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Emerging Perspectives on Teaching Urban Form: A Blended Learning Approach

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Abstract: Over the past few decades, several analytical approaches have been developed to understand urban form and to address the complexity of human settlements as well as various socio-economic and environmental challenges. Each approach is characterized by specific disciplinary and geographical trends, often emerging from distinct schools of thought within urban morphology. Typically, these approaches are associated with specific research centers or individual researchers and have frequently been applied in isolation, with some exceptions. The teaching of urban morphology in higher education institutions across Europe faces the challenge of training future graduates to effectively address contemporary urban issues from often isolated perspectives rooted in the aforementioned schools of thought, either reflecting specific national educational trends or adopting a globalized approach that overlooks local specificities. Furthermore, the relationship between professional practice in urban and planning fields and higher education institutions is a notable concern. While the importance of broad knowledge and multidisciplinary skills for urban professionals is recognized, the connection between academia, research and practice is minimal. The increasing demand for evidence-based approaches in urban design highlights the need for solutions grounded in sound knowledge. To address the relationship between academic research and its integration into professional practice, innovation in teaching practices is crucial, aligning academia with the evolving needs of planning, architecture, and urban design professions. This involves focusing on developing learners' fundamental and transversal skills and providing tools, methods, and research findings applicable in professional settings. This paper is based on two research projects that sought to bridge the gaps between different morphological approaches in teaching and between academic research and practical application. The projects, Emerging Perspectives on Urban Morphology (EPUM) and the Knowledge Alliance for Evidence-Based Urban Practices (KAEBUP), brought together partners from various South and Central European countries to address these gaps. EPUM focused on integrating different morphological approaches within the context of teaching, while KAEBUP aimed to connect theoretical knowledge with practical actions concerning the built environment. The situative pedagogical perspective, rooted in communities of practice and supported by a blended learning approach, is central to this endeavor. This perspective provides a collaborative framework for educators, students, and professionals in urban morphology to co-create knowledge through integrated learning, teaching, and research activities.

Keywords: urban morphology; situative learning; blended learning; urban studies pedagogy; evidence-based design

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Citation: Charalambous, N.; Oliveira, V. Emerging Perspectives on Teaching Urban Form: A Blended Learning Approach. *Land* **2024**, *13*, 1339. https://doi.org/10.3390/land13091339

Academic Editors: Marco Maretto and Nicola Marzot

Received: 16 July 2024
Revised: 8 August 2024
Accepted: 15 August 2024
Published: 23 August 2024

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1. Research and Education in Urban Morphology

Since the early 1960s, the predominant focus on the "building" in architectural theory and practice has faced criticism from influential works by Lynch [1], Cullen [2], and Jacobs [3]. These seminal contributions present a fresh perspective on city-building, emphasizing questions about the meaning of a city's form for its residents and how planners can

enhance the city's image to make it more vivid and memorable. Lynch introduces the criterion of legibility to the city-building process, emphasizing its potential impact [1]. Similarly, Cullen's "townscape" grounds itself in individual visual perception, treating the town as an object perceived by its inhabitants, fostering an art of relationship through concepts like serial vision, place, and content [2]. Jacobs, in her critique of mainstream architecture and planning in the 1950s, focuses on ordinary aspects to comprehend how cities function, advocating for learning principles that promote social and economic vitality [3].

In the mid-1960s, Rossi proposed a new architecture of the city, advocating for the establishment of an urban science within the human sciences context [4]. In alignment with this paradigm shift, Alexander et al. provide guidance on empowering people to design their own houses, streets, and communities through the language of "patterns" [5]. Each pattern contributes to larger patterns above it and is complemented by smaller patterns below it. Over the years, diverse perspectives, including historical [6,7], social [8–10], and economic [11] dimensions, have enriched the body of knowledge in urban studies.

Urban morphology, a fundamental area in the study and education of the built environment, constitutes a well-established body of knowledge encompassing various theories, concepts, methods, and techniques for analyzing the physical structure of cities [12,13]. This discipline adeptly delineates the components of urban form (such as streets, street-blocks, plots, and buildings) and their intricate combinations across different resolution levels. Its scope spans diverse built environments, from historical cores to peripheral regions, and from planned to informal settlements. Furthermore, urban morphology elucidates how these elements evolve over time due to various agents and transformative processes. Notably, it assesses the repercussions of alterations in urban form, considering not only urban landscape criteria but also environmental, social, and economic factors.

This meticulous depiction and understanding of the built environment provides valuable insights for planning and design recommendations. Urban morphology bridges a gap in planning practice by offering a nuanced comprehension of urban form, an aspect often overshadowed by land use considerations. Research in this field provides a detached perspective on processes and procedures, offering a temporal contrast to the routine of planning practice. Conversely, planning practice contributes new frameworks to morphological research, incorporating political, legislative, and business dimensions and an awareness of broader contexts where the relevance of a city's physical form is demonstrated.

In the realm of architectural practice, urban morphology provides a comprehensive understanding of the built environment, diverging from the conventional emphasis on buildings and design. This shift offers an alternative perspective, addressing the main elements of urban form. Architectural routines, typically rigid and established, stand to benefit from this more flexible approach, particularly in navigating the inherent tension between conservation and change. The reciprocal exchange between research and practice can enhance both fields, fostering adaptability and a comprehensive outlook on interventions in the built environment.

Urban morphology traces its roots back to the late nineteenth century in Central Europe, emerging from various works on urban geography. Another morphological tradition originated from architecture, driven by concerns about the relationship between new and old city sections. Seminal works on Alnwick and Venice played a significant role in a renewed interest and innovation in the study of urban form, driven by geographers and architects, witnessed in the latter half of the twentieth century [14,15]. Individual contributions during this period paved the way for the establishment of "schools of thought," attracting researchers worldwide. Presently, four dominant schools of thought in urban morphology include historico-geographical [14,16,17], process–typological [15,18,19], space syntax [20–22], and a diverse approach termed "spatial analysis" by Kropf [23–25], although these do not encompass the entirety of urban morphology studies. In recent decades, the field has experienced a vibrant phase, as evidenced by national reviews published in the journal *Urban Morphology*.

An analysis of the urban morphology field during recent years, though, reveals one major gap—its main approaches have been mainly developing back-to-back, in isolation. Kropf explicitly raised this issue and the need for comparative studies, arguing that "urban form" should be the common ground for exploring complementarity between the different approaches (historico-geographical, process–typological, space syntax, and spatial analysis) [23] and offering a theoretical framework. Kropf emphasizes the need to develop this comparative approach, arguing that "a close examination of key texts suggests that 'urban form' is described in different ways in the different approaches. The gaps do not represent insuperable barriers. Already the different approaches are broadly complementary. How could they be made more rigorously and effectively so?" [23]. Oliveira et al. developed Kropf's line of research by selecting one relevant concept from each of the four approaches and applying it to a case study in Porto, Portugal, exploring complementarities between the concepts [26]. The research suggests that the concept of morphological regions has the potential to build the first layer of analysis and gather contributions from the other three concepts [27,28]. Recently, Monteiro and Pinho have extended this line of thought, confirming the role of the morphological regions concept and, more important, integrating three relevant concepts from three approaches into a robust methodology, demonstrating its potential for morphological analysis and for the design of municipal plans [29].

Geddes's PhD thesis establishes a theoretical framework based on cities as complex social assemblages, encompassing both physical and social aspects through three analytical approaches (configurational, relational–material, and historico-geographical). By examining key processes over time, the study identifies synthesizing mechanisms, providing tools to define Limassol's characteristics at different historical junctures and shedding light on its present-day identity. The thesis also suggests potential areas for further research, such as process–typological analysis, to deepen understanding of housing typologies and street layouts [30].

The teaching of urban morphology in higher education institutions (HEIs) throughout Europe also encounters the difficulty of tackling contemporary urban challenges from isolated viewpoints that reflect distinct national educational trends or adopt a globalized approach that may overlook local specificities. Oliveira compiles diverse perspectives on the teaching of urban morphology in a book that initiates with a discourse on the significance of urban morphology for cities and societies, progressing to the core subjects suitable for an urban morphology course [31]. The concluding part of the book, specifically pertinent to this paper, explores efficient teaching approaches for these morphological topics. This involves examining factors such as the integration of urban morphology into different degree programs, its alignment with various instructional levels and its connections with other courses, its significance in the intersection of research and practice, and the structure of curricula (encompassing teaching methods, resources, teaching hours, and lesson content). Additionally, Ruiz-Apilánez et al. provide a comprehensive analysis of how urban morphology is taught in Spanish schools of architecture [32]. A pivotal aspect of teaching urban morphology is its connection to professional practice. While some authors, notably those within the process–typological approach, underscore the robust link between reading and design [19,33], others, particularly in space syntax, accentuate the challenges in reconciling scientific principles with practical applications [34–36].

The endeavor to find common ground both in research and teaching through potential combinations of various approaches within the field of urban morphology is undoubtedly challenging. However, by understanding the strengths and weaknesses of each approach, informed choices can be made based on the specific nature of the subject under investigation, thereby promoting a more comprehensive and integrated approach to urban form studies [37]. Distilling the latest theories and methods in this field is crucial not only for understanding our cities but also as a vital educational tool to enhance the capabilities needed by students, planners, architects, and policymakers to address urban issues, social phenomena, and design challenges in a collaborative manner.

The need to establish a transpatial network that connects different approaches, creating learning environments that facilitate knowledge exchange, fostering opportunities for interaction among all relevant stakeholders, and bridging the gaps between research boundaries, education, and practice, is identified and lies at the core of this paper. The importance of collaboration of stakeholders from diverse geographical areas and schools of thoughts is acknowledged, providing an opportunity to explore complementarities in the theoretical and operational foundations of a growing number of urban morphology studies.

In this line of research, two recently funded projects highlight the necessity of creating collaborative learning spaces that integrate and coordinate various morphological approaches. These spaces are designed to foster participation and collaboration among all relevant stakeholders, both within academia and beyond, in discussions on contemporary urban issues. Such learning environments promote awareness and critical comparison of the theoretical, conceptual, and methodological foundations of different approaches. They also help identify the main strengths and weaknesses of these approaches, relate them to real-world projects and practice, and explore the potential for combining these diverse methodologies. Ultimately, the goal is to enhance the teaching of urban form by incorporating multiple perspectives on describing, explaining, and prescribing the physical form of cities.

The Emerging Perspectives on Urban Morphology (EPUM) project, funded by Erasmus+, acknowledged the need for comparative studies through collaborative learning environments capable of enabling the current and future generation of planning, design, and architecture professionals to address comprehensively and effectively the complex issues and challenges faced by contemporary cities (https://www.cs.ucy.ac.cy/projects/epum/, accessed on 7 August 2024). The project, launched in 2017, brought together five partners from different countries in South and Central Europe that have been promoting different morphological approaches, representing the different "schools of thought" described at the beginning of this section.

The acknowledgment of the quality of the EPUM project in terms of process and results has supported the launching of a new research project aiming at going one step further and applying this research and education framework in professional practice in planning, urban design, and architecture. The Knowledge Alliance for Evidence-Based Urban Practices (KAEBUP) project, launched in early 2021, brought together four academic partners (from the different "schools of thought") and four professional partners to address the challenge of relating education, research, and practice (https://www.kaebup.eu/, accessed on 7 August 2024).

The core of this paper lies in presenting and reflecting on the methodology and the teaching and learning activities of the EPUM and KAEBUP projects, which aimed at building bridges between separate worlds by establishing an open learning environment that connects diverse urban form approaches, bringing together researchers, educators, learners, and practitioners from various institutions, geographic locations, and methodological backgrounds. As mentioned above, while EPUM aimed at bridging different morphological approaches through a focus on teaching, KAEBUP aimed at bridging knowledge and action on the built environment.

To effectively address the complexities of an open learning environment, an optimal strategy emerges through the need for a seamless integration of face-to-face and online learning activities—a blend that encourages both independent work and collaborative engagement, through both synchronous and asynchronous activities. A blended learning educational approach has thus been proposed in both projects to be the most suitable and effective method to address the projects' aims in the field of urban morphology studies. Taking center stage in this educational approach is a situative pedagogical model, rooted in communities of practice. This pedagogical model not only underscores the importance of collaborative learning in real-life contexts but also emphasizes a blended learning strategy to bridge the gap between theoretical understanding and practical application in the built

environment. In this collaborative framework, teachers, students, and professionals can converge to co-create knowledge during learning, teaching, and research activities.

This approach goes beyond traditional educational boundaries, fostering a dynamic synergy that not only may enhance the overall learning experience but also will establish a robust foundation for the seamless integration of diverse knowledge and action in the domain of urban morphology studies. It propels learning beyond the confines of a singular environment, unlocking the potential for co-creating knowledge to effectively address contemporary urban challenges. It also promotes a student-centered model encouraging a transpatial collaborative construction of knowledge while allowing for local educational cultures and specificities to develop.

The proposed blended learning approach that supports a situative pedagogical model, fostering collaborative learning activities in urban morphology studies, is discussed in the following section, with a subsequent focus on the methodology and the outcomes of a number of case studies implementing blended learning activities within the EPUM and the KAEBUP projects.

2. A Blended Learning Approach Supporting a Situative Pedagogical Model and Fostering Collaborative Learning Activities in Urban Morphology Studies

2.1. Blended Learning

Blended learning is a concept that has witnessed a surge in popularity within higher education in recent years and represents a dynamic and multifaceted approach with a multitude of interpretations and applications. Essentially, it entails the seamless integration of traditional face-to-face instruction with computer-mediated learning experiences. This integration can manifest at different levels of granularity, encompassing individual activities, courses, entire programs, or even institutional practices [38–40]. Theoretical foundations for blended learning underscore the significance of learner-centered approaches, active engagement, and collaborative learning. Simultaneously, they caution against primarily exploiting it for efficiency and supplementation.

As observed by Randy and Vaughan, the value of blended learning extends beyond the mere application of information and communication technology (ICT) in teaching and learning [41]. It represents a learning environment that embraces a fusion of traditionally perceived contradictory concepts, such as collaborative reflection and asynchronous communities. Such a learning environment, as envisioned by Punie, characterizes ICT-enabled educational spaces that transcend existing constraints, whether they are physical, conceptual, or institutional [42]. Punie emphasizes the potential of such environments to enable personalized learning and social interaction on various scales, ranging from individual learners and communities to entire cities and regions. Such spaces possess the flexibility to accommodate diverse learning styles, teacher expertise, and curricula, gradually evolving into informal platforms for sharing expertise and knowledge beyond the institutional boundaries. In the OIKONET network on housing studies, the concept of a blended "learning space", has been introduced in the field, aligning with Punie's visionary approach [43]. However, only a few initiatives fully utilize its potential to enrich the learning process and foster collaborative engagement across institutional and geographical boundaries, particularly in specialized fields such as urban morphology studies [39,40].

2.2. Blended Learning in Urban Morphology

What makes the blended learning approach particularly pertinent for addressing the challenges presented by the EPUM and the KAEBUP projects is its ability to facilitate a wide array of collaborative learning activities among diverse partners while empowering participants to work both independently and collaboratively, synchronously and/or asynchronously. This approach nurtures a community of inquiry that transcends institutional, disciplinary, and geographical boundaries, accommodating a diversity of instructional levels and formats, and implying that learners, learning styles, academic curricula, subject areas, disciplines, and educational cultures can seamlessly coexist and intermingle [43].

The open learning environment proposed encompasses both theoretical and practical learning materials on the different urban morphology approaches, ultimately aiming at identifying and aligning complementary approaches to develop a more comprehensive analysis of urban form and social phenomena through the integration of online (via a shared digital platform hosting collaborative online learning spaces) and onsite (intensive workshops) collaborative learning activities [44]. The core of this learning process is to link activities conducted within each institution's program with collaborative tasks among institutions, whether synchronously or asynchronously. Various learning activities and tasks executed across institutions are facilitated, promoting flexible interaction between courses in the academic programs of participating institutions, relating to different approaches to urban form analysis in different urban contexts. The learning structure is designed to be flexible, supporting diverse activities such as collaborative project development or course assignments, which can be completed by students individually or in groups, within or across institutions. Additionally, learners can have access to collaboratively developed key open educational resources (OERs—through material collated from existing sources and new material developed online) on each analytical approach and learn the fundamentals at their own pace [45].

The outlined blended learning environment effectively addresses the challenge posed by the diversity of methods in understanding and analyzing urban form. It leverages the potential of combining and coordinating different approaches rather than selecting between isolated views. The shared open educational resources among different approaches aid in identifying the range of phenomena that urban morphology investigates. In line with Kropf [23], common aspects can then be identified and used as reference points to coordinate different views rigorously, fostering a composite perspective where different approaches support each other to enhance the understanding of human settlements. In this way, key elements of urban form can serve as a common ground for exploring the complementarity between various approaches, (such as historico-geographical, process–typological, and space syntax). Learners can collaborate on common concerns and issues without being restricted by any boundaries.

Within this learning context described in more detail in the following sections, an open educational practice can emerge, offering an innovative, open, and inclusive system of teaching and training in urban form from a multidisciplinary perspective and enabling collaborators to freely exchange and co-create ideas, knowledge, tools, approaches, and materials employed in the study of urban form while retaining their autonomy over their academic programs, structures, and curricula.

2.3. EPUM Blended Collaborative Learning Activities (CLAs)

The EPUM project was developed between 2017 and 2020 through a partnership of the University of Cyprus, Universidade do Porto, Sapienza Università di Roma, TU Wien, and Space Syntax Ltd. The consortium comprised institutions representing distinct perspectives or "schools of thought" on urban form, each with its unique curriculum and educational culture. The project addressed the need for comparative studies and integration of different approaches in urban morphology, offering an alternative path to that explored by Kropf [23], Oliveira et al. [33], and Monteiro and Pinho [35].

Taking a transnational approach, EPUM established a network of institutions representing diverse analytical approaches to urban morphology studies exploring the integration of three different morphological perspectives (historico-geographical, process–typological, and space syntax) and one emerging view on cities (relational–material approach) through education, which is a substantial difference from the paths presented above. The project established themes of study about urban form proposed and debated by the project partners; learning activities, designed in collaboration and carried out following a blended learning approach; and learners from different institutions inside and outside academia, constructing knowledge in collaboration in the various learning activities.

The pedagogic model adopted promoted a collaborative teaching system in urban morphology through an open learning curriculum (OLC) [46]. The OLC, implemented via the blended learning environment, enabled learning activities and tasks to span across institutions, inspired by Biggs' constructive alignment methodology [47]. It aimed at ensuring that intended learning outcomes harmoniously corresponded with teaching and learning activities and assessment tasks, fostering meaningful learning experiences where students construct knowledge actively. In this context, teaching acts as a catalyst for learning, guiding students through meaningful learning activities rather than simply transmitting information.

To this end, the flexible learning approach described in the previous sections was adopted, which does not disrupt existing curricula but enhances them by integrating collaborative activities across institutions, disciplines, and geographic locations. Activities within individual institutions' programs intertwined with collaborative activities across multiple institutions and stakeholders in both physical and virtual settings. These activities evolved in an open-ended manner, synchronously or asynchronously, including online collaborative activities through the EPUM digital platform and face-to-face activities in two intensive workshops of two weeks taking place in Porto and Nicosia [44].

The EPUM digital platform [48], a collaborative web-based learning environment, supported the blended learning approach by providing digital learning spaces (collaborative learning activities—CLAs) and open educational resources (OERs) structured under various thematic activities. CLAs facilitated the exploration of the potential benefits of combining and coordinating different analytical approaches in urban morphology while encouraging the active participation and collaboration of all relevant stakeholders in contemporary urban issues debates.

Through these activities, EPUM has selected and gathered existing resources and developed new resources (OERs), including books, papers, briefing papers, short and long films, pre-recorded lectures, and a website [45]. This has provided fundamental content for the development of the OLC and online training tools—available at https://www.cs.ucy.ac.cy/projects/epum/, accessed on 7 August 2024. These resources facilitated collaboration within the education system, accessible to higher education students and anyone seeking training, regardless of location or institutional background. The digital platform included tools for students to upload data files, receive feedback, and engage in discussions. Additional tools visualized activity interactions, making the process engaging and comprehensible for various stakeholders.

2.4. KAEBUP Blended Collaborative Learning Activities

The KAEBUP project builds on the process and results of the EPUM project and goes further to develop and apply this research and education framework in relation to professional practice in planning, urban design, and architecture. KAEBUP brings together a consortium of higher education institutions (HEIs), non-governmental organizations (NGOs), and enterprises from diverse European cities with expertise in evidence-based design (EBD) and a shared common goal of strengthening the collaboration between practice, research, and pedagogy. This collaboration aims to mutually benefit from the tools that research can offer to practices/enterprises on one hand, and from the practical insights gained for academia from evidence-based practices (that is, practices embracing research outcomes that inform design decisions) on the other [49]. The overarching objective is to empower students with the skills essential for a seamless transition into the professional realm, concurrently inspiring academics, and researchers to foster innovation through research.

Within the educational landscape, KAEBUP further develops the pedagogic model of EPUM, navigating through various learning theories, encompassing empiricism, cognitive perspectives, and situative perspectives. The emphasis lies on functional knowledge, enabling learners to apply theoretical understanding to real-world scenarios. The situative perspective (learning as social practice), rooted in communities of practice, takes center

stage, providing a collaborative framework for teachers, students, and professionals to co-create knowledge during learning, teaching, and research activities [50]. As Conole points out, "*the situative perspective views learning as social participation, and emphasises interpersonal relationships involving imitation, modelling, and the joint construction of knowledge. It views the ultimate objective of learning as to enable us to experience the world as meaningful*" [51]. The pedagogic model also integrates elements of other approaches, including learning-by-doing and reflective practice, acknowledging the multifaceted nature of effective education. The KAEBUP pedagogic model is summarized in the diagram in Figure 1.



Figure 1. The KAEBUP pedagogic model.

The project's pedagogical vision revolves around the development of functioning knowledge, strategically employing constructive alignment to articulate cognitive abilities while fostering transversal skills such as observation, critical thinking, creativity, and teamwork. The different components of the project's pedagogic approach, such as achieving the cognitive abilities required to develop functioning knowledge and the learning tasks encouraging reflection and providing feedback, are detailed in the project's deliverables, available at the project's website (kaebup.eu accessed on 7 August 2024). A competences framework for the transversal skills considered important in urban morphology studies linking academia to practice is included in the "research-to-practice" (R2P) platform developed by the consortium. The R2P platform comprises open educational resources (OERs) to support blended learning activities and co-creation of a critical mass of knowledge. The inclusion of a research-to-practice (R2P) platform and the establishment of a long-term network further enrich the learning experience by fostering meaningful interactions among students, researchers, and professionals, ultimately steering KAEBUP towards its goal of preparing students for evidence-based urban practices.

As in the case of EPUM, a blended learning approach is particularly relevant in addressing the challenges inherent in the KAEBUP project due to facilitating a diverse range of collaborative learning activities among the academic and non-academic partners. This project's activities also evolve in an open-ended manner, synchronously or asynchronously, including online collaborative activities through a digital platform and face-to-face activities in intensive program workshops. A series of onsite workshops and internships implemented within the KAEBUP framework aimed at reinforcing this international educational and training approach (intensive training workshops, business model workshops, internships). These workshops provided participants with a unique chance to immerse themselves in professional environments, gaining insights into how research can serve as the foundation for innovative professional urban practices. Additionally, participants

gained an understanding of the specific expectations that practices in the realms of planning, architecture, and urban design have from urban morphology research.

The following section exemplifies the blended learning approach of EPUM and KAE-BUP through an evaluation and a reflection on the methodology of a series of workshops implementing the learning activities described above.

3. Methodology

3.1. Workshop Methodology

Collaborative blended learning activities were designed in both projects focusing on specific case studies, aiming at involving all participants in defining pertinent and current issues in urban areas. These activities seamlessly bridged physical and virtual spaces, evolving in an open-ended manner as the learning process unfolded. The workshops combined physical and virtual lectures, practical group tasks, and critical discussions involving learners and stakeholders, including professionals, local authorities, community members, and organizations.

The workshops followed a sequence encompassing pre-workshop, workshop, and post-workshop activities conducted both online and onsite. Pre-workshop activities occurred at each institution, focusing on building knowledge about the study subject and the site through online collaborative learning activities and the projects' digital platforms. These preparatory activities facilitated the establishment of connections among courses, students, and topics, enhancing collaborative work during the onsite phase.

Content initially developed remotely was shared and discussed through the digital platforms, later culminating in onsite collaboration. Teachers and learners worked together in multinational teams to develop urban strategies and were exposed to various theoretical and methodological approaches. The workshops included lectures, design studio work, design critiques, and social events. Post-workshop activities sustained the learning process and were consolidated within each institution through continuous online collaboration.

3.2. Evaluation of the Blended Learning Approach

Questionnaires and/or focus groups acknowledging the students' experiences and perceptions of the blended learning approach were conducted in both projects. These included targeted questions addressing the strengths and challenges of various aspects such as learning and teaching activities, assessments, formative feedback, field study visits, workshops, and the use of digital platforms.

EPUM. Evaluation was performed on all the learning activities run collaboratively by the EPUM partners in relation to the blended learning environment as presented in Table 1. (including the collaborative learning activities (CLAs) in the EPUM digital platform, the Porto intensive workshop, and the Nicosia intensive workshop).

Table 1. EPUM relevant evaluation activities.

Activities	Tools	Target	Online/Focus Group	Timeline
Learning/Teaching/Training Activities (LTT)				
Collaborative learning activities	Q3	Students	Online	During and at the end of CLAs
	Q3	Teachers	Online	During and at the end of CLAs
Porto intensive workshop	Q2	Participants Teachers and Students	Online	At the end of the workshop_M11_SEP2018
Nicosia intensive workshop	Q2	Participants Teachers and Students	Online/Focus Groups	At the end of the workshop-M24_SEP2019

Table 1. *Cont.*

Activities	Tools	Target	Online/Focus Group	Timeline
Digital Environment				
Digital platform	Q5, Q6, Q7	All project partners	Online	M11, M23, M36

The aim of this evaluation was to assess, through questionnaires distributed to participants at the end of each learning activity (and/or other indicators) and/or focus groups, the effectiveness of the blended learning approach in (a) integrating the learning activities between different institutions carried out in the project's shared digital platform (small-scale activities) with the face-to-face activities carried out in courses of the participant institutions through open learning processes (synchronously or asynchronously), and (b) comparing the theoretical, conceptual, and methodological basis of the different urban form approaches, identifying their main strengths and weaknesses, and exploring the possibilities to combine some of these different ways of describing, explaining, and prescribing the physical form of cities through the teaching of urban morphology.

KAEBUP. Evaluation was performed on all the blended learning activities run collaboratively by the KAEBUP partners, specifically all the international training workshops and the business models workshops as presented in Table 2. The aim of this evaluation was to assess, through questionnaires distributed to participants at the end of each learning activity, the effectiveness of the teaching approach and environment in achieving the expected learning outcomes set out through the project's validation framework. Informal, in-depth conversations with students who participated in multiple activities were also carried out to understand the motivations behind long-term commitment to the project's blended learning activities.

Table 2. KAEBUP relevant evaluation activities.

Activities	Tools	Target	Format	Timeline
Learning, Teaching And Capacity Building Activities				
Intensive training workshop 1	Q2	Participants: students	Online questionnaire	After the workshop M6 June 2021
Intensive training workshop 2	Q3	Participants: students	Online questionnaire	After the workshop M10 October 2021
Intensive training workshop 3	Q5	Participants: students	Online questionnaire	After the workshop M11 November 2021
Multiple learning activities	Conversations Q5	Participants: students KAEBUP partners	Students' profiles Online questionnaire	After participation in activities M18 June 2022 At end of year 1—M12

All the above activities were evaluated through reflection on indicators for each specific learning activity. The results will be discussed following the description of the workshops.

4. The Workshops

4.1. Epum Workshops: Exploring the Urban Form of Porto and Nicosia

Two transnational intensive workshops were conducted, emphasizing a multidisciplinary examination of urban form with the involvement of diverse stakeholders. These

workshops, centered around the historical cities of Porto and Nicosia, served as case studies to explore the potential of (a) integrating various urban form study approaches and (b) engaging in shared collaborative activities within a blended learning environment.

Porto Intensive Training Workshop

The main goal of the two-week Porto intensive workshop was to expose participants to a range of urban form approaches and then explore their effective combination. These included the historico-geographical approach, process–typological approach, space syntax, and relational approach for analyzing the physical form and contemporary challenges of Porto's historic core. In the first week, students from various institutions, supervised by different educators, applied each morphological approach individually (Figure 2). The studio work was complemented by lectures from educators, local authority practitioners, and key stakeholders, focusing on Porto's urban form, agents of change, and the four morphological approaches. After applying these approaches individually, in the second week students worked in mixed groups, exploring the possibility of combining multiple approaches in their urban form analysis.

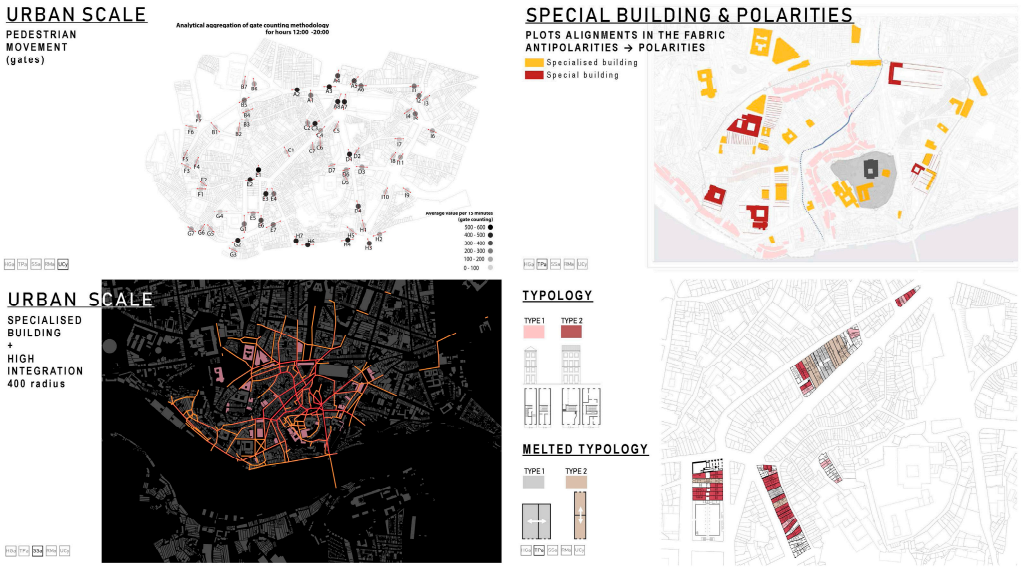


Figure 2. Analysis of Porto's historic center through different analytical approaches.

Nicosia Intensive Training Workshop

Building on the outcomes of the Porto workshop, the Nicosia intensive workshop set out to further explore the application of the four morphological approaches. Initially, the focus was on analyzing the physical form of Nicosia's divided historical core and understanding the contemporary challenges it faces. Subsequently, the workshop aimed at applying these approaches to the design of a specific area within the city. Acknowledging the intricate factors that have shaped the city over time, the workshop aimed to unravel the conditions of instability that have contributed to the city's form and the contemporary challenges stemming from these conditions. In the initial workshop days, mixed groups of students from London, Nicosia, Porto, Rome, and Wien explored the potential of integrating various urban morphology approaches to analyze the urban form of the historic core. This analysis incorporated insights from pre-workshop activities conducted at partner institutions and available on the EPUM collaborative online platform. During the remainder of the workshop, students engaged in a systematic reflection on their analytical work and formulated intervention strategies for the preservation and transformation of existing urban forms within the Ayios Kassianos area, a neighborhood situated within the city's buffer zone (Figure 3).

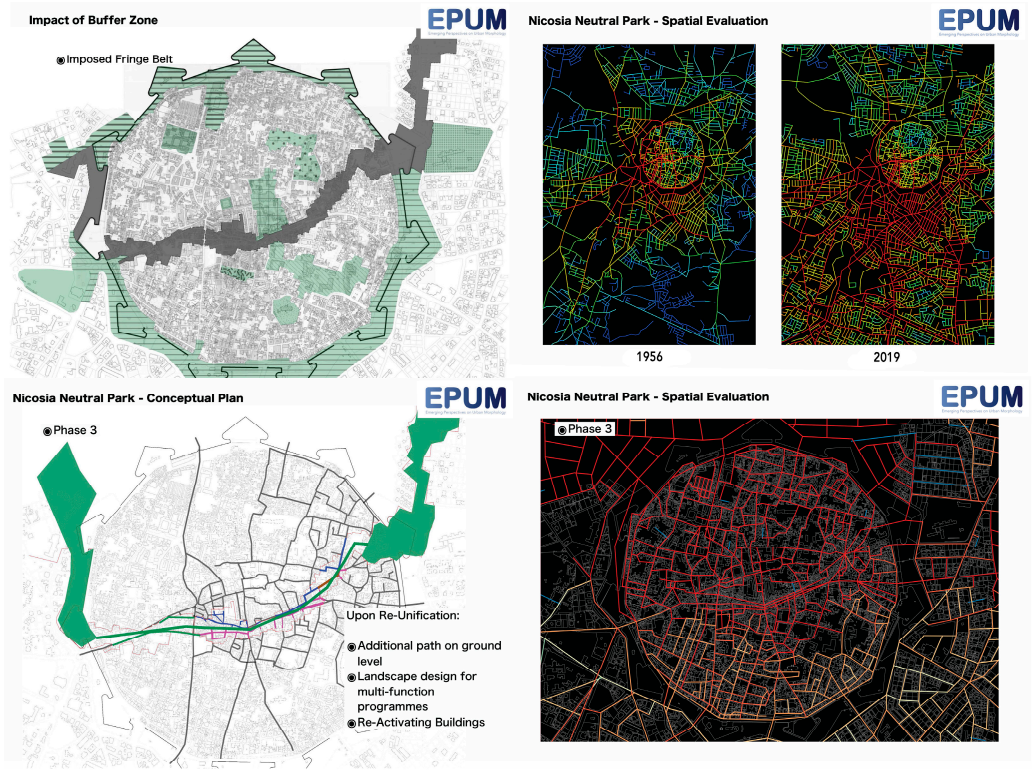


Figure 3. Spatial analysis and design proposal for Ayios Kassianos.

The benefits of an integrated morphological approach can be highlighted by elaborating on one of the case studies, for example, the analysis of the historic center of Porto. Historico-geographical analysis is a valuable tool for understanding a city's unique urban character and guiding planning activities. This approach offers a detailed understanding of the urban landscape, allowing for a more rational division of territory based on morphological criteria. It aids in prioritizing and improving decision-making for effective urban heritage management, conservation area control, and design control of the urban fabric. For Porto, addressing concerns about the loss of urban identity and built heritage was crucial. Enhancing this approach by integrating it with other morphological methods, such as process–typological, space syntax, and relational–material approaches, further enriched the analysis and its applicability in planning practices.

Combining the historico-geographical and the process–typological approaches helped to explain urban formation and development by linking fringe belt features with the concept of poles. Integrating it with space syntax provided insights into syntactical measures and the performance of different morphological regions. Lastly, combining it with relational–material approaches helped to understand how various populations (by age, socioeconomic status, and education) interact with and use the urban form, offering a comprehensive view that enhances urban planning and management strategies.

4.2. KAEBUP Workshops: Exploring the Urban Form of Riyadh

The three international training workshops (ITWs) were centered on a real architectural project: a building for the Ministry of Municipal and Rural Affairs (MoMRA) on a significant avenue in Riyadh, Saudi Arabia. This building, currently under development, was designed by Schiattarella Associates (SA), a partner in the project.

In 2021, three universities, in collaboration with SA, organized the workshops. The primary aim was to leverage scientific research to inform and enhance SA's design methodology. Each university contributed its specialized knowledge to a unified framework, aligning their efforts to meet the collective objectives and expected outcomes of the workshops. The first ITW, held in June and hosted by the University of Cyprus in Nicosia,

focused on public space design. The second workshop, conducted by the University of Porto in September, examined urban morphology and the influence of urban form patterns on social diversity. The final workshop, organized by the University of Parma in November, concentrated on environmental analysis.

These workshops became important venues for interdisciplinary knowledge exchange and collaboration. They sought to integrate academic insights, professional practices, and community perspectives by using a range of collaborative learning models and formats. This strategic approach aimed to foster a rich dialogue between academia and practice, promoting innovative solutions for urban design and planning.

ITW1 focused on the topics of evidence-based design, data-gathering methodologies, and the mapping of urban public spaces, aiming to unveil the synthesizing mechanisms shaping the city and interactions with its public space networks and establishing meaningful connections between how urban space is perceived, conceptualized, and lived. This exploration aimed to foster the development of new insights for understanding, planning, and designing public spaces, with a primary focus on urban morphology, while facilitating the articulation and discussion of similarities and differences between mapping, diagramming, and designing, involving non-academic stakeholders in architecture, planning, and urban development.

An example of the work produced illustrates the potential of KAEBUP's approach to evidence-based design. Examining the relationship of priorities between the commissioned building and its surrounding public space, one of the teams investigated the potential for the design to encourage the activation of public areas, even though the initial focus was solely on the building's design. Conducting a thorough analysis of the spatial and typological features of the building in its context, utilizing space syntax and interviews with designers, the team utilized online ethnographic methods to scrutinize the current scenario concerning the relationship between building plots and the adjacent public realm. This involved assessing the levels of activity within and around the site. The immediate context revealed that most buildings are set back and fenced, contributing to low activity levels, as indicated by Twitter location mapping and heatmaps in comparison to the surrounding area. Proposing the placement and design of the building along the block edges emerged as a strategy likely to positively influence the activation of public space within and around the new structure (Figure 4).

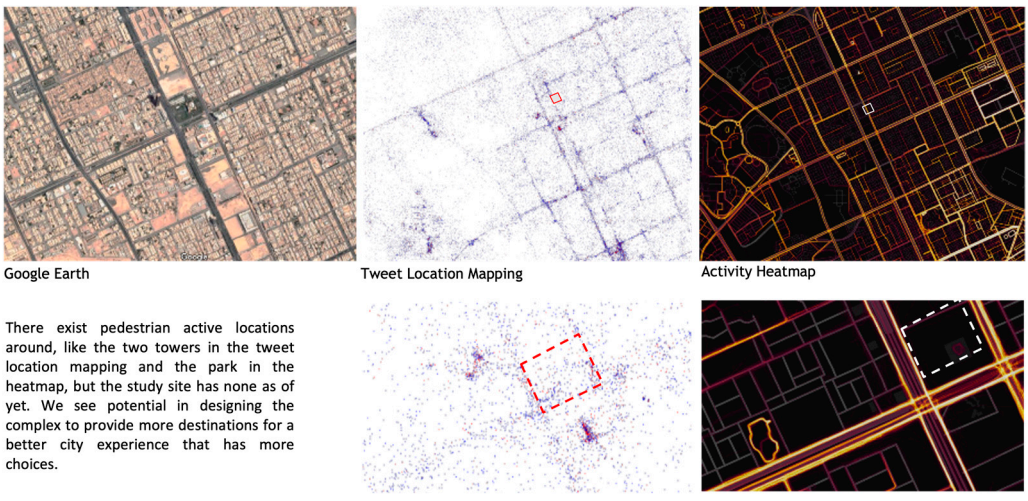


Figure 4. Spatial analysis of the public space in relation to the building.

The primary objectives of the second international training workshop (ITW2) were threefold: first, to understand the complex relationship between urban morphological research and architectural practice; second, to explore urban morphology as a scientific foundation for developing an architectural perspective that serves as an alternative to conventional architectural methods; and third, to acknowledge the critical role

of historical and geographical contexts in the design process. This was particularly emphasized by the unique characteristics of Riyadh, including its climate, cultural norms, and privacy requirements.

Figure 5 demonstrates the outcomes of the analysis by one of the teams, focusing on the identification of symbolic parts of the city's evolution and the relation with the case study. The team argued that the city's rapid development and expansion since the mid-twentieth century have eroded its once-distinct identity. The present urban landscape, originally shaped by the Doxiadis plan in the 1970s, grapples with fundamental challenges related to climate, privacy, and livability due to its car-centric design. In this context, the MoMRA building emerges as a symbol of reclaiming traditional architecture and urban history. However, its impact is hampered by its location amidst highways and skyscrapers, presenting issues of accessibility and visibility and giving it an isolated quality. The question persists whether MoMRA generates a widespread influence or whether its architectural allure alone suffices to attract people. Targeted interventions are proposed that could serve as a pilot redevelopment initiative, testing its success.

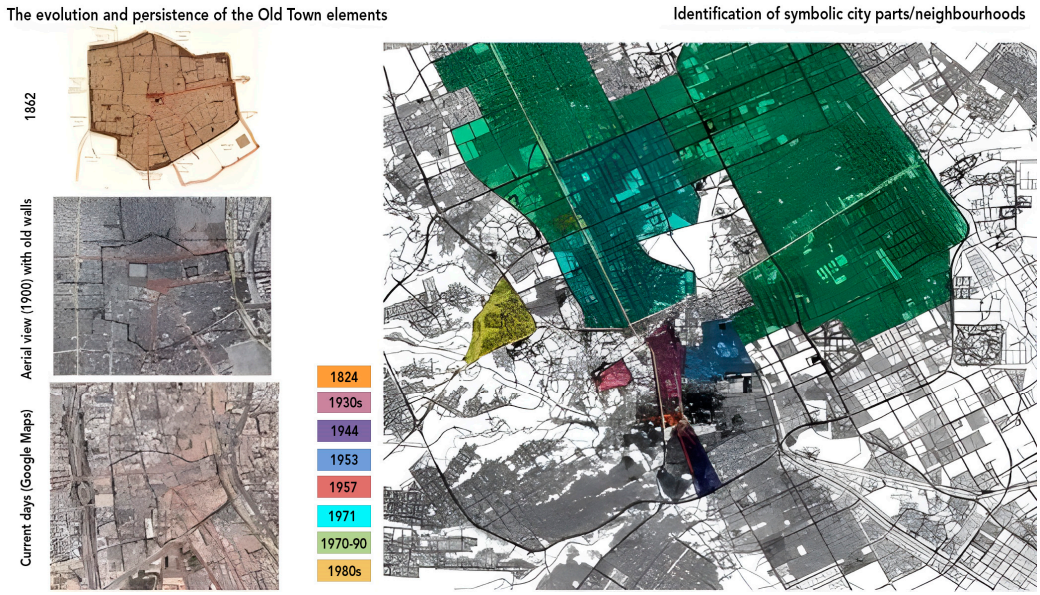


Figure 5. Identification of symbolic parts of the city and neighborhoods.

ITW3 focused on the consideration of environmental factors, evident in its application to both urban regeneration and new development initiatives, and data gathering methodologies via EnviMet, discussing topics such as microclimate modelling, eco-cities and eco-districts, designing with climate change, and strategies and new perspectives of environmental urban design. The microclimate and micro-urban scale of public spaces in the case study of Riyadh was studied through eleven different urban tissues of the city (with different orientation, building density, spatial configuration, and greenery). The knowledge shared went beyond theoretical insights, encompassing practical design tools and aiming to establish relationships between urban livability and the challenges posed by climate change.

An example is presented in Figure 6. Exploring the methodologies for interpreting environmental data to inform effective design solutions, the team focused on assessing the environmental performance of a specific urban block. The investigation delved into the thermal behavior, hygrometric aspects, and outdoor comfort data of the area. Analyzing the relative humidity (RH) map, the team identified the significance of courtyard size on RH values. Larger courtyards exhibited higher RH values, while smaller ones yielded lower RH values. Outdoor relative humidity was found to be influenced by sun exposure, with minimal values observed in areas with significant sun exposure, particularly evident in the secondary urban canyon oriented northeast. The compactness (mass) of buildings

contributed to moderate relative humidity values due to the presence of shade. Notably, certain areas between buildings experienced strong winds, with wind speed amplified through channels. These findings contribute valuable insights for crafting design solutions that account for environmental nuances in the specific urban block.

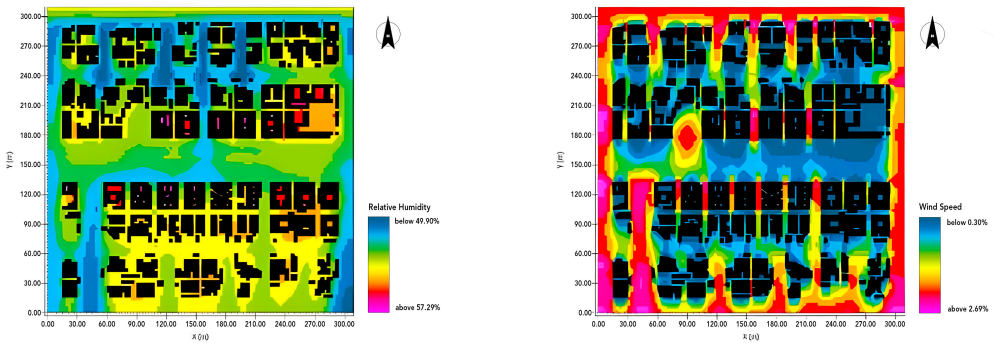


Figure 6. Measuring environmental performance in a specific urban block.

The research findings for MoMRA encompass a range of aspects, focusing on how a building's design impacts site accessibility, its integration into the urban fabric, and strategies for mitigating climate change at the street block level in Riyadh's specific climatic context. The collaborative interaction between enterprises and academia, which included an educational process and active student involvement, resulted in the co-creation of valuable knowledge and practical tools that were previously unavailable to the designers involved in the case studies, as well as to the broader academic and professional community. These resources could have significantly benefited the designers during their project processes and continue to hold relevance for future endeavors.

5. Challenges Faced during the Implementation of Blended Learning and Integrated Morphological Approaches

Online semi-structured questionnaires (5-point Likert scale), focus groups, and user testing of the digital environments were conducted with approximately 110 participants across both projects. The feedback was instrumental in refining the projects' learning activities and environments.

Overall, as regards the teaching and learning experience in the projects' blended learning environment, the feedback was largely positive, emphasizing the importance of interdisciplinary research, collaboration, interaction, and complementarity of different urban morphology approaches and between academia and practice. However, it is important to highlight several challenges faced associated both with the blended learning environment and with the attempt for integrated morphological approaches, as revealed through the questionnaires evaluating the projects' learning activities.

As regards **the blended learning environment**, while both students and teachers appreciated the link between onsite intensive workshops and online collaborative learning activities through the projects' digital platforms, aligning these activities posed difficulties. The importance of better integrating the online learning activities with the face-to-face sessions was highlighted, with feedback indicating that preparatory activities, such as pre-recorded training videos and key texts, are essential for complex methodologies delivered online.

Students also faced challenges in time management for online short-term activities before and after the onsite workshops and required better verification of commitment and availability for group work, impacting other students' efforts. Alignment with existing curricula, institutional timetables, and assignments needs to be carefully designed.

As regards the **integrated morphological approach**, the challenge of in-depth understanding of the diverse theoretical foundations of the various approaches was highlighted by both tutors and students. As noted by the teams in the Porto workshop, one important

challenge lies in the structure of the spatial analysis. For example, the process–typological method emphasizes the importance of the time factor, starting from the present and tracing the urban shape through sequential developmental steps, similar to the historical–geographical approach, while space syntax analysis and relational–material methods concentrate on the current urban form, focusing research on present-day structures and relationships. Also, new participants who were not present in the whole series of workshops faced difficulties in engaging with unfamiliar approaches, whereas those with prior workshop experience had better urban form literacy. This feedback emphasized the need for consistent participant engagement across workshops and highlighted the importance of onsite work, interaction with local actors, and structured consultation schedules.

Additionally, ensuring that real-life case studies were suitable for all urban morphology approaches and fully exploited for analysis was noted as a challenge.

To ensure a seamless and effective learning experience within the framework of the open learning curriculum proposed by the EPUM and KAEBUP projects, which enriches and complements existing urban morphology curricula, it is crucial to have well-aligned online pre-workshop activities, onsite hybrid workshops, and online post-workshop activities collaboratively designed by all participants.

Pre-workshop activities are essential for building foundational knowledge about the different morphological approaches, the study object, and the real-life case study at each institution through the open educational resources compiled by all participants (including pre-recorded lectures, key articles, etc.). These activities establish a network of relationships among courses, students, and topics, facilitating collective work during the onsite workshops. In the initial phase, pre-workshop activities raise awareness through remote participation at each institution using analytical approaches. In the subsequent implementation phase, these activities continue remotely but are enhanced through collaboration on the digital platforms and within the collaborative learning activity (CLA) environment.

Onsite workshop activities can then bring together the preliminary remote work, allowing teachers and learners to collaborate in developing urban strategies within multinational teams. These workshops further expose participants to the diverse theoretical and methodological approaches through a mix of lectures (both online and onsite), design studio work, design critiques, and social events. Interaction with local stakeholders, including community groups, policymakers, and practitioners, provides valuable insights into specific real life case studies, urban contexts, and challenges.

Post-workshop activities further the learning process, consolidating and extending it back at each institution through continuing online collaboration on the digital platforms. This ongoing engagement ensures that the knowledge and skills gained during the workshop are reinforced and expanded upon, promoting continuous learning and collaboration.

6. A Blended Learning, Situative Pedagogy in Urban Morphology

The research projects presented underscore the imperative of viewing various spatial analysis approaches as complementary and interlinked facets that underpin a blended learning approach. This involves the collaboration of different morphological approaches and active involvement of non-academic sectors in a collaborative knowledge co-production. The methodology employed in these projects aligns with the conditions conducive to transdisciplinary research, particularly when exploring socially relevant problem domains marked by uncertain knowledge, contested problem definitions, and significant implications for those affected. Transdisciplinary research navigates such complex problem fields through a process that integrates diverse disciplines and approaches and involves actors from a number of sectors. The overarching goal is to identify and analyze problems collaboratively, aiming to co-develop knowledge and practices that advance what is collectively perceived as the common good.

In the context of the EPUM project, a significant endeavor was launched to develop an open learning curriculum (OLC) in urban morphology. This initiative engaged educators

and students from higher education institutions in multidisciplinary blended learning activities aimed at addressing the diverse challenges faced by contemporary cities. To facilitate this, EPUM curated open educational resources (OERs) and introduced an innovative collaborative online platform [51]. The implementation of the OLC for urban form studies within EPUM revealed that the blended learning approach played a pivotal role in establishing an open learning and teaching space that transcended institutional and research boundaries.

Embracing and further developing the blended learning approach initiated by EPUM, the KAEBUP project aspired to cultivate a reflexive and transformative pedagogic approach, seeking to equip students with the skills essential for addressing contemporary urban challenges through real-life projects. To this end, the project encompassed the active engagement of practitioners in the teaching process, the integration of ongoing real-life projects for both teaching and research purposes, and work-based learning experiences within enterprises. The selection of real-life case studies, drawn from recent architectural projects by KAEBUP's partner enterprises, served to contextualize the learning process, ensuring its relevance to the practical demands that future professionals will encounter. This approach capitalizes on the potential for enduring local collaborations while upholding international mobility and cooperation as core principles, fostering continuous knowledge exchange and co-creation, and supporting the comprehensive development of learners' transversal skills. To meet KAEBUP's objective of enriching learners' exposure to the professional realm, a multifaceted blended learning approach was again implemented, integrating lectures from industry professionals and infusing learning tasks based on the ongoing projects provided by partner enterprises. The reciprocal relationship between teaching, learning, and research in evidence-based practice was explored, with the culmination of knowledge co-development facilitated through the online "research-to-practice" (R2P) platform.

The blended learning approach, supported by the EPUM and the R2P digital platforms, plays a pivotal role in the implementation of all the activities, creating ideal conditions for open dialogue, critical debate, negotiation, and agreement between diverse participants involved in the shaping of the built environment. The collaborative design and implementation of learning spaces encourage an open educational practice, enabling partners to freely share ideas, knowledge, tools, approaches, and materials used in urban form studies. Simultaneously, it allows participating institutions to maintain their academic autonomy while working both independently and collaboratively. This approach lays the groundwork for the creation of an online community of practice, where active participation of learners, students, teachers, and practitioners facilitates an educational social praxis, emphasizing the co-construction and co-evolution of knowledge.

Author Contributions: Conceptualization, N.C. and V.O.; methodology, N.C. and V.O.; writing—original draft preparation, N.C. and V.O.; writing—review and editing, N.C. and V.O. All authors have read and agreed to the published version of the manuscript.

Funding: The work presented in this publication was carried out within the Emerging Perspectives on Urban Morphology: Researching and Learning from Multiple Practices (EPUM) project, grant agreement number 2017-1-CY01-KA203-026745 and the Knowledge Alliances for Evidence-based Urban Practices (KAEBUP) project, grant agreement number 621585-EPP-1-2020-1-CY-EPPKA2-KA.

Data Availability Statement: The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

Acknowledgments: EPUM and KAEBUP project partners, tutors, students, and participants in the projects' workshops.

Conflicts of Interest: The authors declare no conflicts of interest.

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