

The effect of partial-landscape of educational buildings on the vitality of students (case study: Faculty of Engineering in Malayer University)

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Detailed abstract

Introduction

Educational buildings and universities, due to the daily presence of students and the fact that they spend half of their day there, are among the main places for students to interact and flourish. It is necessary that their building not only physically contain students, but can play an effective role as a second home in the field of students' flourishing and growth in all fields, especially their psychological development. Universities that fail to create an inviting and engaging environment will quickly become boring for students. A lack of vitality in the educational environment not only reduces motivation to learn, but also limits social interaction and cooperation among students, a situation that can directly affect the individual and group progress of students and the quality of their academic performance. Therefore, a purely academic and educational view of universities, without considering the psychological and environmental dimensions, will not meet the needs of today's students. In addition to meeting physical needs, appropriately designed educational buildings can help improve students' mood, increase vitality, and enhance their motivation to learn. Among the factors affecting this is the landscape of these buildings. The present study focuses on the effect of color and skyline variables of educational buildings (including variables that shape the physical appearance of these buildings) on students' vitality. Therefore, in this study, the relationship between physical-visual features including four colors (such as gray, white, red, and cream) and seven skyline graphic patterns in educational buildings, with variables such as happiness and positive emotions, attention and concentration, dynamism and attractiveness, and social interaction (which collectively can shape the concept of vitality) was examined.

Materials and Methods

In total, 28 simulated images of the building facade were prepared. These images were evaluated by students (students aged 18-30 years old who were relatively familiar with the study context) through the online platform. The study site in this research was the Faculty of Civil Engineering and Architecture of Malayer University. The facade of this building is considered to be relatively traditional and uses colors common in educational spaces. The simplicity of the building's facade and its soft coloring provided the opportunity for future changes and transformations. Given this potential, the aim of this study was to select a more desirable color combination and design a more attractive and motivating skyline for student spaces. This research was conducted relying on the Delphi and descriptive-analytical methods, and based on Comparison of repeated measurement means, Bonferroni post-hoc test and SPSS software analytical graphs. This methodological design and structure enables the examination of the impact of visual variables of the building façade—such as façade color and skyline profile—on students' psychological perceptions and levels of vitality. The validity of the present study was established through an iterative Delphi process involving the researcher and experts to refine the indicators, questions, simulation approach, and measurement methods. Cronbach's alpha statistic was used to assess the reliability of

the research questions; the values obtained for the dependent variables—namely happiness and positive emotions, attention and concentration, dynamism and attractiveness, social interactions, and aggregate vitality—were 0.924, 0.930, 0.929, 0.928, and 0.932, respectively (with a combined alpha of 0.953 for all five variables). Since all values exceeded 0.7, the reliability of the instrument was confirmed. In fact, Statistical analysis was conducted using the repeated measures test—including sub-tests such as Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root—along with the Bonferroni post-hoc test, to analyze the status of each of the five dependent variables based on the grouping variables of color (4 categories) and skyline (7 categories) (Simultaneous and separate examination of the effects of color and skyline). Thus, each of the dependent variables—happiness and positive emotions, attention and concentration, dynamism and attractiveness, social interactions, and vitality—was evaluated individually using a repeated-measures test, once based on the categorical variable of color and once based on the categorical variable of skyline shape; additionally, the dependent variable of vitality (the study's primary, aggregate dependent variable) was evaluated by simultaneously considering the effects of color and skyline. In fact—following consultation with measurement and assessment specialists—a repeated measures test was employed here; this is because variations in the skyline's shape and color, along with the evaluation of the resulting images by the same participants, constitute repeated measurements from those individuals, meaning the classification variables are not independent.

Findings

Overall, the analytical results of the present study indicated that, based on a separate analysis of the color grouping variable (four conditions), there were significant differences in the scores for the dependent variables—happiness and positive emotions, dynamism and attractiveness, and social interaction—associated with the independent variable of color. Separate analyses of the color grouping (4 variants) and skyline graphic (7 variants) variables revealed significant differences in the scores for the dependent variables—concentration, attention, and perceived vitality—across the levels of each independent variable. This suggests that the chosen color and skyline categories were appropriate for the study of vitality among students (though the results indicated that the building facade color had a more pronounced impact on the vitality perceived by students viewing the educational building than the skyline profile did).

Discussion

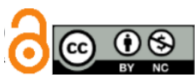
One of the limitations of the present study is the restricted range of physical variations, such as color palettes and skyline patterns, examined, which stemmed from an analysis of the forms of educational buildings within the study context (these two parameters being the ones that most capture students' attention regarding the facades of such buildings). Future studies could assess a broader spectrum of color and skyline variables by expanding the range of building uses under investigation. Another limitation of the present study was the use of a virtual environment and simulated images as a substitute for the real-world setting. While this simulation enabled the researchers to apply a diverse range of colors and skyline configurations—and despite the fact that simulated environments and images are a common method for examining environmental impacts on human perception—it nonetheless warrants mention as a study limitation. Future researchers could address these limitations to enhance the comprehensiveness and validity of the findings.

Conclusion

The results of this research generally indicated that warm, soft and neutral colors (such as white and cream) and convex sky lines (such as round and triangular convex sky lines) had the highest vitality, and cold, soft and warm, dense colors (such as gray and red) and concave and stepped sky lines (such as round and concave, triangular and concave and convex stepped) had the lowest vitality among the surveyed population. The subject of this study, if

repeated in future studies conducted in other contexts and climates and trying to cover the possible limitations of such research (and even if generalized to educational buildings specific to different age groups such as types of schools), could provide more guiding principles for design for managers and decision-makers of educational buildings. Given that most educational buildings use the repeated type pattern in the landscape and façade, there is a noticeable gap in the knowledge of this field for such studies. Also, using the results of the present study, if further investigated in future studies, can provide strategies for the School Renovation Organization, decision-makers, and consulting designers of this organization, both in the process of renovating existing educational buildings and in the process of designing newly constructed educational buildings.

Keywords: Educational building, Facade, Color, Skyline, Vitality.



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