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Student Preferences in Shaping the Learning Space and Their Impact on the Educational Process

ABSTRACT

The physical environment in which learning takes place has increasingly been recognized as an important factor influencing students' motivation, emotions, and academic performance. Contemporary approaches to the design of educational environments emphasize the need for evidence-based planning that considers students' experiences and learning preferences. The aim of this study was to identify the spatial characteristics that students perceive as contributing most significantly to productive learning and to examine how different design elements influence their perception of educational spaces. The research was conducted through a questionnaire administered to fifty students of the Faculty of Technical Sciences, University of Novi Sad. The survey investigated students' preferences regarding learning methods, spatial organization, environmental comfort, collaborative spaces, and architectural characteristics of learning environments. The collected data were analyzed using descriptive statistical methods and interpretation of students' evaluations. The findings indicate that students consider individual learning to be the most productive learning approach, while learning during lectures received the lowest evaluation. Functional characteristics of learning environments, particularly ergonomic furniture, adequate thermal comfort, and appropriate equipment, were identified as the most influential factors affecting learning productivity. Conversely, decorative elements such as colors and interior aesthetics were found to have a considerably lower impact. Nevertheless, students expressed a clear preference for modern, well-lit, technologically equipped learning environments and recognized the value of dedicated spaces for relaxation and informal interaction as contributors to collaboration, knowledge exchange, and academic motivation. The results suggest that improvements to higher education learning environments should prioritize functionality, comfort, and adaptability rather than purely aesthetic interventions. The study contributes to the growing body of research supporting evidence-based design approaches in educational space design and provides practical guidelines for the planning and renovation of university learning spaces.

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KEY WORDS
Learning environments, higher education, learning productivity, educational space, students' perceptions

1. Introduction

University learning spaces support more than scheduled teaching: they also accommodate individual study, collaborative work, informal exchange and access to learning resources. As educational practices change, the design of these spaces must account for activities and users rather than only visual appearance. Brown (2005) argues that formal and informal spaces should be considered as parts of an integrated learning environment, while Temple (2008) emphasizes their role in the wider university community.

Researchers have examined the relationship between spatial characteristics and learning using several approaches. In his study, Brooks (2011) investigated outcomes in contrasting formal learning environments. Barrett et al. (2015) reported associations between classroom design and academic progress among primary-school pupils; their findings provide a broader environmental-design perspective, although they cannot be transferred directly to university students. Research focused specifically on higher education indicates that learning-space preferences are strongly related to the activity being undertaken and the need for quiet or collaboration (Beckers, van der Voordt & Dewulf, 2016).

This study examines students' evaluations of learning approaches and university spaces at the Faculty of Technical Sciences, University of Novi Sad. It aims to identify the environmental characteristics associated with perceived productivity, evaluate preferences for visual and architectural features, and examine the perceived role of rest and interaction spaces. The objective is to inform design priorities based on student-reported experience, without claiming effects on academic achievement.

2. Materials and methods

A questionnaire survey was conducted among 50 students at the Faculty of Technical Sciences, University of Novi Sad. The questionnaire comprised 30 numbered questions addressing study practices, university facilities, visual and functional characteristics, informal spaces, and potential improvements. This conference paper analyzes a subset of results documented in the broader research, using the complete thesis only to clarify the original instrument and response categories. The original study reports that 26 respondents (52%) were master's students and 16 (32%) were fourth-year students; the remaining eight respondents were from other study years or doctoral studies.

The analyzed questions included five-point scales for perceived productivity of individual study, group study and learning during lectures; ratings of eight environmental factors; and evaluations of five features of an illustrated contemporary interior. Other questions required selection between two illustrated environments or agreement with statements about rest areas and informal interaction. Responses were processed in Microsoft Excel and summarized by counts and percentages. For five-point scales, ratings of 1–2 were additionally classified as negative, 3 as neutral, and 4–5 as positive. Each factor was rated separately by all 50 respondents. The original thesis includes the questionnaire and its visual stimuli. No inferential tests or objective learning-performance measurements were reported. Consequently, all comparisons are descriptive and concern respondents' perceptions, not demonstrated improvements in learning.

3. Results

3.1. Preferences for learning approaches

Individual study received the most favorable ratings: 29 respondents (58%) rated it 5 and seven (14%) rated it 4, yielding 72% positive ratings (4–5). Group learning had a more mixed distribution, with 17 students (34%) choosing the midpoint rating of 3 and 20 (40%) providing positive ratings. Learning during lectures had 13 positive ratings (26%), while 22 students (44%) assigned ratings of 1 or 2. Thus, individual study was the most favorably perceived option, whereas studying during lectures was the least favorably rated of the three approaches.

3.2. Visual preferences and spatial character

For the comparison between a neutral, light-colored interior and a visually dynamic interior, 28 students (56%) selected the neutral option and 22 (44%) the colorful alternative. A separate question contrasted two illustrated learning environments: one with windows, daylight, vegetation and natural ventilation, and another enclosed environment without windows and with artificial lighting (Figure 1). The first was preferred by 43 students (86%), versus seven (14%) for the second (Figure 1). Because several characteristics varied simultaneously, the result cannot isolate the effects of daylight, plants, windows or ventilation individually.



(a)



(b)

» **Figure 1:** *Original visual alternatives from survey: (a) daylit, planted space with windows; (b) enclosed space with artificial lighting*

3.3. Rest, social interaction and recreation

A suitable rest area was perceived as potentially motivating better learning by 41 respondents (82%), while seven were uncertain and two disagreed. Thirty students (60%) agreed that a creative rest area could encourage longer stays on campus. Thirty-seven (74%) considered such areas potentially useful for initiating group work or projects, and 40 (80%) agreed that informal exchange could help solve learning-related problems. For a proposed recreation/play area, 26 students (52%) selected the response that it would make them more active and energetic for learning; 24 (48%) selected the alternative that it would distract them. These are expectations rather than observed behavioral effects.

3.4. Functional and architectural characteristics

When respondents rated eight factors for their influence on perceived learning productivity, furniture comfort received 39 positive scores (78%), room temperature 37 (74%), and availability of learning equipment 33 (66%). These factors were followed by the possibility of cooperating without disturbance (29; 58%) and choosing a seat (26; 52%). Fewer positive scores were given to freedom of movement (16; 32%), room colors/design (15; 30%) and an outdoor view (14; 28%). Table 1 reports the complete positive-score comparison, based on the original frequency table for question 26.

Table 1

Positive ratings (scores 4–5) for environmental factors affecting perceived learning productivity (n = 50)

Factor	Positive (n)	Positive (%)
Furniture comfort	39	78%
Room temperature	37	74%
Equipment and resources	33	66%
Cooperation without disturbance	29	58%
Choice of seating location	26	52%
Freedom of movement	16	32%
Room colors and design	15	30%
Outdoor view	14	28%

In a separate evaluation of an illustrated modern interior (question 27), bright lighting was positively rated by 38 students (76%), high ceilings by 36 (72%), and technological modernity by 37 (74%). Cheerful colors received 31 positive ratings (62%), while classroom transparency received only 18 (36%) and 25 negative ratings (50%). These findings suggest a favorable response to brightness and modernity, alongside reservations about visually open classroom boundaries.

4. Discussion

The preference for individual learning does not negate students' support for shared areas. Respondents associated focused study with comfortable, functional conditions, while also recognizing the potential of rest spaces to support informal exchange and collaboration. Beckers, van der Voordt and Dewulf (2016) similarly found that students' spatial preferences depend on whether activities require concentration or communication. The present results therefore favor a differentiated campus environment offering both quiet areas and places for interaction, rather than a single design solution.

Furniture comfort, temperature and adequate equipment emerged as more important to perceived productivity than decorative characteristics. This functional emphasis is consistent with the broader literature on environmental conditions and learning, although the evidence from Barrett et al. (2015) concerns primary schools rather than higher education. Brooks (2011), by contrast, examined formal learning spaces in a university context and illustrates why future research should combine students' perceptions with measured educational outcomes. The present study cannot establish that changing any physical factor would increase performance.

Visual findings also require careful interpretation. The 86% preference for the daylit, planted environment involved a comparison in which several features changed together; the individual contributions of lighting, greenery and enclosure cannot be separated. Likewise, favorable ratings for modernity and lighting coexist with relatively low ratings for classroom transparency, suggesting that openness may not always be perceived as beneficial. Temple (2008) emphasizes that campus spaces support broader institutional and social functions, while Brown (2005) discusses the value of connecting formal and informal learning environments. Together, these perspectives support balancing privacy, functionality and social opportunity. The study is limited to 50 respondents from one faculty, with a sample concentrated in senior and master's-level students. Its findings are descriptive, self-reported and partly based on illustrated scenarios rather than direct experience in controlled spaces. Broader samples, on-site assessments and before-and-after evaluations would be needed to test the generalizability and practical effects of proposed changes.

5. Conclusions

Among the surveyed students, individual study received the highest perceived-productivity ratings. Furniture comfort, thermal conditions and adequate equipment were more frequently rated as influential than interior color, views or freedom of movement. At the same time, respondents favored a daylit and planted visual alterna-

tive, positively evaluated brightness and technological modernity, and recognized the potential benefits of rest and interaction areas.These findings suggest that university space improvements should prioritize functional comfort and suitable resources while providing a complementary range of quiet and informal environments. Visual interventions should be considered in relation to the activities they support, not solely their aesthetic effect. The results offer practical, institution-specific evidence of student preferences rather than causal proof of improved academic performance.

Considering the results obtained in this study, it is worth examining whether the teaching and learning approaches currently applied at the university could be adapted to better accommodate students' preferences. However, it should be acknowledged that the number of students attending particular courses may represent a limiting factor in the implementation of different learning approaches.

Providing students with greater opportunities for independent learning, which was identified as the preferred approach by the majority of respondents, could contribute to improving the quality of education and facilitating knowledge acquisition. Working with smaller groups is certainly one of the prerequisites for implementing advanced teaching methods, including the flipped classroom approach. This approach involves students independently studying theoretical materials outside scheduled class hours, which aligns with their expressed learning preferences.In such a model, classrooms and scheduled teaching sessions would be adapted to support collaborative activities and the practical application of theoretical knowledge acquired independently before class. Teaching sessions would become more interactive, encouraging discussion, the exchange of opinions, and collaborative problem-solving rather than passive participation in traditional lectures.

The implementation of this approach would also benefit from modifications to the physical learning environment, particularly the spatial configuration of classrooms. Changes in seating arrangements, the positioning of instructors in relation to students, and the possibility of moving freely within the classroom could facilitate the transformation of students from passive observers into active participants in the learning process. Such an environment would encourage the exchange of experiences, critical discussion, and knowledge acquisition through interaction.

These changes would affect not only students but also instructors, whose roles would shift from traditional positions of authority and control toward those of facilitators, moderators, and active participants in discussions. This transition would require instructors to engage with questions, perspectives, and ideas that may not always be anticipated or fully addressed through predefined teaching materials.

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