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The Impact of Color and Interior Design of School Spaces on Students' Psychology and Learning

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ABSTRACT

This article comprehensively examines the impact of various interior design elements—such as color, lighting, ventilation, acoustics, layout, furniture, and material selection—on students' behavior, psychology, and academic performance in educational environments. The main objective of the research is to analyze the role of physical environments in enhancing learning quality, mental health, social development, and creativity, and to provide practical solutions for improving school interior design. The research methodology is mixed (theoretical and field-based), combining a literature review with interviews with teachers, distribution of questionnaires among students and teachers, direct observation, and statistical data analysis. The findings reveal that a well-designed physical environment can enhance motivation, reduce stress, improve concentration, foster social interaction, develop talents, and boost academic performance. The study also emphasizes the importance of natural light, purposeful color schemes, proper ventilation, noise control, flexible layouts, and human-centered design in educational spaces. Practical recommendations for creating effective, dynamic, and inspiring learning environments are provided at the end.

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Introduction

Designing educational spaces goes beyond merely arranging desks or choosing wall colors. These spaces should align with students' physical, psychological, and cognitive needs. Behavioral science studies suggest that well-designed educational environments can enhance students' motivation, social interaction, and concentration (Woolner et al., 2007). Proper classroom design plays a significant role in reducing anxiety, increasing the sense of belonging, promoting active learning, and encouraging creativity. This research aims to establish a practical framework for optimizing school environments by analyzing interior design elements in detail.

Research Significance

Humans are highly influenced by their surrounding environments, particularly in educational spaces where students spend much of their day. Educational spaces must not only meet functional and academic needs but also positively influence psychological and cognitive aspects. Interior design elements such as color, lighting, ventilation, layout, and acoustics can have direct and indirect effects on students' mental states, focus, motivation, and ultimately academic performance (Barrett et al., 2015). Therefore, examining this subject from behavioral, psychological, and environmental perspectives is essential.

Research Problem

Despite growing attention to educational space quality, many schools still lack interior designs that consider students' psychological and cognitive needs. Numerous learning environments fail to meet criteria that facilitate academic improvement. However, studies have shown that proper educational design significantly impacts student behavior and performance (OECD, 2017). The absence of a comprehensive, environmentally psychological design model for schools remains a key challenge in this field.

Research Objective

This study aims to develop interior design criteria for school environments that enhance students' mental health, concentration, motivation, and productivity. By analyzing various learning environment dimensions and their impacts, the research proposes strategies for improving school interior quality.

Literature Review

Numerous studies have explored the connection between the physical environment of schools and student academic performance. For example, Earthman (2002) highlights the relationship between school facility conditions and student scores. Woolner et al. (2007) emphasize the importance of learning environment design in motivating students, reducing anxiety, and promoting social interactions. Barrett et al. (2015) specifically address how classroom design elements like lighting, color, ventilation, and layout collectively influence academic performance. This study builds upon previous findings to localize and integrate those standards within the context of Iranian schools.

Methodology

1. Theoretical Approach:

This section examines previous studies in environmental psychology, human behavior, and interior design. These sources include academic articles, psychological research, and evidence demonstrating the influence of the physical environment on learning and behavior (Tanner, 2009; Yildirim et al., 2011).

2. Analytical Approach:

Field data were collected through questionnaires distributed to students and teachers, then statistically analyzed to determine correlations between interior design elements and students' psychological and academic responses.

Findings

1. Colors

Colors are among the most influential elements in learning environments, affecting not just decoration but mood and behavior. Color impacts emotions and physiology, influencing mood states and performance.

- Physiological and Psychological Responses:

Colors trigger both physiological and emotional responses. Studies show color can alter blood pressure, eye fatigue, and brain activity. Warm, bright colors stimulate the nervous system, while cool, soft colors have a calming effect. For instance, red can increase heart rate and blood pressure, whereas blue can slow the heartbeat and reduce body temperature.

- Cool Colors (Green, Blue, Purple):

Table 1. Colure

Purple	Blue	Green

- o Encourage calmness and introspection
- o Promote openness and freedom
- o Green is the most restful color for the eyes
- o Blue can help calm hyperactive students
- o Boost creativity and performance, especially with blue
- o Enhance individual productivity and social adaptability
- o Classrooms painted in light blue, yellow, yellow-green, and orange improved students' IQ and creativity

- Warm Colors (Red, Orange, Yellow):

Yellow	Orange	Red

- o Stimulate mental activity and excitement
- o Yellow stimulates the nervous system, representing energy and intelligence
- o Orange signifies creativity and sociability, linked to children's activity
- o Red can increase aggression but also attention and engagement
- o Effective for tasks requiring high attention and information retention

- Neutral Colors (White, Gray):

Gray	White

- o Can cause fatigue and boredom
- o Increase irritability and reduce concentration
- o Score lower in "social adaptability" and "individual productivity"

o White walls with high reflectance can strain the eyes and disrupt vision

2. Space Dimensions

• Appropriate Classroom Size:

Adequate classroom dimensions significantly affect student comfort and focus. Each student should have at least 1.5 m² of space to ensure proper light and air circulation. Proportional space per student is essential for movement and social interaction (Earthman, 2002).

• Overcrowded Spaces:

Crowded classrooms lead to stress, reduced concentration, and aggressive behaviors. Research suggests 1.5 to 2 m² per student is ideal to prevent fatigue and restlessness (Tanner, 2009).

• Open Spaces:

Spacious classrooms enhance comfort, safety, and reduce anxiety. Students feel more relaxed and can concentrate better in larger environments (OECD, 2017).

3. Lighting

Lighting has a more substantial impact than any other design element. Understanding how light interacts with a space helps architects improve performance. According to Tanner, "Light, after food and water, is the most important environmental input in regulating body functions."

• Natural vs. Artificial Lighting:

Although both are used in schools, natural light is superior due to its psychological and physiological benefits. It enhances visual comfort, mood, and alertness more than artificial lighting (Barrett et al., 2013).

• Benefits of Natural Light:

Natural light improves learning performance, alertness, cognitive abilities, behavior, mood, circadian rhythms, and productivity. Proper daylighting in classrooms improves well-being and visual quality, which artificial light cannot replicate cost-effectively.

4. Ventilation

Classroom air quality directly affects students' physical and mental health. Poor ventilation can lead to drowsiness, fatigue, headaches, and decreased concentration. Natural ventilation through properly designed windows, combined with mechanical systems, can create a healthy, energized atmosphere. In polluted urban areas, effective air filtration becomes essential (Bakó-Biró et al., 2012).

5. Acoustic Environment

Noise pollution is a major challenge in educational settings. Disruptive sounds from streets, hallways, or even classmates can interfere with learning. Using sound-absorbing materials, double-glazed windows, and acoustically optimized wall and ceiling designs reduces noise and improves focus. Good acoustics increase verbal comprehension, enhance teacher-student interaction, and reduce stress (Shield & Dockrell, 2003).

6. Layout and Furniture

• Classroom Layout:

Flexible layouts should accommodate diverse learning needs. Circular and group arrangements foster student participation and interaction. Movable furniture allows for quick adaptation to different teaching styles (Barrett et al., 2015).

• Ergonomic Furniture:

Furniture must be ergonomic and comfortable to prevent physical discomfort like back and neck pain. Adjustable chairs and desks help improve posture and concentration. Lightweight, mobile furniture allows for flexibility in classroom design (Woolner et al., 2007).

- Psychological Impact of Layout and Furniture:

Well-designed classroom layouts reduce anxiety and promote a sense of belonging. Proper student spacing and designated social areas foster positive interactions and reduce behavioral issues (OECD, 2017).

7. Textures and Materials

Using natural textures such as wood, fabric, or warm surfaces in school interiors makes environments feel more human and inviting. These materials can reduce the stress associated with sterile and formal spaces.

Conclusion

The findings of this study demonstrate that interior design in schools significantly affects students' learning, behavior, and mental well-being. Elements like color, light, sound, ventilation, and space—individually and interactively—can create either positive or negative learning environments. While elements like neutral colors, poor lighting, noise, and inadequate ventilation may cause anxiety, boredom, and academic decline, thoughtful design can enhance academic performance, motivation, positive interactions, and overall well-being.

Cultural, climatic, and age-specific needs must also be considered. Future research could explore the effects of interior design on different age groups, special education schools, or informal learning environments. Collaboration between designers, psychologists, and education officials is key to creating human-centered and effective learning spaces.

Practical Recommendations for School Interior Design

Based on the findings, the following recommendations are proposed for improving educational interior environments:

1. Purposeful Use of Color:
   - o Use cool colors (blue, green) for high-concentration classrooms (math, science)
   - o Use warm colors (yellow, orange) for arts and group activities
   - o Avoid overuse of dark or neutral tones; combine with energizing colors (Yildirim et al., 2011)
2. Maximize Natural Light:
   - o Incorporate large windows, semi-transparent curtains, and strategic desk placement to utilize daylight effectively (Tanner, 2009)
3. Effective and Sustainable Ventilation:
   - o Use a combination of natural and mechanical systems, along with air quality monitoring, to ensure healthy classroom air (Bakó-Biró et al., 2012)
4. Acoustic Design:
   - o Install ceiling and wall sound-absorbing panels, use double-glazed windows, and ensure classroom sound isolation to reduce noise and improve learning quality (Shield & Dockrell, 2003)
5. Flexible Classroom Layouts:
   - o Use mobile furniture, modular desks, and multifunctional spaces to accommodate diverse teaching and learning styles (Barrett et al., 2015)
6. Open and Collaborative Spaces:

o Create additional areas beyond traditional classrooms for group work, individual study, or short breaks to reduce student stress and promote engagement (OECD, 2017)

References

[1] Bakó-Biró, Z., Clements-Croome, D. J., Kochhar, N., Awbi, H. B., & Williams, M. (2012). Ventilation rates in schools and learning performance. Building and Environment, 48, 215–223
[2]Barrett, P., Zhang, Y., Davies, F., & Barrett, L. (2015). Clever classrooms: Summary report of the HEAD Project. University of Salford, Manchester.
[3]Barrett, P., Zhang, Y., Moffat, J., & Kobbacy, K. (2013). A holistic, multi-level analysis identifying the impact of classroom design on pupils' learning. Building and Environment, 59, 678–689.
[4]Earthman, G. I. (2002). School facility conditions and student academic achievement. UCLA's Institute for Democracy, Education, and Access (IDEA).
[5]OECD (2017). The OECD Handbook for Innovative Learning Environments. OECD Publishing
[6]Shield, B. M., & Dockrell, J. E. (2003). The effects of noise on children at school: A review. Building Acoustics, 10(2), 97–116
[7]Tanner, C. K. (2009). Effects of school design on student outcomes. Journal of Educational Administration, 47(3), 381–399.
[8] Woolner, P., Hall, E., Higgins, S., McCaughey, C., & Wall, K. (2007). A sound foundation? What we know about the impact of environments on learning and the implications for Building Schools for the Future. Oxford Review of Education, 33(1), 47–70.
[9]Yildirim, K., Hidayetoglu, M. L., & Capanoglu, A. (2011). The effects of color and light on indoor wayfinding and the evaluation of the perceived environment. Journal of Environmental Psychology, 31(3), 333–342.