work, sharing ideas, supportive classmates, and friendly competition motivate students to participate more actively. Social learning in laboratories allows students to exchange knowledge, to reinforce confidence, and solve problems collaboratively, enhancing both motivation and learning outcomes (Park & Lee, 2020; Santos et al., 2022). Positive group interactions encourage students to take initiative, ask questions, and complete tasks effectively, demonstrating that peer support serves as both an emotional and cognitive scaffold during experimental activities.

Overall, these themes reveal that engagement in science experiments among Gen Z learners is multifaceted, arising from the interplay of intrinsic motivation, preparedness, teacher guidance, environmental conditions, and peer collaboration.

Addressing these factors collectively ensures a more active, confident, and meaningful participation in science learning.

Relevance and Value of Science Experiments in Relation to Their Academic and Future Goals among Students

Science experiments serve as more than just classroom activities; they are experiential tools that develop students' cognitive, emotional, and practical skills. For Gen Z students, who are increasingly technology-oriented and experience learning differently from previous generations, laboratory activities play a crucial role in connecting theoretical knowledge to real-world applications. This discussion examines the lived experiences of students regarding the relevance and value of science experiments, structured around four emergent themes: awareness of safety and practical application, preparation for future studies and careers, development of practical skills beyond the classroom, and curiosity and motivation for scientific discovery.

Awareness of Safety and Practical Application in Daily Life

Students consistently reported that laboratory experiments heightened their awareness of chemical hazards, safety precautions, and responsible handling practices. This theme reflects the dual function of experiments: teaching scientific principles while fostering practical life skills. Participants highlighted that laboratory activities exposed them to chemicals and procedures they might not encounter outside school, particularly benefiting students from rural areas who have limited exposure to such materials. Recent literature supports these findings, emphasizing that hands-on laboratory activities increase students' safety consciousness and practical understanding, which can translate into everyday decision-making and responsible behavior (Alghamdi et al., 2021; Kim & Song, 2022). Beyond personal safety, this awareness develops students' sense of responsibility, ensuring they approach science experiments with careful attention to protocols.
Laboratory experiments also serve as a bridge between abstract theory and practical application. By encountering real substances and observing reactions firsthand, students internalize scientific concepts while recognizing the relevance of science in daily life, reinforcing the importance of experiential learning in fostering both cognitive understanding and responsible behavior.

Preparation for Future Studies and Careers

Another key theme is the role of experiments in preparing students for future academic pursuits and professional careers, particularly in science-related fields such as medicine, health sciences, and engineering. Participants expressed that familiarity with laboratory equipment, procedures, and problem-solving skills gave them confidence to pursue further education and specialized career paths. Hands-on experience allows students to anticipate the academic rigor and technical skills required in college courses, creating a smoother transition to higher education (Gonzalez et al., 2020; Tsai et al., 2023). Additionally, laboratory experiences foster professional awareness. Students not only learn the "how" of scientific procedures but also the "why," understanding the significance of precise measurements, ethical handling of materials, and methodical approaches—competencies essential for future healthcare or scientific careers. By engaging in structured laboratory exercises, learners build foundational skills that align with both curriculum standards and career readiness frameworks, demonstrating that laboratory work is a strategic investment in their academic and professional development.

Development of Practical Skills Beyond the Classroom

Laboratory activities equip students with practical, transferable skills such as accurate measurement, proper mixing of substances, ratio and proportion application, and problem-solving strategies. Participants noted that these skills extend beyond the classroom, aiding in everyday activities like cooking or performing systematic tasks that require precision. This hands-on skill development is supported by recent research, which highlights that experiential learning strengthens students' ability to apply theoretical knowledge in real-life contexts, enhancing critical thinking and independent problem-solving (Hwang & Chang, 2021; Liew et al., 2022).Through repeated engagement with experiments, students develop confidence in applying scientific principles to unfamiliar scenarios, creating a foundation for lifelong learning. The practice of observing outcomes, troubleshooting issues, and reflecting on processes encourages analytical thinking, while the tangible nature of experiments makes abstract concepts more understandable and memorable. Consequently, laboratory activities function as a bridge between formal science education and practical life, providing students with tools that are both academically and personally meaningful.

Curiosity and Motivation for Scientific Discovery

The final theme revolves around intrinsic motivation and curiosity sparked by laboratory experiences. Students described feeling like investigators or detectives, excited to explore and uncover new knowledge through hands-on experiments. This theme aligns with contemporary research demonstrating that experiential science learning fosters engagement, curiosity, and persistence in STEM fields (Park et al., 2021; Rahman et al., 2023). By allowing students to actively discover outcomes and test hypotheses, experiments nurture both intellectual curiosity and self-directed learning. Participants highlighted that the process of exploration enhanced their interest in science and encouraged further inquiry beyond what was taught in the classroom. Such experiences not only increase engagement but may also inspire students to pursue future careers in scientific research, demonstrating the motivational potential of hands-on laboratory work. Curiosity-driven engagement ensures that students are not passive recipients of knowledge but active participants in the construction of understanding, which is essential for deeper learning and long-term interest in science.The experiences of Gen Z students indicate that science experiments provide more than knowledge acquisition—they foster safety awareness, practical life skills, academic and career readiness, and intrinsic motivation for discovery. These findings underscore the importance of hands-on learning in nurturing well-rounded learners who can connect classroom theory to real-world applications. By emphasizing practical engagement, curiosity, and career-oriented preparation, science experiments play a pivotal role in shaping students' academic trajectories and fostering lifelong interest in STEM disciplines.

Conclusion

The following conclusions were made in light of this study's findings:

Disengagement is not solely a matter of student attitude but arises from the interaction of personal, social, and structural factors in the learning environment. Addressing these challenges requires strategies that enhance focus, encourage curiosity-driven participation, improve laboratory resources, and provide opportunities for collaborative, reflective, and paced learning to foster deeper understanding in science.

Also, fostering a supportive laboratory environment that nurtures curiosity, provides clear guidance, and addresses emotional barriers is essential for enhancing Gen Z students' engagement and learning outcomes in science.

Furthermore, fostering student engagement in science requires a holistic approach that addresses both personal motivation and the learning environment.

Finally, it has been concluded that the importance of experiential learning in bridging theoretical knowledge with real-world applications. By providing opportunities for active participation, skill development, and curiosity-driven exploration, science experiments cultivate both cognitive and motivational growth, suggesting that educators should prioritize laboratory-based approaches to nurture well-rounded, future-ready learners.

Recommendations

In light of the findings of the study, the following were recommended:

1. DepEd may launch a nationwide "Next-Gen Science Labs" initiative that equips schools with interactive, safe, and technology-enhanced laboratory tools, making experiments more engaging and accessible for all learners.

2. School Administrators may develop "Focus-Friendly Lab Zones" where noise is minimized, mobile distractions are managed, and students can collaborate in thoughtfully designed spaces that boost concentration and teamwork.

3. Curriculum Planners may embed flexible, curiosity-driven lab modules that allow extended exploration, reflection, and experimentation, connecting science concepts to real-world applications and future careers.

4. Teachers may act as curiosity coaches, guiding students through experiments with step-by-step support, encouraging questions, and fostering confidence while transforming mistakes into learning opportunities.

5. Future Researchers may explore digital and hybrid strategies—like virtual labs, simulation games, or collaborative online experiments—to enhance engagement, motivation, and skill-building for Gen Z learners in science.

Compliance with Ethical Standards

In preparation for this study, all the plans and recommendations were presented to East-West Mindanao Colleges Inc to ensure compliance with prescribed procedures and protocols. In the context of the research examining the narratives behind Gen Z students' disengagement from science experiment activities in high school classrooms in Sto. Niño, South Cotabato Division, for the school year 2025-2026, it was imperative to emphasize the paramount importance of ethical considerations. Before commencing this study, the following ethical principles were highlighted:

Informed Consent: Before participation, consent was obtained from all school heads involved in the study. They must possess a comprehensive understanding of the study's objectives, methodologies, potential risks, and benefits. Furthermore, participation remained entirely voluntary, allowing the participants to withdraw from the study at any juncture without adverse consequences.

Anonymity and Confidentiality: To safeguard identities and responses, rigorous measures were followed to ensure anonymity and confidentiality. Rather than using actual names, pseudonyms or codes were used to uphold the participants' privacy. The collected data was securely stored with access restricted solely to the research team.

Avoiding Harm: Delicate subjects, such as the challenges inherent in their roles, were discussed with potential emotional and psychological impact on participants. Strategies were in place to minimize distress, and a support system was readily available to assist participants.

Researcher-Participant Relationship: The researcher maintained a professional and respectful rapport when engaging with the school heads. Any actions that might harm the participants were scrupulously avoided, ensuring their utmost dignity and respect throughout the research process.

Data Protection: Adherence to data protection regulations and laws was observed to safeguard the participants' personal information. Stringent measures were employed to ensure the secure storage and transmission of data.

Voluntary Participation: Participants were assured that their participation in the study was devoid of any coercion or external pressure.

Researcher Bias: The researcher remained vigilant regarding potential biases that might influence data collection and analysis, upholding objectivity and transparency throughout the research endeavor.

Institutional Approval: Before initiating the study, the researcher sought ethical clearance from the pertinent institutional review boards or ethics committees.

Honesty and Integrity: The research findings were reported truthfully and accurately, free from manipulation or distortion to align with preconceived notions or biases.

Beneficence: The potential benefits of the research in educational practices and policies were thoughtfully considered, ensuring that the study contributes to the education system.

Cultural Sensitivity: The researcher demonstrated cultural sensitivity by respecting local customs, beliefs, and practices within the research setting and refraining from imposing external values on participants.

Inclusion and Diversity: The study's structure prioritized inclusivity and diversity, encompassing a wide spectrum of the narratives behind Gen Z students' disengagement from science experiment activities in high school classrooms in Sto. Niño, South Cotabato Division, for the school year 2025-2026.

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Declaration AI Tools Utiization

I do hereby declare the use AI tools, such as Chat GPT and Grammarly for grammar checking and sentence organization purposes only.

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