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Reporting from the Arena of Architectural Higher Education

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DOI
10.3390/su15032476

Publication date
2023

Document Version
Final published version

Published in
Sustainability

sustainability

MDPI

Article

Approaching Extracurricular Activities for Teaching and Learning on Sustainable Rehabilitation of Mass Housing: Reporting from the Arena of Architectural Higher Education

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Abstract: The article presents the potentials and capacities of extracurricular activities such as student workshops for strengthening existing curricula and introducing emerging specialised areas, topics, and challenges into architectural higher education. The specific objective of this study is to enhance and test different pedagogical models for learning on the sustainable rehabilitation of mass housing neighbourhoods (MHN), as a specific type of modern heritage, through innovative extracurricular teaching practices based on interdisciplinarity, flexibility, and adaptability. This research presents three student workshops focusing on the rehabilitation of mass housing neighbourhoods (MHN), involving students, academics, and professionals from the field, organised in Germany, Serbia, and North Macedonia in 2022. Moreover, it engages a comparative analysis of the learning formats and approaches developed within this discipline-specific cross-border collaboration. The study provides (1) an insight into the comparative analysis of learning capabilities and (2) the formulation of workshop models supported by diagramming of the workshop structure. The conclusion of the article summarises the findings and highlights the essential aspects for engaging student workshops, as an instrument for generating operational knowledge in the field of mass housing rehabilitation.

Keywords: extracurricular activities; extracurricular learning formats; student workshops; workshop models; pedagogical models; architectural higher education; mass housing neighbourhoods; sustainable rehabilitation

Citation: Dragutinovic, A.; Milovanovic, A.; Stojanovski, M.; Damjanovska, T.; Đorđevic, A.; Nikezic, A.; Pottgiesser, U.; Ivanovska Deskova, A.; Ivanovski, J. Approaching Extracurricular Activities for Teaching and Learning on Sustainable Rehabilitation of Mass Housing: Reporting from the Arena of Architectural Higher Education. *Sustainability* **2023**, *15*, 2476. https://doi.org/10.3390/su15032476

Academic Editors: Cristina Marieta, Alexander Martín Garín and Iñigo Leon

Received: 22 December 2022
Revised: 22 January 2023
Accepted: 25 January 2023
Published: 30 January 2023

1. Introduction

The disciplinary frameworks of architecture and urbanism are currently exposed to numerous challenges, further intensified by the COVID-19 pandemic, which has brought into sharper focus the importance of the environmental sensitivity of cities and landscapes. In this context, the urban practices (both planning and designing process) require, more than ever, the reconsideration of existing approaches and the development of innovative methodologies for creating and maintaining "inclusive, safe, resilient and sustainable cities and human settlements", as phrased in Sustainable Development Goal 11 (SDG 11) [1]. In order to realise this long-term perspective in a practical scope, it is of leading importance to take an integral view of the architectural discipline through all its pillars of development—practice, education, and research. This research advocates a bottom-up approach, with the idea of pointing out the importance of initiating a new education paradigm towards establishing a new dominant discourse and outcome for other pillars of the architectural discipline.

We are experiencing the year of New European Bauhaus (NEB) education, within which innovation and learning-by-doing are listed as key parts of the new models of design education at all levels within Europe and beyond [2]. In the context of the growing NEB initiative, several visions have been developed, among which the issue of education is recognised as one of the core values for both social and environmental sustainability. The necessity of integrating the SDGs into the domain of architecture was also confirmed by the professional engagement of the International Union of Architects (UIA), which created *An Architecture Guide to the UN 17 Sustainable Development Goals*, demonstrating its impact and repercussion on all 17 SDGs [3]. In order to strengthen the connection between architecture and sustainable principles, the Architects' Council of Europe (ACE) further distinguishes the general principles for assessing quality in the built environment including (1) cross-disciplinary discussion—knowledge sharing and widening boundaries of discipline, (2) the place-based approach—inclusion of a wider spatial-cultural context in the process of architectural design, and (3) the holistic approach—comprehensive and circular understanding of spaces and living environments combined with local communities and cultures [4]. The question of achieving quality in the built environment was determined through the *Baukultur* concept, which was formalised within the Davos Declaration [5] through a two-fold direction: (1) as a unique quality system that provides criteria for assessing the quality of places [6] and (2) as a new, adaptive approach for shaping our built environment "that is rooted in culture, actively builds social cohesion, ensures environmental sustainability, and contributes to the health and well-being of all" [5] (p. 3).

1.1. General Background

In order to respond to the aforementioned challenges, this study aims to address a pedagogical shift within the arena of architectural higher education. In addition to the growing influence of the NEB initiative, which has a vision that is based on the issue of sustainability, the same is recognised in the context of updating the European Association for Architectural Education (EAAE) Charter, on the occasion of 10 years since its adoption [7]. The SDGs in architectural education and research are recognised as a central aspect of the EAAE Charter update, by reflecting on the actual societal role of architectural research. The basic principles stated in the EAAE Charter [7] correspond, to a large extent, with the guidelines of the ACE Statement [4], which confirms the strong connection between the different pillars of the architectural discipline. Based on the correspondence of these determinants, the following can be recognised: (1) cross-disciplinary discussion should be stimulated through continued expansion of the discipline's knowledge base, (2) the place-based approach should be stimulated through stronger links between theory and practice and between academic and professional arenas, and (3) the holistic approach should be stimulated by engaging with other disciplines to create new knowledge and syntheses.

Considering the level of development and the dynamics of updating the existing study programs within the framework of architectural education, a mismatch in the dynamics is recognised for two processes: (1) the emergence of new challenges in architectural and urban studies and (2) the accreditation and updating of the content of study programs and curricula. The accreditation processes of study programs are linked to defined procedures and protocols that are based on multi-year cycles. This means that the introduction of urgent challenges and topics into architectural curricula requires new models. In this adaptation process, the potential and capacity of extracurricular activities is of leading importance for strengthening existing curricula and introducing emerging specialised areas. In this context, in the last few years, several declarations and manifestos [8–10] have been developed, which, by targeting new specialised areas of research, place education and particularly new pedagogical models at the centre of research innovation. Prominent research on the existing implications of architectural education indicates the need for "going beyond affirmative action requirements in order to promote a climate that values differences and manages diversity" [8] (p. 257).

One of the leading topics in this framework is the examination of the value of heritage and its protection, where the Leeuwarden Declaration on the adaptive re-use of built heritage [9] states that "re-used heritage can provide the basis for school and educational programs" by stimulating the following thematic relations: (1) a reflexive dialogue between history and future, (2) the multi-scale approach, and (3) the case-by-case approach. Following this line of reasoning, DOCOMOMO developed the Manifesto on Education [10] in order to stimulate and promote a discussion on better education for Modern Movement heritage, "embracing its cultural, ethical, and social ideas and values that are still relevant in 21st century society" [10] (p. 1).

1.2. Importance of the Workshop within the Arena of Architectural Higher Education

One of the ways to achieve a better connection between the acute challenges of the practice of architecture and academic curricula is reflected in the reconsideration of existing learning formats—learning environments and types of courses. The contemporary structure of architectural study programs at the higher education level is characterised by the following: (1) a studio-driven culture, with the design studio as a central pillar of the curriculum and as an interface between theoretical knowledge and practical skills, and (2) electivity and a wide range of electives courses offered to students in order to allow them to choose courses and learning content in accordance with intended professional profiling. Although this structure indicates a high level of flexibility and the possibility for students to create their own curricula, a limitation can be found in the conditioning of the learning content in accordance with the defined framework of the accredited study programme and the tight weekly schedule that, in general, only offers results at the end of the semester/course. In this sense, this study recognises the capacity of extracurricular student activities that could provide students the opportunity to create their own third curriculum, with the function to support the obligatory scope of the study program. Previous research that studied the pedagogical perspective of extracurricular activities as an alternative approach to architectural design identified three categories of extracurricular activities in the domain of architecture and related fields [11]—seminars/lectures, student competitions, and workshops. Moreover, conferences, excursions, and study trips can be included in this categorisation.

Although all three identified forms of extracurricular activities have a unique role in integrating reflective learning [12,13], each of them develops a characteristic relationship between education and other pillars of the architectural discipline: (1) lectures, seminars, and conferences provide the opportunity to upgrade theoretical knowledge and exchange ideas between research and practices; (2) architectural competitions represent an environment for strengthening professional capacities and familiarisation with a real professional context; (3) workshops (supported by excursions and study trips) represent a learning environment that provides a high level of interactivity, encouraging critical and creative thinking, as well as opportunities for engaging different learning modes from individual to group work. Relying on the characteristics of all three forms of extracurricular activities, it is recognised that workshops correspond, to the greatest extent, with the characteristics of the design studio environment. Following this line of reasoning, student workshops are recognised as an educational framework for reflection-in-action, with two main conditions: (1) a learning context in which the student is actively engaged in research/design process and (2) student involvement that should be in the form of reciprocal reflection-in-action—demonstrating and imitating as well as telling and listening. Moreover, existing research indicates that the context of the architectural student workshop can provide (1) motivation for creativity and its immediate evaluation [14–16], (2) stimulation of the spectrum of learning modes (learning by experiencing, learning by reflecting, learning by doing, and learning by thinking) [17,18], (3) engagement with blended learning by combining online with face-to-face sessions [19,20], (4) teacher–student exchanges in crits and external experts' involvement through architectural critique interactions [21], and (5) support for collaborative engagement in groups—structured collaboration [22].

1.3. Paper Outline and Objectives

Based on the identified challenges within the contemporary framework of the architectural higher education derived from the perspectives on educational declarations and manifestos, several research gaps were identified: (1) the unsynchronised introduction of thematic priorities and research challenges in relation to the cycle-based accreditation procedures of study programs; (2) the need for creating innovative extracurricular teaching practices based on flexibility and adaptability in a rapidly changing disciplinary framework; (3) the need for bringing interdisciplinarity and diversity into architectural higher education. In addition to those, a gap is also perceived in the insufficient connection between emerging architectural and urban challenges and the content of existing study programs, mainly in (1) content-related issues—insufficient knowledge and experiences about the existing buildings and mass housing neighbourhoods—and (2) methodology-related issues—insufficiently developed strategies for conceiving and implementing extracurricular activities within architectural education. In order to overcome these issues, the paper engages a cross-geographical research dialogue for testing pedagogical practices and aims, to develop a comparative analysis of student workshops as a main category of extracurricular activity related to architecture and urban design.

The specific objective of this study is to test and pilot different pedagogical models for teaching and learning on the rehabilitation of mass housing. This could provide insights for further action by (1) implementing student workshops that engage with the rehabilitation of mass housing as a central topic, as a specific type of modern heritage and (2) acquiring the knowledge/results from implemented workshops based on a comparative analysis of the learning capabilities and diagramming of workshop processes. Following these objectives, three research questions arise: (1) what are the differences in the structure and outcomes of implemented workshop models, in line with the differences of the thematic scope/focus of workshops and engaged case studies; (2) what are the differences in the learning capabilities gained within implemented workshops; (3) could unique workshop models be formulated as a framework for further action, based on the relation/conditionality between learning capabilities and implemented workshop phases.

The first part of the paper presents the research context. It provides an insight into the project *Rehabilitation of Mass Housing as Contribution to Social Equality* implemented within the German Academic Exchange Service (DAAD) programme *East-West Dialogue: Higher Education Dialogue with Western Balkan Countries,* explaining the position of the workshop's implementation and analysis within the comprehensive project framework. The second part of the paper presents the materials and methods applied in this research, including a general research conceptualisation, an explanation of the comparative analysis of research capabilities, and a general explanation of the workshop design. The third part of the paper presents the results and discussion, divided into two parts: (1) insights from a comparative analysis of learning capabilities, and (2) the formulation of workshop models supported by the diagramming of workshop structures. The conclusion summarises the findings and highlights the essential aspects for engaging student workshops, as an instrument for generating operational knowledge in the field of mass housing rehabilitation.

2. Research Context: RE-MHN Project-DAAD Higher Education Dialogue

The research context of the paper is positioned within the project *Rehabilitation of Mass Housing as a Contribution to Social Equality* (RE-MHN). The project was initiated by Technische Hochschule-Ostwestfalen-Lippe (TH OWL)–Institute for Design Strategies (IDS), Germany, in collaboration with the University of Belgrade–Faculty of Architecture (UB-FA), Serbia, and the Ss. Cyril and Methodius University in Skopje (UKIM)–Faculty of Architecture, North Macedonia. The main research subject of the RE-MHN represents mass housing neighbourhoods (MHN) perceived as the "largest share of urbanity and morphological image of the large-scale cities in Europe, and the leading pattern of urban transformation and expansion in the second half of the 20th century" [23] (p. 1). Some of the main purposes of this project are to discuss the potentials that MHN have for their region and community and the possibilities that they provide spatially as well as to evaluate and further develop inspiring ways to maintain, re-use, and revitalise them, based on selected case studies. Accordingly, the project strives to establish a unique research framework, in order to implement analysis-, process-, and problem-based research and to engage all partners in action for thematic innovations in mass housing rehabilitation through different educational approaches and methods used in different contexts to identify common and distinctive aspects. The overall methodology of the project is based on two parallel approaches, which led to the achievement of the project objectives and implementation of project activities. The first approach is the bottom-up approach, where every partner has the responsibility to look towards the local educational conditions and needs and to address local case studies. Therefore, each partner contributes to the development of the project activities, based upon what the local society needs. The second is the top-down approach, which includes all participants working in collaboration towards achieving common goals in-between East-West Dialogue. New methods combine interactive discussions with students in workshops, seminars, and conferences and continuously check inputs from qualified and associated partners.

The first phase results of the project implementation are published in a following research article [23], with a primary aim to establish preliminary insights into the current level of MHN rehabilitation as well as to identify challenges for further actions through a comparative case study and an expert questionnaire. The insights from the first phase provided strong inputs for the selection of the case studies (research subject) for student workshops. This paper aims to present the results of the second phase of the project, which is aimed at enhancing and testing innovative teaching practices for the rehabilitation of mass housing, through the involvement of students, academics, and professionals from the field, thus introducing them into local communities' processes (see Figure 1). This phase strives to (1) enhance the competences and motivations of both academics and students to become real actors of environmental and social change and to (2) train and enhance them within the framework of the rehabilitation of the mass housing neighbourhoods, towards creating (a) a new profile of an architectural student/young professional, who is equipped to contribute to sustainable rehabilitation of the built environment, and (b) a new profile of an architectural educator, who is capable of assuming the responsibility for the improvement of the education and training of future architects. The project provides a proactive research and learning arena, involving young academics, professionals, local citizens, and relevant stakeholders. It enables discipline-specific cross-border collaboration in the Balkan region and Germany, which enables understanding of the common issues as well as the differences—both in the thematic sense and from the educational perspective.

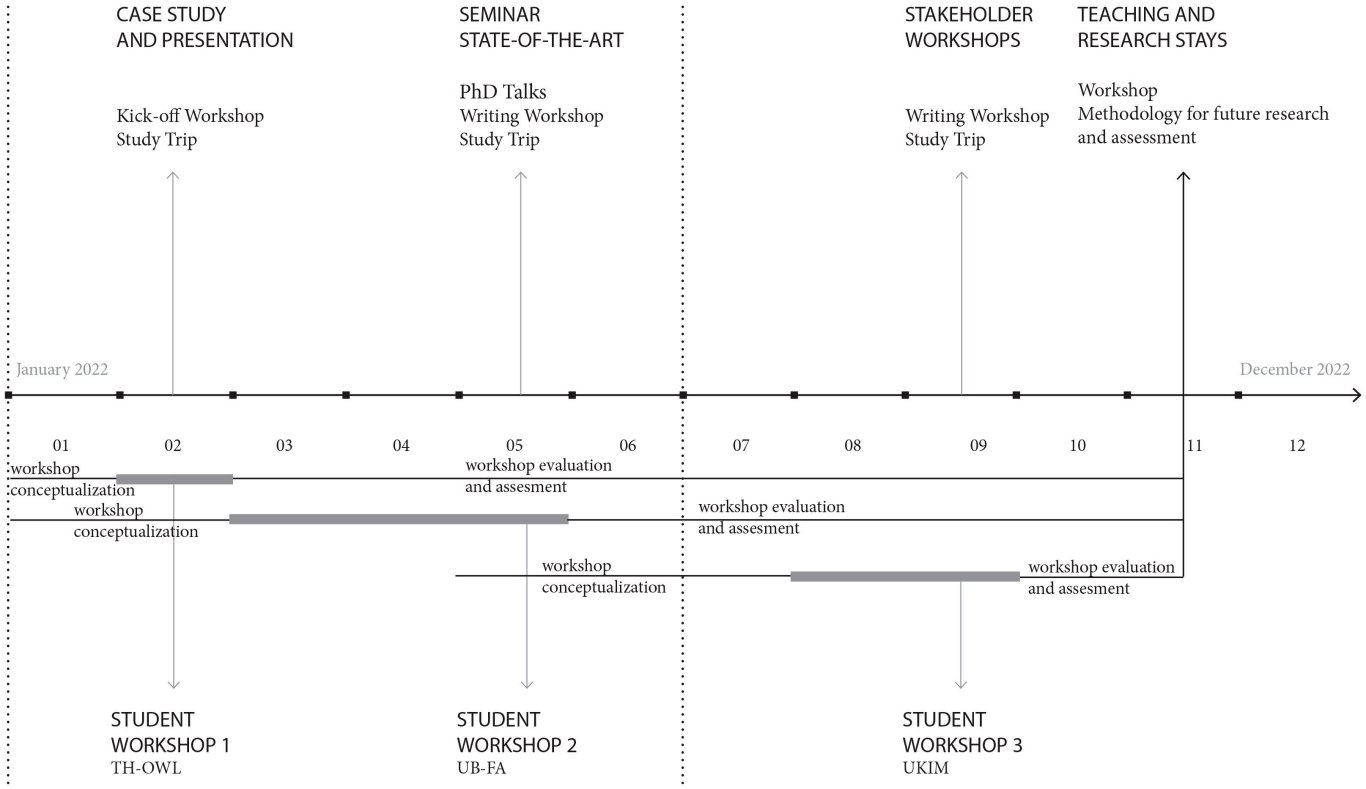

Figure 1. Activities timeline within the RE-MHN project—DAAD Higher Education Dialogue. Source: authors, 2022.

3. Materials and Methods

3.1. Research Conceptualisation

This research engages student workshops as one of the role categories of extracurricular activities in architectural higher education and analyses the learning capabilities of workshops in line with the framework of UNESCO/UIA Charter for Architectural Education [24]. Three student workshops were designed and implemented in three different European higher education institutions involved in East-West Academic Dialogue: Technische Hochschule-Ostwestfalen-Lippe (TH OWL), Germany (as a representative of Western Europe), and the University of Belgrade–Faculty of Architecture (UB-FA), Serbia, and Ss. Cyril and Methodius University (UKIM)–Faculty of Architecture, North Macedonia (as representatives of Southeastern Europe). The research was conducted in three phases, (1) workshop conceptualisation—formulating topics and thematic framework, setting up methodology for each of the workshop, and choosing location, (2) workshop implementation—involving students and reflecting on designed extracurricular activities, and (3) workshop assessment and specification—analysing each workshop in line with the learning capabilities (design–knowledge–skills) listed within UNESCO/UIA Charter of Architectural Education [24], as well as through specification of the workshop models and diagramming of workshop process by intertwining the thematic framework of workshops and insights from the analysis of capabilities. The following sections explain in more detail the approach of analysis and specification of workshops as well as provide a general background of the workshops.

Workshop conceptualisation was carried out first at the level of the institutions (the universities that implemented the workshops), in order to engage locally specific learning/teaching approaches, and then at the level of the RE-MHN project consortium (through a joint discussion of representatives of all institutions), in order to establish the specific content of and methodology for each of the workshops. In this sense, the basic criteria for the conceptualisation of the workshops and the provision of a framework for the comparative

study included (1) the engagement of different spatial levels, i.e., the focal scale of analysis within the workshops—multi-scale approach or single-unit approach (settlement or block level), (2) the engagement of different methods and tools—a combination of onsite analysis with digital tools and methods, (3) different learning environments and modes—one-to-one, one-to-many, many-to-one, and many-to-many, and (4) workshops designs, resulting in different outcomes and outputs—both on individual and workshop levels. Workshop implementation was carried out during the entire lifetime of the RE-MHN project in a reflective way, which enabled the experiences and outcomes of one workshop to be evaluated and transferred to the next workshop. The implementation of all three workshops included all phases of the linear design process, analytical, creative, and executive, and provided a framework for the presentation of the results through a public presentation and/or exhibition. Workshop assessment and specification were carried out on two levels: (1) directly after the implementation of each workshop—individual analysis of a completed workshop—and (2) after the completion of all workshops—comparative analysis of all three workshops. In the continuation of this section, the approach to the analysis engaged in the assessment and specification phase is presented as well as the general background of all workshops.

3.2. Analysis of Capabilities

In accordance with the idea of creating and conducting three thematically and methodologically different workshops (the basis for gaining comparative insight), the study engages an analysis that aims to simultaneously look at the substantial and procedural aspects of the workshops, namely, (1) from a content-related aspect to investigate and decode fields of knowledge, skills, and competences (together perceived as learning capabilities), which are engaged and gained through workshop implementation phase; and (2) from a methodological aspect, to decode the connection and conditionality between phases of the design process and learning capabilities.

In the context of the substantial aspect, the research engages the framework of the UNESCO/UIA Charter for Architectural Education [24], developed with the intention for the "creation of a global network of architectural education within which individual achievements can be shared by all and that will enhance the understanding that architectural education constitutes some of the most significant environmental and professional challenges of the contemporary world" (p. 4). Within the section that introduces the objectives of architectural education, UNESCO/UIA Charter introduces relevant capabilities presented in three main groups: (1) design, (2) knowledge, and (3) skills. A list of capabilities is provided for all three groups, with the note that within the knowledge group there are also six subgroups: (1) cultural and artistic studies, (2) social studies, (3) environmental studies, (4) technical studies, (5) design studies, and (6) professional studies. In the first step, a critical screening of all listed capabilities was carried out, and certain overlaps in the wording of individual capabilities were observed. Based on this insight, a unique list of learning capabilities was adapted, which are all indexed (Table 1). This table provides a framework for workshop assessment and, accordingly, provides insight into capabilities that are derived from each workshop for specification of other workshops (defining models of workshops).

In the context of the procedural aspect, the research introduces the framework of the original design process model [25] and challenges connection and conditionality between phases of design process and identified learning capabilities. In this sense, cross-analysis of procedural and substantial aspects is performed in the following order for each workshop: (1) capabilities are affiliated with the particular phase of original design process (analytical, creative, and executive phase); (2) capabilities are considered in line with listed indexes—(a) direct engagement of capability within workshop process (direct—•), (b) indirect engagement of capability within workshop process (indirect—o), (c) capability is not considered within workshop process according to specificity of workshop content (not considered—x), or (d) capability is not applicable in particular design phase (not applicable—/).

Table 1. List of learning capabilities. Source: authors, according to the UNESCO/UIA Charter [24].

	Design
D.1.	creative and innovate thinking
D.2.	documentation and systematisation of data
D.3.	problem-based and critical thinking
D.4.	three-dimensional thinking
D.5.	integrating knowledge and divergent factors
D.6.	formulating strategies for action and design solutions
	Knowledge
	Cultural and Artistic Studies
CAS.1.	considering historical and cultural precedents
CAS.2.	engaging fine arts in architectural design
CAS.3.	understanding of heritage issues
CAS.4.	rising awareness of other creative disciplines
	Social Studies
SS.1.	designing for and with society and users' needs
SS.2	considering contextual, spatial, and functional requirements
SS.3	applying the relevant codes, regulations, and standards
SS.4.	considering philosophy, politics, and ethics
	Environmental Studies
ES.1.	appreciating natural systems and built environments
ES.2.	understanding ecological sustainability and environmental impact
ES.3.	planning and design in relation to glocal demography and resources
ES.4.	taking into account disaster risks and natural systems management
	Technical Studies
TS.1.	acquiring knowledge of structure, materials, and construction
TS.2.	applying and innovating building techniques
TS.3.	applying integrated technical design
TS.4.	understanding of services systems and activities
TS.5.	understanding the technical procedures from conception to realisation
	Design Studies
DS.1.	acquiring knowledge of design theory and methods
DS.2.	understanding of design procedures and processes
DS.3.	acquiring knowledge of design precedents and architectural criticism
	Professional Studies
PS.1.	understanding procurement of architectural services
PS.2.	understanding finance, real estate investment and facilities management
PS.3.	understanding (in) conventional roles of architects in an international context
PS.4.	understanding of business principles
PS.5.	understanding of professional ethics and codes of conduct
	SKILLS
S.1.	acting in collaborative and interdisciplinary environment
S.2.	utilising manual, electronic, graphic, and model-making capabilities in research and exploration
S.3.	utilising manual, electronic, graphic, and model-making capabilities in design and development
S.4.	communicating ideas through oral and written presentation
S.5.	communicating ideas through drawing and modelling
S.6.	applying systems of evaluation and performance assessments

3.3. General Background of Workshops

3.3.1. Workshop 1: TH OWL

The first student workshop was organised in February 2022 in Zollverein Coal Mine Industrial Complex (German Zeche Zollverein), UNESCO World Heritage Site since 2001, in the city of Essen, Germany. This, Workshop 1, was part of the kick-off event of the RE-MHN project, which was a hybrid event combining seminars, workshops, and site visits. Workshop 1 focused on the exploration and documentation of selected mass housing neighbourhoods built in 1960s and 1970s in Dortmund and Bochum, Germany. The main objective was to understand different factors behind the rehabilitation of mass housing neighbourhoods and heritage issues in this region. The workshop assignment was not only to analyse these neighbourhoods, including spatial analysis—morphology of these settlements—but also to address social aspects and perceptions of residents and general public.

Workshop 1 employed place-based research, focusing on 4 different case studies in Dortmund and Bochum: Terrassenhaus Girondelle in Bochum (1965–1969), Wohnkomplex Hannibal II in Dortmund (1973–1975), Wohnbaukomplex Hannibal I in Dortmund (1971–1974), and Woldenmey-Siedlung in Dortmund (1963–1969) (Figure 2).

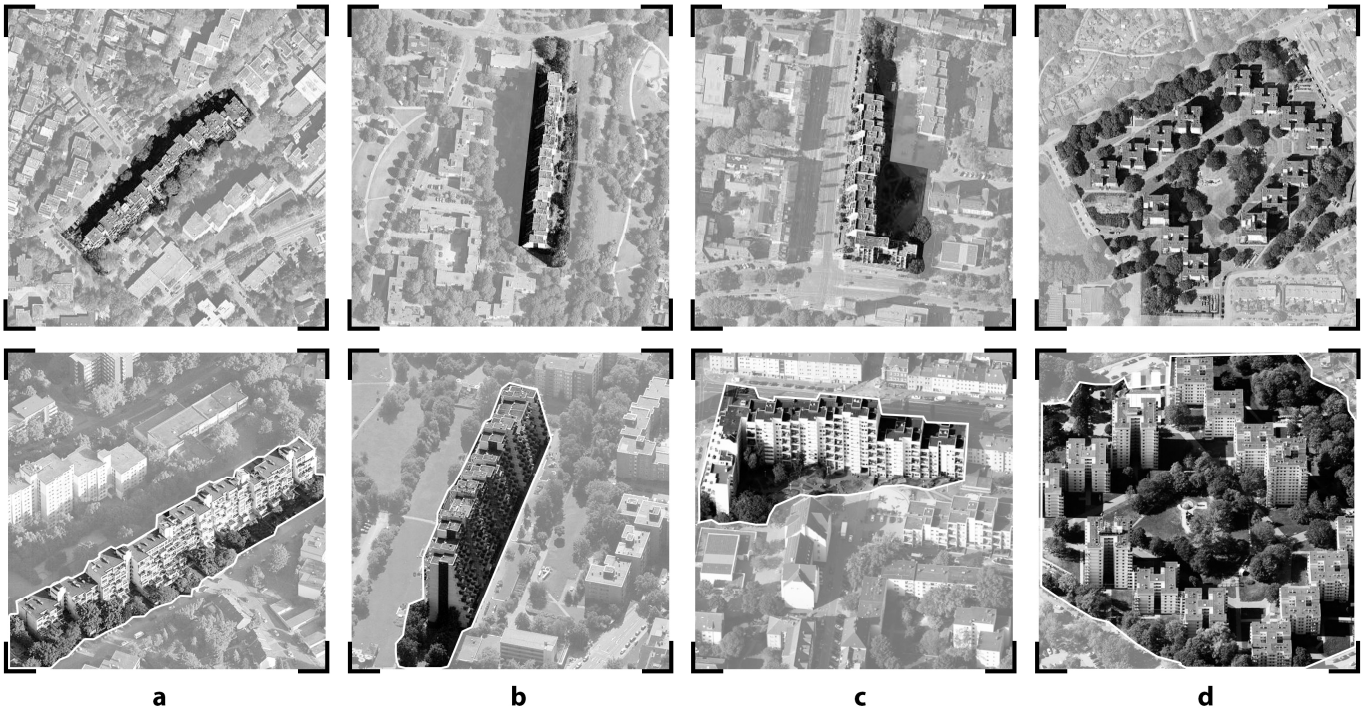

Figure 2. Case studies in Dortmund and Bochum: (**a**) Terrassenhaus Girondelle in Bochum (1965–1969), (**b**) Wohnkomplex Hannibal II in Dortmund (1973–1975), (**c**) Wohnbaukomplex Hannibal I in Dortmund (1971–1974), and (**d**) Woldenmey-Siedlung in Dortmund (1963–1969). Source: authors, adapted from Bing Maps, 2022.

Each of the housing settlements has different characteristics and design principles behind it, but also its current conditions differ. The primary research of the students focused not only on historical material but also on different planning documents and reports available from the cities of Dortmund and Bochum as well as other scientific and non-scientific publications, including press releases, about these settlements. Moreover, during the workshop, the students had organised site visits, when they conducted photo documentation and talks with residents of these neighbourhoods.

The workshop combined several learning approaches, including place-based and critical thinking, integrating knowledge and different factors with documentation and systematisation of data. It included thematic lectures on historical interpretative research

from different regions, through which the students gained basic methodological inputs for research. The student results were presented to the wider audience, including not only representatives of academia but also professional associations and experts in photography, scientific writing, and digital publishing. The results of the workshop include photo essays, diagrams, and "identity cards" of the 4 mass housing neighbourhoods (Figure 3).

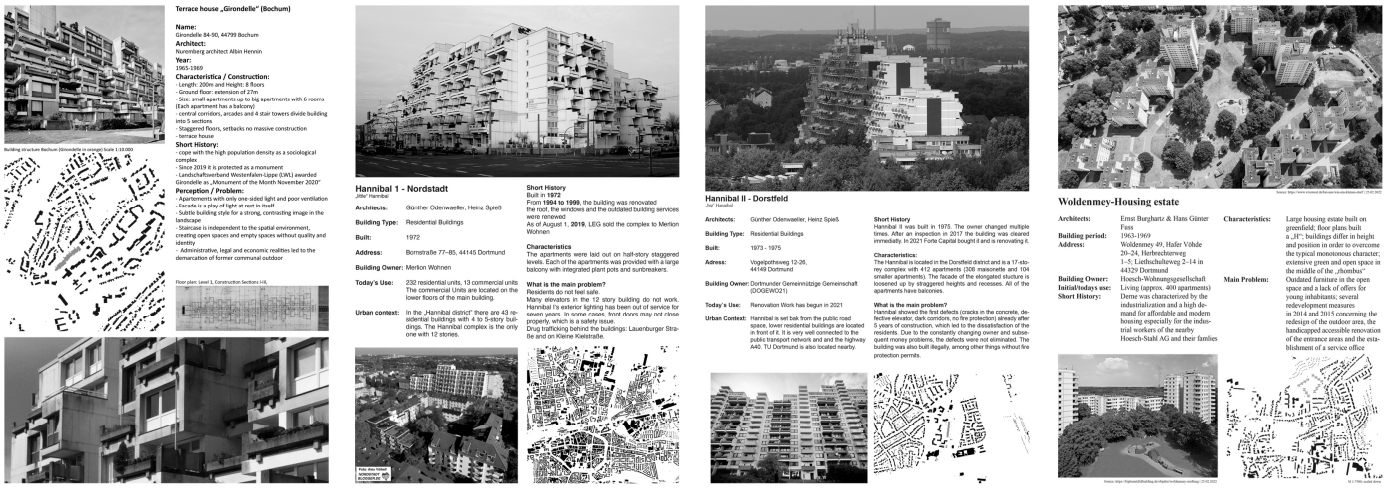

Figure 3. Identity cards of the case studies: (**a**) Terrassenhaus Girondelle in Bochum (1965–1969), (**b**) Wohnkomplex Hannibal II in Dortmund (1973–1975), (**c**) Wohnbaukomplex Hannibal I in Dortmund (1971–1974), and (**d**) Woldenmey-Siedlung in Dortmund (1963–1969). Source: Julia Bussen, Tessa Disse, Vanessa Pohl, Svenja-Christin Voß, and Zeynep Aksoy, from the student workshop results, 2022.

The workshop involved 5 bachelor's and master's students of architecture, interior design, and urban planning from TH OWL, Germany.

3.3.2. Workshop 2: UB-FA

The second student workshop, entitled "ISO-SCAPES: Research Mass Housing through Drawing", was implemented from February to May 2022 at the UB-FA. This, Workshop 2, was focused on the discovery and representation of mass housing patterns built on the territory of the city of Belgrade, Serbia, in the second half of the 20th century (see Figure 4). The main objective was to look at current relational flows, gaps between urban and rural as well as between architecture and nature, global flows, and everyday life at the level of mass housing neighbourhood. The workshop assignment was, therefore, to identify and map the impulses and transformations that have been generated over time and then to provide graphical representation in the form of drawings—isometrics of the mass housing settlements.

Workshop 2 employed case-study-based research that is structured in several phases, from phenomenon identification to its graphical interpretation. The case-study-based research covered 12 different large-scale housing settlements in Belgrade that were planned and implemented under socialist conditions (1963–1984). This means that each of these settlements has different design principle and programming framework, which requires students to recognise the phenomena of modernity at different spatial levels and, accordingly, develop methods for their systematisation through drawing.

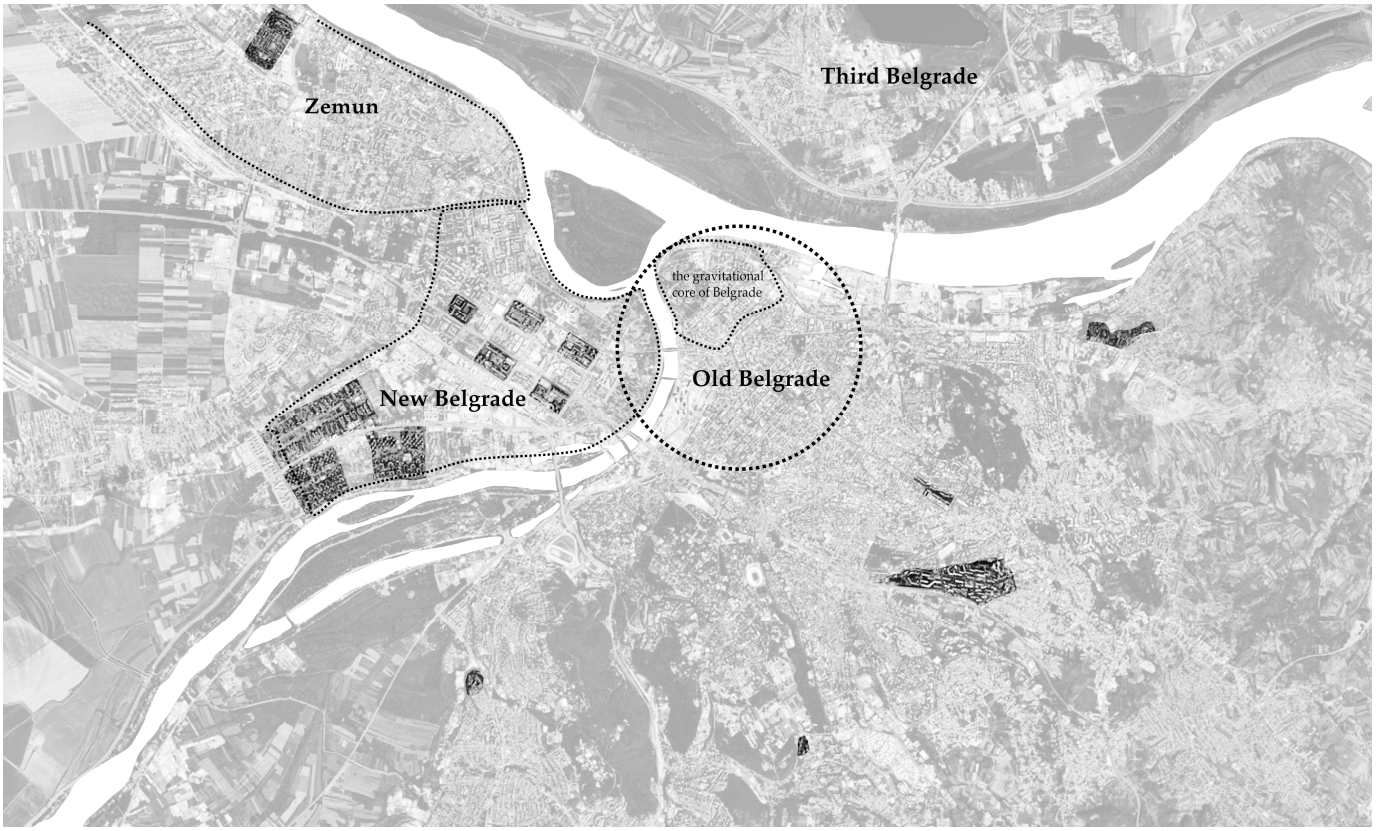

Figure 4. ISO-SCAPES—mass housing neighbourhoods in Belgrade. Source: authors, adapted from the ISO-SCAPES student workshop results, 2022.

In that sense, the primary research material is historical material—original plans and projects of all 12 mass housing settlements as well as periodicals about the field of architecture and urbanism from the period of planning and construction of the settlements (Architecture Urbanism, Urbanism of Belgrade). The transfer of historical material to digital was carried out using CAD, Rhinoceros 3D, and graphic design software. The workshop included a combination of several approaches to learning and research and, accordingly, different modes of communication and knowledge outcomes. These outcomes differ in relation to the realisation phase of the workshop: (1) thematic introductory lecture on chronological and historical-interpretative research through which the students gained basic methodological inputs for research; (2) PechaKucha presentations on recognised phenomena related to modernity–rurality, industrialisation–sociology of housing, and harmonisation of urban planning–social and economic problems of housing; (3) transferring of historical material into digital drawings with indication of contemporary changes (in 3 iterations).

The result of the workshop is recognised on two levels—the first is a systematic chronological review of the mass housing neighbourhoods developed in Belgrade in the period 1963–1984, while the second part of the contribution is reflected in the created "ISO-SCAPES" of 12 individual neighbourhoods (see Figure 5 for a selection of 4 "ISO-SCAPES").

The workshop involved 20 students organised in 12 groups from different study levels, as follows: 9 master's students in architecture, 4 students from 5-year single-cycle study programmes (integrated studies) in architecture, and 7 students from Ph.D. level in the field of architecture and urbanism.

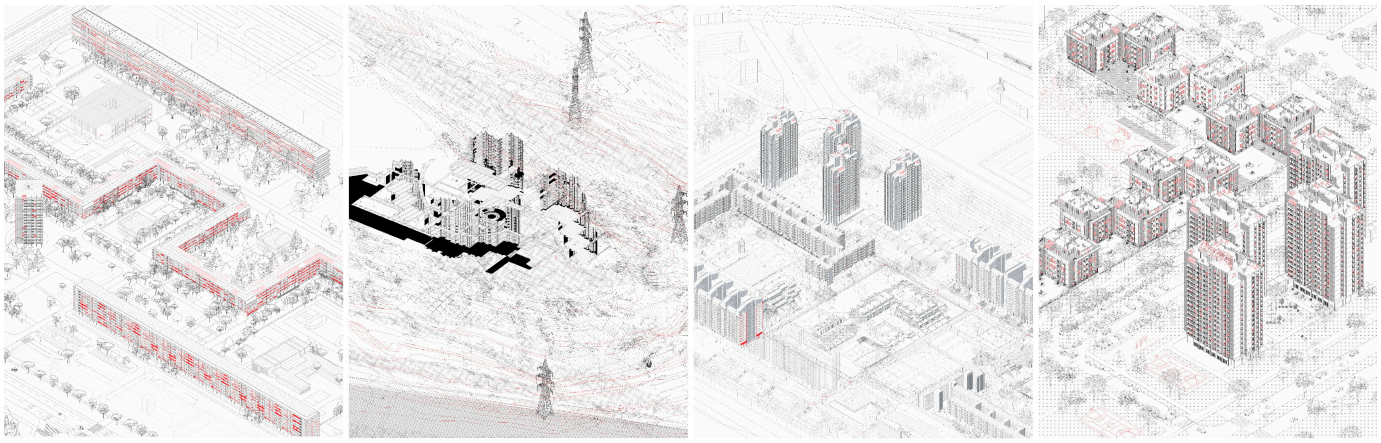

Figure 5. ISO-SCAPES—axonometric drawings of the mass housing neighbourhoods in Belgrade, selection of the student workshop results: (**a**) Block 21, New Belgrade (1963), illustration: Vera Jovanovic; (**b**) Julino Brdo (1970), illustration: Milica Bozic and Marko Ristic; (**c**) Block 23, New Belgrade (1974), illustration: Mina Vujovic and Teodora Stevanovic; (**d**) Block 30, New Belgrade (1979), illustration: Nikola Mitrovic and Djordje Mitrovic. Source: ISO-SCAPES student workshop results, 2022.

3.3.3. Workshop 3: UKIM

The third student workshop, "Rethinking the Commons", was implemented in September 2022 at the UKIM, North Macedonia. The focus of the workshop was on rehabilitating Skopje's Aerodrom settlement by revitalising its unused public space. The main objective of the workshop was to explore and propose various scenarios for urban renewal of the area, exploiting the concept of "urban acupuncture", used as a design strategy for urban regeneration [26], and understanding how soft transformation could have impact on revitalisation of MHN and the immediate surroundings. The initial premise of the workshop was that small-scale interventions could have a transformative impact; accordingly, students were directed towards programming the common space and focusing on the relationship between the people/residents, the community, and the public space.

In the initial phase, the students were introduced to original historical drawings of the winning competition proposal by the Yugoslav Institute for Urbanism and Housing, aiming to understand ideas behind the people-centred approach (humanisation) and to create ground for rethinking and reinterpretation of the segments that were never realised. The workshop starting point was the theme of water canal, which was once envisioned as the backbone of the settlement (Figure 6). It is worth mentioning that incomplete project implementation resulted in a lack of content and public infrastructure of the site, causing the space to become alienated from its residents and ultimately become unpopular, while reducing its role exclusively to that of transit.

Besides strong historical inputs, the pedagogical model was expanded by (1) using a drone to map and provide high-quality and accurate orthophoto pictures and vector data (DJI Mavic 2 Pro drone with Hasselblad camera) and (2) employing specific techniques such as photogrammetry, used to create a 3D model of the site (Pix-4Dcapture). The use of these techniques had benefits regarding time consumption, efficiency, precision, and real-time accuracy manner.

Figure 6. Aerodrom settlement in Skopje: rehabilitation concept (photogrammetry image of the contemporary condition and proposed small-scale interventions along the unrealised canal). Source: Rethinking the Commons, student workshop results, 2022.

The workshop included a set of already established methods and approaches to learning and research and, accordingly, resulted in different knowledge outcomes. These outcomes can be traced following workshop phases: (1) analytical—photographic and drawing surveys and archive documentation analysis—using generative multiscale drawings for problem-based and critical thinking and understanding user needs and contextual spatial, social, cultural, and ecological values; (2) sketching and conceptual development followed by reflections and dialogue between the students and the tutors, directed towards creative and innovative thinking and integrating knowledge and divergent factors; (3) elaboration phase through a series of technical and artistic drawings and final presentation of the student's projects.

The workshop resulted in five rehabilitation projects placed along the botanical garden: Neighbourhood Conservatory, Bird Sanctuary Lookout, Children's Playland, Community Gametime, and Steering Path. Reprogramming of public space through these five pavilions aimed to round off the initial overall idea of living in this neighbourhood and to create a socially and culturally diverse public space for the people through urban acupuncture. The purpose was to strengthen the public character of the botanical garden, spark interest, and encourage people from the surrounding area to visit the space more often and, like for most of this neighbourhood, to "domesticate" it (see Figure 7).

The workshops involved 10 students (bachelor's and master's level) organised into five groups. Besides tutors from the UKIM-FA workshop, experience was enriched by involving additional academics and practitioners.

Figure 7. Rethinking the Commons—Aerodrom settlement in Skopje, student workshop results: (**a**) "Steering Path", illustration: Ana Bojadijevska and Mahmud Tale; (**b**) "Children´s Playground", illustration: Bojana Stankovska and Ljupka Koceva; (**c**) Community Gametime, illustration: Ana Tashkovska and Nina Strezovska; (**d**) "Bird Sanctuary Lookout", illustration: Diana Stefanovski and Verica Rizova; and (**e**) "Neighbourhood Conservatory", illustration: Jusra Durmishi and Faton Kjerimi. Source: Rethinking the Commons, student workshop results, 2022.

4. Results and Discussion

The three thematically and methodologically different workshops engaged different pedagogical models for teaching and learning on the sustainable rehabilitation of mass housing neighbourhoods (MHN). A comparative analysis of the substantial and procedural aspects of the three workshops is presented in the Table 2. The first part of this section presents a comparative analysis of workshops that addresses the learning capabilities (based on the previously mentioned framework of the UNESCO/UIA Charter for Architectural Education) developed within each workshop, which are in line with the phases of the design process (analytical, creative, and executive phases). The second part of this section provides the definition of the three workshop models, supported by associated diagrams of the implementation process with two main progressions (axes): (1) the vertical progression defines the timeframe of the workshop by marking the main phases, and (2) the horizontal progression defines the phases of the design process.

Table 2. Comparative analysis of learning capabilities in line with the phases of the design process (analytical, creative, and executive phase). Source: authors, 2022.

	Workshop 1			**Workshop 2**			**Workshop 3**		
List of Capabilities	A	C	E	A	C	E	A	C	E
				Design					
D.1.	x	x	x	●	x	●	o	●	●
D.2.	●	●	●	o	●	o	x	x	x
D.3.	●	o	o	●	o	o	●	o	o
D.4.	x	x	x	x	x	●	x	o	●
D.5.	●	x	/	●	x	/	o	o	/
D.6.	/	x	x	/	x	x	/	●	●

Table 2. *Cont.*

	Workshop 1			Workshop 2			Workshop 3		
Knowledge									
Cultural and Artistic Studies									
CAS.1.	●	o	o	●	o	x	o	o	x
CAS.2.	x	x	x	x	x	x	x	x	o
CAS.3.	●	o	●	●	o	o	o	o	x
CAS.4.	o	x	o	x	x	x	o	o	o
Social Studies									
SS.1.	●	x	x	x	x	x	●	●	o
SS.2	●	o	●	●	o	o	●	●	o
SS.3	x	x	x	x	x	x	o	●	o
SS.4.	●	o	x	o	o	x	o	o	o
Environmental Studies									
ES.1.	o	x	x	o	o	o	●	●	●
ES.2.	o	x	x	o	o	o	●	●	●
ES.3.	●	o	x	●	o	x	o	o	x
ES.4.	x	x	x	x	x	x	o	●	o
Technical Studies									
TS.1.	●	o	x	o	x	o	o	●	o
TS.2.	x	x	x	x	x	x	o	o	o
TS.3.	x	x	x	x	x	x	x	o	x
TS.4.	o	x	x	x	x	x	x	o	x
TS.5.	x	x	x	x	x	x	x	o	x
Design Studies									
DS.1.	x	x	x	●	o	x	o	●	o
DS.2.	x	x	x	x	x	x	●	●	●
DS.3.	o	x	x	●	o	●	o	o	o
Professional Studies									
PS.1.	o	x	x	x	x	x	x	x	x
PS.2.	●	x	x	x	x	x	x	o	x
PS.3.	o	x	x	o	x	x	o	●	o
PS.4.	o	x	x	x	x	x	x	x	x
PS.5.	●	x	x	x	x	x	o	o	x
Skills									
S.1.	●	●	●	●	●	●	●	●	●
S.2.	●	o	/	●	●	/	●	●	/
S.3.	/	x	/	/	o	/	/	●	/
S.4.	/	o	o	/	o	●	/	●	●
S.5.	/	x	x	/	●	●	/	●	●
S.6.	x	/	x	o	/	x	o	/	x

Table indexes: A—analytical phase, C—creative phase, E—executive phase; ●—direct, o—indirect, x—not considered, /—not applicable; for full list of capabilities, refer to Table 1.

4.1. Comparative Analysis of Workshops

The comparative analysis of learning capabilities revealed different learning focuses and approaches for each workshop. Workshop 1 mainly targeted the capabilities of documenting and systematising data, while Workshop 2 rather focused on creative, innovative, and three-dimensional thinking. Workshop 3 aimed at different capabilities, including the formulation of strategies for actions and design solutions, which were not addressed in Workshops 1 and 2 (Table 2).

The common characteristics of all three workshops were understanding the heritage issues and considering the historical and cultural aspects. Engaging with fine arts was not

addressed in any of the workshops, while raising awareness of other creative disciplines was indirectly present in Workshops 1 and 3. Workshop 3 strongly enhanced the capabilities for designing for and with society and users´ needs as well as other capabilities related to social studies, while Workshop 2 directly enhanced only the capabilities for the consideration of the contextual, spatial, and functional requirements in the analytical phase. Workshop 1 focused on the capabilities related mostly to social studies within the analytical phase. The capabilities related to environmental studies were mainly indirectly present in the case of Workshops 1 and 2, while Workshop 3 directly enhanced the capabilities for appreciating natural systems and built environments and understanding ecological sustainability and environmental impact through the whole design process. The capabilities related to technical studies were very modestly enhanced within all the workshops. The capabilities related to design studies were completely excluded within Workshop 1 but were strongly addressed within Workshop 3. The capabilities related to professional studies were completely excluded within Workshop 2, while they were partly addressed within Workshop 1 in the analytical phase and Workshop 3 in all design phases, mainly indirectly.

Enhancing the capabilities for acting in collaborative and interdisciplinary environments was common and was one of the strongest characteristics of all three workshops. Moreover, all the workshops were utilising manual, electronic, graphic, and model-making capabilities during research and exploration and in the analytical and creative phases. Workshops 2 and 3 utilised such capabilities during design and development as well.

4.2. Definition of Workshop Models

The comparative analysis profiled three workshop models that differ in their research-based and outcome-directed nature, as follows (Table 3): (1) Workshop Model 1: evidence based and state-of-the-art directed; (2) Workshop Model 2: representation based/problem directed; (3) Workshop Model 3: problem based/design directed—applying different teaching and learning formats, focuses, and approaches and enhancing different capabilities and skills.

Table 3. Summary of workshops. Source: authors, 2022.

Workshop	Content Based	Outcome Directed	Focal Design Phase	Focal Capabilities
Workshop Model 1	Evidence based	State-of-the-Art directed	Analytical phase	Knowledge
Workshop Model 2	Representation based	Problem directed	Executive phase	Skills
Workshop Model 3	Problem based	Design directed	Creative phase	Design

This profiling of the models corresponds, to the greatest extent, with the initially established criteria for the conceptualisation of the workshops. According to the criterion of scalarity, a multi-scalar approach was engaged through all the research phases, from analytical to executive, in the framework of Workshop 1, thus encouraging reflective thinking on the different aspects derived from the different scales. In Workshop 3, a multi-scalar approach was also engaged, by observing the level of the mass housing settlement and wider urbanity in the analytical and executive phase, while, in the creative phase, the focus was placed on the level of the neighbourhood and public space. In this order, reflective thinking within Workshop 3 was established during the transition from one research phase to another, not within each phase individually. The exception was Workshop 2, which engaged the multi-scale approach only in the analytical phase, while the creative and executive phases focused on the level of the mass housing block as an urban unit. All three workshops confirmed the importance of engaging a multi-scale approach for studying and understanding the rehabilitation of mass housing, while bearing in mind that it is a part of a complex urban system within which numerous cause-and-effect relationships are realised at different spatial levels—from the level of a settlement to the level of a single unit. According to the criteria of the engagement of different methods and tools, their different distributions in relation to the basic goals and thematic frameworks of

the workshops, as well as in relation to the phases of the linear design process on which the workshops have a focus, were recognised. Thus, the first workshop predominantly engaged the analytical methods of data collection and systematisation as well as their visualisation through morphogenesis maps and the creation of settlement ID cards; the second workshop involved historical interpretive and contextual analysis supported by digital tools—3D modelling; the third workshop utilized, on the one hand, traditional analytical methods combining desk research and site visiting and, on the other hand, innovative digital techniques such as photogrammetry and drone mapping survey. In accordance with the different methodological frameworks of the workshops, the diversity in the established learning environments and modes is also recognised: (1) all workshops had an introductory part with presentations, which is designed in ex cathedra mode with an accompanying discussion; (2) all workshops involved group work, leaving students the opportunity to independently form groups in relation to their own affinities; (3) all workshops provided criticism through the inclusion of external participants—within the first workshop, through a public presentation, within the second workshop, through the exhibition and Ph.D. Talks Seminar, and within the third workshop, through the exhibition and presentation for guest critics.

Following this line of elaboration, this research indicates that the workshop model based on evidence dominantly focuses on the analytical phase of the design process. This is the result of the overall objective of Workshop 1, which is aimed at establishing the current state-of-the-art conditions of an engaged mass housing neighbourhood. The second model of the workshop, which is affiliated with Workshop 2, is based on representation and is aimed at visualising recognised problems related to the contemporary context of mass housing neighbourhoods. In this sense, this model has a focus in the executive phase. The third workshop model tended to move beyond the framework of identifying problems and phenomena, by moving a step further and developing design scenarios for mass housing rehabilitation. Accordingly, Workshop 3 is, by its nature, based on the identification of problems, but it aims at solving the identified problems through the creative phase of the design process. Observing the general approach to the conception of the workshop in relation to the nature of the workshop participants and their interactions with stakeholders, it is recognised that Workshop Models 1 and 3 are found within middle-out approaches, bearing in mind that the residents of MHN are indirectly involved in the design process as follows: (1) Workshop Model 1 engages interviews with the local community, while (2) Workshop Model 3 engages informal discussions with residents during site visits to examine local needs for common space re-design.

4.2.1. Workshop Model 1: Evidence Based/State-of-the-Art Directed

Workshop 1 resulted in an evidence-based and state-of-the-art-directed model of a student workshop. At the general level, this model of the workshop aims to stimulate the systemic and critical analysis of an engaged spatial framework and to develop a review of the main notions related to the existing condition of the analysed space. Bearing in mind that Model 1 is based on evidence, its process is dominantly positioned in the analytical phase of the comprehensive workshop-implementation process (Figure 8). Additional specificity is reflected in the appearance of two iterative analysis processes—the first, which establishes a preliminary analysis based on desk research, and the second, which reflexively checks the conclusions and outcomes of the first analytical phase based on a site visit and interviews with the local community. The creative phase of Model 1 has a synthesis role in the critical interpretation of the collected data in the first phase and the identification of problems through discursive analysis. By its nature, the creative phase is based on the dialogue between students and external critics (feedback session), while the executive phase generates insights from the creative phase that are added to the presentational content (morphogenesis maps and the mass housing ID cards).

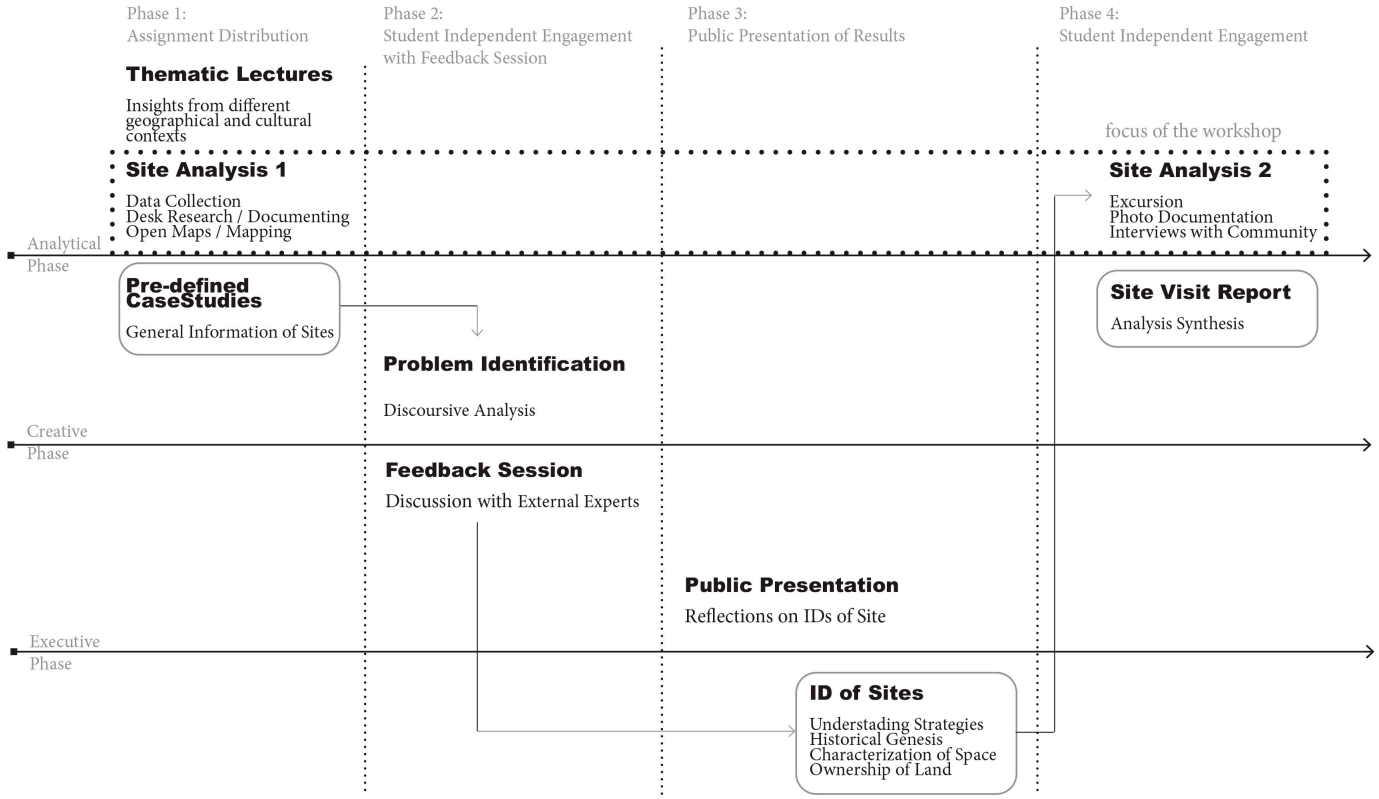

Figure 8. Workshop Model 1: evidence based/state-of-the-art directed, diagram of the implementation process. Source: authors, 2022.

4.2.2. Workshop Model 2: Representation Based/Problem Directed

Workshop 2 resulted in a representation-based and problem-directed model of a student workshop. At the general level, this model of the workshop aims to identify the problems and phenomena associated with the engaged spatial framework and to visualise/represent the insights derived from the historical and contextual analysis. Bearing in mind that Model 2 is based on representation, its process is dominantly positioned in the executive phase of the comprehensive workshop-implementation process (Figure 9). In this sense, the analytical phase has an intermediate role to carry out a general analysis, while the creative phase has a role in identifying the problems and phenomena that are later represented in the executive phase. In addition, the creative phase has a role in developing the concept of the drawing—the scale, level of detail, and basic elements that are shown in the drawing. The executive phase has a two-fold role: to operationalise the knowledge from the creative phase and to establish the content for the further presentation of the results.

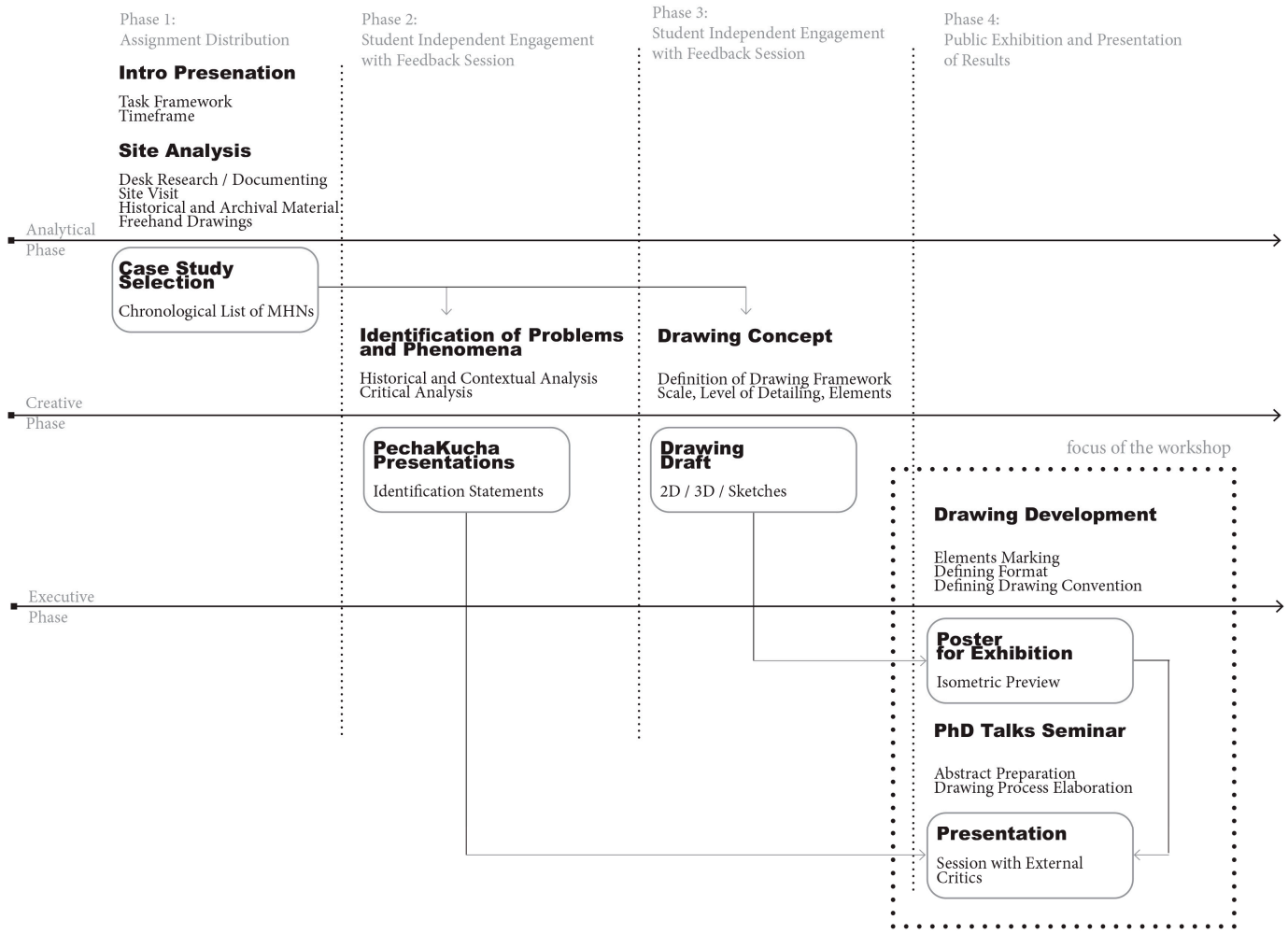

Figure 9. Workshop Model 2: representation based/problem directed, diagram of the implementation process. Source: authors, 2022.

4.2.3. Workshop Model 3: Problem Based/Design Directed

Workshop 3 resulted in a problem-based and design-directed model of a student workshop. At the general level, the model of the workshop aims to identify the problems (physical, social, environmental, cultural, and economic) associated with the engaged spatial framework and to develop a scenario for its rehabilitation. Bearing in mind that Model 3 is based on the problem, its process is dominantly positioned in the creative phase of the comprehensive workshop-implementation process (Figure 10). In this sense, the creative phase has the role to both identify the main design problem and to propose the way in which the identified problem could be solved on two levels: (1) the level of the conceptual design of single units and (2) the level of the comprehensive master plan. The analytical phase of Model 3 has a screening role—it aims to collect, document, and survey the current state of the analysed case study. The data collected within the analytical phase are input to the creative phase. The executive phase has a role in the visualisation of both the developed conceptual design and master plan.

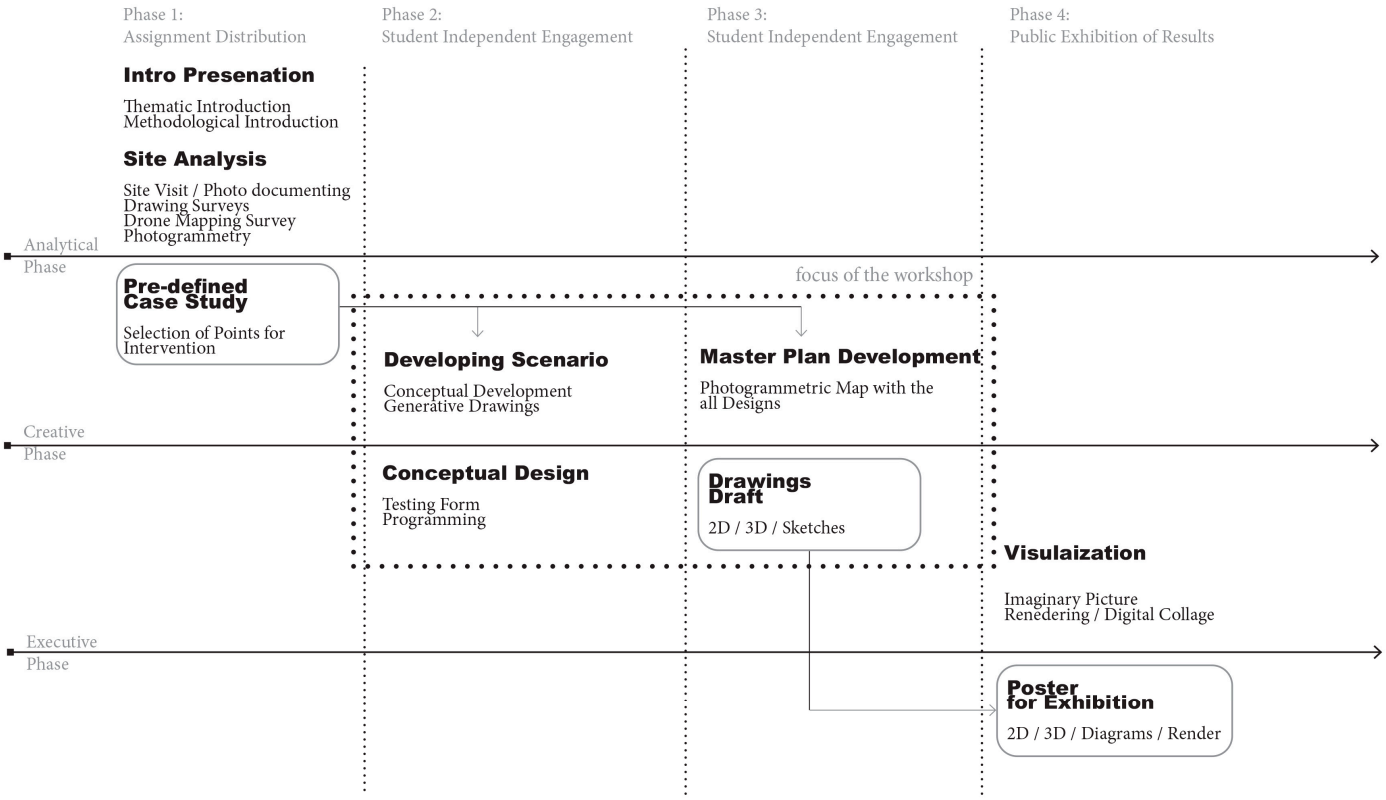

Figure 10. Workshop Model 3: problem based/design directed, diagram of the implementation process. Source: authors, 2022.

5. Concluding Remarks

The concluding remarks were developed according to the initial research questions outlined at the beginning of this paper: (1) what are the differences in the structure and outcomes of the implemented workshops' models, in line with the differences of the thematic scope/focus of the workshops and engaged case studies; (2) what are the differences in the learning capabilities gained within the implemented workshops; and (3) could unique workshop models be formulated as a framework for further action based on the relation/conditionality between the learning capabilities and workshop phases?

The answer to the first question was found in relation to the developed general models of the three implemented workshops as well as through the insights into the conceptual framework of each workshop. The research demonstrated that the relationship between the thematic framework of the workshop and the engaged spatial framework (case study) significantly encourages the structure and outcomes of the workshops. Workshop 1/Model 1 engages multiple case studies that enabled a comparative study through a multimedia approach. Workshop 2/Model 2 engages a number of contextually and chronologically connected spatial frameworks, which made it possible not only to consistently observe one spatial level of reference for all engaged case studies but also to obtain a two-fold result: an individual analysis of the case studies (student-group level) and a chronological overview of all the case studies (workshop level). Workshop 3/Model 3 engages a complex urban system consisting of several spatial units, which enabled the development of the design for all the individual interventions and then for the establishment of a synthesis (master plan) at the level of the overall spatial framework.

The differences in the learning capabilities gained within the implemented workshops are based on the different learning focuses and approaches of each workshop. As the comparative analysis showed, Workshop 1 mainly enhanced the capabilities of the documentation and systematisation of data, while Workshop 2 enhanced creative, innovative, and three-dimensional thinking. Workshop 3 enhanced different capabilities, including

the formulation of strategies for actions and design solutions that were not addressed in Workshops 1 and 2 (elaborated in Section 4.1.).

The different learning approaches and, accordingly, the enhanced skills and capacities within each workshop, profiled three workshop models that differ in their research-based and outcome-directed nature: (1) Workshop Model 1: evidence based/state-of-the-art directed, (2) Workshop Model 2: representation based/problem directed, and (3) Workshop Model 3: problem based/design directed. Model 1 is mainly based on evidence, and its process is dominantly positioned in the analytical phase (as indicated in the implementation process of Workshop Model 1—Figure 8). Model 2 is mainly based on representation, and its process is dominantly positioned in the executive phase (as indicated in the implementation process of Workshop Model 2—Figure 9). Model 3 is mainly based on a problem. and its process is dominantly positioned in the creative phase (as indicated in the implementation process of Workshop Model 3—Figure 10).

Each workshop focuses on one of the stages of the design process (analytical, creative, or executive), which is in accordance with the general goals of the workshops and the engaged methods. In this sense, Workshop Model 3 comprehensively includes all three phases and results in concrete solutions that provide answers to the identified problems from the analytical phase. The research demonstrated that there is a strong connection between the nature of the methodology of the workshops and the learning capabilities (generated between the set goals and the expected learning outcomes), which indicates that through the workshops it is possible to define a specific scope sufficient for achieving certain learning capabilities. Accordingly, the workshop as a format for extracurricular activities could be a strong complementary addition to existing curricula, by targeting the knowledge and skills that correspond to one or more phases. In this sense, the research further confirmed that traditional formats in architectural education such as the design studio are the basis for the learning capabilities and their integral inclusion in the curriculum, while workshops could replace some aspects or topics that cannot be mastered in the studio.

The teaching and pedagogical approaches applied within the three workshops' profiled learning outcomes include the core competences and skills of the students, as summarised in the learning capabilities assessment. This study shows how different approaches enhance different types of competences and skills, thus providing an insight into the possible methods for enhancing those that are targeted. Furthermore, interlinking the profiled methods and adjusting the workshop format may enable the enhancement of a wider scope of competences and skills.

Author Contributions: Conceptualisation, all authors; methodology, all authors.; validation, A.D., A.M. and A.Đ.; formal analysis, A.D., A.M., M.S., T.D. and A.Đ.; investigation, all authors; resources, all authors; data curation, A.D., A.M., M.S. and T.D; writing—original draft preparation, A.D., A.M. and A.Đ.; writing—review and editing, U.P., A.I.D. and A.N.; visualisation, A.D. and A.M.; supervision, U.P., A.N., A.I.D. and J.I.; project administration, U.P. and A.D. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by DAAD with funds from the German Federal Foreign Office (Programme East-West Dialogue: Higher Education Dialogue with Western Balkan Countries), and the APC was funded by the TU Delft Library. The research activities of the authors are supported by DAAD, the German Federal Foreign Office, and the Ministry of Education, Science and Technological Development of the Republic of Serbia, grant number 451-03-68/2020-14/200090, within the MorphoLab.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: The authors want to thank all students and tutors involved in the realised workshops in Germany, North Macedonia, and Serbia.

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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