URBAN VOIDS AS LIVING LABORATORIES: AN EDUCATIONAL FRAMEWORK FOR RESEARCH-BASED REGENERATION

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Abstract
Urban voids—often perceived as neglected or residual spaces—can serve as valuable platforms for experimental learning and applied urban research. This paper presents an educational framework that utilizes urban voids as living laboratories for research-through-design approaches in landscape architecture education. The study focuses on a vacant lot located on Jesenského Street in Nitra, Slovakia, where spontaneous successional vegetation has gradually occupied an unused gap within the compact urban structure. The site served as a model territory for an intensive one-week educational workshop involving landscape architecture students. The workshop followed a structured research-based design process that included on-site observation, spatial documentation, and a questionnaire survey capturing perceptions of the site and its potential uses. Based on the collected data, students conducted basic spatial analyses and developed experimental design proposals exploring different transformation scenarios. Rather than producing a single solution, the workshop generated a set of conceptual strategies representing diverse spatial approaches—from minimal interventions preserving spontaneous vegetation to more structured systems and gradual transformation scenarios redefining the relationship between wilderness and designed public space. The synthesis of these proposals resulted in a series of design principles and recommendations applicable to the regeneration of small urban voids.

Key words: research through design, participatory workshop, urban gaps, successional vegetation, urban greenery

Introduction

The transformation of contemporary cities is often accompanied by the emergence of underutilized or abandoned spaces, commonly referred to as urban voids. These spaces, typically perceived as residual or dysfunctional elements of the urban fabric, represent a significant yet underexplored potential for ecological, social, and spatial regeneration (Čibik, 2024; Čibik, 2025a). Recent research highlights their role as flexible and adaptive environments capable of supporting new forms of public space and urban greenery (Vinczeová et al., 2025; Žolobaničová et al., 2025). In the context of sustainable urban development, increasing attention has been given to small-scale interventions, green infrastructure, and the reactivation of forgotten spaces as tools for improving environmental quality and urban livability (Čibik and Jankechová, 2023; Kuczman and Paganová, 2024). Urban voids, due to their fragmented distribution within compact city structures, offer unique opportunities for experimental approaches that integrate ecological processes with design strategies. These approaches often combine bottom-up initiatives, participatory processes, and educational activities, contributing to the creation of socially responsive public spaces (Miklášová et al., 2021; Porvazník et al., 2025; Paganová and Kuczman, 2025). At the same time, the integration of vegetation and landscape elements into urban environments plays a crucial role in enhancing biodiversity, microclimatic regulation, and recreational potential (Kuczman et al., 2022; Bihuňová and Štěpánková, 2024). This is particularly relevant in the context of small and neglected urban spaces, where even minimal interventions can significantly influence environmental performance and user experience (Čibik, 2025b). Despite these developments, there is still a lack of structured frameworks that would connect research, design, and education in the context of urban void regeneration. This paper addresses this gap by proposing an educational model that treats urban voids as living laboratories for research-through-design processes. Through a case study of an intensive student workshop conducted on a vacant site in Nitra, Slovakia, the study explores how experimental design approaches can generate diverse spatial scenarios and contribute to a deeper understanding of the regenerative potential of urban voids.

Materials and methods

Materials: The research was conducted on a vacant urban plot located on Jesenského Street in Nitra, Slovakia (48.317653, 18.085006). The site represents a typical urban void within a compact city

structure, characterized by a narrow gap between adjacent buildings and the presence of spontaneous successional vegetation. Due to its morphology and location, the space reflects common conditions of underutilized inner-city parcels with limited functional use and accessibility. The site served as a model territory for an intensive one-week educational workshop involving students of landscape architecture. The workshop was organized as part of a research-oriented teaching process, where the urban void was approached as a living laboratory for experimental design and applied research. The selected location provided suitable conditions for observing the interaction between spontaneous natural processes and potential design interventions within a constrained urban environment.

Methods: The research was based on a research-through-design approach, combining analytical and experimental methods within the framework of an educational workshop. The process consisted of several consecutive phases. The initial phase focused on on-site observation and spatial documentation, including the analysis of spatial configuration, vegetation structure, and existing patterns of use. This was followed by a questionnaire survey aimed at capturing user perceptions of the space, its current qualities, and potential future uses. Based on the collected data, students conducted basic spatial analyses and developed conceptual design proposals exploring different transformation strategies. The proposals varied in their level of intervention, ranging from minimal approaches preserving spontaneous vegetation to more structured spatial systems introducing new spatial organization.

Results

The final phase involved the synthesis of individual proposals into a unified matrix of scenarios, representing a spectrum of spatial approaches and intervention intensities. This matrix served as an analytical tool for comparing different strategies and identifying recurring design principles. The evaluation of the proposals was based on key parameters, including spatial configuration, functional adaptability, ecological integration, and social activation.

The workshop resulted in a set of experimental design proposals exploring different approaches to the transformation of the selected urban void. Rather than converging towards a single solution, the individual outputs revealed a wide range of spatial strategies reflecting diverse interpretations of the site and its potential.

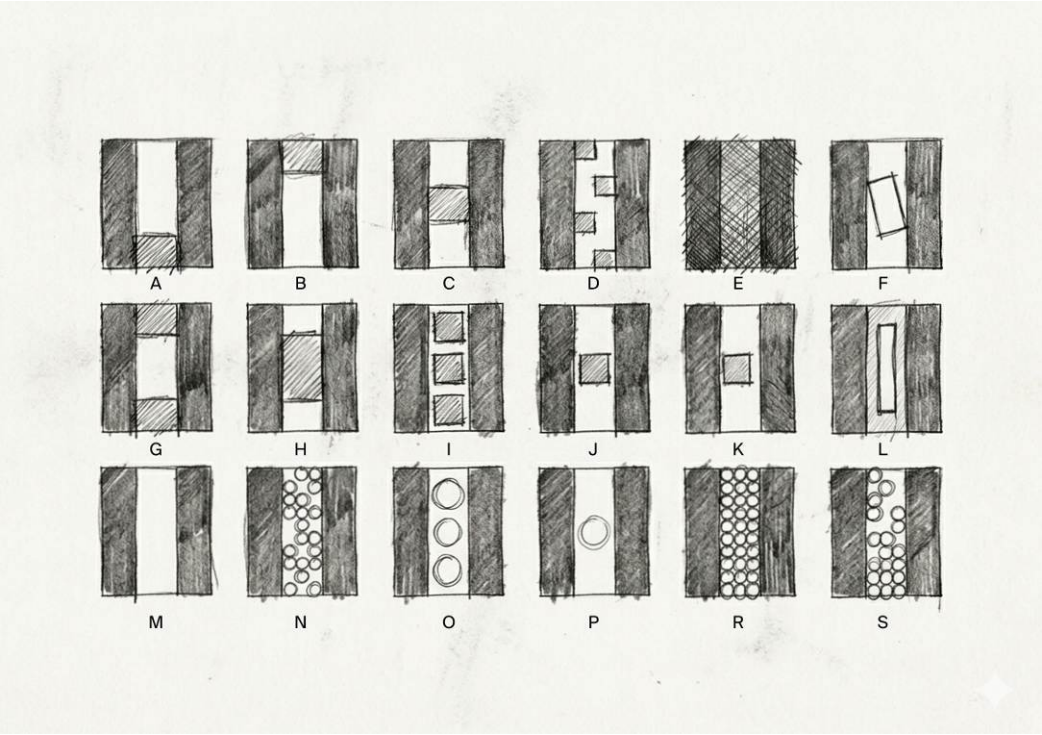

Fig. 1: Matrix of student-generated intervention scenarios (A–S) illustrating object-based (A–L) and vegetation-based (M–S) approaches to urban void transformation. Source: author.

To enable comparative analysis, the proposals were synthesized into a unified matrix of intervention scenarios (Fig. 1), labeled A–S. The matrix is structured according to the type of spatial intervention, distinguishing between object-based (built) and vegetation-based strategies. The first two rows (A–L) represent interventions based on the insertion of built elements, while the third row (M–S) focuses on vegetation-driven approaches. Within the object-based scenarios (A–L), several sub-categories can be identified. Scenarios A–D explore compact and centralized insertions, while E–H introduce larger or more dominant spatial elements. Scenarios I–L focus on linear or vertical structuring, organizing the space through directional elements and spatial sequencing. These approaches demonstrate varying degrees of spatial definition and functional specificity. The vegetation-based scenarios (M–S) represent a contrasting set of strategies, emphasizing ecological processes and spatial softening. Scenarios M–P illustrate dispersed or singular planting elements, while N, R, and S explore densification through clustered vegetation systems. These approaches highlight the potential of planting strategies to redefine spatial boundaries, enhance biodiversity, and improve microclimatic conditions.

The results demonstrate that even within a constrained urban void, a wide spectrum of spatial possibilities can be generated. The matrix reveals different relationships between built structure and natural processes, ranging from minimal intervention to more intensive spatial transformation. The analysis confirms that the value of the design process lies not in producing a single optimal solution, but in generating a range of alternative scenarios. This approach enables a deeper understanding of the spatial potential of urban voids and supports the development of adaptable and context-responsive regeneration strategies.

Discussion and Conclusion

The results of the workshop demonstrate that urban voids can function as effective platforms for research-based education and experimental design. The use of a real site within a compact urban structure allowed students to engage directly with spatial constraints, ecological processes, and user perceptions, reinforcing the value of site-specific learning. The matrix of scenarios reveals that even small and constrained urban spaces can accommodate a wide range of spatial strategies. The distinction between object-based and vegetation-based interventions highlights two fundamentally different approaches to regeneration: one focused on spatial definition and functional structuring, and the other on ecological processes and gradual transformation. These approaches are not mutually exclusive but can be combined to create hybrid systems that respond to both environmental and social needs. From an educational perspective, the research-through-design approach proved to be an effective tool for generating diverse and comparable outputs. The structured process enabled students to move from observation and analysis to conceptual design, while the synthesis of individual proposals into a unified matrix provided a higher level of abstraction and interpretation. This step was crucial in transforming individual design solutions into a transferable analytical framework.

The findings suggest that the value of urban voids lies not only in their physical characteristics, but also in their capacity to act as experimental environments. When approached as living laboratories, these spaces support the exploration of alternative design strategies, encourage critical thinking, and facilitate the integration of ecological and social aspects of urban development.

In conclusion, the proposed educational framework contributes to the broader discourse on sustainable urban regeneration by demonstrating how small-scale interventions and research-based teaching methods can be combined. The resulting matrix of scenarios offers a transferable tool for understanding and designing urban voids, while also highlighting the importance of flexibility, adaptability, and context-responsive design in contemporary landscape architecture.

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Souhrn
Městské prázdnoty mohou sloužit jako experimentální prostředí pro výuku a výzkum v oblasti krajinářské architektury. Studie představuje edukační rámec založený na přístupu research through design, aplikovaný formou workshopu na reálném území v Nitře. Výsledkem je matice scénářů, která ukazuje různé přístupy k transformaci těchto prostorů a jejich potenciál pro ekologickou i sociální regeneraci.

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