



Students' Perceptions of Classroom Learning Environment in Elementary Schools

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ABSTRACT

The classroom learning environment plays an important role in supporting elementary students' learning experiences. However, studies examining students' perceptions using Barrett et al.'s Naturalness–Individualization–Stimulation (NIS) framework remain limited. This study aimed to examine elementary school students' perceptions of the classroom learning environment based on the NIS framework. A descriptive quantitative design was employed involving 145 elementary school students in Pontianak, Indonesia. Data were collected using a 32-item questionnaire and analyzed using descriptive statistics. The findings indicate that students generally perceived their classroom environment positively. Individualization received the highest mean score ($M = 3.54$), followed by Naturalness ($M = 3.44$), while Stimulation received the lowest score ($M = 3.32$). Classroom ownership and natural elements were perceived positively, whereas classroom layout, sound, temperature, color, and spatial complexity received lower evaluations. These findings suggest that students value comfortable and flexible learning environments, while limited visual and spatial stimulation may reduce classroom engagement. This study highlights *Stimulation* as the main area for improvement and provides practical guidance for optimizing classroom layouts, environmental comfort, and visual elements to better support learning.

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1. INTRODUCTION

Learning in elementary education is shaped not only by instructional methods but also by the environment in which learning occurs (Lou et al., 2023; Wibowo et al., 2025). Classroom learning environments therefore play a fundamental role in shaping students' learning experiences because the quality of the physical setting can support or hinder learning (Tobia et al., 2022; Vijapur et al., 2021). In addition to its influence on academic outcomes, the classroom environment also contributes to students' well-being, particularly through its impact on motivation (Adedokun et al., 2017). Therefore, understanding students' perceptions of the classroom learning environment provides valuable insights for designing learning spaces that better respond to students' needs (Oliveras-Ortiz et al., 2021). Moreover, students' perceptions of the learning environment provide meaningful information about the quality of the educational setting and can inform strategic decisions aimed at improving learning experiences and student outcomes (Aldridge & Blackstock, 2024).

A well-designed classroom environment has been shown to enhance students' physical comfort and psychological well-being, both of which are essential for effective learning (Honan et al., 2024; Tobia et al., 2022). Students who perceive their learning environment as comfortable are more likely to participate actively, remain engaged during classroom activities, and interact positively with their peers and teachers (Kariippanon et al., 2019; Morris & Imms, 2025). Conversely, inadequate environmental conditions, such as insufficient lighting, poor thermal comfort, limited air quality, or restricted space for movement, may reduce students' concentration, comfort, and classroom participation (Honan et al., 2024). These findings reinforce the view that the classroom environment should be regarded not merely as a physical setting but as an integral component of the teaching and learning process.

Students' perceptions of their learning environment provide valuable information for evaluating how effectively classroom environments support learning and for guiding improvements in educational practice (Aldridge & Bianchet, 2022). These perceptions reflect how students experience and interpret various classroom characteristics, including physical conditions, spatial organization, and visual features, which shape their daily learning experiences (Vijapur et al., 2021). Evidence suggests that even elementary school students actively perceive and evaluate both the structural and symbolic features of their classroom environment, highlighting the importance of incorporating students' perspectives into the design of learning spaces (Pitehnoee et al., 2020). Therefore, understanding students' perceptions is essential for developing classroom environments that are more responsive to their learning needs and experiences.

Previous studies have shown that classroom environments influence students' behavior, motivation, engagement, and overall learning outcomes (Hariyani et al., 2025; Mayasari et al., 2025). Classroom environments also contribute to students' cognitive, emotional, and social development by supporting positive learning experiences (Kariippanon et al., 2019). Furthermore, students' perceptions have been recognized as valuable indicators for evaluating classroom learning environments because they reflect important classroom experiences, including teacher support, peer relationships, involvement, and differentiated instruction (Cai et al., 2022).

While many studies have examined classroom environments in relation to learning outcomes, fewer have investigated how elementary school students perceive multiple physical classroom dimensions simultaneously. Most previous studies have focused on learning outcomes or general classroom conditions rather than investigating how students

perceive multiple dimensions of the physical classroom environment simultaneously. In particular, the integrated dimensions of Naturalness, Individualization, and Stimulation (NIS), despite representing key aspects of classroom design, have received relatively limited attention in studies examining elementary students' perceptions of classroom environments (Bautista & López-Costa, 2025). Therefore, examining students' perceptions through the NIS framework can provide a more comprehensive understanding of how classroom environments support elementary students' learning experiences.

To better understand how physical classroom environments support learning, several conceptual frameworks have been proposed to evaluate classroom design. One of the most widely adopted frameworks is the Naturalness, Individualization, and Stimulation (NIS) framework developed by Bautista & López-Costa (2025), which explains how environmental quality, spatial flexibility, and visual complexity contribute to students' learning experiences. Recent literature has continued to recognise these three dimensions as essential components of the physical learning environment and as important factors associated with students' psychosocial learning experiences (Baars et al., 2021).

The NIS framework conceptualizes classroom quality through three complementary dimensions: naturalness, Individualization, and stimulation. Naturalness emphasizes environmental conditions such as lighting, thermal comfort, air quality, acoustics, and natural elements that support students' comfort and learning (Sun & Firzan, 2024). Individualization concerns classroom ownership, layout, and flexibility, enabling students to interact with and adapt the learning space according to their needs (Sun & Firzan, 2024). Stimulation focuses on visual and spatial characteristics, including color and environmental complexity, which contribute to students' attention, engagement, and learning performance (Appiah-Kubi et al., 2026). Together, these dimensions provide a comprehensive perspective for understanding students' experiences of classroom environments.

This gap highlights the need for further investigation to better understand how these elements are perceived by students and how they contribute to the learning process. Based on this background, this study aims to examine elementary school students' perceptions of classroom environments through the dimensions of Naturalness, Individualization, and Stimulation (NIS) and to provide empirical evidence that can inform the design of more supportive classroom learning environments.

2. METHODS

This study employed a descriptive quantitative research design to explore students' perceptions of the classroom learning environment in elementary schools. This design was selected because it enables the systematic description of students' perceptions using numerical data, allowing researchers to identify patterns across different aspects of the classroom learning environment.

The study was conducted at an elementary school in Pontianak and included 145 valid student responses. Participants were selected using a purposive sampling technique, targeting students who were able to understand and complete the questionnaire independently. Only questionnaires with at least 75% of the items completed were included in the analysis, while incomplete questionnaires were excluded.

Data were collected using a structured questionnaire consisting of 32 items measured on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The questionnaire was developed based on the classroom environment framework proposed by Bautista & López-Costa (2025), encompassing three dimensions, see **Table 1**: Naturalness (15 items), Individualization (11 items), and Stimulation (6 items). To ensure content

validity, the questionnaire items were developed based on the theoretical framework and refined to ensure their suitability and clarity for elementary school students. The internal consistency of the instrument was assessed using Cronbach's alpha, yielding a value of 0.880, which indicates good reliability.

Table 1. Dimensions, Elements, and Number of Questionnaire Items

Dimension	Elements	Number of Items
Naturalness	Lighting, Air Quality, Temperature, Sound, Natural Elements	15
Individualization	Ownership, Layout, Flexibility	11
Stimulation	Color, Complexity	6
Total		32

Prior to data collection, the questionnaire was administered with guidance to ensure that students clearly understood each statement. This step was important considering the age of the respondents, as elementary school students may require additional explanation to interpret the questionnaire items accurately. The data collection process was conducted during school hours in a controlled classroom setting to minimize external disturbances and ensure consistency across respondents.

The data were analyzed using descriptive statistical techniques to identify overall patterns in students' perceptions. The mean score for each respondent was first calculated based on all questionnaire items, and then aggregated to obtain mean values for each aspect and each element of the classroom environment. This approach allows for a more detailed understanding of how different components of the classroom environment are perceived by students.

The interpretation of the mean scores was based on Likert scale intervals, see **Table 2**. The interval width was calculated using the formula (maximum score – minimum score) divided by the number of categories, resulting in an interval value of 0.8. Based on this calculation, the categories were defined as follows: 1.00–1.80 (strongly disagree), 1.81–2.60 (disagree), 2.61–3.40 (neutral), 3.41–4.20 (agree), and 4.21–5.00 (strongly agree). These categories were used to interpret the level of students' perceptions across different aspects and elements of the classroom environment.

Table 2. Likert Scale Interpretation

INTERVAL	CATEGORY
1.00—1.80	Strongly Disagree
1.81—2.60	Disagree
2.61—3.40	Neutral
3.41—4.20	Agree
4.20—5.00	Strongly Agree

3. RESULTS AND DISCUSSION

3.1. Students' Perceptions of Classroom Learning Environment

To address the research objective of describing students' perceptions of the classroom learning environment, the analysis focused on three key aspects: naturalness, individualization, and stimulation. These aspects represent important dimensions of the classroom environment that influence students' learning experiences and provide an

overview of how students perceive the quality of their learning spaces. Descriptive statistics were used to summarize students' responses across these aspects. The summary of students' perceptions of the classroom learning environment is presented in **Table 3**.

Table 3. Summary of Students' Perceptions of the Classroom Learning Environment

Aspect	Mean (M)	Category
Naturalness	3.44	Agree
Individualization	3.54	Agree
Stimulation	3.32	Neutral

The results are categorized into three main aspects: naturalness, individualization, and stimulation. Overall, the findings indicate that students tend to have positive perceptions of their classroom environment, although variations are observed across different aspects. The individualization aspect shows the highest mean score ($M = 3.54$), which falls into the "agree" category. This indicates that students generally perceive that element such as classroom ownership, layout, and flexibility support their learning activities. A well-organized and flexible classroom arrangement allows students to interact more comfortably and participate more actively during the learning process.

The naturalness aspect also demonstrates a positive perception ($M = 3.44$), which is categorized as "agree." This suggests that environmental factors such as lighting, air quality, temperature, and sound are generally perceived as comfortable by students. These physical conditions contribute to creating a conducive learning atmosphere, enabling students to maintain focus and engagement during classroom activities. In contrast, the stimulation aspect shows a relatively lower mean score ($M = 3.32$) and falls into the "neutral" category. This indicates that visual elements such as color variation and spatial complexity have not been fully optimized to support students' learning experiences. The limited presence of stimulating visual elements may reduce students' interest and engagement in the classroom. Overall, these results indicate that while the classroom environment is generally perceived positively, certain aspects, particularly stimulation, still require improvement to better support students' learning experiences, see **Table 4**.

Table 4. Mean Scores of Classroom Environment Elements by Category

Aspect	Element	Mean (M)	Category
Naturalness	Lighting	3.54	Agree
	Sound	3.10	Neutral
	Temperature	3.17	Neutral
	Air Quality	3.52	Agree
	Natural Elements	4.05	Agree
Individualization	Ownership	3.76	Agree
	Layout	3.39	Neutral
	Flexibility	3.50	Agree
Stimulation	Complexity	3.38	Neutral
	Color	3.27	Neutral

In addition to the general findings across the three main aspects, a more detailed examination of individual classroom environment elements provides deeper insights into students' experiences. The analysis reveals that not all elements within each aspect contribute equally to students' perceptions of the learning environment. The detailed

analysis of each classroom environment element is presented in **Table 4**. The findings show variations across elements within each aspect.

Within the naturalness aspect, the presence of natural elements shows the highest mean score ($M = 4.05$), indicating that students strongly appreciate environmental features that create a more natural and comfortable atmosphere. This finding suggests that incorporating elements such as greenery, natural light, or connections to outdoor environments can positively influence students' well-being and engagement. In contrast, sound ($M = 3.10$) and temperature ($M = 3.17$) receive relatively lower scores, falling into the neutral category. This indicates that auditory and thermal conditions may not yet fully support students' comfort, potentially affecting their concentration during learning activities. These findings highlight the importance of managing environmental factors that are often less visible but have a direct impact on students' sensory experience.

In the individualization aspect, ownership emerges as the most positively perceived element ($M = 3.76$), suggesting that students feel a sense of belonging within their classroom environment. This sense of ownership can contribute to increased motivation and responsibility toward the learning space. Flexibility ($M = 3.50$) is also perceived positively, indicating that students benefit from classroom environments that allow adaptable arrangements and varied learning activities. However, layout ($M = 3.39$) falls into the neutral category, suggesting that the spatial organization of the classroom may not fully support students' movement and interaction. This indicates a need for more thoughtful spatial planning to enhance functionality and student engagement.

The stimulation aspect shows consistently lower scores across its elements, with both complexity ($M = 3.38$) and color ($M = 3.27$) categorized as neutral. This suggests that visual and aesthetic elements in the classroom environment have not yet been fully utilized to support learning. While overly complex environments may cause cognitive overload, insufficient visual stimulation may also reduce students' interest and engagement. Therefore, achieving an appropriate balance between simplicity and visual richness is essential in designing effective classroom environments.

Overall, the detailed findings indicate that students' perceptions of the classroom environment are influenced by a combination of physical comfort, spatial flexibility, and visual experience. While certain elements such as natural features and classroom ownership are already well perceived, other elements, particularly those related to sensory comfort and visual stimulation, require further improvement. These results emphasize the need for a more holistic approach in classroom design, integrating environmental, spatial, and aesthetic considerations to better support students' learning experiences.

3.2 Discussion

The findings of this study highlight the important role of the classroom environment in supporting students' learning experiences in elementary education. The high perception of the individualization aspect indicates that students value classroom environments that allow flexibility, interaction, and a sense of ownership. This suggests that adaptive and student-centered classroom layouts can enhance students' engagement and participation during learning activities. In such environments, students are not only passive recipients of information but are also encouraged to actively participate and interact with their peers. This finding is consistent with previous studies emphasizing that flexible learning spaces can support collaboration and active learning (Kariippanon et al., 2019). Furthermore, flexible classroom arrangements enable a wider range of learning activities and promote interaction among elementary school students (Vijapur et al., 2021). In addition, classroom

environments that provide flexible furniture configurations and sufficient space for movement support pedagogical agility, collaborative learning, and student engagement across a variety of instructional activities (Lee, 2023). The use of flexible furniture also contributes to more active, inclusive, and student-centered learning compared to traditional classroom layouts, which tend to be more rigid and individualistic (Morris & Imms, 2025). This indicates that spatial adaptability is a key factor in creating learning environments that accommodate diverse student needs.

Similarly, the positive perception of naturalness suggests that basic environmental conditions, such as lighting, air quality, temperature, sound, and access to natural elements, play a crucial role in supporting students' comfort and well-being. These elements form the foundation of a conducive learning environment, as they directly affect students' physical and psychological conditions. Previous studies have shown that factors such as balanced lighting distribution, appropriate light intensity, and reduced glare are important for maintaining concentration and minimizing visual fatigue in classroom settings (Lakman & Mokhtar, 2024). In addition, noise levels have been identified as a key factor affecting students' ability to concentrate during learning activities (Dalimunthe & Sari, 2020). Good air quality is also associated with improved health conditions, which can indirectly influence students' academic performance (Honan et al., 2024). Moreover, integrating opportunities for students to connect with nature has been found to support psychological well-being in an efficient and accessible way (Harvey et al., 2020). These findings reinforce the idea that a well-maintained physical environment contributes to a more conducive learning atmosphere, supporting both concentration and overall learning experiences (Bautista & López-Costa, 2025). In this context, maintaining basic environmental quality should be considered a priority in classroom design and management.

However, the relatively lower score in the stimulation aspect indicates that visual and spatial elements in the classroom have not yet been fully optimized. Elements such as color variation and spatial complexity have the potential to enhance students' interest and motivation; however, their limited presence may reduce engagement during classroom activities. This finding aligns with previous research suggesting that visual elements in elementary school classrooms provide only partial support for learning (Loyong et al., 2026). In addition, an appropriate balance between color simplicity and spatial complexity can help improve focus and reduce students' cognitive load (Loyong et al., 2026). This implies that classroom design should not only prioritize functionality but also consider how visual elements can stimulate students without causing distraction. A classroom that is too plain may fail to capture students' attention, while an overly complex environment may overwhelm them. Therefore, careful consideration is needed to achieve an optimal balance that supports both engagement and concentration.

Overall, although the classroom environment is generally perceived positively, improvements are still needed, particularly in enhancing visual and spatial stimulation. Creating a balanced classroom environment that integrates comfort, flexibility, and visual engagement can better support students' learning processes. This finding is consistent with previous studies indicating that classroom environments integrating flexibility, visual quality, and effective spatial organization enhance students' interaction, engagement, and overall learning experiences (Ali et al., 2026). These findings also highlight the importance of adopting a holistic approach to classroom design, in which physical, spatial, and aesthetic elements are considered interconnected components. Therefore, educators and schools should consider not only functional aspects but also the aesthetic and experiential qualities

of classroom environments. By doing so, learning spaces can better support students' engagement, comfort, and meaningful learning experiences.

Based on the findings, classroom improvement efforts should primarily focus on elements that received relatively lower evaluations, particularly classroom layout, sound, temperature, color, and spatial complexity. Although students generally perceived the classroom environment positively, optimizing these elements may further enhance students' comfort, interaction, and engagement. Therefore, schools should prioritize flexible classroom layouts, improve environmental comfort through adequate lighting, ventilation, and acoustic management, and incorporate balanced visual elements such as educational displays and appropriate color schemes to create more engaging learning environments.

4. CONCLUSION

This study explored elementary school students' perceptions of the classroom learning environment based on the dimensions of Naturalness, Individualization, and Stimulation (NIS). The findings indicate that students generally perceived their classroom environment positively, particularly regarding naturalness and Individualization, while stimulation remained the least positively perceived aspect, indicating the need for improvements in classroom visual and spatial design. These findings contribute to classroom environment research by providing empirical evidence from students' perspectives using the NIS framework, highlighting stimulation as a priority for future classroom development. Practically, schools and teachers should optimize classroom layouts, environmental comfort, and balanced visual elements to create learning environments that better support students' engagement and learning experiences. Future research is recommended to examine the effectiveness of specific classroom design interventions across different educational contexts.

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