



DELVING INTO THE LIVED EXPERIENCES OF SECONDARY SCIENCE TEACHERS ON THE USE OF THE 7E'S LESSON PLAN: A QUALITATIVE STUDY

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ABSTRACT

This phenomenological study explored the lived experiences of secondary science teachers in the Division of Tagum City as they implemented the 7Es lesson plan. Ten public school science teachers participated in the study through in-depth interviews and focus group discussions. Data were treated using thematic analysis. Findings revealed that teachers experienced cognitive exhaustion and instructional compression due to the demanding nature of the framework and time constraints. Despite these challenges, they emphasized that systematic planning enhanced student learning and improved instructional efficiency. To address difficulties, science teachers employed coping strategies such as consultation with master teachers and co-teachers, structural adaptations, pedagogical prioritization, and strategic, adaptive lesson planning to ensure operational readiness. Reported benefits include technology as a pedagogical tool for understanding scientific concepts, assessment as a responsive process for enhancing learning, and active learning as a pathway to scientific understanding. Teachers also established adaptation strategies such as flexible adjustments to 7E activities for diverse learners, guided support for independent student learning, and contextualized inquiry using local, real-life examples. Overall, the study highlights that while the 7Es lesson plan presents significant challenges, it also fosters meaningful learning outcomes.

KEYWORDS: Science education, 7E's lesson plan, secondary teachers, phenomenology, thematic analysis, Division of Tagum City, Philippines

INTRODUCTION

To further improve student participation and learning outcomes, science teachers incorporated the use of the 7E lesson plan into their classroom instruction. This lesson plan is an instructional framework based on constructivist learning theory that guides the learners through seven sequential steps: Elicit, Engage, Explore, Explain, Elaborate, Evaluate, and Extend. However, studies revealed that many teachers encountered difficulties in implementing the framework, such as insufficient instructional time, inadequate instructional resources, and that it requires an extensive preparation (Lubiano & Magpantay, 2021; Rahman & Chavhan, 2022; Urdanivia et al., 2023).

In India, teachers often reported that curriculum demands and class schedules limit their ability to fully implement all seven phases of the framework. As a consequence, they skipped or shortened certain stages, which affected the quality of inquiry-based learning (Roussan & Hassan, 2025). Similarly, teachers feel pressured to prioritize content coverage over meaningful inquiry experiences due to highly structured learning competencies or curricula (Agrawal et al., 2025). In the Philippines, Tijap and Pelgone (2022) claimed that Filipino science teachers experienced challenges in the development of learning materials, teaching strategies, assessments, and classroom management related to the use of the 7E framework.

In the Davao region, particularly in Tagum City, science teachers are also using the 7Es framework. However, in several instances, the researcher directly heard the various

accounts of science teachers who indicated that developing a 7E lesson plan creates pressure because it requires a significant amount of preparation to satisfy the demands of a 7E lesson plan. Additionally, teachers stated that they often struggle to complete all seven phases within limited class periods. That is why, despite the growing body of literature on the effectiveness and implementation of the 7E lesson plan, there remains limited qualitative evidence that captures the lived experiences of secondary science teachers who regularly utilize the framework in Philippine classrooms.

PURPOSE OF THE STUDY

The main purpose of this phenomenological study was to describe the lived experiences of secondary Science teachers in the Division of Tagum City in using the 7Es lesson plan. Additionally, the study explored how secondary science teachers cope with the challenges of making and using the 7E lesson plan, examined the perceived benefits of its implementation, and investigated the adaptations they employ to address the diverse needs of their students.

RESEARCH QUESTIONS

1. What are the lived experiences of secondary Science teachers in using the 7E's lesson plan?
2. How do secondary Science teachers cope with the challenges of using the 7E's lesson plan?
3. What are the benefits of using the 7E's lesson plan model in secondary science classrooms?



4. How do secondary science teachers adapt the 7E's lesson plan model to suit the needs of their students?

THEORETICAL LENS

This study is anchored on constructivist learning theory, which has become a prominent approach to teaching for decades. The works of Dewey (1986), Montessori (1965), Piaget (1964), Bruner (1985), and Vygotsky (1978) gave constructivist learning theory historical precedence. According to Balta (2016), the constructivist learning method is based on the notion that students actively create knowledge by fusing what they have learned thus far with what they have learned recently. Furthermore, constructivism-based education fosters students' intellectual, social, and psychological development and equips them to use it in a range of settings (Cherono, 2021). Students can work, watch, research, interact, ask questions, and communicate their expectations to everyone in a constructivist classroom.

METHODS

Research Design

This study employed qualitative research, particularly a phenomenological design. The use of a qualitative approach was appropriate in this study since it aims to explore the

experiences of the participants subjectively. Moreover, the use of phenomenological research was suitable in this approach because it aimed to acquire the finest information from the participants regarding their actual and lived experiences in utilizing the 7Es lesson plan.

Research Participants

This study involved 10 public secondary science teachers as participants. Among the teachers, five participants were interviewed in an in-depth manner, while the remaining five were interviewed as a group or through focus group discussions (FGD). Creswell (2013) emphasized that for a phenomenological investigation, a sample size of 3 to 20 is ideal.

Data Analysis

To analyze the data gathered in this study, the researcher employed the thematic analysis framework developed by Braun and Clarke (2013) which enables researchers to systematically organize, interpret, and generate themes from participants' narratives. It consists of six phases: (1) familiarizing oneself with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report.

RESULTS AND DISCUSSION

Table 1
Lived Experiences of Secondary Science Teachers in Using the 7E's Lesson Plan

Major Themes	Core Ideas
Cognitive Exhaustion	- Each phase requires activities, increasing cognitive load among teachers. - The number of steps makes teaching preparation difficult. - Feeling drained or exhausted due to the demanding nature of the 7E's format.
Instructional Compression	- Prioritizes proper discussion over activities when time runs out, indicating a fallback to traditional methods under pressure. - Delays in the early phases of the 7E's lead to the sacrifice of critical synthesis and feedback at the end.
Enhanced Student Learning	- Careful planning ensures every phase is maximized, allowing the students to respond well. - Improvising through logistical hurdles leads to a payoff in student confidence - Preparations in the 7E lesson plan help the students to be more engaged and active
Improved Instructional Efficiency	7Es lesson plan helps to make lesson more organized. - The 7Es save time and energy by focusing effort on the learning gap.

Cognitive Exhaustion

Science teachers revealed that the utilization of the 7E's lesson plan is cognitively exhausting. This is primarily due to its demanding structure that requires extensive design and planning. Moreover, in spite of its effectiveness in promoting inquiry-based learning among students, the lived experiences of the participants showed that the laborious design of the 7E's framework significantly increases their cognitive load, particularly during preparation and implementation. This finding aligns with cognitive load theory, which emphasizes that tasks involving multiple interdependent components increase intrinsic cognitive load among teachers (Paas & van Merriënboer, 2020).

Instructional Compression

Science teachers reported that when time is limited, the 7E's model is at risk of reverting to a traditional 3E or 4E model (Engage, Explain, Evaluate). Also, teachers expressed a sense of professional anxiety caused by the "pressure of coverage". This experience is aligned with the findings of Kilag et al. (2023), who reported that, while the 7E's model is theoretically ideal for science education, teachers encountered a 'temporal wall' in the Philippine secondary education context. This 'Instructional Compression' creates a paradox in which the more a teacher tries to facilitate deep inquiry (Explore), the less time they have to verify that learning occurred in the 'evaluate' phase (Teig et al., 2020).



Enhanced Student Learning

The teachers stated that careful planning acts as a cognitive blueprint. Teachers claimed that when all stages or phases are carefully planned or mapped out, the flow of the lesson becomes smooth and reduces student confusion. In line with the study's outcomes, the research from Joswick and Hulings (2023) claimed that an organized process is essential to obtain a well-structured student outcome that promotes experience and knowledge of the learners.

Improved Instructional Efficiency

This result highlights that when the 7E's are executed well, the friction of teaching decreases while the velocity of

learning increases. A primary finding within this theme is that the 7E's model provides a predictable structural roadmap that reduces instructional downtime. Teachers in the study likely shared that the transition from Engage to Explore and Explain creates a natural momentum. This finding is relevant to the study of Smith et al. (quoted by Salvetti et al., 2023), who claimed that peer cooperation improves students' conceptual comprehension, most likely as a result of conversational understanding gains or the influence of more experienced peers. Santi and Atun's (2021) research demonstrated how the 7E Learning Cycle Model improved student motivation and learning results in a Turkish classroom.

Table 2

Coping Mechanism of Science Teachers on the Challenges Encountered in Using 7Es Lesson Plan Model in Secondary Science Classrooms

Major Themes	Core Ideas
Cognitive Exhaustion to Consultation with Master Teachers and Co-teachers	- Consistently seeking support from school heads and master teachers when difficulties are encountered - Institutional support plays a vital role for an effective implementation of the 7E's lesson plan.
Structural Adaptation and Pedagogical Prioritization	- Merging the initial phases of the 7E model to ensure to facilitate the importance of the inquiry process, which is exploration. - Flexibility and patience as internal tools to handle an imperfect classroom. - A shift in strategy is essential, from difficult or complex activities to short yet engaging ones.
Strategic and Adaptive Lesson Planning to Ensure Operational Readiness	- Better planning and preparing the necessary materials ahead of time reduces problems in the classroom. - Adjusting questions and groupings to keep the 7E engine running even when faced with heavy workloads or large student numbers

Cognitive Exhaustion to Consultation with Master Teachers and Co-teachers

The results have shown that teachers became more confident in using the 7E framework if they received strong guidance and mentorship from their colleagues or experts. This finding corroborates the study of Nicol et al. (2020), who claimed that inquiry-based activities are fundamental in attaining the interest of the learners and encouraging a deeper understanding of the scientific principles. This is best when preparation is done with the help of experts to ease the difficulties in applying the 7Es framework. Moreover, Chorono (2021) stated that while ongoing professional development is essential, support systems and working with colleagues are one way of improving teaching strategies, therefore leading to improved learning outcomes.

Structural Adaptation and Pedagogical Prioritization

Science teachers in this study viewed the 7Es framework as an essential framework despite its demanding phases. Participants consistently shared that usually they breakdown the standard 7Es stages to include any essential supports to improve the teaching-learning process. This suggests that for veteran educators, the success of a lesson is not measured by adherence to the 7E sequence, but by the pedagogical prioritization of the learner's current cognitive

state. This corroborates the study of Ergin (quoted by Osanlou et al., 2024), who stated that the 7E learning cycle is a constructivist method that raises student engagement in the learning process by meeting their expectations. It includes active research skills and activities that are essential for knowledge and understanding. The 7E model focuses on how students discover new concepts and relate them to what they already know.

Strategic and Adaptive Lesson Planning to Ensure Operational Readiness

Teachers ensure readiness by using short diagnostic tasks or simple questioning to map the classroom's prior knowledge. This prevents the common pitfall of the 7E's where the Explore phase becomes chaotic because the foundational concepts were not stabilized. This is in line with the study of Yannier et al. (2021), who claimed that experiential learning is vital in promoting students' active learning and conceptual understanding. In support, a study claimed that sufficient teaching resources played a critical role in achieving a successful science education. Besides, a study revealed that promoting active learning strategies or methodologies significantly improves student outcomes, particularly in a larger context of science education (Theobald et al., 2020).



Table 3

Benefits of Using the 7Es Lesson Plan Framework In Secondary Science Classrooms

Major Themes	Core Ideas
Technology as a Pedagogical Tool for Understanding Science Concepts	- Technology is an essential element of the 7Es model because it bridges the gap between complex concepts and learner understanding. - Incorporating technology as a mechanism to support learning and exploration. - Utilization of technology, such as video simulations or applications, improves student comprehension
Assessment as a Responsive Process for Learning Enhancement	- By incorporating formative assessments, teachers can monitor and evaluate the learning of the students, thereby allowing them to adjust discussions. - The tool "exit ticket" probably functions as a bridge between understanding of the learners and teacher intervention.
Active Learning as a Pathway to Scientific Understanding	- The 7Es model shifts the focus from rote memorization to Deeper Understanding. - Learners transition from information receivers to explorers, probably increased classroom engagement and proactive discovery. - Mastery in scientific ideas and principles is reflected in the application of knowledge rather than merely recalling facts.

Technology as a Pedagogical Tool for Understanding Science Concepts

Science teachers noted the importance of digital tools as engines in achieving a successful utilization of the 7Es framework. For the participants, technology is an essential mechanism that encourages participation and provides a better understanding of the scientific ideas and principles. Notably, a study conducted by Gyampon et al. (2020) claimed that integration of technology in the 7Es framework promotes active learning and improves student engagement in science education. By using technology, teachers can able to establish and cultivate students' critical thinking, participation, and lifelong love for science exploration or inquiry. In the same manner, technology-enhance learning further provides opportunities for interactive learning that definitely cater to diverse learning styles and preferences (Kilag et al., 2023).

Assessment as a Responsive Process for Learning Enhancement

The science teacher claimed that the 7Es learning model is most effective when treated as a recursive cycle, not as a linear process. Essentially, the findings revealed that participants viewed the 7Es learning model as a powerful tool in diverse classrooms, particularly when giving assessments to

students to assess their understanding of the subject matter. This is connected with the research of Roushan and Hassan (2025), who highlighted that the 7E instructional model promotes continuous assessment and feedback throughout the learning process. Similarly, Abdullahi et al. (2021) noted that formative assessment plays a crucial role in enhancing student learning and improving knowledge retention.

Active Learning as a Pathway to Scientific Understanding

Participants shared that the 7E framework essentially promotes sustainable knowledge retention among students. This is due to the efforts made by teachers that allow the learners to use their theoretical knowledge in manipulating processes involved in real-life scenarios. The findings of the present study are consistent with the work of Lisao et al. (2023), who reported that the 7E Learning Cycle Model significantly improves students' conceptual understanding and knowledge retention by engaging learners in active learning, scientific inquiry, and real-world application of concepts. Similarly, Mekonnen et al. (2024) found that students exposed to the 7E Learning Cycle demonstrated significantly greater conceptual understanding and a reduction in misconceptions compared to those taught through traditional methods.

Table 4

Adaptation Strategies of Secondary Science Teachers in Using the 7Es Framework to Suit the Needs of the Students

Major Themes	Core Ideas
Flexible Adjustment of 7E Activities for Diverse Learners	- Adjusting lesson complexity to match students' understanding while maintaining engagement. - Applying the stages of the 7Es framework to guide instructional strategies and support all learners. - Integrating visual, auditory, and kinesthetic learning preferences throughout the 7Es learning cycle.
Guided Support for Independent Student Learning	- The lesson plan as both a strategic guide and a source of instructional confidence. - Shifting from information provider to learning facilitator. - Using the 7Es framework to promote scientific inquiry and student-centered learning.
Contextualized Inquiry Through Local and Real-Life Examples	- Context-responsive adaptation of the 7Es framework - Connecting scientific concepts to students' prior knowledge through Elicit and Engage - Localization of the 7Es framework for meaningful learning



Flexible Adjustments of 7E Activities for Diverse Learners

Curricular Elasticity suggests that the 7E model is only as effective as the teacher's willingness to modify its parts. For these science teachers, the model serves as a dynamic scaffolding tool that balances the rigor required for gifted students with the relevance required for those with learning challenges. Study revealed that some of the challenges experienced by science teachers, according to Suardana et al (2021), are that students from different socio-economic backgrounds may have varying levels of prior knowledge and experiences relevant to science concepts, impacting the "Elicit" and "Engage" phases. Manuaba's meta-analysis from 2022 highlighted the beneficial relationship between students' conceptual comprehension, critical thinking, and problem-solving abilities and active learning.

Guided Support for Independent Student Learning

Autonomy-Supportive Instructional Scaffolding is what makes the 7E model resilient in real-world secondary classrooms. It further suggests that successful instruction is highly achieved by providing students with a structural ladder in order to meet learning standards and competencies. This is tantamount to the study of Zimmerman (2017), who asserted that peer interaction or cooperation is one of the elements of a constructivist method in which students are supported through scaffolding to understand the topic or concepts. Also, interactive learning environments are crucial for encouraging student participation and developing a better comprehension of scientific ideas (Lubiano & Magpantay, 2021).

Contextualized Inquiry Through Local and Real-Life Examples

This theme reflects a shift from a purely theoretical delivery of science to a place-based pedagogical approach, where the local environment, community practices, and daily life of the students serve as the primary laboratory for learning. This reduces cognitive friction. When a learner observes a scientific phenomenon reflected in their own backyard, this helps the students move forward from being a foreign to being familiar with or masters of the topic. This is related to the outcome of Balci et al. (2021), who stated that inquiry-based learning, particularly local-based investigations or explorations, helps learners to analyze their thoughts, generate new ideas, and definitely clear misconceptions about a scientific process or phenomenon. Evidently, Fatmawati et al. (2023) supported that idea, claiming that meaningful learning experiences are critical for promoting long-term information transfer and knowledge retention.

Implication for Teaching Practice

The results of the study on the lived experiences of science teachers in using the 7Es lesson plan present numerous implications for teaching practice, especially in fostering instructional effectiveness, teacher support, and classroom improvement. First, the study suggests that science teachers should be supported in improving planning competencies that include time management and alignment of learning objectives with every stage or phase of the 7Es model. Second, there is a clear implication for continuous professional development. In this regard, training programs, workshops, as well as seminars

focusing on the practical application of the 7Es framework can probably allow the teacher to successfully implement the model. Third, the results imply that schools or institutions should bolster professional learning communities where educators can share resources, plan lessons together, and discuss effective teaching practices.

Recommendation for Future Research

Several recommendations for future research are proposed to deepen the understanding of secondary science teachers' experiences in using the 7E lesson plan. Since the participants reported experiencing cognitive exhaustion and extensive preparation demands in developing 7E lesson plans, future researchers may investigate specific strategies, interventions, or support mechanisms that can reduce teacher workload while maintaining the integrity of the 7E framework. Moreover, considering that time constraints emerged as a recurring challenge in completing all seven phases of the lesson cycle, future studies may examine innovative instructional approaches or modified 7E models that are more adaptable to limited class periods. Finally, because this study involved a limited number of participants and was not intended to generalize findings to all secondary science teachers, future research may include a larger and more diverse group of participants from different regions, school settings, and grade levels. Researchers may also explore the experiences and perceptions of students regarding the implementation of the 7E framework to provide a more comprehensive understanding of its effectiveness in science education.

Concluding Remarks

The findings revealed that the implementation of the 7E framework is both challenging and rewarding, as teachers encounter instructional complexities while recognizing its value in enhancing science teaching and learning. The study found that despite challenges such as time constraints and the demanding nature of lesson preparation, the 7E model promotes increased student engagement, active participation, effective formative assessment practices, and a more meaningful teaching-learning process. These findings affirm the potential of the 7E framework in supporting inquiry-based and learner-centered science education.

Moreover, teachers demonstrated resilience through adaptive strategies such as collaboration, flexibility, and contextualized instruction to address implementation challenges and meet the diverse needs of learners. Overall, the findings suggest that the successful implementation of the 7E framework requires continuous institutional support, enabling teachers to maximize its benefits and further improve science education outcomes.

REFERENCES

1. Abdullahi, S., Asniza, I. N., & Muzirah, M. (2021). Effect of 7E instructional strategy on the achievement and retention of students in biology in public secondary schools in Adamawa State, Nigeria. *Journal of Turkish Science Education*, 18(4), 748-764. <https://doi.org/10.36681/tused.2021.101>.
2. Agrawal, M., Sharma, B., & Kuldeep. (2025). Enhancing academic achievement in science: The impact of the 7E Learning



- Model on Upper Primary Students. *International Journal of Education and Management Studies*.
3. Balta, N., & Sarac, H. (2016). The Effect of 7E Learning Cycle on Learning in Science Teaching: A meta-Analysis Study. *European Journal of Educational Research*, 5(2), 61-72.
 4. Cherono, J. (2021). Effect of 7E Learning Cycle Model on students' academic achievement in biology in secondary schools in Kenya: A case study of Chesumei-Sub-County. University of Eldoret, Kenya.
 5. Fatmawati, B., Marzuki, M., Roshayanti, F., & Suprpto, P. (2024). Fostering students' problem-solving skills through biology learning model integrated with Kurikulum Merdeka. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 10(2), 392-403. <https://doi.org/10.22219/jpbi.v10i2.32857>
 6. Gyampon, O., Aido, B., Nyagbblosmase, G., Kofi, M., & Amoako, S. (2020). Investigating the effect of 7E learning cycle model of inquiry-based instruction on students' achievement in science. *Journal of Research and Method in Education*, 10(5), 39-44.
 7. Kilag, F., Zia-Ul-Islam, S., & Islam, F. (2023). An experimental study regarding impact of 7e's instructional model-based instructions upon student's attitude towards physical education subject at higher secondary school level. *Global Social Sciences Review*, 5(4), 137-151. [https://doi.org/10.31703/gssr.2020\(V-IV\).15](https://doi.org/10.31703/gssr.2020(V-IV).15)
 8. Lubiano, M. L., & Magpantay, S. (2021). Enhanced 7E instructional model towards enriching science inquiry skills. *International Journal of Research in Education and Science*, 7(3), 630-658. doi:10.46328/ijres.1963
 9. Nicol, D., Atnafu, M., & Woldemichael, M. (2020). The effectiveness of guided inquiry-based technology integration on pre-service mathematics teachers' understanding of plane geometry. *Journal of Pedagogical Research*, 6(4), 84-100.
 10. Osanlou, S., Cakiroglu, J., & Tekkaya, C. (2024). Engagement, exploration, explanation, extension, and evaluation (5E) learning cycle and conceptual change text as learning tools. *Biochemistry and Molecular Biology Education*, 34(3), 199-203.
 11. Paas, F., & van Merriënboer, J. J. G. (2020). Cognitive-load theory: methods to manage working memory load in the learning of complex tasks. *Current Directions in Psychological Science*, 29(4), 394-398.
 12. Rahman, S., & Chavhan, R. (2022). 7E Model: an effective instructional approach for teaching learning. *EPRA International Journal of Multidisciplinary Research*, 8(1), 339-345.
 13. Roushan, R., & Hassan, M. M. (2025). The 7E instructional model: a contemporary constructivist framework for enhancing learning outcomes in science education. *International Journal of Social Science Research (IJSSR)*, 2(6), 252-258.
 14. Salvetti O. O., & Adetunji, A. F. (2023). Comparative effect of the guided discovery (gd) and concept mapping teaching strategies on senior secondary school students
 15. Santi, M.T., & Atun, S. (2021). Learning activities based on learning cycle 7e model: chemistry teachers' perspective. *Proceedings of the 6th International Seminar on Science Education (ISSE 2020)*.
 16. Suardana, I. N., Redhana, I. W., Sudiarmika, A. A. I. A. R., & Selamat, I. N. (2021). Students' critical thinking skills in chemistry learning using local culture-based 7E learning cycle model. *International Journal of Instruction*, 11(2), 399-412.
 17. Teig, N., Scherer, R., & Nilsen, T. (2020). "I know i can, but do i have the time? the role of teachers' self-efficacy and perceived time constraints in implementing cognitive-activation strategies in science." *Frontiers in Psychology*, 10, 1697
 18. Tijap, H., & Pelgone, A. J. (2022). Filipino science teachers' needs, challenges, and practices in the new normal. *Jurnal Pendidikan MIPA*.
 19. Urdanivia Alarcon, D. A., Talavera-Mendoza, F., Rucano Paucar, F. H., Cayani Caceres, K. S., & Machaca Viza, R. (2023). Science and inquiry-based teaching and learning: A systematic review. *Frontiers in Education*, 8.
 20. Yannier, N., Hudson, S., & Koedinger, K. (2021). Active learning is about more than hands-on: a mixed-reality ai system to support stem education. *International Journal of Artificial Intelligence in Education*, 30.
 21. Zimmerman, B. J. (2017). Self-regulation of learning: process approaches to personal development. In K. R. Harris, S. Graham, and T. Urdan (Eds.). *The Educational Psychology Handbook, Volume 1: Theories, constructs, and critical issues* (pp. 399-425). Washington DC: American Psychological Association