



PÉCSI TUDOMÁNYEGYETEM  
UNIVERSITY OF PÉCS



**UNICA**  
UNIVERSITÀ DEGLI STUDI  
DI CAGLIARI

# Research on the Activation of Urban Leftover Space Based on Spatial Narrative

---

A Thesis Booklet  
submitted to the  
University of Pécs  
&  
University of Cagliari

---

In Fulfilment of the Requirements for the Degree of  
DOCTOR OF LIBERAL ARTS&DOCTOR OF PHILOSOPHY  
IN ARCHITECTURAL ENGINEERING

---

By  
MENGYANG WU  
2022



Università degli Studi di Cagliari  
Dottorato di ricerca in  
Ingegneria Civile e Architettura

# 1.INTRODUCTION

## 1.1 Research Background

Thirteen years ago, 51.1% lived in cities. By 2019, the portion of people living in cities has risen to 55.7%[1]. Urbanization has been most prominent in emerging economies during the previous ten years, particularly in creating Asia and Oceania (Figure 1.1), which saw the urbanization rate increment from 42.3% in 2009 to 49.1% in 2019[1] The extent of the worldwide population living in metropolises is relied upon to increment to 70 percent by 2050[2] (Figure 1.2).

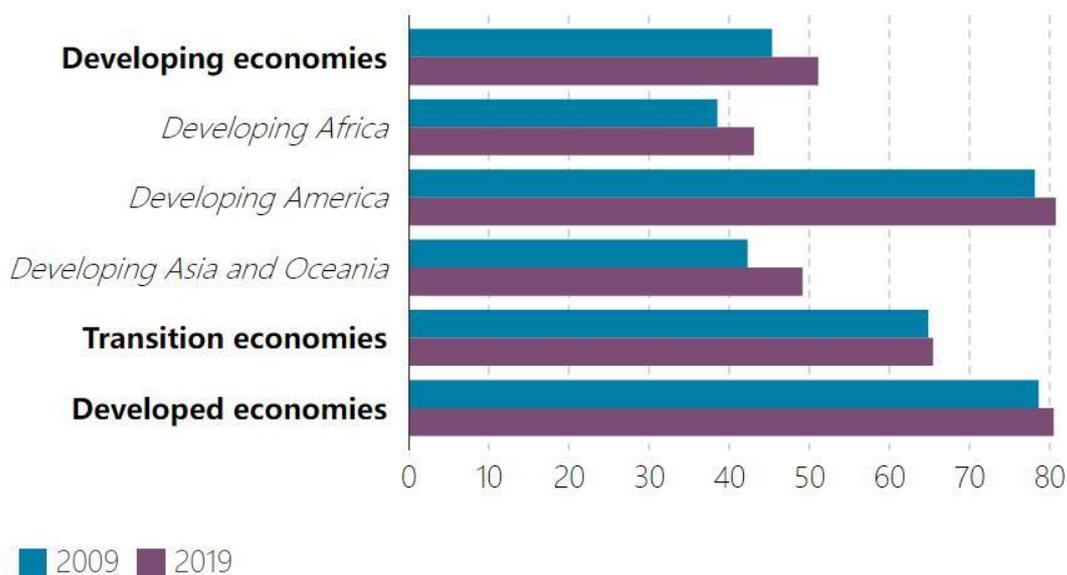


Figure 1.1 Urban population by group of economies (stats.unctad.org)

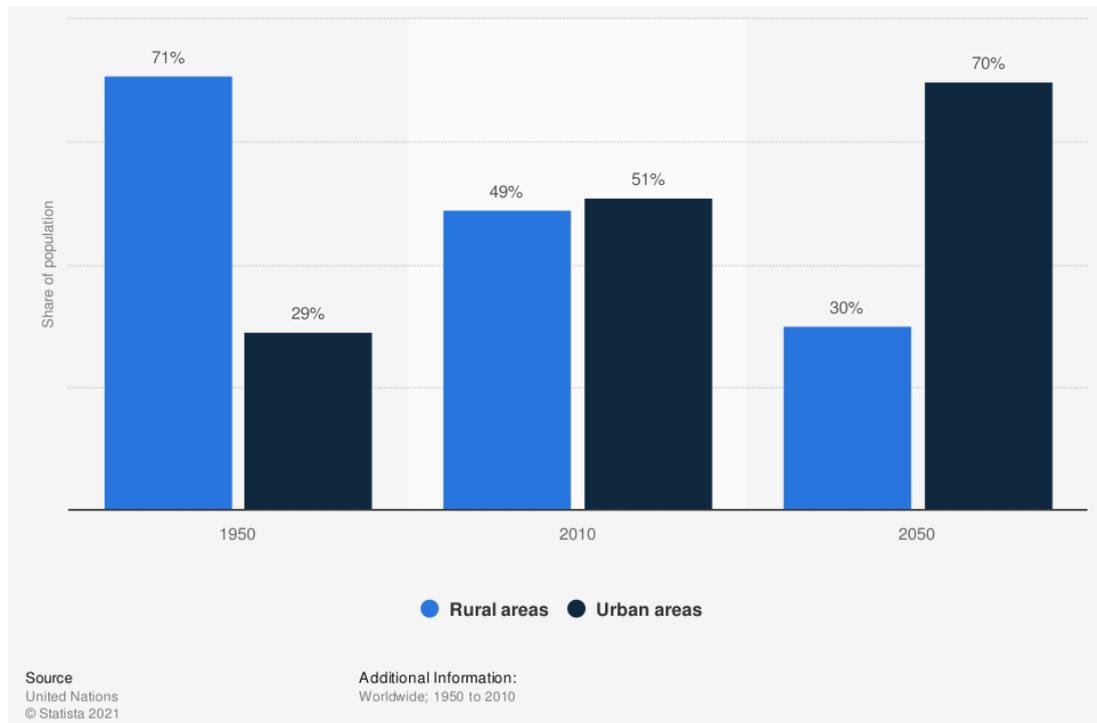


Figure 1.2 Global share of people living in cities from 1950 to 2050 (statista.com)

This growth will bring about urban areas possessing a higher percentage of available land region. The rapid urbanization process at this stage has promoted the renewal and upgrade of urban construction, and it has also continued to iterate the lifestyles of citizens, which has changed the demands of urban activities for original space. And functionalism has become the mainstream of urban construction. Urban space is treated as an object of production and of being produced, leading to the modulization of urban space morphology[3]. The continuous expansion of land, meanwhile the separation of architectural design and urban planning have led to a rapid growth trend of unused vacant urban land[4], [5]. Many studies have shown the harsh effects of urban expansion, including the surging air pollution index, the aggravation of traffic congestion, the uneven distribution of resources and even scarcity, also the sharp rise in the cost of infrastructure[6]–[8]. The city has produced many low-utilization and long-term idle leftover spaces, which are also spaces that lack emotional connections. These are concentrated in the fragmentation of urban spatial units, the strengthening of spatial divisions, the weakening of spatial connections and the decline of overall spatial functions[9].

## **1.2 Existing Problems and Defects**

The fragmentation of space is a noticeable aspect of the evolution of urban space. Main features: (i) Imbalance in the coordination of spatial functions. The distribution of residential, commercial and recreational spaces is imbalanced, and the function of the activity space becomes homogenized, which has also led to (ii) a blocking of spatial connections[10], [11]. The connectivity of functions within the city decreases and to a certain extent spatial independence from each other and land use benefits become lower. In addition, (iii) the enclosed nature of spatial form. The large number of gated enclosed communities continues to fragment the spatial unit, further weakening the function of public space in the city, and the mode of transport tends to be more dominated by private cars. The sense of social belonging and community is becoming weaker and weaker, exacerbating social isolation and conflict[12].

## **1.3 Research Questions**

In order to activate the role of the leftover space in the surroundings, this research has posed the following main questions:

- I. What is the form of the distribution of the leftover space in a specific area? Are there any regular features in the factors that affect its formation?
- II. How to construct the storytelling of the space narrative through the orientation of human behaviors and activities, thus activating the possibilities of the leftover space?
- III. How can spatial narrative optimize the leftover space and enhance the connectivity with its environment?

## **1.4 Objectives of the research**

The focus of this thesis is not on the point-by-point revitalization of each leftover space in the city so that they can be completely utilized by people, but on the construction of the leftover spaces as collections in different hierarchical categories, integrating and laying out spaces with a global perspective. We specifically sought to achieve the following objectives in this study:

- (i) Systematic identification and categorization of spatial leftover in vacancy, by comparing the leftover space with the surrounding infrastructure and architectural and

landscape environment in different scales, forms, states and other elements.

(ii) Focusing on the behavioral activities of people in a specific environment, recording the interaction between the leftover space and people, and trying to identify multiple factors that influence the strength of the connection.

(iii) Reconnections to the leftover spaces. The story from the characters to the space is the dominant line, using the spatial narrative as a medium for the leftover spaces to be strung together with new possibilities.

### **1.5 Significance of Research**

This study investigates the vacancy status of the leftover space, summarizes the causes of its formation in different contexts and the corresponding influencing factors, which provides a reliable theoretical basis for subsequent space optimization. This research proposes to use human behavioral activities as a clue to relate the leftover spaces in the scenes through spatial narratives, in order to operate and reconnect these neglected "potential spaces". This essay provides a detailed arrangement of the leftover space and the corresponding design concepts, which can be a useful guidance for reusing of the space. The purpose is to generate significant reference indicators relating to the city's current and future conditions, and to provide guidance for the city's development.

## **2.METHOD**

### **2.1 Method selection rationale**

With the aim of investigating the possible factors influencing the formation of leftover space in an existing environment and designing a strategy for spatial activation at a later stage, we propose a combinatorial methodology based on the theories of several scholars[13]–[17]: 1) the link between spatial form and environmental structure (based on urban space design theory); 2) the influence of individual behavioral activities in relation to space (based on spatial narratives); 3) concept and design (based on participatory design). Each of these and the methods used are described in Chapters 3 and 4. The methodology of this study is divided into three main phases: (i) Literature

review, based on the theoretical foundations of leftover space and spatial narratives. (ii) Inductive approach, which includes the collation of existing leftover spaces in the city and the collection of examples of alternative types of spatial optimization. (iii) Case study, with research and spatial design practice in the Cagliari. For achieving the objectives of this study, the author has adopted a qualitative research approach, based on participant observation and interviews in addition to the analysis of existing data.

## 2.2 Research Framework

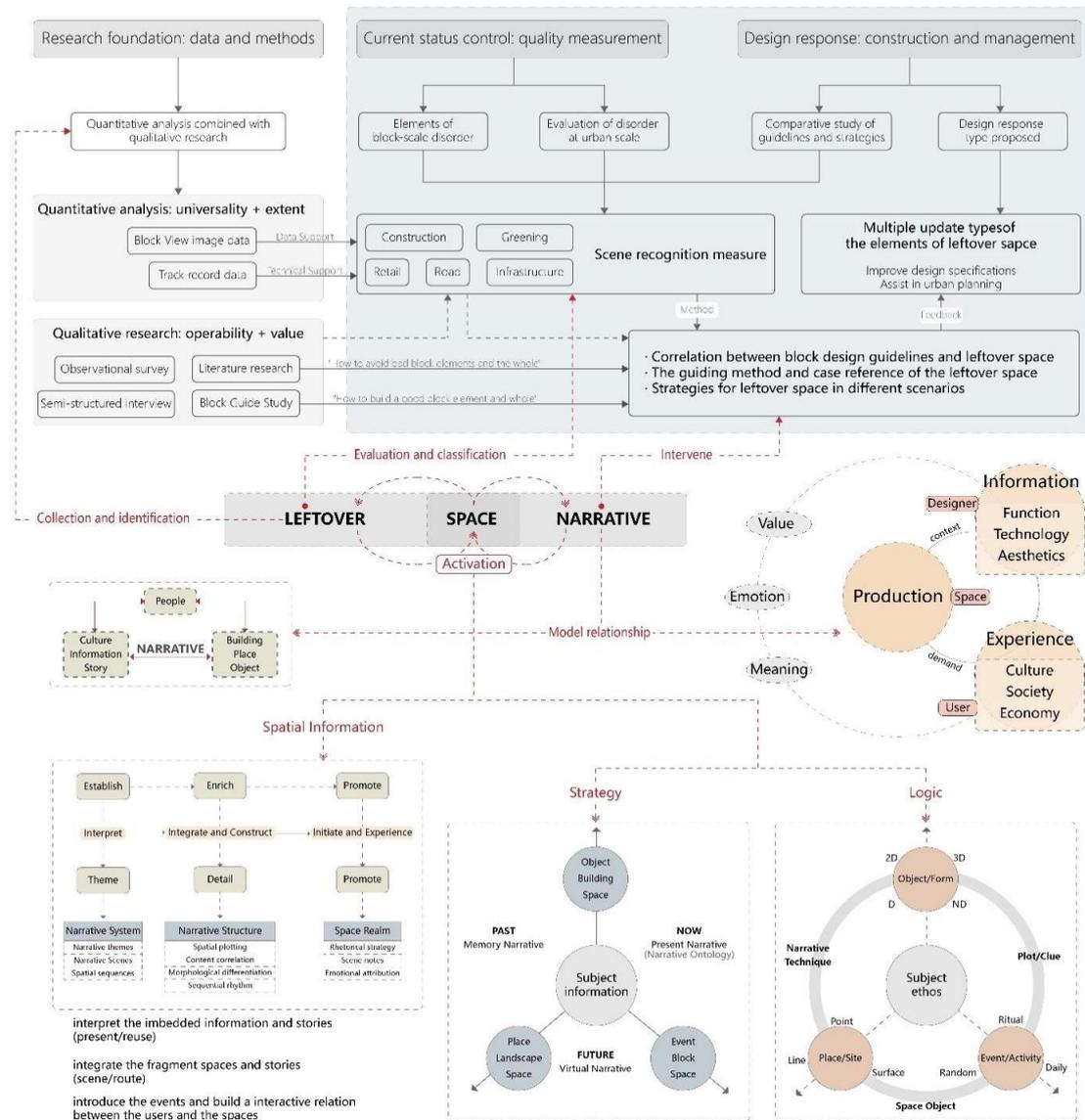


Figure 2.1 The overall research framework (Author,2021)

## 2.3 Information Collection and Analysis

The data collection combines images automatically captured using wearable cameras

and semi-structured participatory interviews. These data allow participants to reflect on behaviors taken for granted and the everyday use of family adaptations, enhancing the collection of interview data in this study. This approach prioritizes the individual and enhances the importance of personal life and experience. We realized that wearable cameras could provide a great opportunity to quantify the state of an individual's attention to the leftover space, as they observe spatial qualities from the wearer's perspective by taking a large number of photographs, which could fill a gap in the existing literature on measuring an individual's attention to the leftover space.

### **3. THESIS STATEMENTS**

#### **Thesis 1**

The richness and uncertainty of this "narrator" has given "tools" many possibilities, leading to more diverse of recording. We chose the district of Is Mirrionis in Cagliari as a pilot study. with the most basic observation method as the main tool. Through prolonged field research and continuous visits to this "inactive neighborhood", the author (as an outsider) gradually approached the insiders, following the activities of the residents and the stories of the place. On this foundation, the concept of the insertion of narrative units is proposed. This was followed by a discussion with residents to make the concept more adaptable. Finally the interventions of the designers and the feedback of the residents are paired with each other, which attempts to activate the multifunctional potential of the scene to compensate for the demands of the residents. This study also aims to inform the subsequent community transformation.

#### **Thesis 2**

Participant observation is the main recording form. Multiple reviews of real-life scenes are shot through first perspective from the wearable camera, and the storyline in the scenes is captured through the written narrative of travel notes and using application for location capture to record moving routes (Figure4.3). It also sets the stage for the story line. Based on the fieldwork, the researcher has made a preliminary classification

of the types of leftover space which were collected. As shown in the table 4.1, it can be divided into 4 categories, which contain a total of 9 sections.

<b>Classify</b>	<b>Contents</b>	<b>Description</b>
Street side space	Corner plot	Underutilized land parcels located on both sides of the street due to irregular land use and other reasons
	Building (red line) setback space	Underutilized buildings retreat from the red line of urban roads
	Road intersection	Road intersections that can be optimised because the corners of the road or width is too wide
Space under the building	Vacant spaces under apartment buildings/buildings	Downstairs passage with low space quality/low utilization
Space around infrastructure	Around highway/vehicle road	The original space is divided by car roads and disconnected from the surroundings
	Neighboring facilities surrounding space	Space that is not fully utilized due to the neighboring effect of garbage transfer stations, substations, sewage treatment plants and other facilities
Inefficient land	Land not to be developed for a short time	The space is of poor quality and is currently almost maintenance-free
	Old/abandoned buildings/bases	Abandoned space that cannot meet the needs of the current era
	Vacant land in the old town	Due to location or historical reasons, long-term shelved and abandoned, resulting in the run-down of the site

Table 3.1 The categories of leftover space in the neighborhood (Author,2021)

Meanwhile, we have also visualized and classified these spaces in order to be able to

explore their features and patterns more intuitively (Figure 4.4).

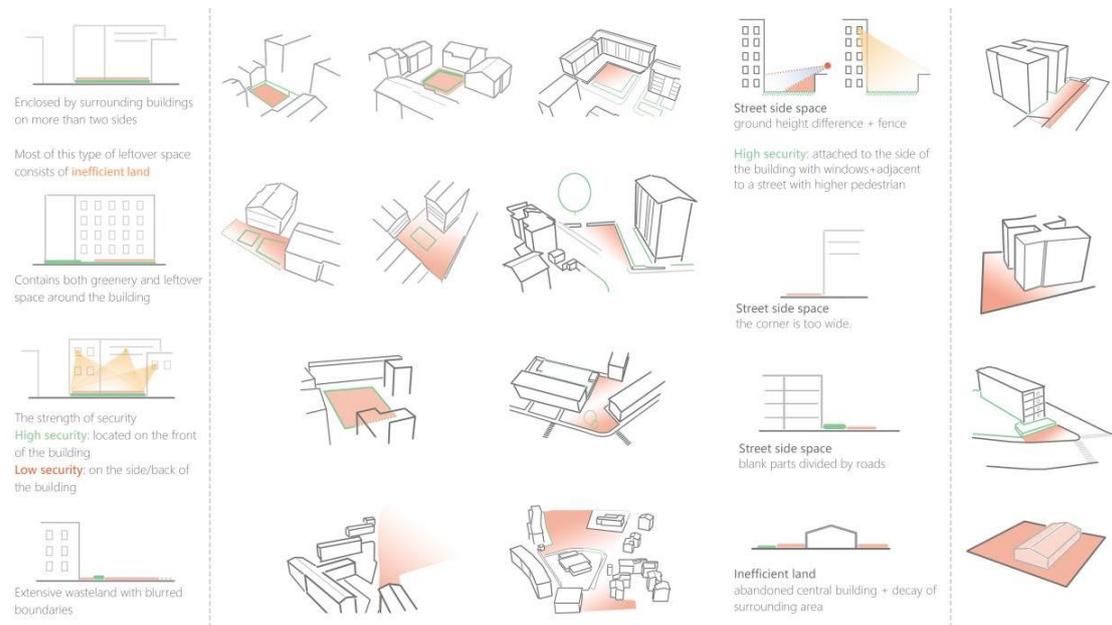


Figure 3.1 Visualization and organization of the leftover space (Author,2022)

### Thesis 3

Among the eight leftover spaces in relation to the surrounding tall buildings, six of them are in a state of being fully or semi-encircled, one is in a form of extending outwards from the middle of the area, and one is in a state of presentation with one side expanding to the other. In terms of boundaries, the boundaries of the leftover space are fuzzy. We also found in our fieldwork that the remaining state of the space is not only dependent on whether it is enclosed by buildings or not. But spatial quality is an even more important part of the influence on this state.

	<b>1ZONE</b> Area = 327.5m <sup>2</sup> Circumference = 97.2m FEATURE: ① Irregular shapes follow the building structure ② Already planned landscapes	<b>2ZONE</b> Area = 890.7m <sup>2</sup> Circumference = 121.9m FEATURE: ① Abandoned building (social school) ② Next to the park + the centre of the block	<b>3ZONE</b> Area = 1507.9m <sup>2</sup> Circumference = 158.0m FEATURE: ① Old football field ② Open and regular ground	<b>4ZONE</b> Area = 159.6m <sup>2</sup> Circumference = 62.5m FEATURE: ① Irregular area cut by building and roadway ② Overly wide pavement	<b>5ZONE</b> Area = 131.2m <sup>2</sup> Circumference = 47.5m FEATURE: ① Low quality landscape ② Occupied by cars ③ On the back or side of the building	<b>6ZONE</b> Area = 200.4m <sup>2</sup> Circumference = 59.5m FEATURE: ① Low quality landscape ② Placement of fence - partial collapse of wall	<b>7ZONE</b> Area = 104.8m <sup>2</sup> Circumference = 41.0m FEATURE: ① Low quality landscape ② The old green area of neighbourhood centre	<b>8ZONE</b> Area = 748.9m <sup>2</sup> Circumference = 173.3m FEATURE: ① Almost vacant status ② Small entrance ③ The irregular shape separated by buildings
BASIC INFORMATION								
FIELD IMAGES								
SPATIAL FORMS								
SPACE & ARCHITECTURE	STREET SIDE SPACE (ALTITUDE DIFFERENCE) 	INEFFICIENT LAND (ABANDONED BUILDING) 	INEFFICIENT LAND (ABANDONED BASE) 	STREET SIDE SPACE (CORNER PLOT) 	INEFFICIENT LAND (ABANDONED BASE) 	INEFFICIENT LAND (ABANDONED BASE) 	INEFFICIENT LAND (ABANDONED BASE) 	INEFFICIENT LAND (VACANT LAND) 
CURRENT FUNCTION	greenery 	greenery/parking 	greenery/football pitch 	walking road 	greenery/parking 	greenery 	greenery 	parking 
FLOW LINE								

Table 3.2 basic states of the leftover space zone1 to zone8 (Author,2022)

## Thesis 4

The history of space is a history of the body, of society, which accommodates and assembles the various relationships in human and social space; it is narrative. Above all, space always extends in time to multiple dimensions; it is temporal. And space extends through history, it is inscribed with the traces of time, the changes of the environment[18]. The urban renewal model constructed under the logic of social and spatial interaction implies an essential connotation - the reconceptualization of the "originality" of the community space. The object of the compilation is the spaces interspersed between the buildings, and the content is the story of everyday life itself, which relies on the interaction between the researchers and the people who are in it, in an attempt to link them together (Figure 3.2).

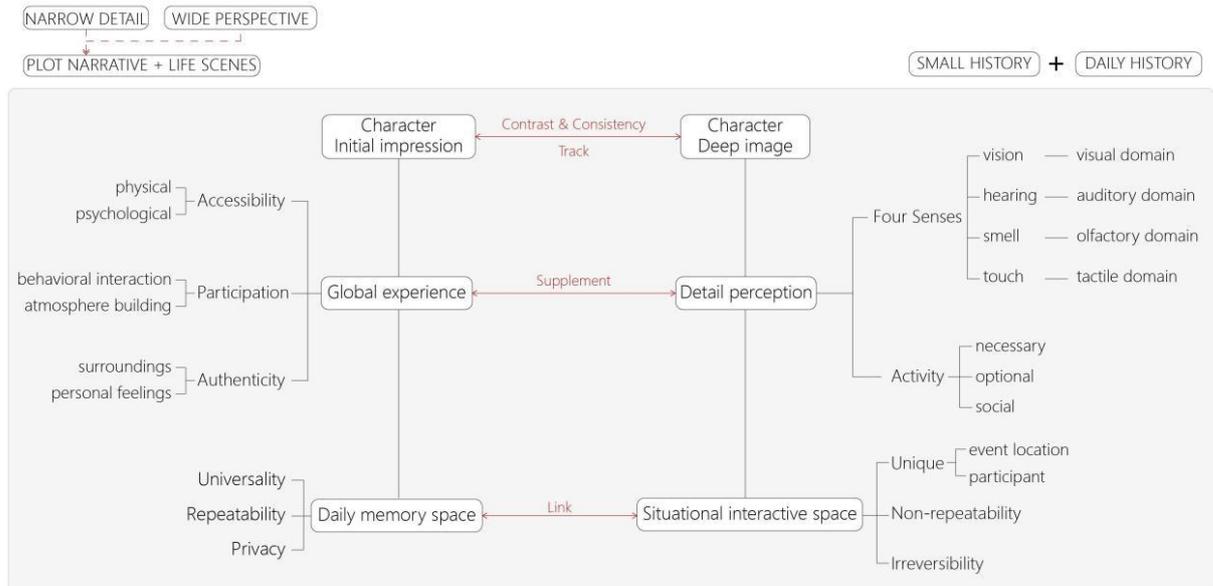


Figure 3.2 Interpreting activity and story memory in space (Author,2021)

### Thesis 5

Based on the location of each space in the neighborhood, they are assigned individual stages of the plot and linked together through story lines. Based on the location and dimension of the area, the researcher made a preliminary prediction of the change in the number of participants and arranged the structure of the narrative (Table 3.3). We have tried to organize a spatial tour by inserting participatory activity installations that predict human behavior and the flow of activity. Alternatively, it is an intervention from the outside that attempts to influence the original trajectory and rhythm of life. As the Table 3.4 shows, the spaces are given their own main functions, which also tightly correlate with the rhythm of the overall story development. Next, a narrative strategy is proposed for each space in turn, which includes the choice of materials to correspond with their function, the suggestion of adaptive design and the scenario simulation of space stories.

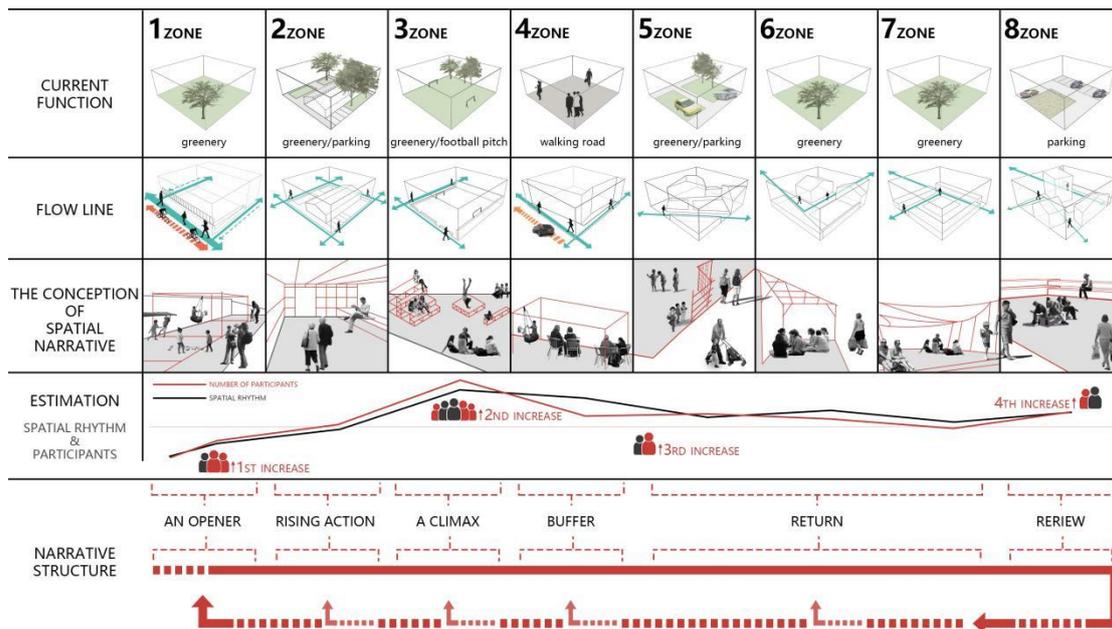


Table 3.3 Prediction of the scenario corresponding to each space (Author,2022)

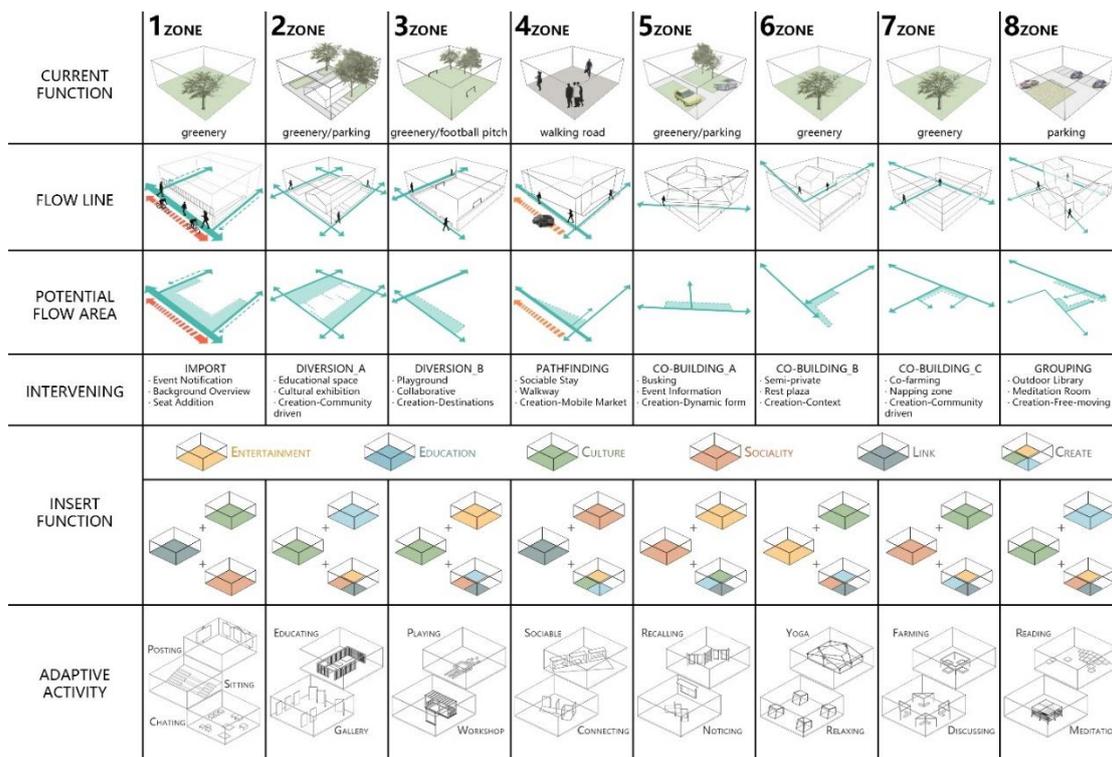


Table 3.4 Spatial analysis and insertion of "functional box" (Author,2022)

## Thesis 6

The researcher selected a range of materials that were available, reusable, operable and adaptable. These materials were selectively reused in the eight scenes to create a unified connection between them (Table 3.5). Through the insertion of various "functional

boxes", which simultaneously modify the units, exploring a sense of playfulness within the order. Not to interfere overly with the specific layout of the site, but to provide certain references and give the co-builders creative space.

Area	Scenario	Materials		Functions	
zone1	Dialogue below ground: Hmm? I find you here!	<b>Existing</b>	<b>Joined</b>	Bar	post
zone2	School memory in the neighborhood: You know? It was the school of my grandpa.	 metal fence	 wooden pallet	 flagging tape	
zone3	Not an empty football field: Come on! let's have fun together!	 stone fence	 wood	 chalkboard	chat
zone4	A moment of pause: It's time for a coffee break	 discarded building	 shipping container	 Safety net	gallery
zone5	Reclaiming a vibrant neighborhood I: Do you remember that summer...	 tree	 Scaffold	 car tire	garden
zone6	Reclaiming a vibrant neighborhood II: Be happy, be bright, be YOU!	 street light	 greenhouse shading screen	 brick	stair
zone7	Reclaiming a vibrant neighborhood III: When life gives u lemons, make lemonade				link
zone8	Is this the start or the end: We are always here to welcome you back				store
road	Addicted to walking: Follow your heart, step by step				play
					workshop

Table 3.5 Selection of materials and allocation of functions (Author,2022)

## Reference

- [1] UNCTAD, 'Total and urban population', *UNCTAD e-Handbook of Statistics 2020*. <https://stats.unctad.org/handbook/Population/Total.html> (accessed Nov. 12, 2021).
- [2] 'Global share of people living in cities since 1950', *Statista*. <https://www.statista.com/statistics/274520/global-share-of-people-living-in-cities/> (accessed Nov. 12, 2021).
- [3] H. Molotch, 'The space of Lefebvre', *Theor Soc*, vol. 22, no. 6, pp. 887–895, Dec. 1993, doi: 10.1007/BF00993685.
- [4] N. S. Abd El Gawad, K. S. Al-Hagla, and D. M. Nassar, 'Place making as an approach to revitalize Neglected Urban Open Spaces (NUOS): A case study on Rod El Farag Flyover in Shoubra, Cairo', *Alexandria Engineering Journal*, vol. 58, no. 3, pp. 967–976, Sep. 2019, doi: 10.1016/j.aej.2019.08.011.
- [5] Y. Jiang and X. Fang, 'Study on the Application of Urban Vacant Land Renewal Under the Background of Delicacy Treatment: A Case Study of Shanghai', *World Architecture*, no. 04, pp. 40-45+129, 2021.
- [6] P. D. Hien, N. T. Men, P. M. Tan, and M. Hangartner, 'Impact of urban expansion on the air pollution landscape: A case study of Hanoi, Vietnam', *Science of The Total Environment*, vol. 702, p. 134635, Feb. 2020, doi: 10.1016/j.scitotenv.2019.134635.
- [7] J. Lu, B. Li, H. Li, and A. Al-Barakani, 'Expansion of city scale, traffic modes,

- traffic congestion, and air pollution’, *Cities*, vol. 108, p. 102974, Jan. 2021, doi: 10.1016/j.cities.2020.102974.
- [8] Y. D. Wei and R. Ewing, ‘Urban expansion, sprawl and inequality’, *Landscape and Urban Planning*, vol. 177, pp. 259–265, Sep. 2018, doi: 10.1016/j.landurbplan.2018.05.021.
- [9] P. Zhu, Q. He, X. Zhu, S. Cui, and X. Wu, ‘Research on urban space fragmentation’, *GEOGRAPHICAL RESEARCH*, vol. 37, no. 03, pp. 480–494, 2018.
- [10] A. Mela, ‘Urban public space between fragmentation, control and conflict’, *City, Territory and Architecture*, vol. 1, no. 1, p. 15, Dec. 2014, doi: 10.1186/s40410-014-0015-0.
- [11] Y. Wang, D. Shaw, and K. Yuan, ‘Gated Neighborhoods, Privatized Amenities and Fragmented Society: Evidence from Residential Experience and Implications for Urban Planning’, *Sustainability*, vol. 10, no. 11, Art. no. 11, Nov. 2018, doi: 10.3390/su10114301.
- [12] B. M. Hagerty, R. A. Williams, J. C. Coyne, and M. R. Early, ‘Sense of belonging and indicators of social and psychological functioning’, *Archives of Psychiatric Nursing*, vol. 10, no. 4, pp. 235–244, Aug. 1996, doi: 10.1016/S0883-9417(96)80029-X.
- [13] R. Trancik, *Finding lost space: theories of urban design*. John Wiley & Sons, 1991.
- [14] G. Zoran, ‘Towards a Theory of Space in Narrative’, *Poetics Today*, vol. 5, no. 2, p. 309, 1984, doi: 10.2307/1771935.
- [15] K. Franck and Q. Stevens, *Loose space: possibility and diversity in urban life*. Routledge, 2006.
- [16] M. Carmona, ‘Re-theorising contemporary public space: a new narrative and a new normative’, *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, vol. 8, no. 4, pp. 373–405, 2015.
- [17] S. Kvale and S. Brinkmann, *InterViews: Learning the Craft of Qualitative Research Interviewing*. SAGE, 2009.
- [18] Z. Yu, ‘From poetic quality to desire: the space narrative of modern architecture’, *Creation and Design*, no. 04, pp. 49-56+79, 2012.

## Publication

### 1. The impact of social interaction on the leftover space

Author: Mengyang Wu<sup>1</sup> and Bálint Bachmann<sup>2</sup>

Journal: POLLACK PERIODICA, 16 (3) pp 151-157 (2021)

### 2. Intervention and renewal – Interpretation of installation art in urban public space

Author: Honghao He<sup>1</sup>, Mengyang Wu<sup>1</sup> and János Gyergyák<sup>2</sup>

Journal: POLLACK PERIODICA, 16 (3) pp 139-145 (2021)

**3. The activation of industrial heritage: transformation in the petite ceinture**

Author: Mengyang Wu<sup>1</sup>, Honghao He<sup>1</sup> and Bálint Bachmann<sup>2</sup>

Journal: POLLACK PERIODICA, 16 (2) pp 150-155 (2021)

**4. The evolution from urban block to residential development: the application and analysis of modularity in urban living community**

Author: Mengyang Wu, Yixuan He and Bálint Bachmann

Chapter in Book: XIX. Szentágothai János Mutidiszciplináris Konferencia és Hallgatói Verseny, pp 259 (2021)

**5. Research on the Connection and Strengthening of the Place Spirit in the City: The Application of Modular Installations in the Terrain Vague**

Author: Mengyang WU

Chapter in Book: 6th MIKLÓS IVÁNYI INTERNATIONAL PHD & DLA SYMPOSIUM, pp 44 (2020)

**6. Micro-Apartment and Co-living design approach**

Author: Chang Lu, Mengyang Wu, Shaha Maiteh, Tianyu Zhao

Book of Abstracts: VIII. Interdiszciplináris Doktorandusz Konferencia 2019: absztraktkötet=8th Interdisciplinary Doctoral Conference 2019

**7. The Reconstruction of Traditional Pitched Roof in Mountainous Building**

Author: Mengyang WU and Bálint Bachmann

Chapter in Book: 6th International Academic Conference on Places and Technologies , pp 621-627 (2019)