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Qualitative Exploration of Student and Teacher Experiences with Active Learning

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Abstract

This study offers a dual-perspective, qualitative exploration of student and teacher experiences within secondary school science active learning classrooms (ALCs). While active learning is widely praised for fostering student engagement, its real-time operational challenges and systemic enablers within secondary education require deeper empirical investigation. Utilizing an in situ, face-to-face interviewing methodology conducted directly within live science sessions, this research captured the immediate cognitive, social, and emotional reflections of a participant sample comprising 120 secondary students (46 girls and 74 boys) alongside their instructional facilitators. The thematic analysis revealed a complex pedagogical ecosystem. Students reported that active learning demystified abstract scientific concepts and enhanced physical wakefulness; however, they concurrently experienced acute academic anxiety and cognitive fatigue due to the ambiguity of open-ended tasks and uneven peer group dynamics. For facilitators, the transition away from traditional lecturing induced significant professional vulnerability, characterized by heavy "front-loaded" lesson design, high-stakes multitasking, and the logistical exhaustion of continuous classroom monitoring. Furthermore, the findings indicate that physical and technological enablers—such as flexible spatial layouts and digital simulations—cannot achieve instructional efficacy in isolation. Instead, systemic bottlenecks like dense, exam-driven curricular pacing and peer friction can only be mitigated when the infrastructure is reinforced by robust, adaptive instructor scaffolding. Ultimately, this study underscores that maximizing the potential of ALCs relies on cultivating a classroom culture that explicitly supports psychological safety during productive scientific struggle, transforming active learning spaces into sustainable educational ecosystems.

Keywords*: Active Learning Classrooms; Secondary Science Education; Student Perceptions; Teacher Experiences; Qualitative Inquiry.*

Introduction

In contemporary science education, the shift from traditional, teacher-centric lecturing to student-centered inquiry has fundamentally transformed the pedagogical landscape, placing a spotlight on the architecture of the learning environment. This study offers a Qualitative Exploration of Student and Teacher Experiences with Active Learning Classrooms (ALCs) within secondary school science tracks, specifically examining how the physical and pedagogical transition affects the classroom dynamic. Utilizing an in situ, face-to-face interviewing methodology conducted directly within active sessions, this research captures the immediate, real-time cognitive and emotional reflections of a sample comprising 120 secondary school students—consisting of 46 girls and 74 boys—alongside their instructional facilitators.

By investigating the lived experiences of both groups simultaneously, this paper aims to identify the systemic challenges, such as cognitive fatigue, group work friction, and curricular time constraints, as well as the critical enabling factors—including flexible spatial configurations, psychological safety, and adaptive instructor scaffolding—that dictate the efficacy of active learning. Ultimately, this dual-perspective exploration seeks to provide educational researchers and practitioners with a nuanced framework for transforming active learning spaces from temporary instructional strategies into sustainable, holistically supported scientific learning ecosystems.

Research Objectives

1. To explore students' perceptions and experiences in active learning classrooms.
2. To examine Facilitator experiences in designing and facilitating active learning.
3. To identify the challenges and factors that enable effective active learning practices.

Research Questions

This study seeks to address this gap by exploring the following Research Questions:

1. How do students perceive their experiences in active learning classrooms?
2. How do Facilitator experience the design and facilitation of active learning?
3. What challenges and enabling factors influence active learning practices?

Literature Review

Defining Active Learning

Active learning encompasses a range of instructional strategies that position students as active participants rather than passive recipients of information. Prior research emphasizes that active learning involves meaningful activities that promote analysis, synthesis, and evaluation of ideas.

Benefits of Active Learning

Numerous studies have reported positive outcomes associated with active learning, including improved academic performance, increased engagement, and enhanced critical thinking skills. Meta-analyses have shown that students in active learning environments outperform those in traditional lectures across STEM and non-STEM disciplines.

Challenges in Implementation

Despite its benefits, active learning presents challenges. Instructors often report increased preparation time, difficulty managing group work, and concerns about student resistance. Students may initially perceive active learning as demanding or uncomfortable, particularly when expectations are unclear.

Need for Qualitative Perspectives

While quantitative evidence is robust, qualitative studies provide deeper insight into how active learning is enacted and experienced. Such perspectives are crucial for understanding contextual factors, emotional responses, and identity-related issues that influence teaching and learning practices.

Methodology

Research Design

This study employed a qualitative research design to explore participants' lived experiences with active learning in Secondary School Level.

Participants

The participant sample for this study comprised a total of 120 secondary school students (N = 120), distributed across gender lines as 46 female students (38.3%) and 74 male students (61.7%). This specific demographic distribution allowed the study to capture a diverse range of qualitative responses regarding student-centered learning.

Data Collection

To capture authentic, immediate reflections on the active learning environment, data collection was conducted directly within the science classrooms through structured, face-to-face questioning of individual students. This real-time, in-class interviewing approach allowed the researcher to engage one-on-one with 46 girls and 74 boys during or immediately following active learning sessions.

Data Analysis

To systematically process the qualitative data gathered from the in-class, face-to-face questioning of the 120 secondary science students (46 girls and 74 boys) and their instructional facilitators. Because data collection occurred within the live classroom environment, the analysis was designed to preserve the immediate, contextualized cognitive and emotional reflections of the participants while uncovering broader, overarching patterns across the entire sample.

Findings

The following findings represent the qualitative data collected through individual, in-class questioning of 120 secondary school science students (46 girls and 74 boys).

Analysis of these real-time responses indicates that while active learning classrooms significantly improve student engagement and collaborative inquiry, they also introduce distinct challenges related to cognitive fatigue, unequal group participation, and anxiety over open-ended science assessments.

Que-1 To explore students' perceptions and experiences in active learning classrooms.

Research into student perceptions within secondary school science education reveals that Active Learning Classrooms (ALCs) fundamentally alter how learners engage with scientific inquiry. When transitioning from traditional, teacher-centric models to active environments, secondary students consistently report a shift from passive rote memorization to deeper conceptual ownership. By manipulating variables through guided inquiry, peer discussion, and hands-on experimentation, students perceive science as an active process of discovery rather than a static collection of facts. However, this cognitive shift is met with a unique developmental tension; while secondary learners highly value the physical autonomy and collaborative peer interactions offered by ALCs, they concurrently express heightened anxiety regarding academic ambiguity. Because secondary performance often carries high-stakes implications for future academic tracking, students frequently experience a friction between their appreciation for collaborative exploration and their deeply ingrained desire for explicit, exam-oriented instruction

Que-2 To examine Facilitator experiences in designing and facilitating active learning.

The qualitative data regarding instructional facilitation illuminates the high cognitive load and real-time multitasking demanded of educators within the ALC environment. Facilitators describe the live classroom experience as an active process of dynamic monitoring, characterized by continuous physical movement between collaborative tables and rapid pedagogical improvisation. Rather than providing direct answers, teachers must master the complex art of formative questioning—responding to student queries with targeted prompts that sustain productive struggle. Furthermore, the findings indicate that facilitators must exert significant socio-emotional energy to manage classroom logistics; this includes navigating the fine boundary between productive collaborative noise and behavioural disruption, as well as actively mediating group dynamics to counteract unequal student participation and disengagement during lab activities.

Que-3 What challenges and enabling factors influence active learning practices?

The qualitative data collected from participants highlights a clear division between the environmental factors that enable active learning and the operational challenges that hinder its execution. On one hand, data analysis indicates that the primary enablers of effective practice include intentional pedagogical scaffolding, flexible classroom spatial layouts that promote physical mobility, and the cultivation of a psychologically safe peer environment where collaborative risk-taking is encouraged. Conversely, prominent challenges emerged regarding cognitive and logistical friction. Students and facilitators alike reported that high ambient noise levels, unequal student workload distribution during inquiry-based tasks, and the acute cognitive fatigue induced by prolonged "productive struggle" represent significant barriers that can rapidly de-attain learning objectives if left unmanaged by the instructor.

Discussion

A holistic synthesis of the findings demonstrates that the implementation of active learning within secondary science classrooms creates a highly dynamic, codependent ecosystem where student satisfaction, facilitator efficacy, and structural enablers are deeply intertwined. While the direct, in situ questioning of the 120 secondary students (46 girls and 74 boys) revealed that student-centered inquiry successfully fosters deep conceptual ownership and physical wakefulness, it concurrently induces acute academic anxiety and cognitive fatigue due to the ambiguity of open-ended science tasks. The data indicates that mitigating this student anxiety depends entirely on the facilitator's capacity to navigate their own complex professional shift; as educators transition from traditional lecturers to adaptive cognitive coaches, they face significant operational friction, intensive "front-loaded" design demands, and the logistical exhaustion of dynamic classroom monitoring. Ultimately, these findings underscore that the physical and technological enablers of the Active Learning Classroom—such as flexible seating layouts and collaborative space configurations—cannot achieve pedagogical efficacy in isolation. Instead, the systemic challenges of cognitive fatigue, peer-related group friction, and rigid, exam-driven curricular pacing can only be overcome when physical infrastructure is reinforced by robust instructor scaffolding and a classroom culture that explicitly protects and validates psychological safety during productive scientific struggle.

Implications

Implications for Teaching Practice

Clear communication of expectations, scaffolding of activities, and gradual implementation may ease student resistance. Instructors may benefit from professional development focused on facilitation and assessment in active learning contexts.

Implications for Institutions

Institutions should consider providing structural support, including flexible classroom spaces, manageable class sizes, and recognition of innovative teaching practices.

Limitations and Future Research

This study was limited to a single institution, which may affect transferability. Future research could explore longitudinal experiences, disciplinary differences, or the perspectives of graduate students.

Conclusion

This study demonstrates that active learning is broadly perceived as engaging and beneficial by both students and instructors, fostering greater participation, collaboration, and deeper understanding of course material. Students reported enhanced engagement and accountability, while instructors described a shift from content delivery to facilitation, requiring adaptation of pedagogical skills and instructional identity. However, the study also highlights challenges, including initial discomfort, classroom management, time constraints, and structural limitations such as class size and layout. Institutional support and professional development emerged as critical enablers for successful implementation.

Overall, these findings underscore that active learning is not solely an individual instructional choice but a systemic practice requiring alignment of pedagogy, resources, and institutional policies. By illuminating the experiences, perceptions, and challenges of participants, this research offers practical insights for educators and institutions aiming to design, implement, and sustain effective active learning practices in higher education.

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