FROM RESIDUAL SPACE TO RECREATIONAL ENVIRONMENT: THE ROLE OF CO-DESIGN IN THE ACTIVATION OF HOUSING ESTATES

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Abstract
Housing estate in-between spaces represent a significant but often underutilized part of the residential environment with potential for the development of everyday recreation. Their low functional usability is a result of spatial uncertainty, lack of program content, and weak relationship of residents to these areas. This paper focuses on the possibilities of linking co-design as a participatory tool of urban planning with the process of activating housing estate interstitial spaces in order to increase the recreational potential of the area. The theoretical basis is the understanding of housing estate in-between spaces as a specific urban "intermediate scale" between architecture and the city, suitable for the application of co-creation. The paper points to the importance of involving residents in identifying recreational needs and designing small-scale spatial interventions that support recreational and physical activities in the everyday environment of housing estates. The result of the co-design approach is an increase in the functional and social value of the space, a strengthening of residents' relationship to the area, and support for the long-term sustainable development of recreational functions. The paper contributes to the discussion on adaptive and participatory approaches in the planning of residential structures.

Key words: in-between spaces, potential, participatory design, urban activation, morphology

Introduction

Large scale housing estates, constructed predominantly in the second half of the 20th century, represent a substantial component of the contemporary urban landscape across Central and Eastern Europe. While they provide essential residential capacity, their spatial configuration often includes numerous residual or interstitial spaces - commonly referred to as “in between spaces” or urban gaps - which remain underutilized, functionally undefined, and socially fragmented. Recent research identifies these areas as latent spatial resources with considerable potential for recreational use, ecological enhancement, and community development (Čibik and Štěpánková, 2020; Bihuňová and Štěpánková, 2024; Melichová, 2025; Žolobaničová et al., 2023). The transformation of residual spaces into meaningful recreational environments is closely linked to broader discourses on sustainable urban development, green infrastructure, and ecosystem services. Studies focusing on collective housing stress the importance of integrating green and blue infrastructure to improve microclimatic conditions, biodiversity, and overall quality of life (Bechera, 2022; Vinczeová and Tóth, 2025; Vinczeová et al., 2025). Likewise, concepts of “forgotten” or “lost” spaces underline the need to reintegrate neglected urban fragments into resilient urban systems (Žolobaničová et al., 2025). In this context, co-design emerges as both a methodological and conceptual framework. As a participatory approach, it enables residents, professionals, and local authorities to jointly develop spatial solutions, bridging expert knowledge and everyday spatial practices. Previous studies confirm that participatory design can facilitate the successful regeneration of housing estates by strengthening social cohesion, enhancing place identity, and ensuring long term sustainability of interventions (Csizmady et al., 2016; Arslan, 2023). Co-design also aligns with bottom up initiatives and civic activism, which have proved effective in transforming underused spaces into vibrant public environments (Miklášová et al., 2024). Renaturalisation and nature based solutions implemented through participatory processes can mitigate urban heat island effects, improve water retention, and support ecological resilience in densely built environments (Bellérová and Hus, 2025; Włodarczyk Marciniak et al., 2024). Landscape architects play an essential role in this process, acting not only as designers but also as facilitators and mediators of interdisciplinary collaboration. Despite growing interest, there remains a need for a more systematic understanding of how co-design can be applied to activate residual spaces within housing estates, particularly in post socialist urban contexts. Therefore, the aim of this study is to explore the transformation of residual spaces into recreational environments through co-design processes, identifying key principles, methodological approaches, and factors influencing successful implementation.

Materials and methods

This study employs a qualitative research approach combining a literature review, case study analysis, and exploratory spatial assessment. The literature review focused on co-design and participatory urban planning, open spaces in housing estates and their recreational potential, green infrastructure, and climate change adaptation strategies. Key sources include studies on participatory design in large housing estates (Csizmady et al., 2016; Arslan, 2023), on recreational and spatial characteristics of housing environments (Bihuňová et al., 2021; Bihuňová and Štěpánková, 2025), and on ecosystem services and green infrastructure (Kuczman and Paganová, 2024; Vinczeová and Tóth, 2025). Additional attention was given to renaturalisation approaches (Bellérová and Hus, 2025) and bottom up initiatives (Melichová 2025; Miklášová et al., 2024).

Spatial and conceptual analysis concentrated on residual spaces as "white spaces" in mental maps (Čibik et al., 2023) and urban gaps as potential intervention sites. The analysis also observed the role of green infrastructure in improving spatial functionality (Kristiánová and Štěpánková, 2015) and the interaction between top down and bottom up approaches (Štěpánková and Kristiánová, 2015).

The Vlčince housing estate in Žilina was selected as a model area. Built between 1971 and 1982, it is one of the city's largest residential districts, comprising approx. 7,500 flats and 17,455 inhabitants. Its modernist spatial structure features functional segregation, open block development, and a high share of open spaces (Vinczeová et al., 2025). These include intensively used recreational spaces as well as neglected, low attractiveness areas (Žolobaničová et al., 2023; Bihuňová and Štěpánková, 2025). Despite basic civic amenities and nearby large green areas, deficiencies persist in smaller recreational and community spaces. Environmental conditions show a need to improve shading, microclimate, and stormwater management due to extensive paved surfaces and insufficient tree cover (Bellérová and Hus, 2025). Socially, Vlčince is a heterogeneous environment requiring inclusive and participatory planning approaches. Interstitial spaces perceived as anonymous or "white spaces" present areas of low perceptual significance but high transformative potential (Čibik et al., 2023).

Results

Open spaces within the Vlčince housing estate show substantial potential for applying co-design principles. Their transformation into high quality recreational and community spaces requires expert design as well as meaningful resident involvement, ensuring the identification of local needs and long term sustainability of interventions.

A multi layered analytical framework was developed combining: spatial analysis, functional classification, perceptual assessment. This framework enables a systematic understanding of interstitial spaces, identification of their potential and creation the typology of Interstitial Spaces:

A. Recreational interstitial spaces – near housing blocks, containing basic amenities, suitable for community recreation.
B. Transit spaces – tied to pedestrian routes, low stay value, potential for "slow space" interventions.
C. Residual areas – undefined, neglected, seen as "blank spots", suitable for experimental or nature based interventions.
D. Low use green spaces – unprogrammed lawns, suitable for rain gardens, community gardens.
E. Semi public spaces – entrances, courtyards, often informally appropriated; sensitive for participatory processes.

Each category was assessed according to: spatial quality, functional use, social potential, environmental quality, transformative potential. The field analysis was conducted using a combination of map analysis, field mapping, and subjective perception of space. The result is a synthetic map of interstitial spaces that classifies the territory according to typology while visualizing its transformative potential. The analytical framework serves as the initial phase of co-design and enables: identifying priority locations for intervention, assigning appropriate participatory tools based on the type of space, formulating transformation scenarios (recreational, ecological, community-based), supporting decision-making based on a combination of data and local experience. A large share of Vlčince's interstitial spaces are functionally weak yet spatially flexible, supporting earlier findings on their latent recreational and ecological potential (Vinczeová et al., 2025; Žolobaničová et al., 2023). Effective co-design requires: early, iterative resident engagement, interactive methods: workshops, community walks, temporary interventions and mediation by landscape architects bridging expert and local

perspectives. Interventions designed through co-design include: recreational micro-spaces, green and blue infrastructure for climate adaptation, community-oriented spaces, tactical urbanism tools for real-time testing (Arslan, 2023). Participatory, nature-based solutions: improve microclimate, increase biodiversity, enhance water retention, strengthen local identity and social cohesion. Challenges include institutional constraints, uneven participation, maintenance issues, and stakeholder conflicts.

Conclusion

Residual spaces in housing estates represent valuable spatial resources capable of addressing contemporary urban, social, and environmental challenges. The Vlčince case demonstrates that co-design can transform these spaces into functional recreational environments supporting social interaction and nature based interventions. Co-design functions as a process oriented framework enabling collaboration between residents, experts, and institutions. Landscape architects play a key role as mediators translating local needs into spatial solutions and balancing top down and bottom up approaches. Long term success depends on incorporating co-design into broader planning and management structures. As a continuous practice rather than a one off intervention, co-design can contribute to the development of resilient, inclusive, and context sensitive public spaces in post socialist housing estates.

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Souhrn
Článek se zabývá reziduálními prostory sídlišť jako nedostatečně využívanými, avšak potenciálně hodnotnými součástmi městského prostředí. Na příkladu sídliště Vlčince v Žilině ukazuje možnosti jejich transformace na rekreační a komunitní prostory prostřednictvím co-designu, propojujícího odborné poznání s lokální zkušeností obyvatel. Tento přístup podporuje sociální soudržnost, posiluje identitu místa a umožňuje efektivní integraci zelené a modré infrastruktury v postsocialistickém městském kontextu.

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