

Classroom Space, Comfort, and Interaction: Challenges Encountered by Pre-Service Teachers in Facilitating Learning

Bernadette S. Binayao, PhD

Bukidnon State University, Malaybalay City, Bukidnon, Philippines

Email address: bernbinayao@buksu.edu.ph

Abstract— This study explored the challenges encountered by pre-service teachers in facilitating learning due to classroom space, comfort, and interaction constraints in public elementary schools. Utilizing Moustakas' (1994) phenomenological research design, the study examined how large class size, inadequate ventilation, and limited teacher mobility affect student engagement, instructional delivery, and classroom management. Findings reveal that restricted movement and congested seating arrangements hinder student-teacher interactions, forcing pre-service teachers to modify their teaching strategies to accommodate environmental limitations. Additionally, poor air circulation contributes to student discomfort, restlessness, and reduced focus, further impacting learning outcomes. In response, pre-service teachers employ adaptive instructional techniques, including cooperative learning, differentiated instruction, and structured classroom management strategies, to optimize student engagement despite spatial constraints. The study underscores the need for improved classroom infrastructure, flexible seating arrangements, and institutional support to create a more conducive learning environment. It also highlights the importance of training pre-service teachers in adaptive instructional approaches to equip them with the skills necessary to manage varied classroom conditions effectively. Recommendations include policy interventions to regulate class sizes, infrastructural improvements, and further research on sustainable classroom management strategies in overcrowded educational settings.

Keywords— Pre-service teachers, classroom space, student engagement, teacher mobility, instructional strategies.

I. INTRODUCTION

The classroom environment is a fundamental aspect of teaching and learning, influencing both student engagement and instructional effectiveness. The physical space, level of comfort, and opportunities for interaction within a classroom shape the quality of education experienced by students and delivered by teachers. A well-organized classroom layout allows for better mobility, improved focus, and more effective teacher-student interaction, fostering an environment conducive to meaningful learning (Barrett et al., 2015). However, when classroom space is limited, ventilation is inadequate, and seating arrangements are restrictive, both students and teachers encounter significant challenges in facilitating learning (Uline & Tschannen-Moran, 2008). These conditions often require educators, particularly pre-service teachers, to adjust their instructional methods to accommodate the realities of the learning environment (Earthman, 2004).

Classroom space plays a crucial role in determining the level of comfort and interaction within the learning environment. When classrooms are overcrowded or poorly arranged, movement becomes restricted, making it difficult for teachers to circulate, provide assistance, and monitor student engagement (Cheryan, Ziegler, Plaut, & Meltzoff, 2014). The physical comfort of students is also affected by factors such as poor ventilation, congested seating, and limited access to learning materials, which may impact their ability to concentrate and actively participate in lessons (Evans & Maxwell, 1997). Additionally, opportunities for interaction—whether between students or between teachers and students—may be hindered, affecting the dynamics of classroom discussions and collaborative learning activities (Maxwell, 2016).

Given these challenges, pre-service teachers must navigate classroom constraints while striving to implement effective teaching strategies. Their experiences in managing classroom space, ensuring student comfort, and facilitating interaction offer valuable insights into how physical environments shape instructional practices (Scott-Webber, Strickland, & Kapitula, 2014). This study seeks to explore the challenges pre-service teachers face in facilitating learning within varied classroom conditions and how these factors influence teaching effectiveness and student engagement (Gillen et al., 2007). By examining these experiences, this research aims to contribute to the ongoing discourse on classroom management and instructional adaptability, particularly in environments where space, comfort, and interaction are limited by physical constraints.

II. FRAMEWORK

This study is anchored on Vygotsky's Sociocultural Theory, which emphasizes the role of social interaction and environmental factors in learning. According to Vygotsky (1978), learning occurs within a social context, where students acquire knowledge through collaborative interactions with teachers and peers. The physical arrangement of the classroom, including space, comfort, and mobility, directly influences these interactions and can either enhance or hinder learning experiences. When classrooms are overcrowded and poorly ventilated, student engagement and teacher supervision become limited, reducing the effectiveness of scaffolding techniques that support student development (Daniels, 2016). This theory

highlights the importance of structured yet flexible learning environments, where pre-service teachers can effectively facilitate student-centered learning despite environmental constraints.

Additionally, this study is supported by Bronfenbrenner's Ecological Systems Theory, which explains how various environmental factors impact an individual's development and learning. Bronfenbrenner (1979) posits that the microsystem, which includes immediate surroundings such as the classroom, significantly influences student behavior and academic performance. A conducive learning environment with sufficient space, comfort, and structured interaction fosters positive engagement and better learning outcomes (Tudge et al., 2009). However, when these conditions are compromised due to overcrowding, poor ventilation, and limited teacher mobility, students may experience higher stress levels, reduced participation, and difficulty concentrating (Evans, 2006). This theory underscores the need for well-structured learning spaces, ensuring that pre-service teachers can implement effective instructional strategies while maintaining an inclusive and interactive classroom environment.

III. OBJECTIVES OF THE STUDY

The study explored the challenges pre-service teachers encountered in facilitating learning due to classroom space, comfort, and interaction constraints and the adaptive teaching strategies used to address the challenges and enhance student engagement.

IV. RESEARCH METHODS AND PROCEDURES

4.1 Methods

This study employed Moustakas' (1994) descriptive phenomenological research design, which focuses on exploring individuals' lived experiences to understand the essence of a phenomenon. Phenomenology, as conceptualized by Moustakas, seeks to capture participants' perceptions, thoughts, and emotions regarding a shared experience by bracketing preconceived notions and emphasizing the meaning derived from their narratives. This approach follows a structured methodology, including epoche (suspension of judgment), transcendental-phenomenological reduction (descriptive analysis of experiences), and imaginative variation (structural synthesis of meaning) to uncover the core essence of participants' experiences. By applying this research design, the study explores pre-service teachers' challenges in classroom space, comfort, and interaction, providing a deeper understanding of their perspectives and the strategies they develop in response to these challenges.

4.2 Locale and Participants

This study was conducted in public elementary schools in Malaybalay City, Bukidnon, during the school year 2024-2025, where pre-service teachers carried out their on-campus and off-campus teaching practice. While Bukidnon is generally known for its cool climate, classrooms in these schools are increasingly affected by rising student populations and climate-related changes, leading to overcrowded and less comfortable learning environments.

V. RESULTS AND DISCUSSION

For pre-service teachers, teaching in a real classroom is exciting but also comes with challenges. One of the biggest factors that affect how well students learn is the classroom environment—how big the room is, how the desks are arranged, whether there is enough space to move, and if the room is well-ventilated. These things affect how students pay attention, take part in lessons, and work together. Many pre-service teachers find that these challenges limit how they teach because they have to adjust their lessons based on the space and conditions they have. This shows how important it is for schools to have better classroom designs and enough resources to create a good learning space for both teachers and students.

Classroom size and layout affect student movement and interaction

One of the biggest challenges pre-service teachers faced is classroom size and layout. Many classrooms are too crowded, making it hard for students to move around and participate in group activities. When armchairs are placed too close together, students cannot work together comfortably, and moving around becomes a problem. Pre-service teachers notice that students struggle to engage in activities that require them to interact with classmates or use learning materials. At the same time, teachers also find it hard to move around the room to check on students. Because of this, pre-service teachers often change their teaching style, using teacher-centered methods instead of interactive activities.

Existing studies confirm that classroom size and layout significantly impact student movement, engagement, and teaching effectiveness, validating the challenges faced by pre-service teachers. Research by Turano (2005), Khatimah (2021), Noor et al. (2021), and Qamar & Nawaz (2021) highlights that well-organized classroom promote collaboration and participation, while poorly arranged, overcrowded spaces hinder interaction and mobility. Similarly, Dar & Bhat (2024) and Kamoet & Mbirithi (2024) emphasize that limited space restricts both student engagement and teacher movement, forcing educators to rely on teacher-centered methods rather than interactive activities. These findings align with pre-service teachers' experiences, where crowded classrooms make group work difficult, reduce student engagement, and limit teacher supervision, ultimately affecting learning outcomes and teaching effectiveness.

Inadequate ventilation and large class size cause discomfort, affecting focus and engagement

Another common problem is inadequate ventilation and large class size, which make classrooms hot, noisy, and uncomfortable. Many pre-service teachers have noticed that when the air in a classroom is stuffy and warm, students quickly become restless and distracted. Some students try to cool themselves by fanning with their notebooks, shifting in their seats, or looking tired. Classrooms with limited space also become too noisy, making it hard for students to listen and concentrate. Even when teachers plan engaging lessons, the physical discomfort prevents students from focusing on learning.

Research supports the negative impact of limited ventilation and classroom space on student comfort, focus, and engagement, aligning with the experiences of pre-service teachers. According to Lee and Chang (2023), overcrowded classrooms with poor air circulation often led to high CO₂ levels, exceeding recommended standards and affecting students' ability to concentrate. Similarly, studies in British primary schools found that over 75% of classrooms had unsafe CO₂ levels, causing discomfort and lower engagement, while Ferreira and Cardoso (2023) reported that excessive classroom occupancy worsens air quality, with some classrooms reaching over 5000 ppm of CO₂, far beyond the acceptable range for maintaining focus. Osai et al. (2021) also highlighted that overcrowded classrooms contribute to restlessness and reduced participation, making it difficult for students to stay engaged in lessons. These findings reinforce pre-service teachers' observations, where stuffy, hot classrooms lead to distractions, with students fanning themselves, shifting in their seats, and struggling to concentrate, even during engaging lessons. This emphasizes the urgent need for improved ventilation, better seating arrangements, and manageable student-teacher ratios to create a more conducive learning environment.

Limited teacher mobility hinders supervision and student interaction

Pre-service teachers also find it difficult to move around the classroom because of tightly packed armchairs and limited space. Walking around helps teachers check student progress, answer questions, and manage classroom behavior, but this is hard to do in a crowded room. Some students, especially those sitting in the back, may not get enough attention because the teacher cannot easily reach them. When teachers are stuck in one spot, students may lose focus because they know the teacher isn't watching closely. Since moving around is difficult, many pre-service teachers have to use their voices more to manage students, but this is not always as effective as walking around and giving direct support.

Studies confirm that limited teacher mobility in overcrowded classrooms hinders effective supervision and student engagement, aligning with the experiences of pre-service teachers. Richardson-Koehler (1988) found that limited teacher mobility restricts supervision, making it difficult to monitor student progress, provide individualized support, and maintain discipline. Similarly, Asadullah (2005) highlighted that overcrowded classrooms reduce teacher movement, negatively affecting teacher-student interactions. Further studies by Mutisya (2020) and Shah & Inamullah (2012) emphasize that teachers in congested classrooms experience stress, making it harder to offer direct support to students, particularly those seated at the back. Additionally, research indicates that when teachers are unable to move freely, they struggle to monitor student behavior and ensure discipline, reinforcing the pre-service teachers' experiences of relying more on verbal management strategies instead of direct engagement. These findings highlight the importance of well-designed classroom spaces that allow teachers to move dynamically, engage students effectively, and improve overall classroom management.

Adapting Teaching Strategies to Overcome Classroom Challenges

Pre-service teachers who encountered challenges related to classroom space, comfort, and student interaction during their teaching experience. With limited space due to the increasing number of students, movement within the classroom was often restricted, making it difficult for both teachers and learners to interact effectively. Overcrowding also contributed to physical discomfort, with poor ventilation and congested seating arrangements affecting student engagement and focus. These challenges required pre-service teachers to adapt their teaching strategies, often shifting from interactive and student-centered approaches to more structured methods due to space limitations. Their experiences provide valuable insights into how classroom conditions influence teaching effectiveness and learning outcomes.

The findings of the study on overcrowding, poor ventilation, and congested seating arrangements affecting teaching and learning are strongly supported by existing research. Yelkpiri, Namale, Esia-Dankoh, and Ofosu-Dwamena (2012) found that teachers actively adapt their instructional strategies to manage overcrowded classrooms. They employ cooperative learning, incentive-based motivation, and structured classroom management to maintain student engagement despite the spatial constraints. However, while some teachers find effective ways to optimize learning in crowded spaces, others struggle with the pressure, leading to less effective instructional practices. This aligns with the experiences of pre-service teachers who must modify their teaching styles when faced with tight classroom conditions and limited mobility.

Similarly, Lapes, Cababat, and Pespeñan (2024) emphasize that overcrowded classrooms contribute to student discomfort, fatigue, and disengagement due to poor air circulation and limited space. These physical challenges force teachers to adjust their instructional techniques to ensure students remain attentive and participative despite the environmental constraints. Laurian and Prospery (2024) further discuss the need for effective teaching strategies to counteract these issues, stressing the importance of differentiated instruction, space optimization, and active learning approaches to create a more inclusive learning environment. These studies reinforce the necessity for pre-service teachers to develop flexible and adaptive teaching techniques when dealing with classroom challenges.

Additionally, Wannarka and Ruhl (2008) highlight that seating arrangements directly impact student engagement, behavior, and comfort. Their research underscores the importance of well-planned classroom layouts in maintaining focus and participation among students. When seating is too cramped and ventilation is poor, students become easily distracted and uncomfortable, reducing the effectiveness of lessons. This supports the study's findings that pre-service teachers must modify their teaching strategies to accommodate overcrowded and physically restrictive classrooms. Addressing these challenges through strategic seating, improved airflow, and dynamic instructional methods can significantly enhance the learning experience for both teachers and students.

VI. CONCLUSIONS AND RECOMMENDATIONS

The findings of this study highlighted the significant impact of classroom space, comfort, and interaction on the teaching and learning experiences of pre-service teachers. Overcrowded classrooms, poor ventilation, and limited teacher mobility present challenges in facilitating student engagement, classroom management, and effective instructional delivery. These constraints often lead pre-service teachers to modify their teaching strategies, shifting from interactive, student-centered approaches to more structured methods due to spatial limitations. Additionally, discomfort caused by poor air circulation and congested seating arrangements negatively affects student concentration, participation, and overall learning outcomes. The study underscores the need for improved classroom design and resource allocation to support both teacher effectiveness and student learning.

Based on the findings, educational institutions should prioritize classroom improvements by ensuring adequate space, better ventilation, and flexible seating arrangements to create a more conducive learning environment. Teacher training programs should also equip pre-service teachers with adaptive instructional strategies, including cooperative learning, differentiated instruction, and classroom space optimization, to help them navigate environmental constraints effectively. Additionally, policymakers and school administrators should implement reasonable student-teacher ratios to minimize overcrowding and enhance classroom interaction and supervision. Future research could explore longitudinal studies on the effectiveness of adaptive teaching methods in various classroom settings, further contributing to the development of sustainable and inclusive educational environments.

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